
DECISION SUPPORT SYSTEMS FOR LEAN PRODUCTION
PLANNING AT JPM INDUSTRY

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“If I have ventured wrongly, very well, life then helps me with its penalty.

But if I haven't ventured at all, who helps me then?”

Søren Kierkegaard

Biographical Note

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Resumo

As empresas enfrentam constantemente desafios para atender às necessidades dos clientes e aumentar a sua competitividade num mercado dinâmico. Os dados são um ativo essencial para enfrentar essas dificuldades, fornecendo informações necessárias para tomar boas decisões e reagir rapidamente às mudanças do mercado.

Na indústria de manufatura, o planeamento de produção eficiente e eficaz, apoiado por uma gestão robusta de dados, é crucial não só para entregar produtos em conformidade com as especificações dos clientes, mas também para otimizar a utilização de recursos e aumentar a produtividade operacional.

Este relatório examina a relação estratégica entre o planeamento de produção e a gestão de dados nas empresas industriais, através de um exemplo prático que detalha todo o processo de implementação de Sistemas de Suporte à Decisão (DSSs) para o planeamento de produção na JPM Industry, uma empresa portuguesa que manufatura equipamento industrial.

O principal objetivo da criação destas ferramentas foi aumentar a eficiência operacional e melhorar o fluxo de trabalho em várias categorias, como o agendamento de produção, a alocação de recursos e a distribuição da carga de trabalho.

Foram desenvolvidas duas ferramentas DSS. Uma ferramenta de Integração de Planeamento Mestre de Produção (MPS) e Rough-Cut Capacity Planning (RCCP) que facilitou a gestão da procura com a capacidade dos centros de trabalho; e uma aplicação de Planeamento Seccional, criada utilizando Microsoft Excel e PowerBI, que permite aos chefes de secção agendar as operações da secção.

Essas ferramentas foram modificadas e aprimoradas de acordo com sugestões e feedback dos intervenientes para garantir a eficiência das ferramentas e a satisfação dos utilizadores. Após o desenvolvimento e implementação das ferramentas, os resultados mostraram uma melhoria significativa na eficácia do planeamento de produção na JPM Industry. O relatório contém explicações detalhadas desses processos e uma discussão abrangente sobre os desafios encontrados e as soluções oferecidas.

Abstract

Companies constantly struggle to meet the needs of their customers and grow more competitive in a dynamic market. Data is an essential asset to face those difficulties, providing the necessary information to make good choices and react quickly to shifts in the market.

In the manufacturing industry, efficient and effective production planning, supported by robust data management, is crucial not only for delivering goods in compliance with client specifications but also for optimizing resource utilization and enhancing operational productivity.

This report examines the strategic relationship between production planning and data management in industrial companies, through a practical example that details the full implementation process of Decision Support Systems (DSSs) for production planning at JPM Industry, a Portuguese enterprise that manufactures industrial equipment.

The main purpose of creating these tools was to increase operational efficiency and improve the workflow in several categories, such as production scheduling, resource allocation and Workload distribution.

Two DSS tools were developed. A Master Production Schedule (MPS) and Rough-Cut Capacity Planning (RCCP) integration tool that facilitated the management of work center demand with capacity; and a Sectional Planning application, created using Microsoft Excel and PowerBI, that enables section chiefs to schedule their section's operations.

These tools were modified and improved in accordance with suggestions and feedback made by stakeholders to guarantee the tools' efficiency and the users' satisfaction. After the development and implementation of the tools, the results showed significant improvement in the effectiveness of production planning at JPM Industry. The report provides detailed explanations of these processes and a thorough discussion covering the challenges encountered and the solutions offered.

List of abbreviations

APS – Advanced Planning and Scheduling

BI – Business Intelligence

BOM – Bill of Materials

BOO – Bill of Operations

BT – Business Transformation

DSS – Decision Support System

ERP – Enterprise Resource Planning

JIT – Just in Time

JIC – Just in Case

KPI – Key Performance Indicator

MES – Manufacturing Execution System

MO – Manufacturing Order

MPS – Master Production Schedule

MRP – Material Requirements Planning

P&O – Production & Operations

RCCP - Rough-Cut Capacity Planning

T&I – Technology & Innovation

JEL codes: D2; L2; M15

Keywords: Data Management; Decision Support Systems; Industrial Organization; Information Systems; Production Economics; Production Planning; Pull Production; Workload Control

Contents

1. Introduction	1
1.1 Motivation and Contextualization	1
1.2 Research Objectives and Methodology	2
1.3 Structure of the report	3
2. Theoretical Framework	5
2.1 Data management and Information Systems in Industrial Organizations	5
2.1.1 Data as an asset	5
2.1.2 Data management in industrial companies	6
2.1.3 Industrial management Information Systems	7
2.1.3.1 Enterprise Resource Planning (ERP)	7
2.1.3.2 Material Requirements Planning (MRP)	8
2.1.3.3 Manufacturing Execution System (MES)	8
2.1.3.4 Decision Support Systems (DSSs)	9
2.2 Production planning	10
2.2.1 Hierarchical production planning	12
2.2.2 Production planning tasks and decision-making	14
2.2.3 Workload Control	15
2.2.4 Master Production Schedule (MPS)	16
2.2.4.1 Rough-cut capacity planning (RCCP)	17
2.2.4.1 Advanced Planning and Scheduling (APS)	18
2.3 Lean Manufacturing	19
2.4 Scope and Delimitations	21
3. Case study	23
3.1 Presentation of the host institution	23
3.1.1 The Business Transformation (BT) department	24
3.2 General functioning of JPM Industry	25
3.2.1 Production at JPM Industry	26
3.2.2 Production planning Information Systems at JPM Industry	27
3.2.3 Production planning and scheduling at JPM Industry	28
3.3 Case study characterization	30
3.3.1 Description of the initial situation	30
3.3.2 Selection of the production planning Decision Support Systems	31
3.4 Master Production Schedule (MPS) Tool	33
3.4.1 Rough-Cut Capacity Planning (RCCP)	35
3.4.1.1 Elaboration and interpretation of the RCCP graphs	35
3.4.1.2 Functioning of the RCCP tool	39
3.4.2 Additional features	41
3.4.2.1 Analysis of Scenarios	41
3.4.2.2 Alert system	41

3.4.3 Accuracy of the BOO time estimates	42
3.5 Sectional Planning Tools	44
3.5.1 Microsoft Excel file	44
3.5.1 PowerBI dashboard	47
3.6 User feedback	49
4. Findings, limitations and future work	53
4.1 Summary of findings – main improvements and limitations	53
4.2 Recommendations for the host institution	55
4.3 Contributions to the field	57
Appendix	59
Appendix I - Life cycle of a project at JPM Industry	59
Appendix II - Examples of a BOO and MO at JPM Industry	60
Appendix III - Functional division of the P&O department at JPM Industry	61
Appendix IV - Active work centers at JPM Industry	61
Appendix V - Chronogram of important milestones	62
Appendix VI - Working Instruction in case of production overload	62
Appendix VII - PowerBI Data Model	63
Appendix VIII - PowerBI dashboards on the shop floor	64
Appendix IX – User feedback survey	64
References	71
Annexes	89

List of Figures

Figure 1 - PDCA cycle	3
Figure 2 - Theoretical relation between planning concepts	11
Figure 3 - Hierarchical and Focused production paradigms	13
Figure 4 - Relationship between MPS and MRP	17
Figure 5 - House of lean manufacturing	19
Figure 6 - Push and pull production	21
Figure 7 - Typical flow of materials	27
Figure 8 - Production planning Information Systems	28
Figure 9 - Table of unexecuted dispatched Machination operations - MPS	33
Figure 10 - MPS tool	34
Figure 11 - Turning Work Center RCCP Graph	38
Figure 12 – RCCP tool	40
Figure 13 - Analysis of Scenarios	41
Figure 14 – Alert system.....	42
Figure 15 - Dispersion graph for the difference between BOO and MES times	43
Figure 16 - Table of unexecuted dispatched Machination operations - Sectional Planning	45
Figure 17 - List of scheduled Machination operations	45
Figure 18 – Scheduling Menu	46
Figure 19 - Tracking of the schedule for a particular project	47
Figure 20 – PowerBI dashboard	48

List of Tables

Table 1 - Input data	36
Table 2 – Data after dates input.....	36
Table 3 – RCCP calculations	37
Table 4 - Summary statistics for BOO and MES times	43
Table 5 - Summary statistics for the difference between BOO and MES times	43
Table 6 - Advantages and limitations of the main planning software options	56

1 Introduction

1.1 Motivation and Contextualization

In today's dynamic market, where customers are becoming more demanding and the market is volatile, companies are compelled to deliver goods according to customer specifications and on schedule. Efficient production planning and scheduling are essential for organizations to effectively satisfy customer orders (Lohmer & Lasch, 2020).

JPM Industry, a Portuguese manufacturer of industrial equipment, acknowledges the significant influence of information in improving decision-making and feels it is vital to continuously look for ways to use data to enhance its production planning procedures and support its operational goals. Information Technologies play a crucial role in this process. According to Schönmann et al. (2016), Information Technologies are essential for enhancing complex production planning systems, which save costs and increase manufacturing efficiency. Likewise, Laudon and Laudon (2021) consider Information Systems to be vital instruments for value creation in a business. They argue that these technologies lessen inefficiencies by offering crucial data for decision-making.

At JPM Industry, production planning is a particularly challenging task because of the job-shop manufacturing environment, the scale and variety of projects, and the diversity of customer needs. Due to the high degree of complexity of the production processes and to the inadequacy of previous tools, it has been increasingly difficult for the responsables for planning and scheduling to effectively reach their objectives, such as allocating resources efficiently and ensuring that products are delivered on time. Tasks such as setting deadlines of production, controlling the Workload to avoid capacity issues and managing resources were mostly performed based on intuition and experience. Despite considerable knowledge of manufacturing processes, these methodologies were insufficient, resulting in frequent unproductive decisions that increase operational costs.

Production Economics is a discipline of economics that studies resource allocation in production processes with the goal of boosting production efficiency (Fuss & McFadden, 2014). The project described in this report contributes to this subject by illustrating how resource allocation strategies can be improved to increase production efficiency and overall economic performance in a manufacturing setting.

The report focuses on the selection and implementation of Decision Support Systems (DSSs) to improve production planning and scheduling decision-making inside the organization. It was produced during a 5-month curricular internship at JPM Industry's Business Transformation department.

1.2 Research Objectives and Methodology

Through a detailed presentation of a real-world application, this research investigates how to generate value from the relationship between production planning processes and data management in an industrial organization. Specifically, it seeks to contribute to the existing research on DSSs for production planning by exploring how these systems can improve resource allocation and enhance overall productivity.

The Deming cycle, frequently referred to as the Plan-Do-Check-Act (PDCA) cycle, serves as the foundation for the methodology used in this report. The four phases of PDCA include planning, implementing, evaluating, and adjusting processes.

During the planning phase, meetings with stakeholders were held to understand the production planning processes of the organization, identify areas for improvement and select the tools that were most appropriate for this specific case. In the execution phase, the development and implementation of the DSS tools were carried out, utilizing data extracted from the MRP and ERP systems through SQL coding to generate useful insights for enhancing productivity. During the check phase, the new tools' effectiveness was monitored, and feedback was collected through feedback sessions to assess user satisfaction and identify areas for further improvement. Finally, the act phase involved making necessary adjustments based on the feedback and standardizing effective procedures, ensuring that the tools and processes continue to meet JPM Industry's evolving needs and fostering a culture of continuous improvement. The main tasks performed at the different phases of the PDCA cycle are shown in Figure 1.

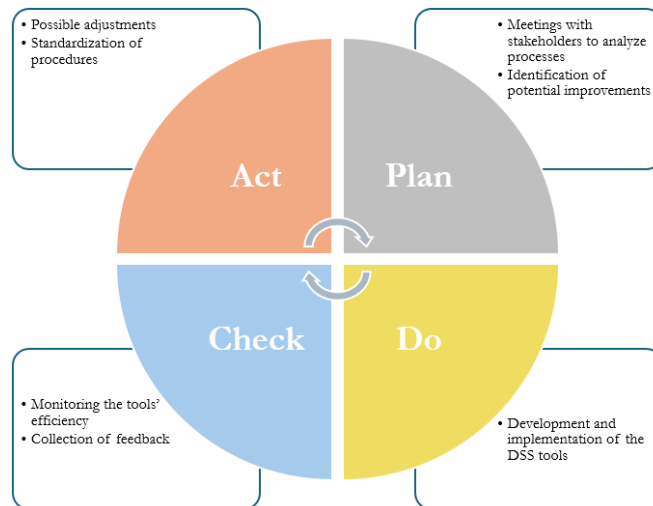


Figure 1 – PDCA cycle

1.3 Structure of the Report

This report consists of four chapters. Chapter 1 introduces the project, outlining its objectives and the methodology used to achieve them. Chapter 2 provides the theoretical framework, providing crucial concepts for understanding the project. Chapter 3 focuses on the Case Study, beginning with an introduction to JPM Industry and its processes. It then details the selection, development, implementation, and feedback of the Decision Support Systems (DSS) created in this project. Finally, Chapter 4 presents the project's findings, discusses its limitations, offers recommendations for the host institution, and highlights the project's contributions to the field of research.

2 Theoretical Framework

This chapter is divided into three sections, each covering an important aspect of industrial production management. The first section discusses data management and Information Systems in industrial environments. The second section delves into essential principles and approaches in production planning and control. The final section delves into the principles of lean manufacturing, which is vital to understand modern production processes. Following this, the chapter finishes with a discussion of the "Scope and Delimitations" of the theoretical framework, highlighting its boundaries.

2.1 Data management and Information Systems in Industrial Organizations

2.1.1 Data as an asset

The importance of data has been emphasized through several analogies. In the context of the information economy, it has been called the "new oil", the "lifeblood", or even the "currency". The Data Management Association (DAMA) provides context for these parallels in the DAMA-DMBOK: Data Management Body of Knowledge (2017), a comprehensive manual that provides insights into basic ideas and tactics necessary for effective data management: In the modern world, data is an asset for enterprises and is necessary for daily operations (hence the currency/blood analogies). It is also an investment with the intention of reaping rewards in the future. It should be viewed as such because data creation requires deliberate effort by professionals, such as inputting data into systems or manipulating existing data. Its value as an asset can be direct, meaning that the data by itself generates value, or indirect, meaning that it can be used in processes to create value. The "new oil" concept applies to the interaction between data and processes. Organizational processes and data work together to create value. Data fuels processes, while processes give data meaning and context.

The quality and accessibility of data are two essential elements for this relationship to work effectively, according to Van Gils (2020). The performance of an organization can be significantly impacted by poor data quality, and scattered data across multiple systems can make it difficult to obtain information. According to the author, data management is the process of treating data as a strategic asset by using it effectively in organizational settings.

2.1.2 Data management in industrial companies

As traditional approaches are becoming outdated in a market that keeps evolving and becoming more competitive, digitalization is becoming a need rather than an option for industrial management. The use of innovative technologies in management is crucial to improve operational effectiveness and efficiency while also lowering expenses (Raptis et al., 2019).

The development of information management systems suitable for the nature of the company allows for clearer and more concise information to be provided to the entire organization, ensuring that all departments are aligned and coordinated (Ling et al., 2015).

The foundational role of data management in industrial companies is underscored by numerous scholars. Aleksandrova et al. (2020) explain that efficiency gains in manufacturing management are increasingly difficult due to extensive progress already accomplished in those areas. Thus, the authors conclude that the biggest efficiency gains come from developing bigger and better information management systems. Data is also essential for reducing downtime and raising overall efficiency in the industrial sector (Pakkala et al., 2024; Schuh et al., 2017)

Many academics have identified a number of variables that impact the performance of data management systems in industrial settings. According to Xiao et al. (2020), strong industrial data management systems should have the ability to gather, store, process, and analyze data. Furthermore, it has been established that proactive decision-making requires the integration of predictive analysis and real-time monitoring.

Manesh et al. (2020) focus on the long-term advantages that modern organizations obtain through knowledge and its exploitation, citing data management systems as the biggest reason for the significant knowledge differences between firms. According to the authors, the ability to obtain, store, and share a vast amount of information within an organization is indispensable for the good functioning of any industrial company.

Felsberger et al. (2016) emphasize the flexibility of Information Systems as essential for manufacturing companies to be efficient and competitive in the fast-paced market of today.

2.1.3 Industrial management Information Systems

From a technical perspective, an Information System is an interconnected set of components that gather, analyze, store, and distribute information to support decision-making and monitor organizational operations (Laudon & Laudon, 2021).

In modern industrial production, three main software systems are essential for day-to-day operations and commonly utilized by the majority of firms: ERP (Enterprise Resource Planning), MRP (Material Requirements Planning) and MES (Manufacturing Execution System).

2.1.3.1 Enterprise Resource Planning (ERP)

ERP systems integrate supply chain, financial, human resources, and customer relationship management into a single comprehensive system (Adhi Prasnowo et al., 2019; Klaus et al., 2000; Romero & Vernadat, 2016). They provide a consolidated database and automate tasks across multiple departments in an attempt to boost efficiency. ERP systems are typically not classified as Business Intelligence (BI) tools, despite the fact that they frequently offer some basic reporting and analytics functionalities (Berchet & Habchi, 2005; Lara-Pérez et al., 2024).

Santos et al. (2021) and Wijaya et al. (2021) describe ERP systems as comprehensive tools that integrate all aspects of a company's operations into a single database. According to the authors, these systems operate within a conceptual framework that balances standardization and customization and consist of two layers. To satisfy the needs of different organizations, the first layer, also known as the generic layer, offers solutions based on accepted best practices and standard management concepts. The second layer, referred to as the specific layer, is multiuser and customized for every business by means of thorough research and modification to suit its particular attributes.

Management literature highlights the importance of ERP systems as real-time control tools that provide a full perspective of a company's operations. These technologies allow managers to track and manage operations across all departments and functions in real time (de Man & Strandhagen, 2018; Ferreira et al., 2012; Kuna, 2014). By combining data and processes, ERP systems improve internal communication, decision-making, and overall productivity. They centralize the collecting, administration, exchange, and structuring of large amounts of data from across departments (Demi & Haddara, 2018; Nwankpa, 2015).

2.1.3.2 Material Requirements Planning (MRP)

A Material Requirements Planning (MRP) system is an important production Information System that determines which parts must be manufactured and which materials must be purchased by particular dates (Guide & Srivastava, 2000; Miclo et al., 2015). To achieve this, the MRP system is integrated with other production subsystems, such as purchasing and shop floor control systems. It generates vital information, such as order release dates and order quantities, for these subsystems and responds to the information they provide, with a primary focus on managing materials and inventory within the manufacturing processes (Moscoso et al., 2010; Ramya et al., 2019).

The principal objective of an MRP system is to create a production plan that outlines the final output of the system over a defined planning horizon (DePuy et al., 2007; Seiringer et al., 2021).

Around the 1970s, the first iteration of MRP, referred to as MRP I, was developed with the primary goal of identifying the requirements for production scheduling (Tavana et al., 2020). A Bill of Materials (BOM) processor was a key component of early computerized MRP systems. In essence, a BOM is a list of all the components and materials required to produce a product (Wang et al., 2023). By dissecting the requirements using the BOM, this processor converted a manufacturing plan for a primary item into plans for the production or purchase of its components (Xia et al., 2023; Zhao et al., 2024). According to Masuchun et al. (2009), MRP systems employ the BOM to estimate the processing or preparation time needed for production as well as the amounts of each type of component that are required.

Capacity planning marked a key evolution in MRP systems, allowing for more regular plan updates and revisions, hence improving responsiveness and adaptability. Ollie Wright introduced the name MRP II in the early 1980s to distinguish these advanced systems from their predecessors (Jacobs & Weston, 2007). This advancement facilitated more informed decision-making and increased industrial efficiency by offering thorough insights into production strategy and process control (Seiringer et al., 2021; Tavana et al., 2020). By incorporating the capacity of work centers into its calculations, the MRP system manages to create operational schedules that are achievable in practice.

2.1.3.3 Manufacturing Execution System (MES)

“There are many information systems used for production control (MRP-I/ MRP-II/ERP), but the core philosophy and approach are the same. A good manufacturing

execution system is an essential element of a solution strategy if the manufacturing process is complex” (McKay & Wiers, 2004, p. 14).

Manufacturing Executive System (MES) is an Information System that ensures that production is completed efficiently and on time by acting as an interface between manufacturing equipment, operations, and ERP and MRP systems (Bratukhin & Sauter, 2011; Fei, 2010; Mantravadi et al., 2020; Saenz de Ugarte et al., 2009). By gathering production data in real-time, processing it rapidly, and keeping a two-way interaction with the other organizational Information Systems, a MES increases the scope of production management and control while decreasing costs and enhancing productivity (Alexakos & Kalogeras, 2017; Fei, 2010).

Arica and Powell (2017) and Saenz de Ugarte et al. (2009) list several MES functionalities, such as product tracking, performance analysis, resource distribution, process management and quality control. MES systems provide up-to-date visibility into manufacturing operations and support decision-making at the operational level.

2.1.3.4 Decision Support Systems (DSSs)

ERP, MRP, and MES systems are commonly integrated with Decision Support Systems (DSSs) to facilitate data extraction, visualization, and analysis. The transformation of production data and its presentation in a useful way allows managers to use this integration to gain more knowledge than they would otherwise, enabling them to make better decisions (Berić et al., 2018; Liu et al., 2010).

Being well-informed and possessing the necessary information to assess and choose amongst options is essential for making effective decisions. This information, which could be factual, numerical data, impressions, images, and more, could be recently gathered or preexisting historical data relevant to a decision-making process (Kasie et al., 2017). It is essential to compile this data from various sources and arrange it. Making representations is a key component of a DSS modeling process, which aids decision-makers in understanding the effects of their decisions (Sauter, 2014).

According to Arnott and Pervan (2008), DSSs are a crucial part of the Information Systems discipline and are mainly meant to assist and enhance administrative decision-making. The performance and operations of a company can be significantly impacted by the creation and deployment of IT-based systems tailored for decision processes. These systems transform vast amounts of data into high-quality, organized information by combining

human talents with computer power, facilitating well-informed decision-making (Felsberger et al., 2016). Moreover, DSSs aim to prevent difficulties in the production processes by anticipating and addressing any issues before they materialize.

2.2 Production planning

Because of their close relationship to coordinating production processes and managing resources, the terms planning, scheduling, sequencing, and dispatching are often used interchangeably in industrial production. Though these ideas are frequently distinguished from one another in the literature, definitions can differ and overlap based on the business and industry (Vogel et al., 2016). It is important to establish clear definitions for each of these terms, as they're a focal point of this report.

Production planning consists of a series of complex decision levels that take into account several criteria, including the size and complexity of products, the number of work centers available, inventory level, etc. and it involves determining the use of production resources to meet forecasted demand over a specific planning horizon (Chen, 2023; Vitzthum & Herrmann, 2017). It's the process of deciding the required level of production within this defined timeframe, which involves analyzing various factors such as available resources, demand forecasts and production capacities to establish an optimal production plan (Baranchikova et al., 2020; Oluyisola et al., 2022; Rezig et al., 2020). It's about setting goals, creating timelines and allocating resources. Additionally, it establishes the overall production strategy of the company by forecasting demand and assessing resource availability (González Rodríguez et al. 2019; Vollmann et al., 1992). The output of production planning, such as material requirements over time, serves as the input for scheduling (Ghaleb et al., 2020; Stoop & Wiers, 1996). This process involves organizing the timing of production activities to meet the requirements outlined in the production plan.

As stated by Schlenkrich and Parragh (2023), scheduling converts planning into workable schedules for manufacturing operations by taking the material requirements that are produced by planning and figuring out when to complete jobs. Within the parameters established by the production plan, this procedure involves allocating particular tasks or jobs to resources, such as humans and machinery. Essentially, it is the detailed plan for when each task will be performed and by whom or what (Calhoun et al., 2002; Smith, 2005). According to Guo et al. (2013), scheduling is more detailed and concentrated on daily operations as opposed to planning. It entails a more detailed allocation of resources and a more specific

strategy to optimize the use of overall capacity. In summary, scheduling is the specific process of figuring out when and how to carry out those plans, whereas production planning is the more general process of deciding what to produce and when. Given the strong connection between the two functions, it's common for them to be managed by the same professionals in an industrial organization (Han et al., 2020; Smith, 2005).

According to Jiang et al. (2022) and Parente et al. (2020), the objectives of production scheduling may include organizational goals such as maintaining service levels, maximizing resource utilization, minimizing setup costs, reducing inventory costs, and improving order flow times. Once the schedule is created, it is passed on to the production sections for implementation. This process is referred to as dispatching (Lee et al., 2009; Salatiello et al., 2024).

Finally, sequencing involves determining the order in which various operations are processed at a work center within a production section (McKay & Wiers, 2004). This can either be incorporated into the scheduling process by the scheduler or left for decision-making by sectional leaders on the shop floor. In the former scenario, the schedule already includes the sequence, eliminating the need for additional decisions. In the latter scenario, sequencing decisions are delegated to the shop floor, granting each work center more autonomy and flexibility (Stadtler, 2015).

Assuming this latter scenario, the theoretical relation between the four key concepts addressed in this section is depicted in Figure 2 (adapted from Stoop & Wiers, 1996).

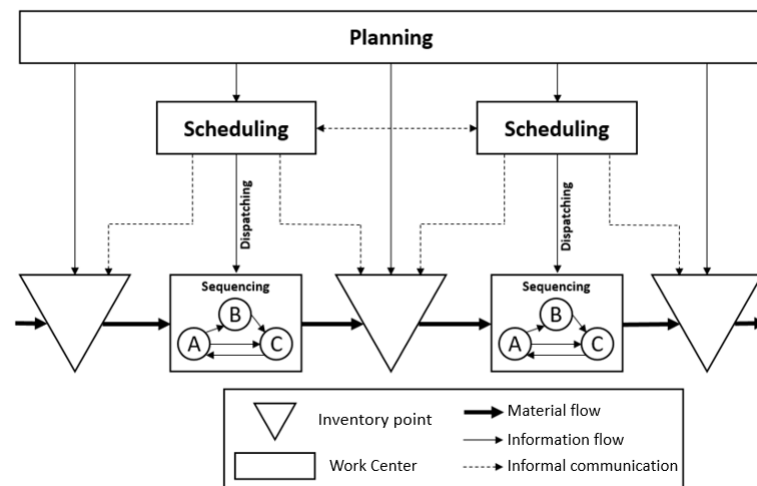


Figure 2 – Theoretical relation between planning concepts
(Adapted from Stoop & Wiers, 1996)

This paradigm, however, ignores some of the difficulties that arise in real-world production scheduling. Planning often does a poor job of coordinating tasks between production sections, as planning functions typically use MRP-type systems, which can cause capacity problems in specific time periods if the operational plan isn't adequate (Lohmer & Lasch, 2020; Omar & Bennell, 2009). To address these challenges, schedulers frequently need to consider job coordination across preceding and succeeding production sections to balance the demand and supply of the different work centers. Both scheduling and sequencing cannot solely rely on the planning layer, as they require in-depth knowledge of specific jobs and shop floor conditions (Dupuis et al., 2022; Stoop & Wiers, 1996). While several algorithms and models have been developed to integrate the entire decision-making planning process into one system, successful real-world implementations usually involve a practical division (Bitran & Tirupati, 1993; Malindzakova et al., 2022; Stevenson, 2009).

The method of organizing the production planning process into a series of sequential hierarchical subprocesses is referred to as hierarchical production planning (Vogel et al., 2016).

2.2.1 Hierarchical production planning

A hierarchical production planning paradigm, according to O'Reilly et al. (2015), is a methodology in which decision-making authority is arranged hierarchically, with lower levels of management making more specific operational decisions and upper levels making more general strategic decisions. This method usually entails a top-down flow of information and control, with policies and instructions descending from higher management to lower levels of the organization (O'Reilly et al., 2015; Van Dierdonck & Brandt, 1988). In contrast, a focused production planning paradigm decentralizes decision-making, concentrating on specific areas of production (May et al, 2021; McKay & Wiers, 2004). This method separates the overall planning process into specialized decision-makers, each in charge of overseeing a certain part of the planning process. Focused paradigms lead to more operational autonomy and flexibility by assigning decision-making authority to those who are most familiar with the specific processes in question (Mukherjee, 1995; Parast & Oke, 2022). The two paradigms can be visualized in Figure 3.

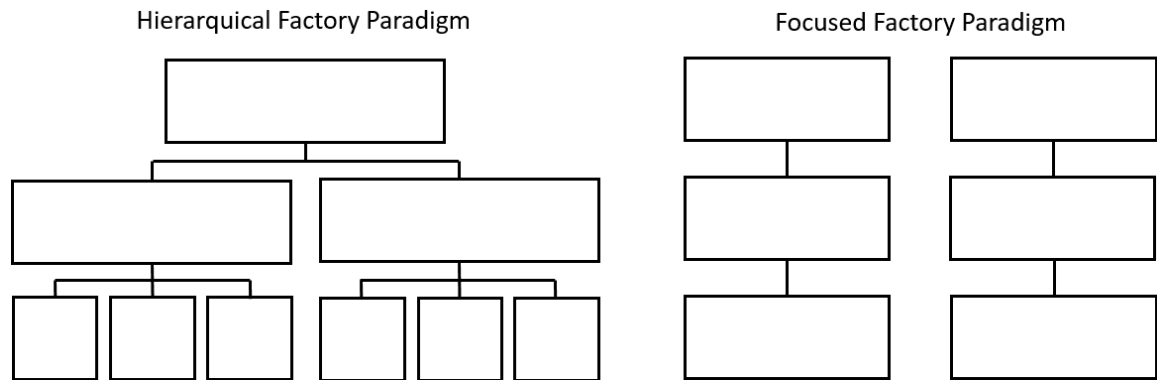


Figure 3 – Hierarchical and Focused production paradigms
(Source: McKay & Wiers, 2004)

The main goal of hierarchical production planning is to decompose a large-scale production planning difficulty into several smaller ones. This approach operates across three different levels: strategic, tactical, and operational (Bilgen & Ozkarahan, 2004; Chen & Qu, 2003). The strategic level plans for the long term through the analysis of possibilities for future scenarios. The tactical level translates the organization's strategic objectives into more intricate operational plans that outline the particular actions, resources, and deadlines needed to meet client requests. At the operational level, shop floor daily production activities are managed by those who are responsible for that area of production, which guarantees effective task completion. Depending on the operational objective and time span assigned to each level of hierarchical production planning, different frameworks are used (Vogel et al, 2016). The tactic level may result in the assignment of deadlines for different stages of production, while in the operations level, tools like Manufacturing Executive System (MES) can be found to control production activities in real-time (Boujnah et al., 2023; Wang et al., 2023).

Several mathematical models and algorithms have been developed for hierarchical production planning, varying in complexity. These tools are often customized for every level of the hierarchy. Planning, scheduling, sequencing, and dispatching tools are available, as well as tools for managing predictions and orders. A single software program might control all of the factory's planning, another could handle all of the scheduling for the factory as a whole or for its main components, and so on down to the lowest level (Farias Bueno et al., 2020). This decomposition and transfer of plans reduces the overall complexity of trying to plan, schedule, and dispatch everything at once within one big system (Barzanji et al., 2019).

2.2.2 Production planning tasks and decision-making

Production planning professionals have a wide variety and complexity of tasks that call for a high degree of adaptation and foresight (Tenhiälä, 2011). Making and keeping plans to guarantee effective production processes is one of their essential duties (McKay & Wiers, 2004). In order to meet deadlines and maximize resource use, this entails coordinating every facet of production, from the acquisition of raw materials to the delivery of the finished product. Another important responsibility is evaluating the state of the company's production processes. Usuga Cadavid et al. (2020) state that in order to comprehend the current state of affairs, a detailed analysis of ongoing operations is required. Continuous monitoring allows planners to identify any deviations from the plan and address them promptly.

Looking ahead and considering various future scenarios is also essential. Sitompul & Aghezzaf (2008) underline this by pointing out that preparing for upcoming obstacles before they become significant problems could help identify possible emergencies that might hinder operational processes. In order to effectively handle unexpected occurrences these professionals must take into account several matters (Bonney, 2000; Oluyisola et al., 2022). According to Oluyisola et al. (2022), these include assessing the impact of the problem, identifying production-related variables that can be changed, figuring out which processes can be postponed, looking into substitute products, and evaluating alternative production options.

In a job-shop scenario, the complexity of all these intricate tasks is amplified due to the wide range of items and procedures utilized (Benavente et al., 2023). Planning and scheduling in such a system raises practical challenges, which Moreira and Alves (2012) thoroughly address. The authors underline the importance of Information Systems that can efficiently help planners assign production deadlines, anticipate completion dates, and select the optimal release dates to avoid early or late deliveries.

In essence, production planners must achieve a balance between short-term operational needs and long-term strategic goals, always adapting to changing conditions (Kang & Choi, 2009).

2.2.3 Workload Control

Building on the responsibilities and decision-making processes of production planners, an essential aspect of maintaining efficient production is effective Workload Control. Workload Control involves managing and balancing the allocation of work across various production resources to ensure that no single resource is overburdened or underutilized (Fredendall et al., 2010; Prabhu et al., 2024; Stevenson, 2006). This is crucial for maintaining smooth and efficient production flows, preventing bottlenecks, and optimizing resource utilization. By implementing robust Workload Control strategies, companies can enhance their overall production efficiency and responsiveness to changing demands (Weng et al., 2008; Yuan et al., 2024).

According to Sagawa and Land (2018) and Stevenson et al. (2011), key decisions in Workload Control involve input control, such as deciding on due date quotations, job acceptance, and the timing of job starts. It also encompasses output control through capacity adjustments. Controlling the total input rate of work to match the output rate and restricting the amount of work on the shop floor are fundamental practices (Kingsman & Hendry, 2002; Stevenson et al., 2011; Yuan et al., 2024). These principles are aimed at ensuring a steady production flow, reducing lead times, and improving delivery reliability (Costa & Portioli-Staudacher, 2021).

Effective Workload Control requires a systematic approach to monitor and manage work-in-progress and ensure that production tasks are evenly distributed among available resources (Fredendall et al., 2010). This involves continuous assessment and realignment of Workloads based on current production status and future demand forecasts. Implementing Workload Control measures can lead to more predictable production outcomes, better adherence to schedules, and improved overall productivity (Costa & Portioli-Staudacher, 2021; Pürgstaller & Missbauer, 2012).

The literature on Workload Control is extensive, offering various perspectives and in-depth analyses on the topic. For example, Hendry et al. (1998) and Perona et al. (2016) focus on its effects on reducing and stabilizing production lead-times. Hendry et al. (2008) explore implementation issues for Workload Control systems. Renna (2015) emphasizes the introduction of pre-shop queue management strategies to balance Workloads more effectively, while Hoeck (2008) highlights the importance of integrating routing and machine flexibility into Workload Control strategies. These studies delve deeper into specific aspects

of Workload Control, providing valuable insights and methodologies that extend beyond the general overview provided here.

2.2.4 Master Production Schedule (MPS)

Developing and executing a Master Production Schedule (MPS) is crucial for efficient task organization (Tang & Grubbström, 2002; Wijaya et al., 2021). While effective Workload Control ensures resources are evenly distributed and production runs smoothly, the MPS is the main framework for these activities (Akillioglu et al., 2013; Teo et al., 2011). The Master Production Schedule is a tool for production planning that identifies which goods will be manufactured, their amount, and the timeline for production to fulfill customer needs. It converts strategic goals and demand forecasts into a detailed plan that guides production activities. This approach considers customer requirements, production capacity, and inventory levels in order to create a feasible operational plan. In contrast to broader planning strategies, MPS focuses on a shorter period, ensuring efficient production management (Amaranti et al., 2020; Jonsson & Ivert, 2015; Wijaya et al., 2021).

The effectiveness of the MPS directly affects several important operational issues, such as customer service levels, inventory expenses, and production efficiency. In reality, an efficient MPS allows for maximizing the use of both labor and machinery. It also avoids the requirement for too much inventory management, leading to lower storage expenses. Furthermore, a well-planned schedule guarantees that the products will be available by the dates agreed upon with the clients. (Amaranti et al., 2020; Jonsson & Ivert, 2015; Ramya et al., 2019; Serrano-Ruiz et al., 2021).

The MPS serves as a vital input to the MRP system, which further refines the production plan into specific material and component requirements (Amaranti et al., 2020; Moscoso et al., 2010). The MPS informs the MRP system of production requirements by outlining the schedule for completed goods. This relationship is depicted in Figure 4.

The MRP system then determines the necessary amounts of raw materials and components, along with their corresponding schedules, to prevent any delays in production (Yeung et al., 1999; Zhu et al., 2021). This incorporation ensures necessary materials are available as needed, bridging strategic and detailed operational planning and ensuring production schedules are feasible and in alignment with business objectives (Luo et al., 2023).

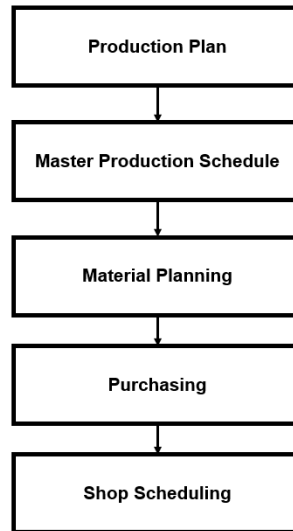


Figure 4 – Relationship between MPS and MRP
(Source: Toomey, 2013)

Implementing MPS in practice can be challenging because traditional MRP I systems do not consider capacity limitations, leading to infeasibility issues. This problem has led to the creation of remedies that tackle capacity limitations by adjusting the MPS prior to its implementation (Bagheri et al., 2022). According to Jonsson and Ivert (2015), there are two distinct methodologies to proceed with Master Production Scheduling: iterative, known as Rough-Cut Capacity Planning (RCCP) and concurrent, named Advanced Planning and Scheduling (APS).

2.2.4.1 Rough-cut capacity planning (RCCP)

Rough-cut capacity planning (RCCP) is a planning technique used in manufacturing and production management that focuses on transforming the Master Production Schedule (MPS) into capacity requirements (Guide et al., 1997; Sugarindra & Nurdiansyah, 2020). It is used to identify significant constraints and it serves as an initial capacity planning tool to evaluate whether the planned production volumes align with available resources (Baydoun et al., 2016). It assists production planners in identifying possible limitations, helping them make timely decisions during the planning stage by enabling them to evaluate the feasibility of the production plan created by the MPS (Jonsson & Ivert, 2015).

Hence, RCCP permits planners to make iterative changes to the MPS, giving them the opportunity to consistently improve the schedule to align with resource availability and address capacity problems as they come up. This method reduces the chances linked to

lacking resources and excessive commitments, improving the reliability and effectiveness of the manufacturing process (Sugarindra & Nurdiansyah, 2020).

2.2.4.2 Advanced Planning and Scheduling (APS)

Advanced Planning and Scheduling (APS) systems aim to improve efficiency in production planning and scheduling in complicated manufacturing settings (Vieira et al., 2021). These systems bring together different parts of the supply chain, such as purchasing, manufacturing, and delivery, to enable immediate coordination and resource optimization. (Vidoni & Vecchiotti, 2015). APS systems use complex algorithms to handle large amounts of data and complex restrictions, offering a wide range of scheduling choices. Their adaptability is demonstrated by the ability to adjust plans in response to changes in demand, resource availability, and unforeseen circumstances (Jonsson et al., 2007). This feature guarantees short response times and optimal resource use (Chen et al., 2011). The ability of APS systems to simulate various planning scenarios prior to implementation is emphasized by Hvolby and Steger-Jensen (2010). This capability is particularly advantageous for enterprises with complicated production processes or unpredictable demand (Meyr et al., 2015).

The way in which APS interacts with the MPS is another crucial feature. According to Kjellsdotter Ivert and Jonsson (2010), APS systems use the MPS as an input and modify it by taking into account specific restrictions and capacity at all production levels. This procedure makes sure that when production capacities and limits are taken into account, the high-level plans outlined in the MPS are viable. While the MPS outlines what products need to be produced, in what quantities, and by when, APS systems create a detailed and executable plan (Genin et al., 2007; Wang et al., 2021). They have the ability to modify the MPS immediately as resource availability or production disruptions change, guaranteeing that production schedules are both feasible and optimized for efficiency and resource utilization (Genin et al., 2007; Lin et al., 2007; Wang et al., 2021).

De Man and Strandhagen (2018) contend that it is difficult to incorporate the hierarchical structure of many businesses' planning processes in an APS system. They point out that organizations often design their own workflows independent of the recommended methods provided by the system. This shows that even with all of the benefits that APS

systems offer, their implementation must be carefully managed to align with established organizational practices (Zoryk-Schalla et al., 2004).

2.3 Lean manufacturing

Lean manufacturing is an optimization technique that is commonly used to improve multiple processes while eliminating non-valuable activities (Abdul Wahid & Dawood, 2024).

The term "Lean" was first introduced by Womack et al. (1990) to describe the philosophy and processes that Japanese automakers adopted after World War II. This approach is rooted in the Toyota Production System, which was initially developed by Toyota Motor Company. Over time, this idea developed into a more comprehensive strategy known as Lean manufacturing. This methodology focuses on the optimization of business processes through the elimination of non-value-adding activities known as waste. It is based on achieving more with less, and businesses are applying it as a crucial part of contemporary manufacturing techniques to boost productivity and become more competitive in the market (Gupta & Jain, 2013; Psomas, 2021). Palange and Dhattrak (2021) describe Lean manufacturing as the process of removing waste from a production system at various phases of production. To facilitate the understanding of the "Lean manufacturing" concept, the lean production principles are illustrated by the "House of Lean Production" in Figure 5 (Wagner et al., 2017).

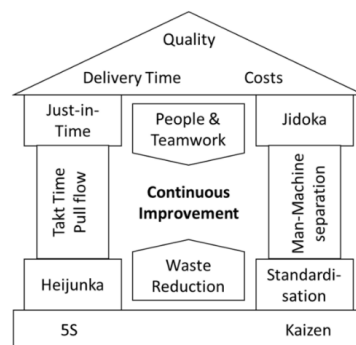


Figure 5- House of lean manufacturing

(Source: Wagner et al., 2017)

In this metaphorical structure, the triangle roof represents the objectives of an organization to promote high levels of customer satisfaction by concentrating on costs, delivery time, and quality. The pillars represent the principles and practices needed to achieve those objectives, while the foundation represents the fundamental values and stability

required to support and sustain the entire lean production system. Palange and Dhattrak (2021) believe that lean manufacturing within a company succeeds when suitable tools are selected and all employees adopt a proactive attitude to enhance the operations of the company.

Lean philosophy and Just-in-Time (JIT) techniques are closely intertwined to the point where their distinction can be blurred. According to Htun et al. (2019) and Pinto (2009), JIT tools such as standardization of operations, implementation of cellular and modular layouts, and reduction of setup times serve as the driving force behind Lean philosophy.

The manufacturing industry has seen a significant transformation because of the JIT manufacturing system, which emphasizes waste reduction and an efficient flow of goods (García-Cutrin & Rodríguez-García, 2024; Taghipour et al., 2020). JIT is one of the most important pillars of management philosophy in lean manufacturing. This approach, as its name implies, promotes having the appropriate amount of product at the right place and time (Javadian Kootanaee et al., 2013; Yang et al., 2021). Its main objective is to increase product quality while guaranteeing timely delivery and reduction of inventory levels and lead times.

By using this method, materials are only produced or acquired in response to customer demands, preventing inventory accumulation. In contrast, the Just-in-Case (JIC) concept involves producing products to have on hand for customers as needed (Javadian Kootanaee et al., 2013; Jiang et al., 2021).

One of the most important JIT practices includes applying a pull production system, instead of a push system (Wei et al., 2024). The pull system is a method in which market orders from customers trigger and direct the production of goods. On the other hand, the push system is closely linked to the Just-in-Case methodology, which concentrates on starting production based on forecasts of future demand under the assumption that the products will be needed in advance of what is procured (Liu et al., 2020; Lyu et al., 2020; Thürer et al., 2024).

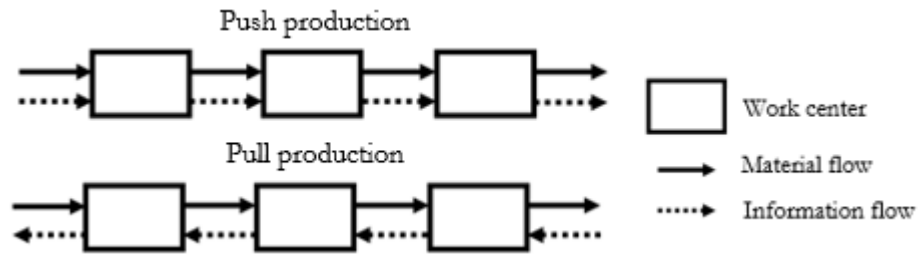


Figure 6 – Push and pull production
(Adapted from Chang & Yih, 1994)

The JIT system is not a stand-alone approach that can be applied in a business; rather, it requires cooperation and coordination between multiple stakeholders, both within the organization and with external partners that integrate the entire supply chain to prevent production line delays (Lara et al., 2022; Taghirpour et al., 2020). Apart from that, for JIT philosophy to work, reliable and efficient ERP, MRP and MES systems must support it because JIT manufacturing works with restricted time margins, and any extra time spent on resource allocation might interfere with the entire production flow and jeopardize fulfilling customer demands (Erkayman, 2019; Xu & Chen, 2016).

2.4 Scope and Delimitations

This theoretical framework evaluates key concepts and methods for industrial production planning. Its primary focus is on production planning components, while also covering data management concepts and fundamental production principles for background. The research focused on the key ideas and concepts required to comprehend the practical components of the report, offering an overview rather than an in-depth investigation.

The research scope was limited to specific issues, therefore it is critical to identify its boundaries and limitations in order to provide context.

The study concentrates on the manufacturing sector rather than non-manufacturing environments and service firms. Hierarchical production planning receives more emphasis than Focused Factory paradigms, and Workload Control is the primary production planning task examined. Job entry and job release decision-making are not covered, while the elaboration of the Master Production Schedule (MPS) is discussed in some detail.

In terms of the time period in analysis, the primary focus is from the start of the 2000s to now, highlighting significant studies. Geographically, production planning

techniques in emerging markets and developing economies receive less attention than literature from Western industrial settings. In terms of methodology, the review combines results from both theoretical and empirical research, without going into extensive detail on particular mathematical models or software algorithms outside of their specific use cases. Finally, it relies on literature mainly found in English, possibly leaving out important studies released in other languages or local journals with limited international database coverage.

In summary, this theoretical framework presents the theoretical basis to comprehend the case study. Implementing DSS in JPM Industry required integrating concepts provided by the theoretical framework with the organization's specific production planning processes, highlighting the connection between theory and practice in industrial environments. Throughout the report, some of the differences between theoretical ideas and their practical application are clarified, highlighting the nuances required for effective implementation.

3 Case Study

This chapter is divided into multiple sections that explore various aspects of the JPM Industry case study. Section 3.1 presents the host organization, with a specific emphasis on the Business Transformation department where the project was implemented. Section 3.2 provides a comprehensive examination of JPM Industry's processes, focusing on the Information Systems for production planning and on the company's manufacturing processes. The case study is described in Section 3.3, with an explanation of the original circumstances that led to the requirement for new production planning Decision Support Systems (DSSs) and the process of selecting the tools. The MPS tool used in the case study is covered in Section 3.4, and the Sectional Planning tools are covered in Section 3.5. Section 3.6 provides an overview of the impact of the recently implemented DSSs based on user feedback.

For the purposes of security and protection of sensitive information, some values in the Figures of this Chapter have been altered, thus presenting fictitious data. Additionally, some Figures have missing values for the same reasons.

3.1 Presentation of the host institution

JPM Industry is one of several sister companies part of JPM Group, it's a worldwide player in the intralogistics market that provides solutions and services to several industries such as airports, postal and parcel industries, manufacturing, process industries, etc. JPM Industry develops custom industrial equipment using the most advanced automation and robotics technologies and offers a complete lifecycle of services, starting in the installation up to maintenance contracts, being able to adapt to the different challenges and complexities that each industry and each client offers.

Established in 1994 by José Paulo Martins da Silva, the company has emerged as a hub of technological advancement and industrial automation. From its inception to its current stature as a prominent player in intralogistics, JPM Industry has undergone significant evolution and growth. The introduction of the metalworking division was a pivotal moment in the company's journey, starting a new era of innovation. This expansion necessitated a strategic move to larger facilities to accommodate the company's growing operations. Subsequent years saw JPM Industry achieve key milestones in certification and global

outreach, with ISO 9001 accreditation in 2007 and expansion into markets spanning Europe and Africa.

In 2009, the formation of the JPM Group signaled a strategic shift towards specialization and diversification. Comprising entities such as JPM Renewables, Jointsteel, and Novafabril Angola, the group expanded its offerings to include sustainable energy solutions, stainless steel equipment manufacturing, and industrial projects across continents.

At the core of JPM Industry's mission is a commitment to delivering tailored solutions to clients worldwide. With expertise in designing and implementing industrial projects, the company has earned the trust of industry giants like TetraPak, Lactogal and Nestlé.

The company operates across two primary domains: crafting of customized industrial solutions tailored to meet the unique needs of clients and production of standardized products for repeating clients.

3.1.1 The Business Transformation (BT) department

The Business Transformation (BT) department at JPM Industry has the primary goal of reforming internal processes, serving as a developmental support hub for all other organizational departments. This department operates under a continuous improvement framework, collaborating closely with other departments to streamline processes, implement digital solutions, and enhance overall productivity. Collaboration with departmental members is pivotal because they possess intricate knowledge of their respective processes, which the BT team may not fully grasp.

Processes targeted for improvement are either identified by the BT department or communicated to them for analysis to achieve desired outcomes. These processes are categorized into two main types: "quick wins" and "challenges". Quick wins involve short-term projects with straightforward solutions and minimal stakeholders. Examples of quick win projects undertaken by the BT team include developing standardized working instructions and flowcharts, creating BI tools to measure departmental KPIs, and generating dynamic lists from the organization's ERP database.

On the other hand, challenges encompass long-term projects or initiatives involving multiple stakeholders from various departments. These projects are typically complex and

have broader organizational impacts. Examples of challenges tackled by the BT department include the management of non-conformities, implementing digital material tracking on the shop floor, and optimizing raw material management. The BT team employs two methodologies to address these challenges, the Plan-Do-Check-Act (PDCA) cycle for lean continuous improvement and Scrum, a framework known for enhancing project progress and team self-organization.

Due to the complexity and the large number of stakeholders involved in the production planning project described in this report, it was categorized as a challenge by the BT team. Consequently, the project followed the two previously described work methodologies.

3.2 General functioning of JPM Industry

JPM Industry functions like an ecosystem, a complex network where various elements interact and contribute to the whole. Its functioning follows Lean principles, with every department trying to apply them to all processes in order to reduce costs and maximize efficiency. As such, JPM Industry's activities follow a predominantly pull production logic, meaning that the process of a new project (customized products) or direct sale (standardized products) starts with the necessity of the external client. Initially, the Commercial department receives the order request, elaborates a chronogram with estimated deadlines for each stage of the project and presents it to Production & Operations (P&O), which includes the production planning team, and the Technology & Innovation (T&I) departments. The P&O team evaluates the technical capabilities of production, the T&I team analyzes the technical requirements and production planning assesses the availability of production resources, if everything is validated then the project starts its implementation phase.

This phase begins with the T&I team conducting the project's technical development and creating the necessary documentation. The result of this work is the Bill of Materials (BOM) for the project. Subsequently, the Industrialization team receives the BOM and produces the Bill of Operations (BOO). The BOO supplements the BOM by incorporating routing information, which includes both the list of materials required and the ordered operations necessary for processing those materials. This ensures that both material requirements and operational steps are clearly defined and coordinated in the manufacturing

process. Each operation in the BOO is assigned an estimated duration, the work center it is allocated to, and the order in which it must be executed.

The BOO is then sent to the production planning team, which inputs it into the organization's MRP system along with deadlines of production for different components of the project. The software system processes these inputs, creates a production plan and generates Manufacturing Orders (MOs), each containing one or multiple operations. This action triggers two events: if the necessary materials for these operations are not in stock, the purchasing section of the Supply Chain department receives a notification to procure them. Simultaneously, the operations are dispatched to the shop floor and sent to their respective work centers so that each section can start producing the project on the shop floor. Production, purchasing and logistics then cooperate to complete the project until its two final stages: expedition and installation.

A flowchart of the functioning of JPM Industry during the life cycle of a project can be found in Appendix I. It should be noted that this is a simplified version of the entire process, additional activities and decision points could be added but it wouldn't generate any added value for the purpose of this report.

For reference, examples of a BOO and an MO are included in Appendix II.

3.2.1 Production at JPM Industry

In order to understand the production planning processes at JPM Industry, it is necessary to first give an overview of how production itself works. The functional division of the P&O department at JPM Industry is shown in Appendix III.

The 25 active work centers that comprise JPM Industry's shop floor production are categorized into 5 sections: Saws, Laser Cutting, Machination, Assembly, and Project Assembly. Every section has its own work centers, machines and operators which are led by a section chief. The chief of each section is in charge of planning and organizing the department's activities. A complete list of all the active production work centers at JPM Industry and their respective sections can be found in Appendix IV.

The Saws, Laser Cutting and Machination sections handle raw materials, while the Assembly and Project Assembly sections do not. Despite JPM Industry employing a job-shop production system, there is an order of operations among the different sections. Saws

and Laser Cutting receive materials from the purchasing department or from each other, and then supply materials to Machination, Assembly or Project Assembly. Machination receives materials from Saws, Laser Cutting or purchasing, and provides processed materials to the two assembly sections. Conversely, the assembly sections may receive materials from any source, they then modify and assemble different components to complete the project and prepare it for expedition. Typically, materials do not move from the Assembly sections back to Machination, Saws, or Laser Cutting, or from Machination to Saws or Laser Cutting, unless rework is required.

Figure 7 depicts the typical flow of materials on the shop floor between the different production sections at JPM Industry.

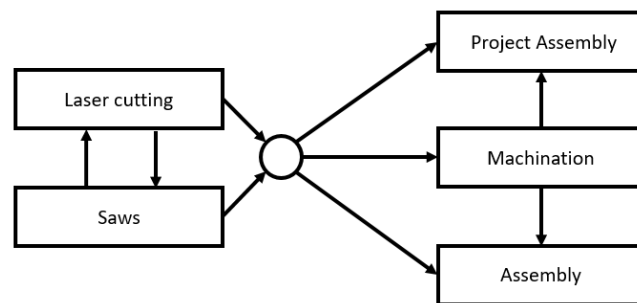


Figure 7 – Typical flow of materials

3.2.2 Production planning Information Systems at JPM Industry

The production planning team at JPM Industry has two primary objectives: ensuring timely project delivery (production control by project) and optimizing resource utilization (production control by work center). To achieve this the organization follows a hierarchical paradigm, in which the production planning team makes broader strategic decisions while the section chiefs make more specific operational decisions.

Aligned with these objectives, the structure of the production planning Information Systems at JPM Industry is represented by a pyramid in Figure 8.



Figure 8 – Production planning Information Systems

At the top of the pyramid is the organization's ERP, which contains information regarding commercial requests, projects, purchase orders, articles, stock levels and internal dossiers. Directly connected to the ERP at the second level is the organization's MRP I software. This bidirectional connection allows changes in one system to automatically update the other, ensuring immediate information flow. The MRP I software manages data on BOMs, BOOs, MOs, operations and necessities of purchasing and production. The third and fourth layers, General Planning and Sectional Planning, which are the main focus of this report, contain information on production dates and times. Finally, at the base of the pyramid is the Manufacturing Execution System (MES) layer. This layer tracks the execution of operations, including details such as the operator and machine used, the date of execution and the duration of each operation. The MES is bidirectionally connected to the MRP I, and indirectly to the ERP, ensuring that data travels instantly between these systems, allowing for real-time decision-making based on up-to-date information.

3.2.3 Production planning and scheduling at JPM Industry

As discussed in previous sections of this report, JPM Industry functions within a production system that includes producing personalized products to meet varying customer preferences, working in a job-shop setting with multiple work centers and operations. This arrangement naturally creates challenges in production planning. To decompose this complex environment, the organization follows a hierarchical planning structure. This section provides an overview of how JPM Industry's production planning and scheduling processes work.

After the Industrialization team finalizes the BOO of a project, the production planning team inputs the BOO details into the MRP I system along with production deadlines for different components of the project. Due to the size and complexity of the projects and BOOs, the team struggles to break down projects into a practical timeline meaning that the inputted deadlines are often arbitrary. Combined with the use of a MRP I system, which does not incorporate capacity planning, this leads to unfeasible production schedules created by the MRP. Consequently, the production schedule formulated by the MRP system is mostly disregarded by production personnel.

Following the creation of this production schedule, which has very little practical use, the production planning team dispatches the operations to the shop floor and develops a Master Production Schedule (MPS), by establishing production deadlines of that project for each section. This MPS serves as the real operational plan followed by production members.

It's important to note that this process diverges from conventional literature practices, where the MPS typically precedes the MRP to facilitate accurate material planning. An MPS is typically developed by attributing deadlines of production for specific components of the project, unlike JPM Industry's case where the MPS is designed by attributing deadlines of production for the the different sections. The MRP software employed at the organization doesn't allow for section-level deadlines being inputted, rendering the direct MPS integration into the MRP very impractical.

Following the creation of the MPS, the deadlines are communicated to the different sections and the section chiefs are then responsible for ensuring that all operations of that given project are completed before the set deadline for their section. Simultaneously, they're tasked with scheduling and sequencing the operations for their work centers in a way that minimizes costs. They can achieve this by sequencing operations in an order that minimizes setup times, by strategically using machines or operators in a way that maximizes productivity, by leveling production activity, among other techniques which can be different for each section and for each work center. As the section chiefs have more technical knowledge of the work centers under their control than the production planning team, they are the ones responsible for the scheduling and sequencing of operations. The production planning team simply gives a timeframe for each operation to be completed but it doesn't decide in what exact day they will be executed or in which order. The balance between an efficient use of resources at the different work centers and the compliance with the deadlines

restriction set by the production planning team on the MPS is the main challenge of a section chief's scheduling at JPM Industry.

Daily tasks performed by the production planning team at JPM Industry involve dispatching operations to their respective work centers, assessing the availability of production resources, setting deadlines of production for different sections and projects, controlling their execution, analyzing future production scenarios, setting priorities for both projects and operations, identifying potential bottlenecks or excess capacity at a given work center and solving those capacity problems.

Daily tasks performed by the section chiefs involve coordinating operations with other sections, efficiently managing their section's resources and aligning their schedules with the deadlines set by the production planning team.

3.3 Case study characterization

3.3.1 Description of the initial situation

Recently, there has been a substantial growth in the size, variety, and number of projects undertaken by JPM Industry. As a result, the APS software that was previously used for production planning was considered insufficient. This software did not have the flexibility needed to adjust to the increasing complexity of the organization's hierarchical production system.

The insufficiency of the software tools in the General Planning and Sectional Planning tiers of the Information Systems pyramid led to heavy dependence on alignment meetings, intuition, and informal discussions by planners, schedulers, and sequencers at JPM Industry for managing production activities. This method was not successful, as it frequently did not fulfill their requirements.

The production planning team set deadlines for the different sections based on intuition and experience rather than data, creating MPSs that caused frequent Workload imbalances and required urgent corrections such as operators performing overtime and subcontracting operations, which have significant costs. Informal agreements on what operations to prioritize in production often led to misalignment due to miscommunication. To check if the different production sections were complying with the deadlines, the team had to spend a considerable amount of time on operational control. Additionally, there

weren't any efficient methods for the team to assess the state of production, to evaluate potential future scenarios or to coordinate operations between different sections.

Section chiefs had no digital tool to schedule their section's operations, resorting to paper, which meant that there was no direct way to evaluate the efficiency of their scheduling, resulting in mostly arbitrary allocations of resources. There was also no good way to check for sequencing opportunities. As the alignment between production planning, section chiefs and operators was done informally, section chiefs spent significant time on operational control and on alignment meetings.

The lack of integration between the MPS and the organization's MRP also presented a major limitation, resulting in misalignments between production needs and procurement. Problems related to earliness or lateness of materials were frequent since procurement had no direct way of knowing for which dates the material they procured was needed. This meant that the procurement process was also subject to an excessive amount of informal communication.

3.3.2 Selection of the production planning Decision Support Systems

Given the framework presented in the previous sections, JPM Industry decided to internally develop short term and low cost Decision Support Systems that enable the planners, schedulers and sequencers to make more informed and effective decisions during the transition to new software. The challenge lied in creating tools that were adapted to the existing processes of the organization, helping in coordinating higher level planning decisions, which deal with aggregated data, with detailed scheduling and sequencing decisions, which involve more specific operational data, improving decision-making at all levels of the hierarchy.

Through meetings with several stakeholders, three key inputs were deemed necessary for the production planning team to effectively create a Master Production Schedule (MPS), by determining the start and end dates of production by project for every section. These three inputs were:

- the Workload by project split into the different work centers;
- the availability of each work center;
- the date of delivery of the project agreed with the client.

Before the implementation of the DSS, out of these three inputs only the date of delivery was used, the production planning team used informal conversations, experience and intuition to attempt to estimate the other two necessary inputs which meant that the state of production was often inaccurately taken into account when determining the deadlines of production for the different sections.

To provide the production planning team the two other necessary inputs, a tool named the Master Production Schedule (MPS) Tool, based on Microsoft Excel, was created. This tool integrates with an RCCP analysis mechanism to ensure the feasibility of the MPS. Besides helping with the creation of the MPS, it also allows the planning team to analyze possible future production scenarios, enables the proactive detection of imbalanced Workloads and allows the control over each section's compliance with the deadlines.

To enable the section chiefs to digitally schedule their section's operations, the Sectional Planning Tool was created. It was designed specifically for the use of the section chiefs and it was developed using Microsoft Excel and PowerBI. Aside from the scheduling of operations, it also facilitates sequencing, allows the production planning team to monitor those schedules, enhancing operational efficiency and coordination, and enables the operators to easily see which operations have been assigned to them, easing their work and reducing the need for the section chiefs to spend so much time on operational control.

It's important to note that the short term and low cost restrictions for the development of these tools meant that highly complex and expensive solutions were ruled out, such as acquiring complex APS softwares or solutions that involved a complete transformation of the existing planning processes. This meant that the limitation regarding the lack of integration between the MPS and the MRP was not addressed by the selected tools, although they've helped mitigate the disconnection between production and procurement.

Detailed explanations on the development and implementation of these Decision Support Systems are provided in the two following sections of this chapter, offering detailed clarifications on how these tools helped mitigate several of the limitations initially found at the organization.

Appendix V contains a chronogram of important milestones during the implementation phase.

3.4 Master Production Schedule (MPS) Tool

BOO times were used to provide the production planning team with the first necessary input to effectively assign deadlines of production, the Workload by project split into the different work centers. These times are the estimations performed by the Industrialization department of the time it takes for an operation to be completed. They represent the theoretical Workload of a given operation.

To aggregate the theoretical Workload of operations by project and work center, dynamic tables were created in Excel using SQL code that extracts data from the organization's MRP I database. These tables list all operations that have been dispatched but not yet executed on the shop floor, as demonstrated in Figure 9. Each row represents a different operation, while the columns contain information on the operations' projects, manufacturing orders (MOs), work centers, status, BOO times, plus other relevant information that may be useful for the production planning team to consult. When an operation is dispatched, a new row is automatically added to the table with the relevant details. When an operation is executed on the shop floor, that execution is registered in the MES, the information is immediately transferred to the MRP system, and the corresponding row is automatically removed from the table.

	A	B	C	D	E	F	G	H	I	K	L	M
	Projeto	numOf	cod_art	DESC_ART	codCt	Status	Tempo Gama	Data Limite Of	quant	Desenho	Abastecida	Componente
1	Stock_Maio	00195932			C36	Confirmada (agendada)	4	28/06/2024	50		Não	
2	035/24	00197179			C36	Confirmada (agendada)	1	22/05/2024	3		Não	
3	059/24	00190910			C37	Confirmada (agendada)	2	17/05/2024	8		Não	
4	Stock_Maio	00197045			C37	Confirmada (agendada)	10	28/06/2024	12		Não	
5	Stock_Maio	00195927			C36	Confirmada (agendada)	8	28/06/2024	5000		Não	
6	Stock_Maio	00195935			C36	Confirmada (agendada)	1	28/06/2024	200		Não	
7	182/23	00196203			C37	Confirmada (agendada)	1,75	07/06/2024	5		Não	
8	059/24	00190606			C37	Confirmada (agendada)	5	17/05/2024	20		Não	
9	059/24	00190818			C37	Confirmada (agendada)	2	17/05/2024	4		Não	
10	035/24	00196888			C37	Confirmada (agendada)	0,5	31/05/2024	1		Não	
11	182/23	00196220			C37	Confirmada (agendada)	8	07/06/2024	4		Não	

Figure 9 – Table of unexecuted dispatched Machination operations - MPS

From these tables, the BOO time estimates of the operations that have the same project and the same work center are added up and inputted into the MPS as the total Workload for that project on that specific work center, following formula 3.1.

$$(3.1) \quad Workload_{P,WC} = \sum_{i=1}^n BOO\ time_{P,WC,i}$$

Where P denotes the specific project, WC denotes the specific work center, n is the total number of operations that have been dispatched but not yet executed for project P at

work center WC, $BOO\ time_{P,WC,i}$ is the Bill of Operations estimated time for the i-th operation of project P at work center WC and $Workload_{P,WC}$ represents the total Workload of project P on the specified work center WC.

B	C	D	E	J	K	L	Y	Z	AA	AB	AC	AD	AE	AF	AG
Legenda Alertas:			Inserir/Alterar Data	Projetos a industrializados											
			Seleção=1 mas há carga	Projetos em standby											
			Carga negativa												
			Células automáticas. Não preencher												
FERRAMENTA DE CARGA DE CAPACIDADE NA P40 (CHÃO DE FÁBRICA)															
OWNER: Planejamento															
Área de negócio	Tip.	Projeto	Cliente	Data de início prevista	Carga (horas)	Data de conclusão prevista	Data de início prevista	Carga (horas)	Data de conclusão prevista	Data de início prevista	Carga (horas)	Data de conclusão prevista	Data de início prevista	Carga (horas)	Data de conclusão prevista
Vendas Diretas - Spare Parts															
TPFS	VD	Direct Sale 1	Client 1	01/07/24	11	21/07/2024	20/07/24	20.0	07/08/24	20/07/24	3.00	07/08/24	20/07/24	15.00	07/08/24
TPFS	VD	Direct Sale 2	Client 2		0		01/07/24	1.0	07/07/24	01/07/24	0.00	07/07/24	01/07/24	0.00	07/07/24
TPFS	VD	Direct Sale 3	Client 3	24/06/24	2	25/06/2024	29/06/24	6.0	21/07/24	29/06/24	6.00	21/07/24	29/06/24	0.00	21/07/24
TPFS	VD	Direct Sale 4	Client 4	03/07/24	1	10/07/2024	01/07/24	13.0	21/07/24	01/07/24	10.00	21/07/24	01/07/24	1.00	21/07/24
TPFS	VD	Direct Sale 5	Client 5	10/07/24	3	17/07/2024	01/07/24	20.0	29/07/24	01/07/24	1.00	29/07/24	01/07/24	17.50	29/07/24
TPFS	VD	Direct Sale 6	Client 6	10/07/24	10	17/07/2024	01/07/24	4.0	26/07/24	01/07/24	0.00	26/07/24	01/07/24	2.50	26/07/24
TPFS	VD	Direct Sale 7	Client 7	24/06/24	17	17/07/2024	01/07/24	12.0	26/07/24	01/07/24	12.00	26/07/24	01/07/24	0.00	26/07/24
Contract Manufacturing															
TPFS	n/a	Project 1	Client 8	07/07/24	18	01/08/2024	11/07/24	5.0	10/08/2024	11/07/24	5.00	10/08/2024	11/07/24	0.00	10/08/2024
TPFS	n/a	Project 2	Client 9	04/07/24	2	01/08/2024		0.0			0.00			0.00	
TPFS	n/a	Project 3	Client 10	04/07/24	2	01/08/2024	15/07/24	10.0	11/08/24	15/07/24	1.00	11/08/24	15/07/24	8.50	11/08/24
TPFS	n/a	Project 4	Client 11	03/07/24	3	01/08/2024	15/07/24	6.0	11/08/24	15/07/24	2.00	11/08/24	15/07/24	3.00	11/08/24
TPFS	n/a	Project 5	Client 12	14/07/24	4	21/07/2024	15/07/24	4.0	11/08/24	15/07/24	0.00	11/08/24	15/07/24	2.00	11/08/24
TPFS	n/a	Project 6	Client 13	14/07/24	5	21/07/2024	21/07/24	9.0	13/08/24	21/07/24	7.00	13/08/24	21/07/24	4.00	13/08/24
TPFS	n/a	Project 7	Client 14		0		01/07/24	1.5	08/07/24	01/07/24	0.50	08/07/24	01/07/24	1.00	08/07/24
TPFS	n/a	Project 8	Client 15	30/06/24	1	07/07/2024	07/07/24	7.0	11/08/24	07/07/24	1.00	11/08/24	07/07/24	5.00	11/08/24
TPFS	n/a	Project 9	Client 16	01/07/24	1	08/07/2024	08/07/24	4.0	11/08/24	08/07/24	3.00	11/08/24	08/07/24	0.00	11/08/24

Figure 10 – MPS tool

The Master Production Schedule tool is depicted in Figure 10, structured in the following manner. Each row represents a different project while the columns represent the 25 active work centers at JPM Industry. For each work center there is a column named ‘Carga’ (Workload), inputted automatically as explained by Formula 3.1, and two columns representing the starting date and the deadline, which are inputted manually by the production planning team.

As the deadlines are set by section and not by work center, columns representing the different sections were also introduced. In Figure 10, Maquinação – N2 (Maquination) represents the entire section, the production planning team inputs the two dates and they’re automatically applied to all work centers of that section (Tornos CT36 - Turning, Fresas CT37 - Milling, etc.). This mechanism reduces the time and effort required from the production planning team, as they no longer need to input dates for each work center individually.

It’s important to note that while the dates are inputted by section, splitting the Workload into work centers rather than sections is essential for decision-making. The information that a given project has, for example, 100 hours of Maquination Workload is fairly meaningless as those 100 hours can be 50 hours of Turning and 50 of Milling or simply

100 hours of Turning, which would likely result in different decisions when it comes to setting the deadline for the section.

3.4.1 Rough-Cut Capacity Planning (RCCP)

While knowing the Workload by work center for every project is essential to assign feasible deadlines of production for the different sections, in order to determine whether a timeframe for a project can be complied with in practice without generating capacity issues, the planning team needs to know the number of available hours that the work centers have in that time period.

Availability is the difference between a work center's production capacity and the Workload that it's been assigned, as stated in formula 3.2.

$$(3.2) \text{ Availability} = \text{Capacity} - \text{Workload}$$

To provide this information, a RCCP analysis mechanism was developed and integrated with the MPS tool. The MPS serves as an input for the RCCP, while the RCCP serves as an analysis tool that is essential to determine the MPS adequately.

The following segment of the report describes a simplified hypothetical example, meant to provide a clear and detailed explanation of how the RCCP analysis works.

3.4.1.1 Elaboration and interpretation of the RCCP graphs

Assume that on June 11th, 2024, JPM Industry will only have two projects with operations deployed to the shop floor, Projects A and B, and that the production planning team will be determining the start and end dates of production of these two projects for the different sections. Project A has operations with a total Workload of 100 hours on the Turning work center whereas Project B has operations with a total Workload of 300 hours on the same work center. The Turning work center has a Daily Capacity of 48 hours, as there's 6 machines that work 8 hours per day.

Table 1 - Input data

Turning work center	
Project A Workload	100h
Project B Workload	300h
Daily Capacity	48h

Project A can start being produced in the Machination section right away as the raw materials are in stock, while Project B will only start production on the 14th of June as the materials have to be processed at the Saws section first. The production planning team inputs these starting dates into the MPS and after analysing the state of production and the delivery dates for the projects, decides that project A has its deadline in the Machination section on the 18th of June while project B has been assigned the 21st of June as its deadline in this section. As there's no work on weekends and holidays, this means that the section has 5 days to execute all operations of project A and 6 days to execute all operations of project B.

Table 2 - Data after dates input

	Starting date	Deadline	Workdays	Turning Daily Workload
Project A	11/06/2024	18/06/2024	5	20h
Project B	14/06/2024	21/06/2024	6	50h

$$(3.3) \text{ Workdays} = (\text{Deadline} - \text{Starting Date} + 1) - \text{Holidays} - \text{Saturdays} - \text{Sundays}$$

$$(3.4) \text{ Daily Workload} = \frac{\text{Workload}}{\text{Workdays}}$$

Table 3 showcases the calculations performed to provide the Availability of the Turning work center from the 11th of June to the 24th of June, following formulas 3.2 to 3.7. Each row of the table represents a different variable, while each column represents a different

day of the time period in analysis. Holidays, Saturdays and Sundays are identified at the top of the table.

Table 3 - RCCP calculations

	11	12	13 Hol	14	15 Sat	16 Sun	17	18	19	20	21	22 Sat	23 Sun	24
Daily														
Workload	20	20	0	20	0	0	20	20	0	0	0	0	0	0
Project A														
Daily														
Workload	0	0	0	50	0	0	50	50	50	50	50	0	0	0
Project B														
Total Daily														
Workload	20	20	0	70	0	0	70	70	50	50	50	0	0	0
Workload	20	40	40	110	110	110	180	250	300	350	400	400	400	400
Daily														
Capacity	48	48	0	48	0	0	48	48	48	48	48	0	0	48
Capacity	48	96	96	144	144	144	192	240	288	336	384	384	384	432
Availability	28	56	56	34	34	34	12	-10	-12	-14	-16	-16	-16	32

$$(3.5) \quad \text{Total Daily Workload} = \sum_{i=1}^n \text{Daily Workload}_i$$

$$(3.6) \quad \text{Workload}(D) = \sum_{d=\text{today}}^D \text{Total Daily Workload}(d)$$

$$(3.7) \quad \text{Capacity}(D) = \sum_{d=\text{today}}^D \text{Daily Capacity}(d)$$

Where D is the final day of the time period under consideration and n is the total number of projects having Daily Workload on that particular work center.

The Workload of a given day represents the total amount of time required to complete the operations from today (June 11th in this scenario) until that day. For example, the Turning work center needs to execute 400 hours of operations between June 11th and

June 24th. Comparably, Capacity denotes the Turning work center's overall capacity for the same time frame. The difference between the two values is represented by Availability. From the June 11th until June 24th, there is enough available capacity to dispatch 32 additional hours of Turning operations.

It's essential to aggregate Workload and Capacity values for the entire period rather than presenting daily values. Daily presentation would be misleading; for example, the Machination section having 5 days to complete 100 hours of Turning operations for Project A does not imply a fixed Daily Workload. They might complete 40 hours on the first day, 40 on the second, 20 on the third and 0 in the final two days. Only aggregated values over a time period provide accurate inputs for the production planning team to assign section deadlines effectively.

Figure 11 depicts the Workload, Capacity and Availability graph for the Turning work center for the hypothetical example presented.

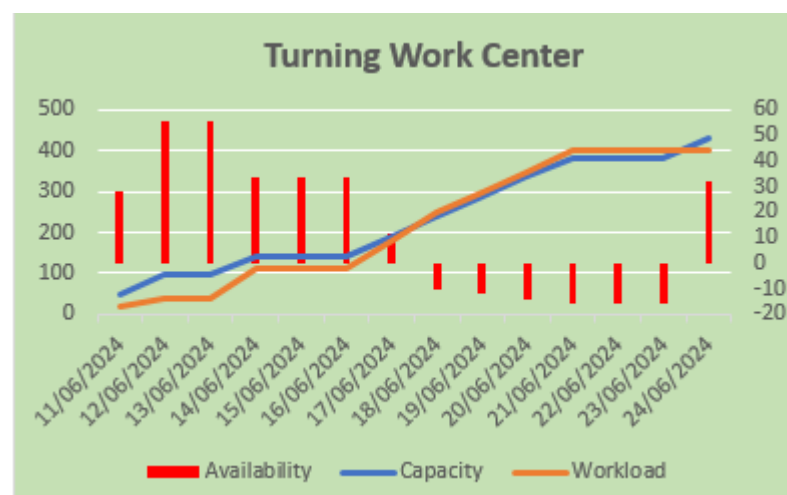


Figure 11 – Turning Work Center RCCP Graph

The primary Y axis (located on the graph's left side) shows the Workload and Capacity values in hours, whereas the secondary Y axis (on the graph's right side) displays the Availability values, also in hours. Capacity and Workload are depicted by the blue and orange lines respectively, while Availability is indicated by the red columns. The X axis represents the days under analysis.

When Workload exceeds Capacity, it means that the work center will be overloaded given the defined MPS. This means that the MPS is unfeasible as the work center won't be

able to complete all operations until their deadlines. If this happens, the production planning team needs to address the capacity problem to stop delays in the production schedule.

In this hypothetical example there's a 6 day period of overload in the 'Turning work center, from June 18th to June 23rd with a minimum of Availability of -16 hours. The first way to solve the overload problem is to adjust the MPS. The team can increase the time period for the Machination section for one or for both of the projects while reducing the time period for other sections, maintaining the delivery dates of the projects agreed upon with the clients and solving the overload problem. This iterative interaction between MPS and RCCP is crucial to create a feasible MPS.

If the MPS can't be adjusted in a way that solves the issue, four different measures can be applied by the production planning team at JPM Industry:

- Reallocate resources from other work centers, increasing the Capacity of the overloaded work center in that time period
- Schedule overtime with the operators, also increasing Capacity but with higher costs
- Subcontract operations, reducing the Workload
- Extend delivery dates by negotiating with the clients, increasing the timeframe to execute operations

A Working Instruction was developed to standardize this decision-making process (see Appendix VI), in accordance with the organization's guidelines.

3.4.1.2 Functioning of the RCCP tool

The RCCP tool is depicted in Figure 12. It contains the graphs for all 25 active work centers for a time period of 3 months, always starting from today's date, using the methodology explained in the previous segment. Different colours were used to split the work centers into their respective sections, facilitating analysis. A table was also created, which automatically identifies if the scheduled MPS means that any work center will be overloaded. In this case, given the MPS created by the production planning team, only the Turning work center was expected to face overload capacity issues, automatically appearing in red in the table and making this situation easier to identify.



Figure 12 – RCCP tool

Aside from identifying overload issues, the goal of the production planning team is to set deadlines for projects in a way that demand closely meets supply in every work center, with a certain margin to not generate any capacity issues that may result in projects not being delivered on time. For each work center, Capacity represents supply and Workload represents demand. If the demand closely matches supply, it means the allocation of resources of the MPS was efficient.

Essentially, if there are capacity issues at any work center, it means that the provided MPS cannot be achieved in practice within the given Capacity, Workload, and designated timeframes. Nonetheless, if multiple work centers demonstrate significant Availability, it indicates that the provided MPS won't efficiently use the capacity of the available resources.

This method guarantees that the production planning team can determine timeframes for each section by conducting thorough Workload and Capacity evaluations, allowing for effective scheduling and resource distribution among the different work centers.

3.4.2 Additional features

Apart from the features presented in the previous segment, these two tools also allow for the analysis of possible future scenarios and the control over each section's compliance with the deadlines set by the production planning team, through an automatic alert system.

3.4.2.1 Analysis of Scenarios

The MPS includes a section dedicated to scenario analysis (see Figure 13). In this section, the Workload and dates are both entered manually. This enables the production planning team to assess how different scenarios impact the availability of work centers, by inputting different Workload values and dates and observing the changes in the RCCP graphs. This feature also facilitates a more in-depth analysis of the state of production by allowing the inclusion of projects with operations that have not yet been dispatched.

Área de negócio	Tip.	Projeto	Cliente	Seleção	Penalidade	Data de início	Carga (horas)	Data de conclusão	Data de início	Carga (horas)	Data de conclusão	Data de início	Carga (horas)	Data de conclusão	Data de início	Carga (horas)	Data de conclusão
Análise de cenários e ajustes de carga																	
Cenário 1																	
Cenário 2																	
Cenário 3																	
Cenário 4																	
Cenário 5																	

Figure 13 – Analysis of Scenarios

3.4.2.2 Alert system

When a section is unable to execute all operations of a project before the deadline set by the production planning team, it is the responsibility of the section chief to inform the team. However, this process depends on direct communication which may result in failures due to human error. To avoid this type of situations, it was created an alert system on the MPS tool. If there's still Workload in a work center for which the deadline has already passed, the date will appear in red, letting the production planning team know that the section did not comply with the deadline.

In figure 14, the deadline for the Saws work center for the third project was the 29th of June. However, on the 1st of July there were still 2 hours of operations on that work center yet to be executed for that project. Therefore, the Excel cell is displaying a red color, indicating to the production planning team that the Saws section failed to complete all assigned operations by the specified deadline.

Today's date: 01/07/2024

Serrotes (CT02)		
Data de início prevista ▾	Carga (horas) ▾	Data de conclusão prevista ▾
01/07/24	11	21/07/2024
	0	
24/06/24	2	29/06/2024

Figure 14 – Alert system

3.4.3 Accuracy of the BOO time estimates

To complement the explanations of the functioning of the MPS tool, this segment presents an analysis regarding the accuracy of the BOO time estimates.

As stated previously, BOO times indicate the theoretical Workload of a specific operation, which means they're crucial inputs for the decision-making processes of the production planning team, especially when using the MPS tool and analyzing the RCCP graphs. These times are estimates performed by the Industrialization department so they are not completely precise. A statistical analysis was carried out to assess the accuracy of these estimations by comparing the theoretical Workload (BOO times) with the effective Workload (MES times).

The sample selected for analysis includes all operations executed in the first 5 months of 2024, from January 1st to May 31st, with a registered time in the MES of over 1 minute. It's a frequent occurrence at JPM Industry that operators forget to register the start of an operation. In these instances, once the operation is concluded, the operators open and close the time registration in the MES attributing a shorter time to that operation than what effectively happened. To exclude these occurrences, operations with a MES time equal or less than 1 minute were disregarded.

Given this restriction, the sample in analysis has a total of 4179 operations. The MES times and BOO times, in hours, of all these operations, were extracted from the organization's MRP database using SQL code. Table 4 presents summary statistics of the two variables.

Table 4 - Summary statistics for BOO and MES times

	Minimum	Maximum	Median	Mean	Standard Deviation
MES time (effective)	0,02h	148,04h	0,91h	3,12h	6,95h
BOO time (estimation)	0,02h	200h	1h	3,31h	8,39h

Table 5 presents the summary statistics of the differences between BOO and MES times, while Figure 15 shows a dispersion graph of the differences for all the operations in analysis.

Table 5 - Summary statistics for the difference between BOO and MES times

	Minimum	Maximum	Median	Mean	Standard Deviation
BOO time – MES time	-12,77h	51,96h	0,11h	0,19h	2,04h

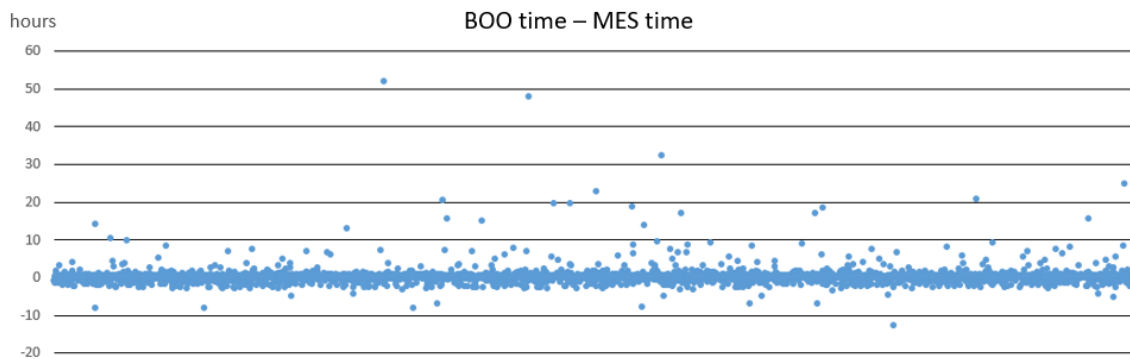


Figure 15 – Dispersion graph for the difference between BOO and MES times

The results presented show a tendency for overestimation, as evidenced by approximately 63% of the operations having estimated times superior to their actual effective times. Possible reasons for this are the incentives for different stakeholders within the production process. If the BOO times are higher than the actual time required to execute operations, the production planning team will set later deadlines and the production section gets a larger timeframe to conclude operations. This means that section chiefs have little

motivation to warn Industrialization of the estimation error. Overestimated BOO times provide a buffer for production sections, reducing the risk of delays and resulting in a less stressful work environment for production workers. Conversely, underestimated BOO times have the opposite effect.

To provide additional context, the Mean Absolute Error of the sample was calculated following formula 3.8.

$$(3.8) \quad \text{Mean Absolute Error} = \frac{1}{n} \sum_{i=1}^n (|BOO\ time_i - MES\ time_i|)$$

The Mean Absolute Error measures the average magnitude of the errors between the estimated and actual times. It is useful for understanding the typical size of the estimation errors, without indicating whether the estimates are generally over or under the actual times.

The calculated Mean Absolute Error of 0.75 hours for the total sample indicates that, on average, the estimated operation times deviate from the actual times by 0.75 hours (45 minutes).

The results of this analysis were relayed and explained to the Industrialization department to inform them of the estimation inaccuracies, and to the production planning team to provide them with additional context when interpreting theoretical Workload values.

3.5 Sectional Planning Tools

At the time of writing of this report, the Sectional Planning DSS was created for 3 of the 5 production sections at JPM Industry: Saws, Machination and Assembly. The development of the tool for the Laser cutting and Project Assembly sections was still being developed. In order to present the practical functioning of the tool in this section of the report, the Machination section was chosen. The tools created for the Saws and Assembly sections follow the same logic and share the same functionalities.

3.5.1 Microsoft Excel file

To create the Maquination Sectional Planning Excel tool, SQL code was used to extract from the organization's MRP I database a list of all dispatched Machination

operations that have not been executed, updating automatically when new operations are either dispatched or executed.

A	B	C	D	E	F	G	H	I
Ordem	Projeto	Referencia	Desenho	Quantidade	Horas Gan	Tratamento	CT	Data planeada
00191429	057/24			6	2		C36	Não
00186208	Stock_Fevereiro			237	1		C37	17/06/2024
00184756	Stock_Janeiro			155	30		C36	Não
00184818	Kanban_Janeiro			90	15		C37	18/06/2024
00190905	059/24			16	16		C16	Não
00185192	Stock_Janeiro			139	15		C36	14/06/2024
00184351	Stock_Janeiro			400	10		C36	17/06/2024
00190631	059/24			260	3		C36	Não
00193364	VD:0332/2024			2	2,5		C37	Não
00187591	Stock_Fevereiro			4	2		C36	Não
00184479	Stock_Janeiro			50	19		C37	14/06/2024
00197036	Stock_Maio			222	7		C16	Não

Figure 16 – Table of unexecuted dispatched Machination operations - Sectional Planning

Each row represents a different operation. While columns A through H are extracted from the MRP I, respectively containing information on that operation's MO, project, reference, drawing, quantity to be produced, BOO time, treatment and work center, column J, containing the scheduled date for that operation, is derived from the list of scheduled operations.

Figure 17 shows the list of scheduled operations.



Inserir Dados

Verificar Horas Programadas

ROUTER

Interferências	CT	Operador	Máquina	Prioridade	Projeto	Referencia	Descricao	Desenho n°	OF	MP	Qtd	H	Acerto	Fina	Tratamento	Data planeada
Falso	CT 36	Operador 1	TORNO CNC - HYUNDAI	2	Projeto 1				00187730		5	2,0	-1,00	3,00		15/06/2024
Falso	CT 37	Operador 2	Convencional's (Fresa)	2	Projeto 2				00187730		10	1,0	0,00	1,00		15/06/2024
Falso	CT 36	Operador 3	TORNO CNC - HYUNDAI	2	Projeto 3				00189499		320	1,0	0,00	1,00		15/06/2024
Falso	CT 43	Operador 4	Router	1	Projeto 4				00182211		1	1,0	0,00	1,00		15/06/2024
Falso	CT 37	Operador 5	DMC DMUSO	2	Projeto 5				00188060		10	1,0	0,00	1,00		15/06/2024
Falso	CT 37	Operador 6	DMC DMUSO	2	Projeto 6				00189519		20	2,0	0,00	2,00		15/06/2024
Falso	CT 36	Operador 7	TORNO CNC - HYUNDAI	2	Projeto 7				00188529		25	3,0	1,00	2,00		15/06/2024
Falso	CT 36	Operador 8	TORNO CNC - HYUNDAI	3	Projeto 8				00188523		15	2,0	0,00	2,00		15/06/2024
Falso	CT 36	Operador 9	TORNO CNC - HYUNDAI	3	Projeto 9				00189135		5	2,0	0,00	2,00		16/06/2024
Falso	CT 36	Operador 10	TORNO CNC - HYUNDAI	3	Projeto 10				00189144		5	1,0	0,00	1,00		16/06/2024
Falso	CT 36	Operador 11	TORNO CNC - HYUNDAI	2	Projeto 11				00189165		100	3,0	1,00	2,00		16/06/2024
Falso	CT 36	Operador 12	TORNO CNC - DMG	3	Projeto 12				00185737		20	6,0	1,00	5,00		16/06/2024
Falso	CT 37	Operador 13	HYUNDAI	3	Projeto 13				00184352		35	0,0	-5,00	5,00		16/06/2024
Falso	CT 36	Operador 14	TORNO CNC - HYUNDAI	2	Projeto 14				00187939		50	0,0	-8,00	8,00		16/06/2024
Falso	CT 36	Operador 15	TORNO CNC - HYUNDAI	2	Projeto 15				00187939		10	0,0	-4,00	4,00		16/06/2024
Falso	CT 36	Operador 16	TORNO CNC - HYUNDAI	2	Projeto 16				00187939		5	0,0	-5,00	5,00		16/06/2024

Figure 17 – List of scheduled Machination operations

To schedule operations, adding them to the list, the Machination section chief clicks on the button 'Inserir Dados' ('Insert Data') and the menu presented in Figure 18 appears.

Smart Planning

JPM 30th ANNIVERSARY

Ordem de Fabrico

Planeamento da Equipa

Máquina

Prioridade

Horas Previstas

Data Planeada

OK Fechar

Figure 18 – Scheduling Menu

The section chief then writes the MO of the operation (‘Ordem de Fabrico’), the operator that will execute it (‘Planeamento da Equipa’), the Machine that will be used (‘Máquina’), the priority of the operation (‘Prioridade’), 1 for most urgent, 2 for medium urgency and 3 for least urgent, the predicted time that operation will take in hours (‘Horas previstas’), which may be equal or different to the BOO estimated time, and the date in which that operation is scheduled for (‘Data Planeada’).

After clicking OK a new row is added with those inputs plus other relevant information that is added automatically, such as the work center of that operation, its project, its status, its BOO time, the reference of the product it will produce and other information that may be relevant for the section chief to consult. VBA code was used to generate this mechanism, facilitating the insertion of data.

Besides enabling the scheduling of operations the tool also enables sequencing. By ordering or filtering the list of dispatched operations by reference, the section chief may schedule two different operations that will produce the same reference for the same date, with the same operator and machine, ensuring that they will be performed one after the other, which reduces setup times and minimizes the costs associated to those operations.

Besides allowing the section chiefs to schedule and sequence operations, these tools also allow the production planning team to track the scheduling of operations by project. By filtering the list of dispatched operations by project, it creates a list of all non-executed dispatched operations of that specific project, allowing the production planning team to

check which operations have been scheduled and for which date. In figure 19, it is presented an example of this functionality. By filtering for project 076/24, 8 dispatched operations appear for the Machination section, 5 of them have been scheduled and 3 of them haven't. This functionality allows the production planning team to track the progress of projects not only by the execution of operations through the MPS tool but also before they've been realized, giving the team a wider scope of visibility over the execution of projects.

A	B	C	D	E	F	G	H	I
Ordem	Projeto	Referencia	Desenho	Quantidade	Horas Gan	Tratamento	CT	Data planeada
00195547	076/24			4	1		C36	17/06/2024
00195506	076/24			2	5		C37	Não
00195463	076/24			4	4,5		C37	Não
00195437	076/24			2	3		C16	14/06/2024
00195513	076/24			28	7		C36	14/06/2024
00195466	076/24			2	1,5		C37	14/06/2024
00195546	076/24			2	1,5		C40	Não
00195547	076/24			4	2		C36	18/06/2024

Figure 19 – Tracking of the schedule for a particular project

3.5.2 PowerBI dashboard

In order to display the schedule of each section in a more informative manner, a PowerBI dashboard was created from the list of scheduled operations. The Data Model used to create the PowerBI for the Machination section can be seen in Appendix VII.

The PowerBI dashboard, shown in Figure 20, contains six KPIs displayed at the top of the page, three filters, a table with a list of operations, and eight graphs for eight different machines. The first three KPIs, from left to right, represent the following variables: the total number of dispatched Machination operations that haven't been executed ('Nº de OF em Aberto'), the number of those operations that have been scheduled ('Nº de OF Planeadas'), and the number of operations that do not have enough stock to start being executed ('Nº de OFs s/Stock'). The remaining three KPIs represent Machine Capacity, Workload, and Availability of the entire section for the day being filtered, which in the case shown in Figure 20, is June 11th.

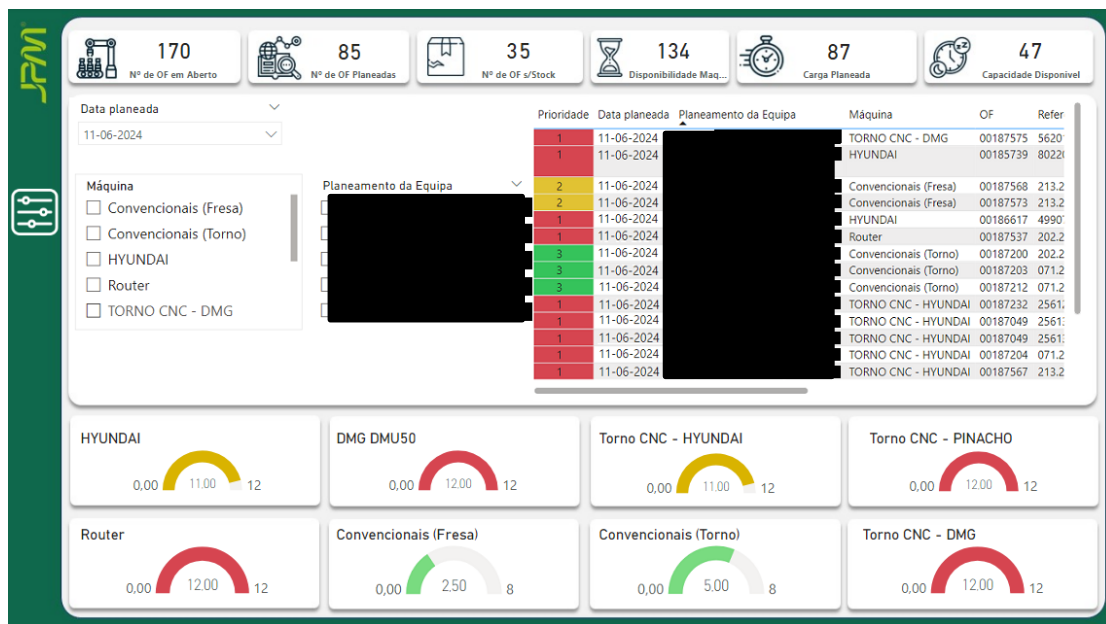


Figure 20 – PowerBI dashboard

The three filters, Planned Date ('Data Planeada'), Machine ('Máquina'), and Operator ('Planeamento da Equipa'), influence all elements on display. For example, by selecting June 18th as the Planned Date and Router as the machine, only operations scheduled for the Router machine on June 18th will appear in the table.

The eight graphs provide an analysis of Capacity, Workload, and Availability by machine for any given day. Only the eight most important machines were included, following the advice of the Maquination section chief. These features enable the section chief to optimize resource use each day, avoiding both overscheduling and underscheduling of operations for any operator or machine, ensuring that the schedule is both feasible and efficient.

Additionally, this PowerBI dashboard is displayed on the shopfloor at JPM Industry so operators can easily know which operations have been assigned to them for the day. This facilitates the sequencing of operations and improves the working environment for employees. Furthermore, it reduces the amount of time the section chief must dedicate to operational control. Appendix VIII showcases the PowerBI dashboards displayed on the shop floor at JPM Industry.

3.6 User feedback

In addition to gathering regular informal feedback from users during the conceptualization and implementation phases of the Decision Support Systems to make continuous adjustments, a user feedback survey was conducted to obtain more comprehensive insights (see Appendix IX). Two members of the production planning team, the section chiefs of the Saws and Machination sections, and the chief of Production & Operations participated in the survey. Although the Sectional Planning tool had already been implemented in the Assembly section, the survey was not forwarded to the Assembly section chief due to the limited time the new tool had been in use in his section.

The survey results indicate a positive reception of the new planning tools. All respondents agreed that they received adequate training to use the tools and that they utilize them constantly. They unanimously acknowledged that the tools aid in decision-making, improve the efficiency of their work, and are well-adapted to the organization's reality. Additionally, they agreed that the tools help enhance coordination among production sections.

The production planning team appreciated the ability to see the Workload on each work center for every project. "Knowing the theoretical Workload on each work center for all projects helps us a lot when trying to determine when we should set the deadlines of production" noted one team member. Section chiefs emphasized how the tools have improved organization within their sections. "The new tool has greatly facilitated my work organization." remarked the Saws section chief. The Machination chief specifically mentioned that the tools have made it easier to sequence operations. "Now it is easier for me to see if I can join different operations together to reduce the setup times of the machines", he said. Respondents also appreciated the increased digitization of processes. "Switching to digital tools has been a big advantage. We can now access information much more easily" commented a production planning team member.

The chief of Production & Operations highlighted the reduction in meeting times and the better organization of processes at different levels of the hierarchy, which has led to increased productivity. He emphasized how important the tools are for analyzing the state of production. He observed that a major obstacle was the constant necessity to quickly subcontract operations or request employees to work extra hours in order to meet project

deadlines, and the tools have assisted in alleviating this problem. "The new tools have reduced the need for emergency measures like overtime and subcontracting, which were big problems" he remarked.

Despite these advantages, users also highlighted several limitations. One significant issue is software performance. For example, updating data with the MPS tool may require several minutes because of the numerous calculations needed to create the RCCP graphs. Similarly, for the Sectional Planning tools, PowerBI needs to be refreshed to fetch the latest data from the Microsoft Excel file, which means the section chiefs are unable to check key information at the same time as they create their daily schedule. "While the tools are very useful, the time it takes for the Excel file to update and process the data can be frustrating" commented a member of the production planning team.

The fact that sectional scheduling is now only performed roughly one week in advance is another restriction that was brought up by both members of the production planning team. This limits their ability to have as much control over the scheduling as they would want. "We have to be constantly checking their files (...) scheduling only a few days ahead isn't enough" said one team member. This narrow approach limits their capacity to effectively plan and optimize resources over an extended period. However, the section chiefs note the difficulties of scheduling too far ahead, as this would result in repeated rescheduling. "If I schedule too far ahead, I end up spending too much time rescheduling" explained one section chief (Section Chief, Saws). The Machination chief proposed a possible solution to address this problem: getting notified if a purchase order is not received on the confirmed date or if a certain section fails to meet the production deadline for a specific operation. "It would help if we got a warning when purchase orders are late. That way we could adjust our schedules sooner." he mentioned.

The production planning team suggested several improvements. They proposed the development of an automatic Key Performance Indicator (KPI) to measure compliance with deadlines, such as a compliance rate by project for each section. They also recommended implementing an alert system to notify them when a section chief schedules an operation for a date beyond the deadline, reducing the need to manually check every Sectional Planning file of the different sections. "An automatic alert system would save us a lot of time and ensure we stay on track with deadlines." suggested a member of the production planning team.

The chief of Production & Operations emphasized the need to connect the scheduling tools with other organizational information systems. He pointed out that the scheduling information is crucial not only for Production but also for Project Management and the Supply Chain department. "Integrating these tools with our other systems would greatly improve coordination with other departments (...) procurement would be more efficient if the dates of production were inputted into our Information Systems" he stated.

Overall, the feedback underscores the value of the new planning tools in improving efficiency, decision-making, and coordination within the organization, while also identifying areas for future improvements.

4 Findings, limitations and future work

4.1 Summary of findings – main improvements and limitations

The project described in this report was developed in the Business Transformation department of JPM Industry, located in Vale de Cambra, Portugal. Its main objective was to develop and implement Decision Support Systems (DSS) that facilitated the production planning decision-making of the organization.

Initially, in order to understand the processes and identify areas for improvement, several meetings took place with different stakeholders. Subsequently, the DSS were selected, developed and implemented, utilizing data extracted from MRP and ERP systems via SQL coding to generate valuable insights for enhancing productivity. Finally, user feedback was gathered to understand the users' assessment of the implemented tools.

In the past, decisions on production planning, scheduling, and sequencing at JPM Industry were mostly made based on intuition and experience as the coordinators of production didn't have the essential information to support their decisions. The implementation of the tools described in this project changed the paradigm of the company, promoting a more data-driven culture. Therefore, decisions became more objective, allowing a more efficient use of resources and improved organization.

The MPS tool provided the production planning team with the needed inputs to effectively set deadlines for the different sections, creating MPS that are both feasible and efficient, reducing the need for emergency measures and enabling a better allocation of resources. Additionally, this tool also allowed the team to check whether the different production sections were complying with the deadlines and enabled them to analyze future production scenarios, reducing the need to spend extra time on operational control and increasing their perception on the state of production. The coordination of operations between the different sections was also facilitated.

The Sectional Planning tools provided a digital way for section chiefs to schedule their section's operations while enabling them to assess the efficiency of their scheduling, resulting in better allocations of resources for the sections in which the tools were implemented. It also allowed the identification of sequencing opportunities, further reducing costs. Moreover, increased visibility over the production processes was also a positive aspect, enabling the production planning team to control projects without having to apply as much effort on operational control. The implementation of the PowerBI dashboards on the shop

floor also improved the work conditions for the operators, showing that the DSSs didn't just have an impact on higher management levels, but for the entire hierarchy.

The project's objectives were thus successfully achieved as the tools managed to meet users' expectations by being aligned with the organization's processes. Their implementation led to improved resource allocation, enhanced productivity, and improved coordination amongst production sections.

Although the DSSs have had significant contributions to the organization, they have several limitations. Despite the improved coordination within the production department, the tools haven't had a direct impact on other relevant departments, due to their lack of integration with the organization's main Information Systems. This limitation remained as one of the biggest challenges for production planning at JPM Industry, as the lack of integration between the MPS and MRP system especially difficults the application of Just-In-Time (JIT) principles. For JIT to be effective, real-time data and seamless communication between production and supply chain is essential. The lack of integration between the MPS tool and the MRP and procurement systems results in delays and inaccuracies in material deliveries, often causing excess inventory or stockouts. This was one of the main limitations found at the beginning of the project and it was not addressed by the implemented tools.

Additionally, the lack of integration also leads to frequent misalignments between sectional scheduling and the overall production schedule, complicated coordination and communication, and challenges in monitoring and adjusting schedules, which means that despite improvements from the implemented tools, the process still relies excessively on meetings and informal conversations to coordinate production activities.

Besides the lack of integration with the organization's Information Systems, the implemented DSSs also have limitations regarding software performance due to low processing times and issues with information robustness due to manual data entry and handling errors.

Furthermore, the inaccuracy of the BOO time estimates are also a significant limitation for the MPS tool. An average error of 45 minutes per operation raises some concerns as these inaccuracies might result in inefficient decision-making.

Finally, a significant limitation of the project is the lack of a quantitative analysis to evaluate the efficiency gains at JPM Industry provided by the new tools. In the field of Production Economics, methods like Data Envelopment Analysis are commonly used to assess efficiency improvements. However, due to the unavailability of reliable production

data and the brief duration of the internship, which restricted the implementation time of the DSSs, conducting a thorough efficiency study was not possible.

4.2 Recommendations for the host institution

Although the Decision Support Systems discussed in the report have improved the effectiveness of production planning processes at JPM Industry, it is clear that these processes are flawed. Specifically, creating a Master Production Schedule (MPS) by assigning deadlines to sections rather than to components of projects introduces inefficiencies. Operations of a specific project within the same section are all assigned an identical deadline, despite differing priorities. Although this is mitigated through communication, priority setting and the production team's extensive process knowledge, it requires unnecessary time and effort. To enable the creation of an MPS by setting deadlines for components and integrating it with the MRP, leading to an alignment with the best practices outlined in literature, it would be necessary to upgrade the organization's Information Systems.

This may include either purchasing an Advanced Planning and Scheduling (APS) system or transitioning from MRP I to MRP II, enabling the new software to conduct the scheduling breakdown of different projects independently. Although a significant investment and considerable modifications to production planning processes would be required, the update would increase system performance and successfully address several current issues.

However, if the company chooses to maintain its current protocols and IT infrastructure, there are still a number of improvements that can be made.

Relying on Excel files has shown to be a flawed solution, in spite of all the improvements that the new tools described in this report brought to the organization, resulting in problems with information robustness, lack of compatibility with other Information Systems, and issues with software performance. An option for addressing this issue is to enhance the tools outlined in the report by internally developing more sophisticated software.

Table 6 showcases the advantages and limitations of the three main options for the future: acquiring complex software such as APS or MRP II, internally developing the tools described in this report on improved software platforms, and continuing with the use of the current tools.

Table 6 - Advantages and limitations of the main planning software options

	APS / MRP II	Internal development	Excel-based DSS
Lower costs		X	X
High integration capabilities	X	X	
Increased robustness of information	X	X	
Scalability	X	X	
Vendor independence		X	X
Low implementation time			X
Customization options		X	X
Reduced complexity		X	X
Automatic scheduling optimization	X		
Automatic sequencing optimization	X		
Low expertise required			X
Familiarity			X
Better software performance	X	X	

Ultimately, it is recommended that a cost-benefit analysis should be realized in order to decide the best course to take. The decision should consider factors such as budget, complexity of planning needs, existing IT infrastructure, and long-term strategic goals.

BOO times will continue to be vital for creating operational plans and schedules, regardless if this information is processed by an MRP II, an APS software, or a production planning team member. Based on the findings it is recommended that the Industrialization department reviews its estimation processes to reduce the discrepancies between BOO and MES times and that further analysis is conducted periodically to monitor the accuracy of the estimations. Some possible solutions may include specialized training for the Industrialization team, acquiring complex software that performs these estimations based on previous operations, or creating departmental KPIs that promote estimation accuracy.

If the organization decides to continue using the same DSSs, whether on Microsoft Excel or on a new software, aside from continuing to adjust the tools based on user feedback,

one other important recommendation for the future would be to centralize the information relative to the different Sectional Planning tools. The information for every section being dispersed on different files or applications highly difficulties the production planning team's task of controlling the progress of projects. A single centralized platform where they could follow both the completion and the scheduling of operations for all sections would be a key production planning feature that would facilitate the identification of problems before they arise, allowing the team to more easily ensure that projects can be delivered to the clients on time without having to resort to emergency measures.

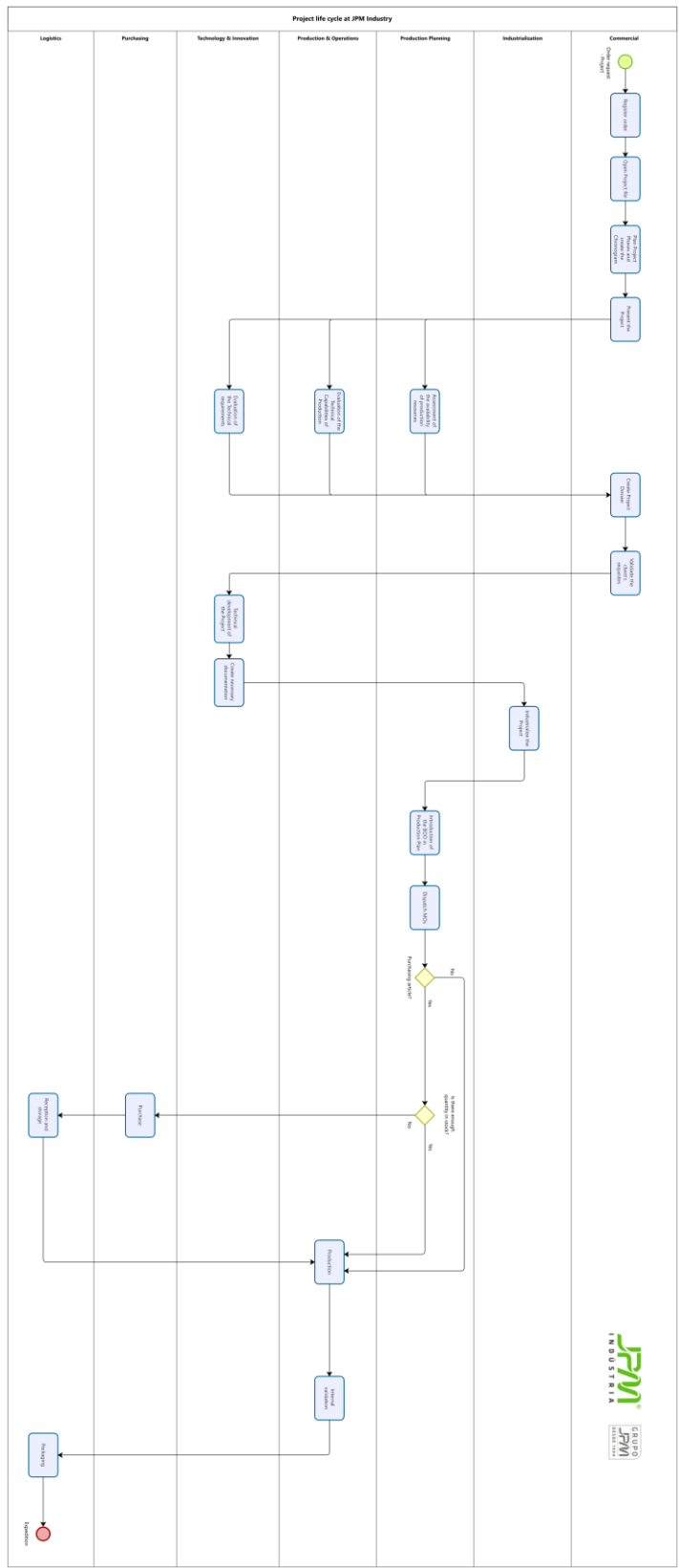
4.3 Contributions to the field

This internship report contributes to existing research on production planning and control by providing a showcase of the practical application of data management practices in an industrial environment. It demonstrates the benefits of implementing DSS for production planning in a real-world scenario while highlighting the need to align theoretical concepts with practical business operations. Additionally, by outlining the full implementation process, from the selection of the tools to the feedback from the users, it offers a comprehensive guide for future implementations. In contrast to the predominant focus on theoretical frameworks and model formulation in the literature related to Workload Control, this research provides a detailed demonstration of a successful implementation in an industry setting.

In most cases, the literature discusses complex algorithms that need robust software systems to be implemented in practice. This report presents a cost-effective way to improve the efficiency of production planning, especially for small and medium-sized enterprises. Furthermore, this report demonstrates that using DSS in production systems can improve production efficiency and resource allocation, showing promise for low-cost solutions that are consistent with the main goals of Production Economics.

Appendix

Appendix I – Life cycle of a project at JPM Industry



Appendix II – Examples of a BOO and MO at JPM Industry

Monitor de Camas Operacionais

Artigo: ACCIONAMENTO ESQUERDO DRIVE UNIT JPM024

hcs MANUFACTORY

Versão Base

Operações do Artigo: Reference code of the final product

Ordem	Operação	Descrição Operação	Centro trabalho	Nome centro	Tempo Op.
1	P07	MONTAR	C27	ACIONAMENTOS	90m

Operação: P07 - MONTAR

Operação: P07 - MONTAR

Centro de Trabalho: C27

Grupo: ACIONAMENTOS

Ferramenta: R04

Mão-Obra: MONTADOR

Tempos: BOO time

Operação: 90m por 1,00 UN

Preparação: 0.00000

Verificar árvore

Routing



056/23 → Project code

Artigo: FLANGE PARA VEIO COMANDO SUPERIOR PALETIZADOR

Desenho nº

Programação nº

MO Code ← 00158183



Quantidade

Quantity ← 10

Entrega

Date of delivery ← 27.04.2023



Reference of the final product

Operation: P04-MAQUINAR

Work center: C37-FRESAGEM

3h30m

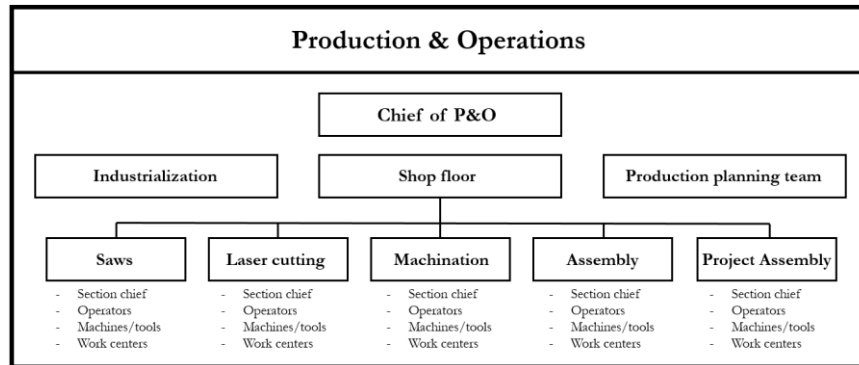


10 -

10.000 UN - BLOCO AÇO (S355JR) 140X105X30 MM -

Reference of the component

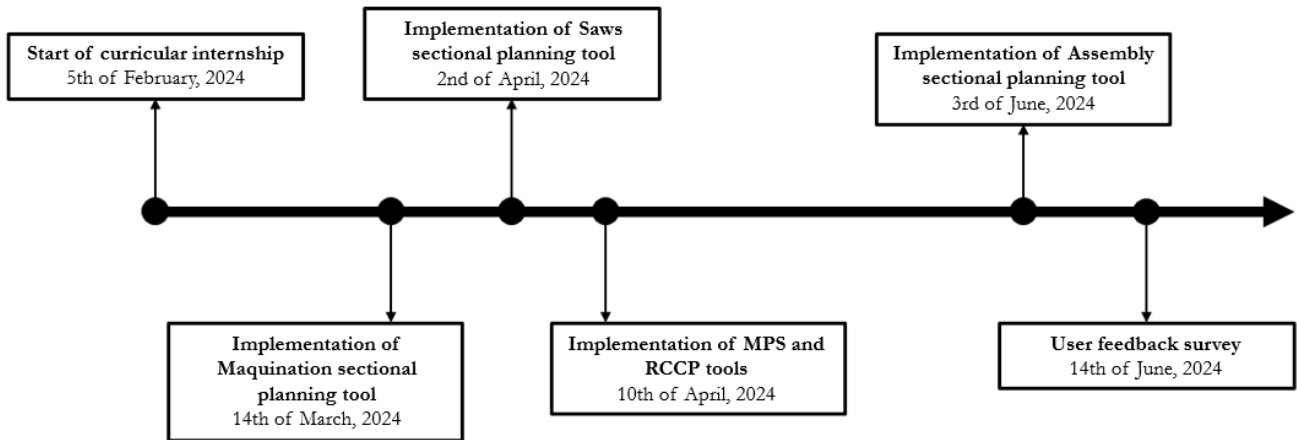
Appendix III - Functional division of the P&O department at JPM Industry



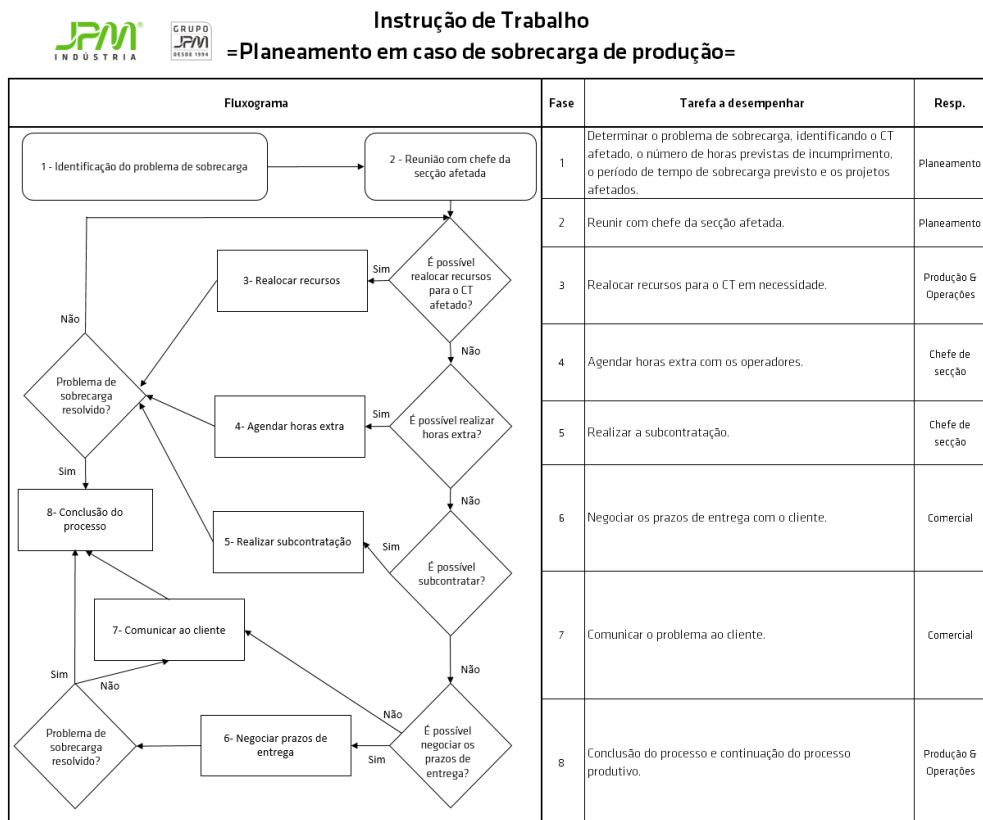
Appendix IV – Active work centers at JPM Industry

Work center code	Name (English)	Name (Portuguese)	Section
CT02	Saws	Serrotes	Saws
CT08	Tube grinding	Esmerilagem tubo	Laser cutting
CT09	Profile cutting	Corte perfis	Saws
CT16	Scalloping	Escatelagem	Machination
CT18	Rolling	Calandragem	Laser cutting
CT21	Welding	Soldadura	Project Assembly
CT22	Pre-assembly	Pré-montagem	Assembly
CT23	Fragments	Troços	Assembly
CT24	Curves	Curvas	Assembly
CT25	Functional units	Unidades funcionais	Assembly
CT27	Actuators	Acionamentos	Assembly
CT28	Project Assembly	Montagem projetos	Project Assembly
CT30	Thread tapping	Roscagem	Laser cutting
CT32	Washing	Lavagem	Assembly
CT33	Automation	Automação	Assembly
CT35	Laser cutting	Corte laser	Laser cutting
CT36	Turning	Torneamento	Machination
CT37	Milling	Fresagem	Machination
CT38	Bending	Quinagem	Laser cutting
CT40	Stripping	Decapagem	Machination
CT42	Laser marking	Marcação laser	Assembly
CT43	CNC Router	CNC Router	Machination
CT45	Machinery finishing	Acabamento maquinação	Machination
CT46	Laser cutting finishing	Acabamento corte laser	Laser cutting
CT47	Carbon steel laser cutting	Corte laser aço carbono	Laser cutting

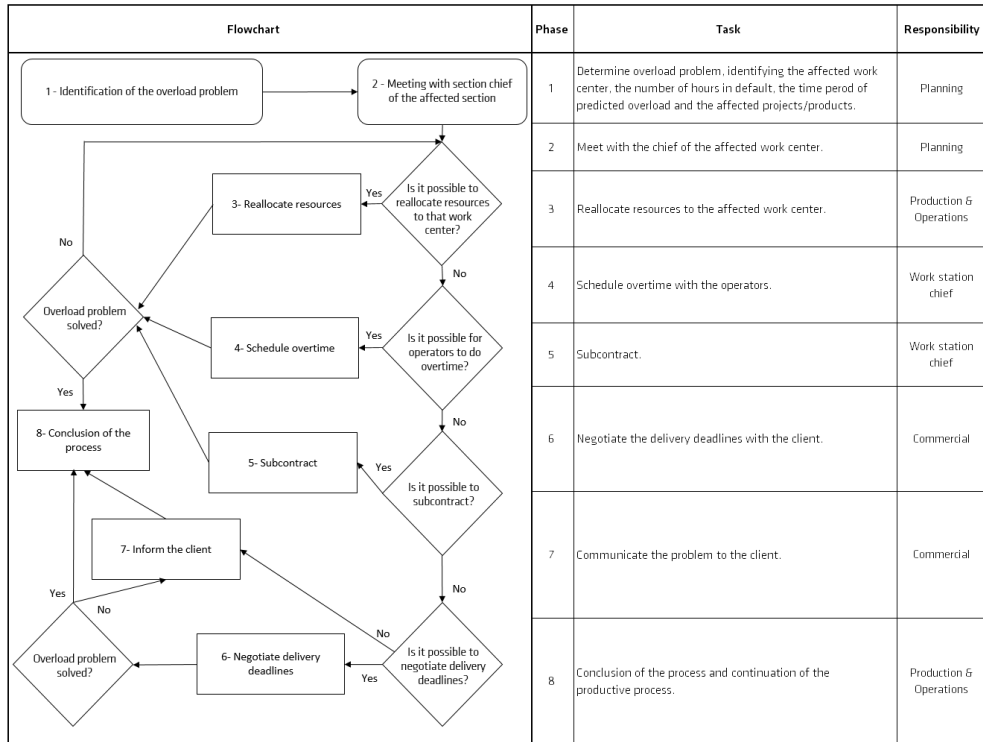
Appendix V - Chronogram of important milestones



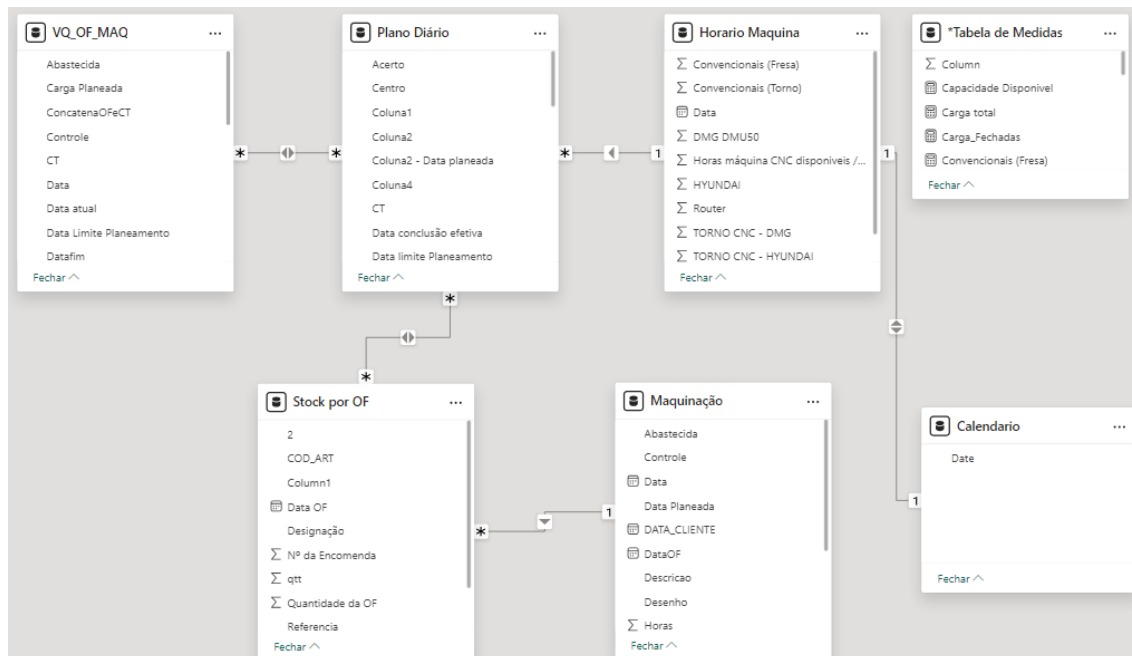
Appendix VI – Working Instruction in case of production overload



Working Instruction =Planning process in case of production overload=



Appendix VII – PowerBI Data Model



Appendix VIII – PowerBI dashboards on the shop floor



Appendix IX – User feedback survey

Inquérito de feedback das ferramentas de planeamento

Caro colaborador, gostaríamos de contar com a sua ajuda para avaliar as novas ferramentas de planeamento. O seu feedback é fundamental para que possamos aprimorar os nossos processos e atender melhor às suas necessidades. Obrigado pela sua participação!

Qual a sua função na empresa?

Your answer

As novas ferramentas de planeamento facilitam a realização das minhas tarefas na empresa.

☐ Concordo totalmente

☐ Concordo

☐ Indiferente

☐ Discordo

☐ Discordo totalmente

As novas ferramentas de planeamento estão adaptadas à realidade da empresa.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

A utilização das novas ferramentas de planeamento é fácil e intuitiva.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

As novas ferramentas de planeamento funcionam rapidamente e sem impedimentos.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

As novas ferramentas de planeamento ajudam a melhorar a coordenação entre as diferentes secções de produção.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

As novas ferramentas de planeamento melhoraram a eficiência dos processos de produção.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

As novas ferramentas de planeamento oferecem os dados necessários para melhorar as decisões de planeamento.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

A formação para a utilização das novas ferramentas de planeamento foi adequada.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

As novas ferramentas de planeamento ainda necessitam de muitas melhorias para chegarem ao seu ponto ideal.

- ☐ Concordo totalmente
- ☐ Concordo
- ☐ Indiferente
- ☐ Discordo
- ☐ Discordo totalmente

Com que frequência utiliza as ferramentas de planeamento?

- ☐ Constantemente
- ☐ Diariamente
- ☐ Semanalmente
- ☐ Raramente
- ☐ Nunca

Quais as principais melhorias proporcionadas pelas novas ferramentas?

Your answer

Quais as principais limitações das novas ferramentas?

Your answer

Quais as suas sugestões de melhoria para um sistema de ferramentas de planeamento futuro?

Your answer

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Feedback survey on new planning tools

Dear colleague, we would like to ask for your help in evaluating the new planning tools. Your feedback is essential for us to improve our processes and better meet your needs. Thank you for your participation!

What is your role in the company?

Your answer

The new planning tools make it easier for me to perform my tasks at the company.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The new planning tools are adapted to the reality of the company.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The use of the new planning tools is easy and intuitive.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The new planning tools help improve coordination between different production sections.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The new planning tools have improved the efficiency of the production processes.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The new planning tools provide the necessary data to improve planning decision-making.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The training for the use of the new planning tools was adequate.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

The new planning tools still require many improvements to reach their ideal point.

- ☐ Fully agree
- ☐ Agree
- ☐ Indifferent
- ☐ Disagree
- ☐ Fully disagree

How often do you use the new planning tools?

- ☐ Constantly
- ☐ Daily
- ☐ Weekly
- ☐ Rarely
- ☐ Never

What are the main improvements provided by the new tools?

Your answer

What are the main limitations of the new tools?

Your answer

What are your improvement suggestions for a future planning tools system?

Your answer

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Annexes

BOO time	MES time	BOO-MES	BOO – MES
3	3,7586111	-0,7586111	0,7586111
0,5	2,0819444	-1,5819444	1,5819444
0,5	0,2388889	0,2611111	0,2611111
2	1,9991667	0,0008333	0,0008333
4	3,9333333	0,0666667	0,0666667
2	0,34	1,66	1,66
1	0,2075	0,7925	0,7925
0,5	1,1836111	-0,6836111	0,6836111
0,5	0,1083333	0,3916667	0,3916667
0,5	0,3961111	0,1038889	0,1038889
3	4,2713889	-1,2713889	1,2713889
0,4	0,3375	0,0625	0,0625
0,5	0,0497222	0,4502778	0,4502778
1	0,8997222	0,1002778	0,1002778
0,5	0,5675	-0,0675	0,0675
0,5	0,0883333	0,4116667	0,4116667
1	2,5027778	-1,5027778	1,5027778
0,5	0,4975	0,0025	0,0025
0,5	1,13	-0,63	0,63
1,5	1,7044444	-0,2044444	0,2044444
0,5	0,6708333	-0,1708333	0,1708333
42	38,8419444	3,1580556	3,1580556
1	1,1525	-0,1525	0,1525
1,5	1,0983333	0,4016667	0,4016667
13	12,7533333	0,2466667	0,2466667
2	1,5063889	0,4936111	0,4936111
3,5	3,5255556	-0,0255556	0,0255556
0,5	0,09	0,41	0,41
0,5	0,2094444	0,2905556	0,2905556
0,5	0,1116667	0,3883333	0,3883333
0,5	0,2269444	0,2730556	0,2730556
4	4,0855556	-0,0855556	0,0855556
0,25	0,3069444	-0,0569444	0,0569444
0,5	2,655	-2,155	2,155
0,5	0,1311111	0,3688889	0,3688889
0,5	0,0613889	0,4386111	0,4386111
0,5	0,0375	0,4625	0,4625
0,5	0,5013889	-0,0013889	0,0013889
0,5	1,4069444	-0,9069444	0,9069444
0,5	1,2008333	-0,7008333	0,7008333
13	11,6758333	1,3241667	1,3241667
1	0,8411111	0,1588889	0,1588889
1	0,2308333	0,7691667	0,7691667
0,5	0,1711111	0,3288889	0,3288889
0,5	1,4202778	-0,9202778	0,9202778
0,25	0,3013889	-0,0513889	0,0513889
0,5	0,5838889	-0,0838889	0,0838889
4	3,8238889	0,1761111	0,1761111
1	0,8355556	0,1644444	0,1644444
2	1,4886111	0,5113889	0,5113889
0,4	0,3844444	0,0155556	0,0155556
0,5	0,5872222	-0,0872222	0,0872222
1,5	3,6736111	-2,1736111	2,1736111
0,5	0,1305556	0,3694444	0,3694444
0,5	0,3908333	0,1091667	0,1091667
5	4,5752778	0,4247222	0,4247222
0,5	0,0275	0,4725	0,4725
0,5	0,1302778	0,3697222	0,3697222
4	3,5236111	0,4763889	0,4763889
0,5	0,6683333	-0,1683333	0,1683333
0,25	0,3166667	-0,0666667	0,0666667
0,5	0,5686111	-0,0686111	0,0686111
0,5	0,1716667	0,3283333	0,3283333
6	5,1194444	0,8805556	0,8805556
6	5,2005556	0,7994444	0,7994444
1,5	1,4688889	0,0311111	0,0311111
0,5	1,5472222	-1,0472222	1,0472222
0,4	0,3263889	0,0736111	0,0736111
37	32,9558333	4,0441667	4,0441667
7	5,3383333	1,6616667	1,6616667
8	7,8908333	0,1091667	0,1091667
1	1,5680556	-0,5680556	0,5680556
0,5	0,375	0,125	0,125
0,5	0,4363889	0,0636111	0,0636111
5	7,2188889	-2,2188889	2,2188889
3	3,2152778	-0,2152778	0,2152778
1	0,9872222	0,0127778	0,0127778
1	0,955	0,045	0,045
0,25	0,3005556	-0,0505556	0,0505556
0,5	0,2425	0,2575	0,2575
0,5	2,8008333	-2,3008333	2,3008333
0,5	0,0605556	0,4394444	0,4394444
0,5	0,1888889	0,3111111	0,3111111
3,5	3,0825	0,4175	0,4175
0,5	0,1819444	0,3180556	0,3180556
0,5	0,0761111	0,4238889	0,4238889
0,5	0,0286111	0,4713889	0,4713889
0,4	0,3280556	0,0719444	0,0719444
0,5	0,1605556	0,3394444	0,3394444
1,5	1,9380556	-0,4380556	0,4380556
0,5	0,0991667	0,4008333	0,4008333
0,5	0,1608333	0,3391667	0,3391667
0,5	1,3986111	-0,8986111	0,8986111
0,5	0,6397222	-0,1397222	0,1397222
1	0,2077778	0,7922222	0,7922222
1,5	1,9294444	-0,4294444	0,4294444
1	1,5327778	-0,5327778	0,5327778

1	0,0283333	0,9716667	0,9716667
0,5	0,4408333	0,0591667	0,0591667
0,5	0,2208333	0,2791667	0,2791667
8	8,0502778	-0,0502778	0,0502778
9	7,0497222	1,9502778	1,9502778
3	3,6763889	-0,6763889	0,6763889
1,25	1,6966667	-0,4466667	0,4466667
0,5	0,2575	0,2425	0,2425
0,5	0,6972222	-0,1972222	0,1972222
0,5	1,7033333	-1,2033333	1,2033333
0,5	1,1361111	-0,6361111	0,6361111
0,5	0,0813889	0,4186111	0,4186111
0,5	0,4236111	0,0763889	0,0763889
0,5	0,6958333	-0,1958333	0,1958333
2	1,8952778	0,1047222	0,1047222
0,25	0,3258333	-0,0758333	0,0758333
0,5	0,1727778	0,3272222	0,3272222
0,5	0,4952778	0,0047222	0,0047222
0,5	2,3069444	-1,8069444	1,8069444
0,5	0,0558333	0,4441667	0,4441667
0,5	0,065	0,435	0,435
0,25	0,3258333	-0,0758333	0,0758333
0,25	0,2761111	-0,0261111	0,0261111
1,5	2,0083333	-0,5083333	0,5083333
1	0,2969444	0,7030556	0,7030556
0,4	0,3402778	0,0597222	0,0597222
1	1,0286111	-0,0286111	0,0286111
1	0,3241667	0,6758333	0,6758333
8	7,515	0,485	0,485
0,5	0,5377778	-0,0377778	0,0377778
8	7,7136111	0,2863889	0,2863889
0,5	2,2455556	-1,7455556	1,7455556
1	0,8661111	0,1338889	0,1338889
1,5	2,1591667	-0,6591667	0,6591667
1	0,8252778	0,1747222	0,1747222
0,5	0,43	0,07	0,07
1	0,2091667	0,7908333	0,7908333
2	1,8888889	0,1111111	0,1111111
1	1,4291667	-0,4291667	0,4291667
6	5,4330556	0,5669444	0,5669444
0,5	1,7211111	-1,2211111	1,2211111
2	3,2547222	-1,2547222	1,2547222
0,5	0,0233333	0,4766667	0,4766667
0,5	0,5438889	-0,0438889	0,0438889
1,5	1,3863889	0,1136111	0,1136111
0,5	1,4133333	-0,9133333	0,9133333
9	9,5080556	-0,5080556	0,5080556
4	3,7822222	0,2177778	0,2177778
1,5	2,0052778	-0,5052778	0,5052778
0,5	0,0425	0,4575	0,4575
0,5	0,6030556	-0,1030556	0,1030556
0,5	0,3877778	0,1122222	0,1122222
4	3,3147222	0,6852778	0,6852778
0,5	0,2438889	0,2561111	0,2561111
4	5,895	-1,895	1,895
2	2,0783333	-0,0783333	0,0783333
0,5	0,6322222	-0,1322222	0,1322222
0,5	0,8061111	-0,3061111	0,3061111
2	1,5038889	0,4961111	0,4961111
0,5	0,4983333	0,0016667	0,0016667
51	37,0216667	13,9783333	13,9783333
1,5	1,6791667	-0,1791667	0,1791667
21	29,0261111	-8,0261111	8,0261111
1	0,8341667	0,1658333	0,1658333
4	5,3588889	-1,3588889	1,3588889
1	0,8755556	0,1244444	0,1244444
1	0,7569444	0,2430556	0,2430556
5	4,9855556	0,0144444	0,0144444
0,5	2,5752778	-2,0752778	2,0752778
0,5	0,7775	-0,2775	0,2775
1	0,8005556	0,1994444	0,1994444
0,5	0,0725	0,4275	0,4275
0,5	0,1636111	0,3363889	0,3363889
0,5	1,3438889	-0,8438889	0,8438889
10	9,2033333	0,7966667	0,7966667
4	2,9219444	1,0780556	1,0780556
0,5	1,1638889	-0,6638889	0,6638889
0,5	0,1958333	0,3041667	0,3041667
0,5	2,51	-2,01	2,01
4	3,1819444	0,8180556	0,8180556
0,5	0,0236111	0,4763889	0,4763889
0,5	2,0997222	-1,5997222	1,5997222
0,5	1,2813889	-0,7813889	0,7813889
0,5	2,2938889	-1,7938889	1,7938889
0,5	0,4352778	0,0647222	0,0647222
2	1,6144444	0,3855556	0,3855556
1	2,725	-1,725	1,725
0,5	0,4730556	0,0269444	0,0269444
4	3,4136111	0,5863889	0,5863889
0,5	0,0861111	0,4138889	0,4138889
2	2,7986111	-0,7986111	0,7986111
0,25	0,3238889	-0,0738889	0,0738889
0,5	0,5002778	-0,0002778	0,0002778
0,5	0,0913889	0,4086111	0,4086111
0,5	0,0516667	0,4483333	0,4483333
0,5	0,6252778	-0,1252778	0,1252778
1	0,8986111	0,1013889	0,1013889
0,5	0,0652778	0,4347222	0,4347222
4	3,8725	0,1275	0,1275
2,5	3,7577778	-1,2577778	1,2577778
0,5	0,4019444	0,0980556	0,0980556

10	9,8647222	0,1352778	0,1352778
3	3,2	-0,2	0,2
0,5	0,1188889	0,3811111	0,3811111
1	0,3144444	0,6855556	0,6855556
0,5	0,8005556	-0,3005556	0,3005556
0,5	0,4638889	0,0361111	0,0361111
1	1,2091667	-0,2091667	0,2091667
1	1,3605556	-0,3605556	0,3605556
0,5	0,6680556	-0,1680556	0,1680556
9	7,9427778	1,0572222	1,0572222
5	5,0255556	-0,0255556	0,0255556
1	2,2708333	-1,2708333	1,2708333
2	2,0844444	-0,0844444	0,0844444
1,5	1,3819444	0,1180556	0,1180556
0,5	0,1086111	0,3913889	0,3913889
0,5	2,7147222	-2,2147222	2,2147222
2	1,7347222	0,2652778	0,2652778
0,5	0,5986111	-0,0986111	0,0986111
14,5	13,9261111	0,5738889	0,5738889
0,25	0,2838889	-0,0338889	0,0338889
38	27,5511111	10,4488889	10,4488889
0,5	0,0413889	0,4586111	0,4586111
0,5	0,4580556	0,0419444	0,0419444
2	2,3144444	-0,3144444	0,3144444
2	2,4519444	-0,4519444	0,4519444
0,5	0,0275	0,4725	0,4725
2,5	4,115	-1,615	1,615
2	1,5427778	0,4572222	0,4572222
15	10,7658333	4,2341667	4,2341667
0,5	0,2252778	0,2747222	0,2747222
0,5	0,0227778	0,4772222	0,4772222
15	12,2247222	2,7752778	2,7752778
2,5	2,2288889	0,2711111	0,2711111
0,5	0,5016667	-0,0016667	0,0016667
0,75	0,645	0,105	0,105
0,5	0,0875	0,4125	0,4125
0,75	0,6752778	0,0747222	0,0747222
0,5	2,7575	-2,2575	2,2575
2	1,4925	0,5075	0,5075
1	0,8355556	0,1644444	0,1644444
0,25	0,3108333	-0,0608333	0,0608333
1	3,6655556	-2,6655556	2,6655556
0,5	0,6011111	-0,1011111	0,1011111
5	7,2805556	-2,2805556	2,2805556
0,5	0,0180556	0,4819444	0,4819444
0,5	0,4722222	0,0277778	0,0277778
2	1,4372222	0,5627778	0,5627778
0,75	1,2938889	-0,5438889	0,5438889
0,5	0,0661111	0,4338889	0,4338889
0,5	0,2091667	0,2908333	0,2908333
2,5	2,255	0,245	0,245
0,5	0,2327778	0,2672222	0,2672222
3	2,9763889	0,0236111	0,0236111
1	0,2661111	0,7338889	0,7338889
1	1,4172222	-0,4172222	0,4172222
1	0,8383333	0,1616667	0,1616667
0,5	0,055	0,445	0,445
1	0,7430556	0,2569444	0,2569444
2	1,9130556	0,0869444	0,0869444
0,5	1,3052778	-0,8052778	0,8052778
11	11,1522222	-0,1522222	0,1522222
1	0,7408333	0,2591667	0,2591667
1,5	2,4033333	-0,9033333	0,9033333
0,4	0,3475	0,0525	0,0525
1	2,7052778	-1,7052778	1,7052778
0,5	0,0986111	0,4013889	0,4013889
25	21,5355556	3,4644444	3,4644444
0,5	0,0616667	0,4383333	0,4383333
0,5	0,105	0,395	0,395
0,8	0,6947222	0,1052778	0,1052778
1,5	0,1738889	1,3261111	1,3261111
0,5	0,2511111	0,2488889	0,2488889
5	5,4186111	-0,4186111	0,4186111
0,5	0,04	0,46	0,46
10	9,6902778	0,3097222	0,3097222
20	16,1538889	3,8461111	3,8461111
2	1,7211111	0,2788889	0,2788889
0,5	0,5141667	-0,0141667	0,0141667
0,5	0,0216667	0,4783333	0,4783333
1	0,9961111	0,0038889	0,0038889
0,5	0,8186111	-0,3186111	0,3186111
0,5	1,7408333	-1,2408333	1,2408333
1	0,9105556	0,0894444	0,0894444
0,5	0,1283333	0,3716667	0,3716667
50	40,2666667	9,7333333	9,7333333
1	1,0047222	-0,0047222	0,0047222
7	7,4347222	-0,4347222	0,4347222
2	0,3580556	1,6419444	1,6419444
0,5	0,5380556	-0,0380556	0,0380556
1	2,9219444	-1,9219444	1,9219444
1	0,1594444	0,8405556	0,8405556
0,5	0,0722222	0,4277778	0,4277778
4	3,9444444	0,0555556	0,0555556
1	0,9463889	0,0536111	0,0536111
0,4	0,3555556	0,0444444	0,0444444
0,5	0,1322222	0,3677778	0,3677778
0,5	1,3958333	-0,8958333	0,8958333
0,5	0,0338889	0,4661111	0,4661111
4	5,9983333	-1,9983333	1,9983333
0,4	0,3419444	0,0580556	0,0580556
0,5	0,4966667	0,0033333	0,0033333

0,4	0,3316667	0,0683333	0,0683333
2	1,8316667	0,1683333	0,1683333
2	2,1658333	-0,1658333	0,1658333
3	2,2361111	0,7638889	0,7638889
0,5	0,2747222	0,2252778	0,2252778
0,25	0,3166667	-0,0666667	0,0666667
2	2,0530556	-0,0530556	0,0530556
2	1,8766667	0,1233333	0,1233333
0,5	0,6786111	-0,1786111	0,1786111
1	0,8938889	0,1061111	0,1061111
6	5,3219444	0,6780556	0,6780556
0,5	0,2302778	0,2697222	0,2697222
0,5	0,6958333	-0,1958333	0,1958333
0,5	1,9547222	-1,4547222	1,4547222
1	0,1027778	0,8972222	0,8972222
0,5	0,0363889	0,4636111	0,4636111
7	6,8352778	0,1647222	0,1647222
0,5	1,745	-1,245	1,245
10	8,5641667	1,4358333	1,4358333
0,5	0,3813889	0,1186111	0,1186111
0,5	0,2447222	0,2552778	0,2552778
4	3,3430556	0,6569444	0,6569444
2	2,1177778	-0,1177778	0,1177778
1	0,0202778	0,9797222	0,9797222
10	9,7383333	0,2616667	0,2616667
0,5	0,1361111	0,3638889	0,3638889
0,5	0,1402778	0,3597222	0,3597222
6	5,7022222	0,2977778	0,2977778
1	3,7144444	-2,7144444	2,7144444
8	7,6005556	0,3994444	0,3994444
0,5	1,7019444	-1,2019444	1,2019444
1	0,7769444	0,2230556	0,2230556
1	1,1894444	-0,1894444	0,1894444
3	3,1425	-0,1425	0,1425
5	4,1536111	0,8463889	0,8463889
0,5	0,1213889	0,3786111	0,3786111
0,5	0,5869444	-0,0869444	0,0869444
2	1,7086111	0,2913889	0,2913889
0,5	0,4419444	0,0580556	0,0580556
4	3,5058333	0,4941667	0,4941667
1	2,5263889	-1,5263889	1,5263889
0,5	1,1836111	-0,6836111	0,6836111
0,5	2,0591667	-1,5591667	1,5591667
12	11,5830556	0,4169444	0,4169444
1	3,7372222	-2,7372222	2,7372222
0,5	0,1844444	0,3155556	0,3155556
1	1,0136111	-0,0136111	0,0136111
0,5	0,4075	0,0925	0,0925
7	7,0061111	-0,0061111	0,0061111
0,5	0,0225	0,4775	0,4775
0,5	0,4308333	0,0691667	0,0691667
0,5	0,4402778	0,0597222	0,0597222
0,5	0,0736111	0,4263889	0,4263889
1	0,8622222	0,1377778	0,1377778
1	0,0816667	0,9183333	0,9183333
0,5	0,1769444	0,3230556	0,3230556
1,5	1,1122222	0,3877778	0,3877778
1	0,7819444	0,2180556	0,2180556
1	1,6113889	-0,6113889	0,6113889
0,5	0,2369444	0,2630556	0,2630556
4	3,9486111	0,0513889	0,0513889
1	1,0613889	-0,0613889	0,0613889
1	0,84	0,16	0,16
2	1,5241667	0,4758333	0,4758333
2,5	4,0752778	-1,5752778	1,5752778
0,25	0,1811111	0,0688889	0,0688889
7	6,11	0,89	0,89
0,25	0,2905556	-0,0405556	0,0405556
0,5	0,2069444	0,2930556	0,2930556
0,5	1,3552778	-0,8552778	0,8552778
0,5	0,4519444	0,0480556	0,0480556
8	7,4730556	0,5269444	0,5269444
2,5	3,3116667	-0,8116667	0,8116667
20	17,5488889	2,4511111	2,4511111
25	24,8611111	0,1388889	0,1388889
0,5	0,4541667	0,0458333	0,0458333
1	0,9055556	0,0944444	0,0944444
9	8,1869444	0,8130556	0,8130556
0,5	2,5413889	-2,0413889	2,0413889
0,5	0,0652778	0,4347222	0,4347222
15	14,8216667	0,1783333	0,1783333
0,5	0,3683333	0,1316667	0,1316667
0,5	0,5705556	-0,0705556	0,0705556
0,25	0,2875	-0,0375	0,0375
2	1,6305556	0,3694444	0,3694444
1	1,5272222	-0,5272222	0,5272222
1	1,0575	-0,0575	0,0575
3	2,7236111	0,2763889	0,2763889
4,5	4,8769444	-0,3769444	0,3769444
1	0,9869444	0,0130556	0,0130556
0,5	0,0311111	0,4688889	0,4688889
2	2,0094444	-0,0094444	0,0094444
0,5	0,0505556	0,4494444	0,4494444
1	0,8861111	0,1138889	0,1138889
0,5	0,035	0,465	0,465
5	4,6663889	0,3336111	0,3336111
0,5	0,1952778	0,3047222	0,3047222
0,5	0,4913889	0,0086111	0,0086111
0,5	0,1452778	0,3547222	0,3547222
0,5	0,5697222	-0,0697222	0,0697222
0,4	0,3341667	0,0658333	0,0658333

0,4	0,3263889	0,0736111	0,0736111
0,5	0,6813889	-0,1813889	0,1813889
0,5	0,1586111	0,3413889	0,3413889
0,5	0,5122222	-0,0122222	0,0122222
31	25,8016667	5,1983333	5,1983333
1	1,1680556	-0,1680556	0,1680556
1	0,8880556	0,1119444	0,1119444
1	1,0283333	-0,0283333	0,0283333
1,25	1,0105556	0,2394444	0,2394444
4	3,8388889	0,1611111	0,1611111
16	15,0152778	0,9847222	0,9847222
0,5	0,1922222	0,3077778	0,3077778
0,5	0,4869444	0,0130556	0,0130556
4	5,8566667	-1,8566667	1,8566667
0,5	0,6130556	-0,1130556	0,1130556
0,5	2,1286111	-1,6286111	1,6286111
2	0,0180556	1,9819444	1,9819444
0,25	0,3030556	-0,0530556	0,0530556
0,5	0,8052778	-0,3052778	0,3052778
7	7,4747222	-0,4747222	0,4747222
0,5	0,2041667	0,2958333	0,2958333
0,5	0,4011111	0,0988889	0,0988889
1	0,9172222	0,0827778	0,0827778
0,5	0,5911111	-0,0911111	0,0911111
0,5	0,6158333	-0,1158333	0,1158333
0,5	0,8147222	-0,3147222	0,3147222
0,5	0,6413889	-0,1413889	0,1413889
0,5	0,0672222	0,4327778	0,4327778
0,5	2,1127778	-1,6127778	1,6127778
7	8,2791667	-1,2791667	1,2791667
9	7,5769444	1,4230556	1,4230556
0,5	0,2625	0,2375	0,2375
1	1,0166667	-0,0166667	0,0166667
1	0,33	0,67	0,67
34	25,5258333	8,4741667	8,4741667
0,5	0,1472222	0,3527778	0,3527778
0,5	0,07	0,43	0,43
2	2,6088889	-0,6088889	0,6088889
0,5	0,0838889	0,4161111	0,4161111
0,5	0,1636111	0,3363889	0,3363889
1	0,9430556	0,0569444	0,0569444
12	10,8216667	1,1783333	1,1783333
1	0,8538889	0,1461111	0,1461111
0,5	0,3580556	0,1419444	0,1419444
4	3,0975	0,9025	0,9025
1,5	0,0694444	1,4305556	1,4305556
0,5	0,0591667	0,4408333	0,4408333
0,5	0,1116667	0,3883333	0,3883333
0,5	0,0625	0,4375	0,4375
7	7,4194444	-0,4194444	0,4194444
0,5	1,3575	-0,8575	0,8575
0,5	0,22	0,28	0,28
1	0,7969444	0,2030556	0,2030556
0,5	1,3338889	-0,8338889	0,8338889
16	14,3336111	1,6663889	1,6663889
0,5	0,0269444	0,4730556	0,4730556
2,5	2,3122222	0,1877778	0,1877778
1	2,6080556	-1,6080556	1,6080556
11	10,6455556	0,3544444	0,3544444
0,25	0,325	-0,075	0,075
0,5	2,5025	-2,0025	2,0025
0,5	3,4655556	-2,9655556	2,9655556
9	7,5433333	1,4566667	1,4566667
0,5	0,7427778	-0,2427778	0,2427778
0,5	0,4086111	0,0913889	0,0913889
0,25	0,2966667	-0,0466667	0,0466667
5	4,1602778	0,8397222	0,8397222
0,5	0,5433333	-0,0433333	0,0433333
0,5	0,3994444	0,1005556	0,1005556
4	4,1919444	-0,1919444	0,1919444
0,5	0,1813889	0,3186111	0,3186111
0,5	0,5230556	-0,0230556	0,0230556
2	4,3838889	-2,3838889	2,3838889
1	1,1144444	-0,1144444	0,1144444
0,5	0,4536111	0,0463889	0,0463889
0,5	0,0344444	0,4655556	0,4655556
0,5	0,2463889	0,2536111	0,2536111
0,5	1,5663889	-1,0663889	1,0663889
5	4,465	0,535	0,535
0,25	0,2847222	-0,0347222	0,0347222
0,5	0,1255556	0,3744444	0,3744444
0,5	0,0813889	0,4186111	0,4186111
5	4,8319444	0,1680556	0,1680556
1,5	1,245	0,255	0,255
0,5	0,0702778	0,4297222	0,4297222
0,5	0,1577778	0,3422222	0,3422222
1	1,1794444	-0,1794444	0,1794444
0,5	0,0988889	0,4011111	0,4011111
0,4	0,6611111	-0,2611111	0,2611111
0,5	3,0019444	-2,5019444	2,5019444
4	4,0277778	-0,0277778	0,0277778
0,5	0,1216667	0,3783333	0,3783333
0,5	0,1772222	0,3227778	0,3227778
0,5	0,1366667	0,3633333	0,3633333
1	0,9952778	0,0047222	0,0047222
0,5	1,9180556	-1,4180556	1,4180556
1	0,8547222	0,1452778	0,1452778
20	18,7416667	1,2583333	1,2583333
0,5	0,1005556	0,3994444	0,3994444
0,5	1,5130556	-1,0130556	1,0130556
0,5	1,5902778	-1,0902778	1,0902778

0,5	0,4283333	0,0716667	0,0716667
0,25	0,3208333	-0,0708333	0,0708333
1	0,9272222	0,0727778	0,0727778
1	0,8775	0,1225	0,1225
0,5	0,1980556	0,3019444	0,3019444
0,4	0,3455556	0,0544444	0,0544444
0,5	0,6366667	-0,1366667	0,1366667
1	1,2213889	-0,2213889	0,2213889
0,5	0,2272222	0,2727778	0,2727778
4	4,4083333	-0,4083333	0,4083333
0,5	0,5183333	-0,0183333	0,0183333
1	1,0905556	-0,0905556	0,0905556
0,75	3,6422222	-2,8922222	2,8922222
1	0,8122222	0,1877778	0,1877778
0,5	0,0408333	0,4591667	0,4591667
1,5	1,5144444	-0,0144444	0,0144444
0,5	2,1752778	-1,6752778	1,6752778
10	10,6194444	-0,6194444	0,6194444
1	0,9833333	0,0166667	0,0166667
0,5	0,0205556	0,4794444	0,4794444
0,5	1,1688889	-0,6688889	0,6688889
4	3,3291667	0,6708333	0,6708333
18	16,7722222	1,2277778	1,2277778
7	6,4244444	0,5755556	0,5755556
1	0,9155556	0,0844444	0,0844444
1,5	1,8994444	-0,3994444	0,3994444
4	3,15	0,85	0,85
3	4,2319444	-1,2319444	1,2319444
12	11,4897222	0,5102778	0,5102778
0,5	0,1605556	0,3394444	0,3394444
1	0,8377778	0,1622222	0,1622222
1	0,7525	0,2475	0,2475
0,5	0,0713889	0,4286111	0,4286111
26	25,9227778	0,0772222	0,0772222
20	18,2536111	1,7463889	1,7463889
1	1,2441667	-0,2441667	0,2441667
1	0,025	0,975	0,975
0,5	0,1416667	0,3583333	0,3583333
15	15,16	-0,16	0,16
0,5	0,6738889	-0,1738889	0,1738889
0,5	2,2511111	-1,7511111	1,7511111
0,5	0,3788889	0,1211111	0,1211111
8	8,8933333	-0,8933333	0,8933333
0,5	0,2027778	0,2972222	0,2972222
1	0,8602778	0,1397222	0,1397222
1	0,8886111	0,1113889	0,1113889
0,5	0,5663889	-0,0663889	0,0663889
0,5	0,7880556	-0,2880556	0,2880556
0,5	0,5613889	-0,0613889	0,0613889
1	0,7436111	0,2563889	0,2563889
0,5	0,4405556	0,0594444	0,0594444
0,5	1,4802778	-0,9802778	0,9802778
0,5	0,4	0,1	0,1
6	6,5675	-0,5675	0,5675
1	0,2211111	0,7788889	0,7788889
3	2,6094444	0,3905556	0,3905556
0,5	0,1555556	0,3444444	0,3444444
0,5	2,2408333	-1,7408333	1,7408333
1	0,3383333	0,6616667	0,6616667
0,5	0,5772222	-0,0772222	0,0772222
0,5	0,4591667	0,0408333	0,0408333
1,5	0,2475	1,2525	1,2525
3	3,0997222	-0,0997222	0,0997222
0,5	0,2230556	0,2769444	0,2769444
1	1,1466667	-0,1466667	0,1466667
0,5	1,0794444	-0,5794444	0,5794444
7	5,4302778	1,5697222	1,5697222
1	1,0208333	-0,0208333	0,0208333
0,5	0,4872222	0,0127778	0,0127778
0,5	0,5555556	-0,0555556	0,0555556
0,5	0,0261111	0,4738889	0,4738889
5	4,8041667	0,1958333	0,1958333
0,5	1,8997222	-1,3997222	1,3997222
1	0,9027778	0,0972222	0,0972222
6	5,2038889	0,7961111	0,7961111
1	0,3305556	0,6694444	0,6694444
0,5	0,5063889	-0,0063889	0,0063889
0,5	0,2627778	0,2372222	0,2372222
5	4,3222222	0,6777778	0,6777778
0,5	0,2325	0,2675	0,2675
0,5	0,2630556	0,2369444	0,2369444
20	28,1397222	-8,1397222	8,1397222
0,5	0,1394444	0,3605556	0,3605556
0,5	0,1208333	0,3791667	0,3791667
0,5	0,0686111	0,4313889	0,4313889
4	3,5044444	0,4955556	0,4955556
0,5	0,1755556	0,3244444	0,3244444
0,5	0,2280556	0,2719444	0,2719444
0,5	0,4663889	0,0336111	0,0336111
0,5	0,1827778	0,3172222	0,3172222
1	0,9586111	0,0413889	0,0413889
0,5	0,5822222	-0,0822222	0,0822222
0,5	0,695	-0,195	0,195
0,5	1,4827778	-0,9827778	0,9827778
0,5	1,6938889	-1,1938889	1,1938889
0,5	1,49	-0,99	0,99
0,5	0,0725	0,4275	0,4275
2	4,525	-2,525	2,525
0,5	0,0230556	0,4769444	0,4769444
0,5	1,4986111	-0,9986111	0,9986111
1	0,9516667	0,0483333	0,0483333

25	24,4888889	0,5111111	0,5111111
1	3,5494444	-2,5494444	2,5494444
2	2,6094444	-0,6094444	0,6094444
6	5,85	0,15	0,15
12	9,295	2,705	2,705
4	3,5486111	0,4513889	0,4513889
1	0,2608333	0,7391667	0,7391667
1	1,0575	-0,0575	0,0575
1,5	1,4641667	0,0358333	0,0358333
1	0,8938889	0,1061111	0,1061111
0,5	1,3538889	-0,8538889	0,8538889
0,5	0,1333333	0,3666667	0,3666667
0,5	0,1572222	0,3427778	0,3427778
0,5	0,3955556	0,1044444	0,1044444
1	1,6472222	-0,6472222	0,6472222
10	9,4802778	0,5197222	0,5197222
0,5	0,2280556	0,2719444	0,2719444
0,5	0,3858333	0,1141667	0,1141667
0,5	0,5247222	-0,0247222	0,0247222
0,5	0,1716667	0,3283333	0,3283333
0,5	0,0827778	0,4172222	0,4172222
1,5	2,3186111	-0,8186111	0,8186111
20	16,8716667	3,1283333	3,1283333
3	4,2097222	-1,2097222	1,2097222
1	1,1244444	-0,1244444	0,1244444
0,5	0,1505556	0,3494444	0,3494444
1	0,88	0,12	0,12
1	1,4072222	-0,4072222	0,4072222
0,5	0,4538889	0,0461111	0,0461111
0,5	0,5441667	-0,0441667	0,0441667
0,5	0,0397222	0,4602778	0,4602778
2	1,9488889	0,0511111	0,0511111
1	0,1311111	0,8688889	0,8688889
7	6,4944444	0,5055556	0,5055556
0,5	2,0997222	-1,5997222	1,5997222
0,5	0,1969444	0,3030556	0,3030556
2,5	3,2163889	-0,7163889	0,7163889
0,5	2,3025	-1,8025	1,8025
1	1,065	-0,065	0,065
7	6,8861111	0,1138889	0,1138889
0,5	0,4713889	0,0286111	0,0286111
9	8,7222222	0,2777778	0,2777778
1	0,8719444	0,1280556	0,1280556
28	27,3677778	0,6322222	0,6322222
0,4	0,3958333	0,0041667	0,0041667
3	0,3655556	2,6344444	2,6344444
1,5	1,9602778	-0,4602778	0,4602778
1,25	1,7758333	-0,5258333	0,5258333
0,5	0,0280556	0,4719444	0,4719444
1,5	4,1702778	-2,6702778	2,6702778
1	0,1561111	0,8438889	0,8438889
1,25	4,0627778	-2,8127778	2,8127778
0,5	1,9891667	-1,4891667	1,4891667
0,5	1,3044444	-0,8044444	0,8044444
2	2,8186111	-0,8186111	0,8186111
1	0,8897222	0,1102778	0,1102778
0,5	0,6672222	-0,1672222	0,1672222
0,25	0,3055556	-0,0555556	0,0555556
0,5	0,3908333	0,1091667	0,1091667
5	6,4511111	-1,4511111	1,4511111
0,5	0,1747222	0,3252778	0,3252778
4	3,4422222	0,5577778	0,5577778
0,5	1,3030556	-0,8030556	0,8030556
0,5	0,1738889	0,3261111	0,3261111
0,5	0,2325	0,2675	0,2675
0,5	2,0561111	-1,5561111	1,5561111
0,5	0,1311111	0,3688889	0,3688889
0,5	0,2661111	0,2338889	0,2338889
10	9,6894444	0,3105556	0,3105556
1	0,9788889	0,0211111	0,0211111
1	3,2702778	-2,2702778	2,2702778
0,5	1,2111111	-0,7111111	0,7111111
0,25	0,1819444	0,0680556	0,0680556
0,5	0,0291667	0,4708333	0,4708333
40	33,1586111	6,8413889	6,8413889
8	6,4980556	1,5019444	1,5019444
2	0,2411111	1,7588889	1,7588889
0,5	0,2544444	0,2455556	0,2455556
1,5	0,1819444	1,3180556	1,3180556
6	5,1608333	0,8391667	0,8391667
0,75	0,6683333	0,0816667	0,0816667
0,25	0,3152778	-0,0652778	0,0652778
0,5	1,3308333	-0,8308333	0,8308333
1	0,0486111	0,9513889	0,9513889
2	1,4455556	0,5544444	0,5544444
0,5	0,0694444	0,4305556	0,4305556
0,5	0,1619444	0,3380556	0,3380556
1	0,9544444	0,0455556	0,0455556
0,5	0,1577778	0,3422222	0,3422222
0,5	0,0975	0,4025	0,4025
0,5	0,0736111	0,4263889	0,4263889
0,5	0,5047222	-0,0047222	0,0047222
1	0,8986111	0,1013889	0,1013889
0,5	3,2344444	-2,7344444	2,7344444
0,5	0,0947222	0,4052778	0,4052778
0,5	1,7677778	-1,2677778	1,2677778
0,5	0,4461111	0,0538889	0,0538889
1,5	0,1308333	1,3691667	1,3691667
0,5	0,1858333	0,3141667	0,3141667
20	20,2402778	-0,2402778	0,2402778
0,5	3,3638889	-2,8638889	2,8638889

2	1,9772222	0,0227778	0,0227778
0,5	0,0333333	0,4666667	0,4666667
0,5	0,0197222	0,4802778	0,4802778
0,5	0,2538889	0,2461111	0,2461111
0,5	0,1025	0,3975	0,3975
1	0,9566667	0,0433333	0,0433333
0,5	0,4855556	0,0144444	0,0144444
1	0,7808333	0,2191667	0,2191667
8	7,9380556	0,0619444	0,0619444
0,5	0,6661111	-0,1661111	0,1661111
1	2,5205556	-1,5205556	1,5205556
0,5	0,0216667	0,4783333	0,4783333
0,5	0,4238889	0,0761111	0,0761111
1	0,8941667	0,1058333	0,1058333
2	1,9205556	0,0794444	0,0794444
0,5	0,2069444	0,2930556	0,2930556
0,5	1,9072222	-1,4072222	1,4072222
1,5	4,0377778	-2,5377778	2,5377778
0,5	0,5294444	-0,0294444	0,0294444
1,25	1,0383333	0,2116667	0,2116667
0,5	0,0694444	0,4305556	0,4305556
1	0,8652778	0,1347222	0,1347222
3	3,1188889	-0,1188889	0,1188889
1	1,6280556	-0,6280556	0,6280556
2	1,7272222	0,2727778	0,2727778
15	14,6786111	0,3213889	0,3213889
2	2,0941667	-0,0941667	0,0941667
0,5	0,0763889	0,4236111	0,4236111
1	0,8391667	0,1608333	0,1608333
1,5	1,7097222	-0,2097222	0,2097222
6	5,1922222	0,8077778	0,8077778
0,5	0,4247222	0,0752778	0,0752778
0,5	0,1069444	0,3930556	0,3930556
0,5	2,3097222	-1,8097222	1,8097222
0,4	0,3302778	0,0697222	0,0697222
12	11,2136111	0,7863889	0,7863889
1	0,3180556	0,6819444	0,6819444
8	7,4977778	0,5022222	0,5022222
6	5,97	0,03	0,03
0,5	2,5663889	-2,0663889	2,0663889
8	6,79	1,21	1,21
0,5	0,0561111	0,4438889	0,4438889
3	2,8752778	0,1247222	0,1247222
0,5	0,0441667	0,4558333	0,4558333
20	16,1775	3,8225	3,8225
1	0,9997222	0,0002778	0,0002778
4	5,1638889	-1,1638889	1,1638889
0,5	0,1605556	0,3394444	0,3394444
13	12,6605556	0,3394444	0,3394444
2	1,9075	0,0925	0,0925
0,25	0,305	-0,055	0,055
0,75	0,6758333	0,0741667	0,0741667
1	0,2675	0,7325	0,7325
1	0,9486111	0,0513889	0,0513889
3	2,3180556	0,6819444	0,6819444
2,25	5,0463889	-2,7963889	2,7963889
0,5	0,5425	-0,0425	0,0425
0,5	0,1177778	0,3822222	0,3822222
5	5,9247222	-0,9247222	0,9247222
3	3,6333333	-0,6333333	0,6333333
2	1,7088889	0,2911111	0,2911111
2	1,8644444	0,1355556	0,1355556
0,5	0,4872222	0,0127778	0,0127778
29	21,5938889	7,4061111	7,4061111
0,5	2,1316667	-1,6316667	1,6316667
0,4	0,3552778	0,0447222	0,0447222
0,5	0,1113889	0,3886111	0,3886111
11	9,7022222	1,2977778	1,2977778
0,5	0,1969444	0,3030556	0,3030556
0,5	0,1641667	0,3358333	0,3358333
9	6,9019444	2,0980556	2,0980556
1	0,1077778	0,8922222	0,8922222
0,5	0,0272222	0,4727778	0,4727778
9	6,6344444	2,3655556	2,3655556
0,5	0,4608333	0,0391667	0,0391667
1	1,1594444	-0,1594444	0,1594444
0,5	0,1433333	0,3566667	0,3566667
0,5	0,0588889	0,4411111	0,4411111
3	3,2777778	-0,2777778	0,2777778
0,5	0,2408333	0,2591667	0,2591667
5	4,1061111	0,8938889	0,8938889
0,5	0,6377778	-0,1377778	0,1377778
0,5	0,0861111	0,4138889	0,4138889
0,5	2,5480556	-2,0480556	2,0480556
28	27,7480556	0,2519444	0,2519444
7	6,3927778	0,6072222	0,6072222
0,5	0,1302778	0,3697222	0,3697222
0,5	0,4933333	0,0066667	0,0066667
1	1,2102778	-0,2102778	0,2102778
0,5	0,7769444	-0,2769444	0,2769444
3	3,0627778	-0,0627778	0,0627778
0,5	0,3808333	0,1191667	0,1191667
1	1,0391667	-0,0391667	0,0391667
0,5	1,9925	-1,4925	1,4925
0,5	0,2619444	0,2380556	0,2380556
2	1,5086111	0,4913889	0,4913889
0,5	1,4380556	-0,9380556	0,9380556
14	13,3411111	0,6588889	0,6588889
0,5	1,7216667	-1,2216667	1,2216667
4	3,6888889	0,3111111	0,3111111
0,5	0,11	0,39	0,39

0,25	0,2913889	-0,0413889	0,0413889
5	4,4033333	0,5966667	0,5966667
6	5,5947222	0,4052778	0,4052778
0,5	2,1927778	-1,6927778	1,6927778
1	1,0647222	-0,0647222	0,0647222
0,5	0,3697222	0,1302778	0,1302778
25	23,9652778	1,0347222	1,0347222
0,5	1,5827778	-1,0827778	1,0827778
1,5	3,7625	-2,2625	2,2625
6	5,8388889	0,1611111	0,1611111
0,5	0,5402778	-0,0402778	0,0402778
0,5	1,3266667	-0,8266667	0,8266667
0,5	0,5505556	-0,0505556	0,0505556
0,5	0,6041667	-0,1041667	0,1041667
1,75	1,3469444	0,4030556	0,4030556
0,5	0,7719444	-0,2719444	0,2719444
0,5	0,4713889	0,0286111	0,0286111
0,5	2,0036111	-1,5036111	1,5036111
6	5,0177778	0,9822222	0,9822222
6	5,7530556	0,2469444	0,2469444
1	0,055	0,945	0,945
2	1,6188889	0,3811111	0,3811111
7	5,0647222	1,9352778	1,9352778
0,5	0,5841667	-0,0841667	0,0841667
0,5	2,2191667	-1,7191667	1,7191667
0,5	0,2155556	0,2844444	0,2844444
19	18,2547222	0,7452778	0,7452778
7	6,6758333	0,3241667	0,3241667
0,5	0,5033333	-0,0033333	0,0033333
9	7,2655556	1,7344444	1,7344444
0,5	2,6683333	-2,1683333	2,1683333
0,5	0,2058333	0,2941667	0,2941667
0,5	0,0866667	0,4133333	0,4133333
17	15,5297222	1,4702778	1,4702778
1	0,9188889	0,0811111	0,0811111
1	0,7983333	0,2016667	0,2016667
3	2,8875	0,1125	0,1125
4	3,9788889	0,0211111	0,0211111
0,5	0,4872222	0,0127778	0,0127778
10	8,9433333	1,0566667	1,0566667
0,5	0,3786111	0,1213889	0,1213889
2	1,6719444	0,3280556	0,3280556
1,5	1,9283333	-0,4283333	0,4283333
1	0,9377778	0,0622222	0,0622222
0,4	0,3275	0,0725	0,0725
1,5	4,2230556	-2,7230556	2,7230556
1,5	3,9425	-2,4425	2,4425
0,5	2,085	-1,585	1,585
8	7,7411111	0,2588889	0,2588889
0,5	2,1002778	-1,6002778	1,6002778
5	5,1194444	-0,1194444	0,1194444
6	5,7577778	0,2422222	0,2422222
0,5	0,7197222	-0,2197222	0,2197222
0,5	1,3325	-0,8325	0,8325
2	2,0380556	-0,0380556	0,0380556
6	5,8422222	0,1577778	0,1577778
1	0,1261111	0,8738889	0,8738889
21	20,4108333	0,5891667	0,5891667
1,5	1,7716667	-0,2716667	0,2716667
0,5	0,2191667	0,2808333	0,2808333
0,5	0,0461111	0,4538889	0,4538889
1	0,7825	0,2175	0,2175
0,5	0,5469444	-0,0469444	0,0469444
2	1,5736111	0,4263889	0,4263889
8	7,3502778	0,6497222	0,6497222
1,5	0,3605556	1,1394444	1,1394444
33	29,8627778	3,1372222	3,1372222
6	8,8055556	-2,8055556	2,8055556
10	8,7322222	1,2677778	1,2677778
1	1,1005556	-0,1005556	0,1005556
0,5	0,1219444	0,3780556	0,3780556
15	16,8202778	-1,8202778	1,8202778
0,5	1,9844444	-1,4844444	1,4844444
6	5,7327778	0,2672222	0,2672222
4	5,0586111	-1,0586111	1,0586111
0,5	0,4955556	0,0044444	0,0044444
3	3,5283333	-0,5283333	0,5283333
12	11,5977778	0,4022222	0,4022222
0,5	0,2516667	0,2483333	0,2483333
8	7,97	0,03	0,03
0,5	0,4527778	0,0472222	0,0472222
1,5	1,7422222	-0,2422222	0,2422222
1	1,4697222	-0,4697222	0,4697222
15	13,6822222	1,3177778	1,3177778
30	25,1244444	4,8755556	4,8755556
0,5	0,0355556	0,4644444	0,4644444
0,5	0,6227778	-0,1227778	0,1227778
1	0,1980556	0,8019444	0,8019444
1	1,3363889	-0,3363889	0,3363889
4	4,0291667	-0,0291667	0,0291667
0,5	0,1038889	0,3961111	0,3961111
0,5	1,4741667	-0,9741667	0,9741667
0,5	3,0183333	-2,5183333	2,5183333
15	12,6016667	2,3983333	2,3983333
4	3,3494444	0,6505556	0,6505556
2	2,0136111	-0,0136111	0,0136111
0,5	0,2197222	0,2802778	0,2802778
1	0,9427778	0,0572222	0,0572222
7	6,3233333	0,6766667	0,6766667
0,5	0,6786111	-0,1786111	0,1786111
0,5	1,8686111	-1,3686111	1,3686111

0,5	0,1355556	0,3644444	0,3644444
1,5	1,215	0,285	0,285
0,5	0,0522222	0,4477778	0,4477778
6	5,185	0,815	0,815
5	5,2430556	-0,2430556	0,2430556
0,5	2,5455556	-2,0455556	2,0455556
7	6,6755556	0,3244444	0,3244444
0,5	1,6305556	-1,1305556	1,1305556
0,5	0,2591667	0,2408333	0,2408333
3	3,9677778	-0,9677778	0,9677778
15	12,2925	2,7075	2,7075
23	19,2822222	3,7177778	3,7177778
0,5	0,4591667	0,0408333	0,0408333
1	1,4541667	-0,4541667	0,4541667
35	40,0038889	-5,0038889	5,0038889
2	2,1002778	-0,1002778	0,1002778
0,5	0,0202778	0,4797222	0,4797222
7	6,2336111	0,7663889	0,7663889
5	6,5913889	-1,5913889	1,5913889
0,5	0,1522222	0,3477778	0,3477778
0,5	0,1983333	0,3016667	0,3016667
0,5	0,6272222	-0,1272222	0,1272222
1	0,9269444	0,0730556	0,0730556
0,5	0,175	0,325	0,325
7	6,7325	0,2675	0,2675
0,5	0,1147222	0,3852778	0,3852778
0,5	0,1188889	0,3811111	0,3811111
0,5	1,3758333	-0,8758333	0,8758333
0,5	0,1811111	0,3188889	0,3188889
0,5	0,025	0,475	0,475
0,5	0,125	0,375	0,375
0,5	2,2988889	-1,7988889	1,7988889
2	1,4641667	0,5358333	0,5358333
1,75	2,6108333	-0,8608333	0,8608333
0,5	0,0180556	0,4819444	0,4819444
1,5	1,7280556	-0,2280556	0,2280556
1	0,2988889	0,7011111	0,7011111
0,5	0,5908333	-0,0908333	0,0908333
0,5	0,7083333	-0,2083333	0,2083333
0,5	0,4194444	0,0805556	0,0805556
0,5	0,0305556	0,4694444	0,4694444
5	4,7255556	0,2744444	0,2744444
2	1,9180556	0,0819444	0,0819444
0,5	0,0266667	0,4733333	0,4733333
3	2,5452778	0,4547222	0,4547222
0,5	0,1894444	0,3105556	0,3105556
0,5	0,1991667	0,3008333	0,3008333
0,5	0,7008333	-0,2008333	0,2008333
2	2,2966667	-0,2966667	0,2966667
1	1,2536111	-0,2536111	0,2536111
0,02	0,0177778	0,0022222	0,0022222
6,5	6,5544444	-0,0544444	0,0544444
19	18,2547222	0,7452778	0,7452778
18	18,435	-0,435	0,435
0,5	0,6219444	-0,1219444	0,1219444
0,75	2,8997222	-2,1497222	2,1497222
1	2,7269444	-1,7269444	1,7269444
0,5	0,1391667	0,3608333	0,3608333
3	2,4752778	0,5247222	0,5247222
0,5	0,3594444	0,1405556	0,1405556
0,5	0,2708333	0,2291667	0,2291667
0,5	0,5341667	-0,0341667	0,0341667
0,5	1,3855556	-0,8855556	0,8855556
1	0,2936111	0,7063889	0,7063889
1	1,0177778	-0,0177778	0,0177778
0,5	0,0558333	0,4441667	0,4441667
0,5	0,0505556	0,4494444	0,4494444
0,5	0,6333333	-0,1333333	0,1333333
0,5	0,3738889	0,1261111	0,1261111
0,5	0,1141667	0,3858333	0,3858333
1	0,1861111	0,8138889	0,8138889
2,5	3,1588889	-0,6588889	0,6588889
40	33,0644444	6,9355556	6,9355556
7	5,56	1,44	1,44
0,5	0,6577778	-0,1577778	0,1577778
0,5	0,1786111	0,3213889	0,3213889
5,75	4,3852778	1,3647222	1,3647222
0,5	1,4930556	-0,9930556	0,9930556
1	0,1763889	0,8236111	0,8236111
0,5	0,7663889	-0,2663889	0,2663889
4	3,77	0,23	0,23
3	2,7497222	0,2502778	0,2502778
0,5	0,2388889	0,2611111	0,2611111
0,25	0,325	-0,075	0,075
25	23,7391667	1,2608333	1,2608333
0,5	0,0427778	0,4572222	0,4572222
0,5	0,5005556	-0,0005556	0,0005556
1	2,3505556	-1,3505556	1,3505556
0,5	0,2433333	0,2566667	0,2566667
1	1,0363889	-0,0363889	0,0363889
0,5	0,6941667	-0,1941667	0,1941667
1	1,4869444	-0,4869444	0,4869444
0,5	0,1986111	0,3013889	0,3013889
0,5	0,2091667	0,2908333	0,2908333
0,5	2,2925	-1,7925	1,7925
2	2,8636111	-0,8636111	0,8636111
0,5	0,1575	0,3425	0,3425
0,5	0,1619444	0,3380556	0,3380556
0,5	0,5227778	-0,0227778	0,0227778
0,5	0,0902778	0,4097222	0,4097222
2	0,2080556	1,7919444	1,7919444

7	6,0527778	0,9472222	0,9472222
0,5	0,6819444	-0,1819444	0,1819444
0,5	0,1891667	0,3108333	0,3108333
4	4,2072222	-0,2072222	0,2072222
0,5	0,65	-0,15	0,15
13	12,7497222	0,2502778	0,2502778
0,5	0,5372222	-0,0372222	0,0372222
1	0,9047222	0,0952778	0,0952778
0,5	0,7461111	-0,2461111	0,2461111
1,5	1,3786111	0,1213889	0,1213889
0,5	0,1166667	0,3833333	0,3833333
1	1,135	-0,135	0,135
0,5	0,2205556	0,2794444	0,2794444
0,5	0,0177778	0,4822222	0,4822222
25	22,3291667	2,6708333	2,6708333
7	7,5141667	-0,5141667	0,5141667
0,5	0,4938889	0,0061111	0,0061111
2	0,1991667	1,8008333	1,8008333
0,5	0,24	0,26	0,26
0,5	0,0433333	0,4566667	0,4566667
0,5	0,0838889	0,4161111	0,4161111
14	13,8688889	0,1311111	0,1311111
0,5	1,0672222	-0,5672222	0,5672222
14	13,6797222	0,3202778	0,3202778
0,5	0,6252778	-0,1252778	0,1252778
0,4	0,3461111	0,0538889	0,0538889
1	1,42	-0,42	0,42
0,5	0,2061111	0,2938889	0,2938889
0,5	2,4361111	-1,9361111	1,9361111
0,5	0,1044444	0,3955556	0,3955556
3	3,0602778	-0,0602778	0,0602778
0,5	0,4230556	0,0769444	0,0769444
1,5	1,1825	0,3175	0,3175
1	1,1841667	-0,1841667	0,1841667
2	2,4425	-0,4425	0,4425
0,5	0,0408333	0,4591667	0,4591667
1	0,7869444	0,2130556	0,2130556
2	2,1422222	-0,1422222	0,1422222
0,5	0,1494444	0,3505556	0,3505556
4	3,7477778	0,2522222	0,2522222
0,5	0,4077778	0,0922222	0,0922222
1	0,88	0,12	0,12
1,5	0,2630556	1,2369444	1,2369444
0,5	0,0386111	0,4613889	0,4613889
3	3,2908333	-0,2908333	0,2908333
5	4,1516667	0,8483333	0,8483333
0,5	0,51	-0,01	0,01
0,5	1,4561111	-0,9561111	0,9561111
0,5	0,1830556	0,3169444	0,3169444
0,5	0,7769444	-0,2769444	0,2769444
5	4,6519444	0,3480556	0,3480556
5	4,5030556	0,4969444	0,4969444
0,5	0,4472222	0,0527778	0,0527778
1	0,19	0,81	0,81
37	30,3433333	6,6566667	6,6566667
7	6,3986111	0,6013889	0,6013889
1	1,0522222	-0,0522222	0,0522222
0,5	0,7394444	-0,2394444	0,2394444
1	0,0763889	0,9236111	0,9236111
0,5	0,6433333	-0,1433333	0,1433333
10	12,3027778	-2,3027778	2,3027778
0,5	0,4730556	0,0269444	0,0269444
6	5,32	0,68	0,68
1	0,9047222	0,0952778	0,0952778
0,25	0,2911111	-0,0411111	0,0411111
0,5	0,1969444	0,3030556	0,3030556
38	32,0138889	5,9861111	5,9861111
6	5,3383333	0,6616667	0,6616667
4	3,1219444	0,8780556	0,8780556
1	0,9880556	0,0119444	0,0119444
1	0,2705556	0,7294444	0,7294444
6	6,1116667	-0,1116667	0,1116667
0,5	1,4427778	-0,9427778	0,9427778
0,5	0,4163889	0,0836111	0,0836111
3	2,6713889	0,3286111	0,3286111
0,5	0,205	0,295	0,295
0,25	0,3030556	-0,0530556	0,0530556
1	2,3086111	-1,3086111	1,3086111
0,4	0,3269444	0,0730556	0,0730556
0,5	0,4655556	0,0344444	0,0344444
0,5	0,5488889	-0,0488889	0,0488889
1,5	1,7236111	-0,2236111	0,2236111
0,5	0,1369444	0,3630556	0,3630556
3	4,0166667	-1,0166667	1,0166667
2,5	3,7222222	-0,7222222	0,7222222
1,5	2,3502778	-0,8502778	0,8502778
4	3,0452778	0,9547222	0,9547222
0,5	0,025	0,475	0,475
0,4	0,3541667	0,0458333	0,0458333
0,5	0,4030556	0,0969444	0,0969444
0,5	0,7752778	-0,2752778	0,2752778
0,5	2,5986111	-2,0986111	2,0986111
0,5	0,5183333	-0,0183333	0,0183333
0,5	0,2247222	0,2752778	0,2752778
0,5	0,0694444	0,4305556	0,4305556
0,5	0,0913889	0,4086111	0,4086111
0,5	0,5683333	-0,0683333	0,0683333
0,5	0,1180556	0,3819444	0,3819444
0,5	0,6833333	-0,1833333	0,1833333
1	0,8405556	0,1594444	0,1594444
2,5	2,3511111	0,1488889	0,1488889

0,5	0,0252778	0,4747222	0,4747222
12	11,6116667	0,3883333	0,3883333
0,5	0,1133333	0,3866667	0,3866667
0,5	0,5863889	-0,0863889	0,0863889
0,5	0,5852778	-0,0852778	0,0852778
2	1,4961111	0,5038889	0,5038889
0,5	0,6491667	-0,1491667	0,1491667
0,5	0,0186111	0,4813889	0,4813889
0,5	0,0433333	0,4566667	0,4566667
8	7,8863889	0,1136111	0,1136111
1	1,0141667	-0,0141667	0,0141667
0,5	0,0330556	0,4669444	0,4669444
0,5	1,8972222	-1,3972222	1,3972222
0,5	0,5461111	-0,0461111	0,0461111
2	2,0725	-0,0725	0,0725
0,5	0,0444444	0,4555556	0,4555556
1	0,1591667	0,8408333	0,8408333
6	8,7533333	-2,7533333	2,7533333
1	0,9127778	0,0872222	0,0872222
1	1,4955556	-0,4955556	0,4955556
0,5	1,3547222	-0,8547222	0,8547222
6	5,1902778	0,8097222	0,8097222
0,5	0,105	0,395	0,395
0,5	2,4097222	-1,9097222	1,9097222
0,5	0,5466667	-0,0466667	0,0466667
9	9,4133333	-0,4133333	0,4133333
1	1,6355556	-0,6355556	0,6355556
0,5	0,5408333	-0,0408333	0,0408333
0,5	0,1244444	0,3755556	0,3755556
2	1,8311111	0,1688889	0,1688889
80	67,1730556	12,8269444	12,8269444
0,5	1,2297222	-0,7297222	0,7297222
0,5	0,5547222	-0,0547222	0,0547222
1	1,6036111	-0,6036111	0,6036111
0,5	0,0375	0,4625	0,4625
4	4,4386111	-0,4386111	0,4386111
0,5	1,2233333	-0,7233333	0,7233333
0,5	0,06	0,44	0,44
0,5	0,0772222	0,4227778	0,4227778
10	9,2841667	0,7158333	0,7158333
0,5	1,2213889	-0,7213889	0,7213889
0,5	1,2105556	-0,7105556	0,7105556
0,5	0,7397222	-0,2397222	0,2397222
1	0,9991667	0,0008333	0,0008333
0,5	0,0236111	0,4763889	0,4763889
0,5	0,5116667	-0,0116667	0,0116667
0,5	0,1525	0,3475	0,3475
5	5,0894444	-0,0894444	0,0894444
1	0,9430556	0,0569444	0,0569444
9	8,4694444	0,5305556	0,5305556
6	5,4186111	0,5813889	0,5813889
0,5	0,6877778	-0,1877778	0,1877778
0,5	1,6122222	-1,1122222	1,1122222
0,5	3,0475	-2,5475	2,5475
25	29,3477778	-4,3477778	4,3477778
0,5	1,6494444	-1,1494444	1,1494444
14	12,9977778	1,0022222	1,0022222
1	1,2694444	-0,2694444	0,2694444
0,5	0,4677778	0,0322222	0,0322222
0,5	1,2230556	-0,7230556	0,7230556
0,5	0,63	-0,13	0,13
4	3,6091667	0,3908333	0,3908333
1	1,0230556	-0,0230556	0,0230556
0,75	1,885	-1,135	1,135
5	4,1297222	0,8702778	0,8702778
1	0,2763889	0,7236111	0,7236111
9	9,1047222	-0,1047222	0,1047222
0,5	1,8788889	-1,3788889	1,3788889
1,5	0,0602778	1,4397222	1,4397222
0,5	1,2072222	-0,7072222	0,7072222
0,5	0,2330556	0,2669444	0,2669444
1	2,2938889	-1,2938889	1,2938889
0,5	0,14	0,36	0,36
1	0,7327778	0,2672222	0,2672222
7	6,9983333	0,0016667	0,0016667
0,5	0,425	0,075	0,075
2	2,1697222	-0,1697222	0,1697222
1	0,3413889	0,6586111	0,6586111
0,5	0,1822222	0,3177778	0,3177778
8	9,4502778	-1,4502778	1,4502778
0,5	0,1991667	0,3008333	0,3008333
0,5	0,1433333	0,3566667	0,3566667
3	2,4522222	0,5477778	0,5477778
1	0,3025	0,6975	0,6975
0,5	0,1891667	0,3108333	0,3108333
0,5	0,6766667	-0,1766667	0,1766667
0,5	0,4227778	0,0772222	0,0772222
0,5	0,6319444	-0,1319444	0,1319444
0,5	0,4097222	0,0902778	0,0902778
5	4,2613889	0,7386111	0,7386111
1	0,0344444	0,9655556	0,9655556
0,5	0,6958333	-0,1958333	0,1958333
1,5	0,0716667	1,4283333	1,4283333
25	24,1866667	0,8133333	0,8133333
0,5	0,0316667	0,4683333	0,4683333
1,5	3,5747222	-2,0747222	2,0747222
0,5	0,0213889	0,4786111	0,4786111
0,5	3,0991667	-2,5991667	2,5991667
0,5	0,6780556	-0,1780556	0,1780556
0,5	0,4902778	0,0097222	0,0097222
1	0,7555556	0,2444444	0,2444444

11	10,2947222	0,7052778	0,7052778
0,5	0,3675	0,1325	0,1325
19	17,9527778	1,0472222	1,0472222
0,02	0,0319444	-0,0119444	0,0119444
0,5	0,455	0,045	0,045
0,5	0,2530556	0,2469444	0,2469444
0,5	0,1161111	0,3838889	0,3838889
0,5	1,9341667	-1,4341667	1,4341667
1	1,4980556	-0,4980556	0,4980556
0,5	0,0983333	0,4016667	0,4016667
1	0,8475	0,1525	0,1525
0,5	3,1269444	-2,6269444	2,6269444
4	3,6647222	0,3352778	0,3352778
0,5	0,4491667	0,0508333	0,0508333
3	3,4191667	-0,4191667	0,4191667
1	1,0847222	-0,0847222	0,0847222
0,5	0,3747222	0,1252778	0,1252778
1	1,0741667	-0,0741667	0,0741667
2	4,2947222	-2,2947222	2,2947222
3	3,0497222	-0,0497222	0,0497222
1	1,6497222	-0,6497222	0,6497222
1,5	1,3313889	0,1686111	0,1686111
1	0,1341667	0,8658333	0,8658333
0,5	0,6402778	-0,1402778	0,1402778
1	0,125	0,875	0,875
0,5	0,0616667	0,4383333	0,4383333
0,25	0,3147222	-0,0647222	0,0647222
10	10,0358333	-0,0358333	0,0358333
1	1,4825	-0,4825	0,4825
0,5	0,5694444	-0,0694444	0,0694444
1	0,8794444	0,1205556	0,1205556
2	2,0891667	-0,0891667	0,0891667
0,5	0,6758333	-0,1758333	0,1758333
2	2,0730556	-0,0730556	0,0730556
0,5	0,6038889	-0,1038889	0,1038889
0,5	0,0525	0,4475	0,4475
0,5	0,6986111	-0,1986111	0,1986111
0,4	0,3838889	0,0161111	0,0161111
1,5	4,2072222	-2,7072222	2,7072222
6	5,9438889	0,0561111	0,0561111
1	1,0377778	-0,0377778	0,0377778
13	12,9897222	0,0102778	0,0102778
0,5	2,0027778	-1,5027778	1,5027778
0,5	0,2419444	0,2580556	0,2580556
0,5	0,4305556	0,0694444	0,0694444
1,5	1,9497222	-0,4497222	0,4497222
4	4,6669444	-0,6669444	0,6669444
1	0,8844444	0,1155556	0,1155556
4	3,3425	0,6575	0,6575
1	0,3338889	0,6661111	0,6661111
0,5	2,0447222	-1,5447222	1,5447222
0,5	0,0369444	0,4630556	0,4630556
0,5	1,0816667	-0,5816667	0,5816667
1,5	1,4902778	0,0097222	0,0097222
0,5	0,1766667	0,3233333	0,3233333
1,5	1,4111111	0,0888889	0,0888889
1	0,0716667	0,9283333	0,9283333
0,5	0,2230556	0,2769444	0,2769444
5	4,6002778	0,3997222	0,3997222
1,5	1,2933333	0,2066667	0,2066667
53	45,8363889	7,1636111	7,1636111
0,5	0,375	0,125	0,125
0,5	0,6647222	-0,1647222	0,1647222
7	7,3405556	-0,3405556	0,3405556
0,5	0,1138889	0,3861111	0,3861111
2	2,0080556	-0,0080556	0,0080556
1	0,3372222	0,6627778	0,6627778
8	7,6605556	0,3394444	0,3394444
1	0,725	0,275	0,275
1	0,9955556	0,0044444	0,0044444
0,5	0,4913889	0,0086111	0,0086111
0,5	0,0455556	0,4544444	0,4544444
200	148,0383333	51,9616667	51,9616667
1,25	2,9175	-1,6675	1,6675
0,5	0,4155556	0,0844444	0,0844444
0,5	0,0213889	0,4786111	0,4786111
0,5	0,2238889	0,2761111	0,2761111
2	3,2527778	-1,2527778	1,2527778
0,5	0,1583333	0,3416667	0,3416667
7	5,8261111	1,1738889	1,1738889
1	1,5561111	-0,5561111	0,5561111
0,5	0,3961111	0,1038889	0,1038889
6	5,2961111	0,7038889	0,7038889
1	3,3169444	-2,3169444	2,3169444
0,5	0,1055556	0,3944444	0,3944444
0,5	0,1208333	0,3791667	0,3791667
0,5	0,0252778	0,4747222	0,4747222
0,5	0,0180556	0,4819444	0,4819444
13	9,3713889	3,6286111	3,6286111
10	8,6005556	1,3994444	1,3994444
0,5	0,0341667	0,4658333	0,4658333
20	19,4633333	0,5366667	0,5366667
0,5	0,775	-0,275	0,275
9	8,3544444	0,6455556	0,6455556
1	0,955	0,045	0,045
1	1,2275	-0,2275	0,2275
1,5	1,4002778	0,0997222	0,0997222
0,25	0,3030556	-0,0530556	0,0530556
1	0,7941667	0,2058333	0,2058333
0,5	0,6927778	-0,1927778	0,1927778
1	0,3530556	0,6469444	0,6469444

0,5	0,6611111	-0,1611111	0,1611111
0,5	0,4255556	0,0744444	0,0744444
1	0,9155556	0,0844444	0,0844444
0,5	0,1275	0,3725	0,3725
8	7,1747222	0,8252778	0,8252778
22	21,96	0,04	0,04
2	1,7777778	0,2222222	0,2222222
0,5	0,1438889	0,3561111	0,3561111
2	1,9736111	0,0263889	0,0263889
1,5	1,4277778	0,0722222	0,0722222
8	7,7519444	0,2480556	0,2480556
4,75	5,2622222	-0,5122222	0,5122222
1,75	1,3480556	0,4019444	0,4019444
0,5	0,4705556	0,0294444	0,0294444
0,5	0,6125	-0,1125	0,1125
5	4,7058333	0,2941667	0,2941667
4	4,5111111	-0,5111111	0,5111111
1	0,0630556	0,9369444	0,9369444
5	6,8361111	-1,8361111	1,8361111
1	0,2141667	0,7858333	0,7858333
0,5	0,0725	0,4275	0,4275
0,5	0,3597222	0,1402778	0,1402778
0,5	2,6927778	-2,1927778	2,1927778
20	20,0066667	-0,0066667	0,0066667
1	0,8569444	0,1430556	0,1430556
17	14,8158333	2,1841667	2,1841667
0,5	0,5969444	-0,0969444	0,0969444
0,5	0,1830556	0,3169444	0,3169444
0,5	1,2008333	-0,7008333	0,7008333
1	0,9188889	0,0811111	0,0811111
4	3,335	0,665	0,665
6	5,7502778	0,2497222	0,2497222
0,5	0,0519444	0,4480556	0,4480556
2	1,4911111	0,5088889	0,5088889
1	0,9961111	0,0038889	0,0038889
2	2,5647222	-0,5647222	0,5647222
0,5	0,4947222	0,0052778	0,0052778
3	3,0483333	-0,0483333	0,0483333
1	0,8272222	0,1727778	0,1727778
26	25,8358333	0,1641667	0,1641667
1	1,195	-0,195	0,195
30	33,12	-3,12	3,12
0,5	0,3669444	0,1330556	0,1330556
0,5	0,4711111	0,0288889	0,0288889
1	1,2127778	-0,2127778	0,2127778
0,5	0,0769444	0,4230556	0,4230556
1	1,2030556	-0,2030556	0,2030556
1	0,8575	0,1425	0,1425
0,5	0,0416667	0,4583333	0,4583333
0,5	0,0886111	0,4113889	0,4113889
1	0,2186111	0,7813889	0,7813889
0,5	0,2258333	0,2741667	0,2741667
0,5	0,1272222	0,3727778	0,3727778
0,5	0,1644444	0,3355556	0,3355556
0,4	0,3844444	0,0155556	0,0155556
0,5	0,2122222	0,2877778	0,2877778
0,5	0,1463889	0,3536111	0,3536111
1,5	3,8691667	-2,3691667	2,3691667
0,5	0,1866667	0,3133333	0,3133333
30	29,0261111	0,9738889	0,9738889
0,5	0,0183333	0,4816667	0,4816667
0,5	1,3780556	-0,8780556	0,8780556
0,5	0,4983333	0,0016667	0,0016667
0,5	0,6811111	-0,1811111	0,1811111
1,5	1,39	0,11	0,11
0,5	0,4180556	0,0819444	0,0819444
1	0,1305556	0,8694444	0,8694444
1	0,7577778	0,2422222	0,2422222
2	2,8205556	-0,8205556	0,8205556
7	6,5252778	0,4747222	0,4747222
0,5	0,03	0,47	0,47
2	1,6441667	0,3558333	0,3558333
2	0,1933333	1,8066667	1,8066667
0,25	0,3191667	-0,0691667	0,0691667
2	1,5883333	0,4116667	0,4116667
0,5	0,0205556	0,4794444	0,4794444
1	0,9086111	0,0913889	0,0913889
0,5	0,4063889	0,0936111	0,0936111
0,5	0,0602778	0,4397222	0,4397222
1	2,9163889	-1,9163889	1,9163889
2	0,1897222	1,8102778	1,8102778
0,5	0,1313889	0,3686111	0,3686111
5	4,6933333	0,3066667	0,3066667
0,5	0,1730556	0,3269444	0,3269444
0,5	0,5241667	-0,0241667	0,0241667
29	37,0436111	-8,0436111	8,0436111
3	2,42	0,58	0,58
0,5	0,2644444	0,2355556	0,2355556
0,5	0,0322222	0,4677778	0,4677778
0,5	0,1502778	0,3497222	0,3497222
0,4	0,3513889	0,0486111	0,0486111
0,5	0,4494444	0,0505556	0,0505556
9	8,9830556	0,0169444	0,0169444
0,5	0,0236111	0,4763889	0,4763889
3	2,1911111	0,8088889	0,8088889
0,5	2,0722222	-1,5722222	1,5722222
12	11,1163889	0,8836111	0,8836111
1	0,9272222	0,0727778	0,0727778
0,5	0,5469444	-0,0469444	0,0469444
1	0,2716667	0,7283333	0,7283333
0,5	0,2122222	0,2877778	0,2877778

1	0,955	0,045	0,045
0,5	0,5055556	-0,0055556	0,0055556
0,5	0,1702778	0,3297222	0,3297222
0,5	0,3791667	0,1208333	0,1208333
0,5	0,0913889	0,4086111	0,4086111
0,5	0,4275	0,0725	0,0725
0,5	0,025	0,475	0,475
4	3,4780556	0,5219444	0,5219444
2,5	2,1058333	0,3941667	0,3941667
11	10,8013889	0,1986111	0,1986111
1	0,2813889	0,7186111	0,7186111
1	0,7463889	0,2536111	0,2536111
1	0,7202778	0,2797222	0,2797222
1	1,1502778	-0,1502778	0,1502778
0,5	0,5113889	-0,0113889	0,0113889
12	9,2336111	2,7663889	2,7663889
0,5	0,2247222	0,2752778	0,2752778
0,5	0,0177778	0,4822222	0,4822222
1,5	1,7130556	-0,2130556	0,2130556
1	0,2891667	0,7108333	0,7108333
1,5	1,5258333	-0,0258333	0,0258333
9	8,2658333	0,7341667	0,7341667
1,5	1,7130556	-0,2130556	0,2130556
1	1,0716667	-0,0716667	0,0716667
2	1,835	0,165	0,165
1	1,0286111	-0,0286111	0,0286111
0,5	0,1569444	0,3430556	0,3430556
0,5	0,1602778	0,3397222	0,3397222
0,5	0,5797222	-0,0797222	0,0797222
0,5	0,3619444	0,1380556	0,1380556
2	1,5430556	0,4569444	0,4569444
6	5,42	0,58	0,58
5	3,7861111	1,2138889	1,2138889
0,5	0,4822222	0,0177778	0,0177778
0,75	3,6580556	-2,9080556	2,9080556
0,25	0,2794444	-0,0294444	0,0294444
1	0,9058333	0,0941667	0,0941667
0,5	0,1672222	0,3327778	0,3327778
0,5	2,6725	-2,1725	2,1725
0,5	1,6280556	-1,1280556	1,1280556
0,5	0,0516667	0,4483333	0,4483333
1	0,2458333	0,7541667	0,7541667
0,5	2,7719444	-2,2719444	2,2719444
0,5	0,4711111	0,0288889	0,0288889
0,5	0,0247222	0,4752778	0,4752778
1	0,9575	0,0425	0,0425
0,5	0,0836111	0,4163889	0,4163889
8	7,5338889	0,4661111	0,4661111
0,5	0,3727778	0,1272222	0,1272222
8	7,5586111	0,4413889	0,4413889
0,5	0,2186111	0,2813889	0,2813889
1,5	1,4538889	0,0461111	0,0461111
0,5	0,8144444	-0,3144444	0,3144444
0,5	0,0886111	0,4113889	0,4113889
1	0,8716667	0,1283333	0,1283333
1,5	4,1763889	-2,6763889	2,6763889
1	2,3075	-1,3075	1,3075
0,5	0,0502778	0,4497222	0,4497222
3	2,3777778	0,6222222	0,6222222
6	4,7313889	1,2686111	1,2686111
1,5	0,1916667	1,3083333	1,3083333
0,5	1,7122222	-1,2122222	1,2122222
1	0,7569444	0,2430556	0,2430556
2,5	3,2883333	-0,7883333	0,7883333
2,5	2,5663889	-0,0663889	0,0663889
1	0,3227778	0,6772222	0,6772222
0,5	0,0725	0,4275	0,4275
14	13,3969444	0,6030556	0,6030556
1,5	2,1402778	-0,6402778	0,6402778
1	0,2605556	0,7394444	0,7394444
10	10,6111111	-0,6111111	0,6111111
0,5	1,8022222	-1,3022222	1,3022222
7	6,5316667	0,4683333	0,4683333
0,5	0,5138889	-0,0138889	0,0138889
0,5	0,6991667	-0,1991667	0,1991667
8	8,1505556	-0,1505556	0,1505556
3	10,0869444	-7,0869444	7,0869444
0,5	0,3786111	0,1213889	0,1213889
0,25	0,1475	0,1025	0,1025
3	2,2933333	0,7066667	0,7066667
0,5	0,4944444	0,0055556	0,0055556
2	2,2105556	-0,2105556	0,2105556
5	4,5391667	0,4608333	0,4608333
0,5	0,235	0,265	0,265
0,5	0,65	-0,15	0,15
1	0,8536111	0,1463889	0,1463889
0,5	0,1897222	0,3102778	0,3102778
0,25	0,1561111	0,0938889	0,0938889
7	6,7894444	0,2105556	0,2105556
0,5	0,09	0,41	0,41
1	3,2947222	-2,2947222	2,2947222
2	1,8091667	0,1908333	0,1908333
1	3,1163889	-2,1163889	2,1163889
11	10,9266667	0,0733333	0,0733333
3	3,0658333	-0,0658333	0,0658333
1	0,1097222	0,8902778	0,8902778
60	39,4055556	20,5944444	20,5944444
5	5,9613889	-0,9613889	0,9613889
0,5	0,0919444	0,4080556	0,4080556
0,5	1,1352778	-0,6352778	0,6352778
0,5	0,7483333	-0,2483333	0,2483333

1	1,2166667	-0,2166667	0,2166667
0,25	0,3102778	-0,0602778	0,0602778
12	11,8344444	0,1655556	0,1655556
0,5	0,0397222	0,4602778	0,4602778
55	47,7269444	7,2730556	7,2730556
0,5	0,4102778	0,0897222	0,0897222
0,5	0,1625	0,3375	0,3375
9	8,3333333	0,6666667	0,6666667
0,5	0,2130556	0,2869444	0,2869444
3,5	3,2002778	0,2997222	0,2997222
0,5	0,4536111	0,0463889	0,0463889
0,5	0,2561111	0,2438889	0,2438889
0,5	0,1272222	0,3727778	0,3727778
0,5	0,4913889	0,0086111	0,0086111
0,25	0,3119444	-0,0619444	0,0619444
65	49,5283333	15,4716667	15,4716667
12	11,6738889	0,3261111	0,3261111
8	8,7427778	-0,7427778	0,7427778
0,5	0,1513889	0,3486111	0,3486111
0,5	0,1844444	0,3155556	0,3155556
2	1,9169444	0,0830556	0,0830556
9	8,4591667	0,5408333	0,5408333
0,5	0,0727778	0,4272222	0,4272222
0,25	0,3227778	-0,0727778	0,0727778
0,5	0,7430556	-0,2430556	0,2430556
5	4,5030556	0,4969444	0,4969444
0,5	0,0663889	0,4336111	0,4336111
0,5	0,0638889	0,4361111	0,4361111
5	4,3238889	0,6761111	0,6761111
2	0,0172222	1,9827778	1,9827778
0,5	0,4413889	0,0586111	0,0586111
0,4	0,3455556	0,0544444	0,0544444
10	9,7963889	0,2036111	0,2036111
1	1,0225	-0,0225	0,0225
0,5	0,6197222	-0,1197222	0,1197222
0,5	0,7961111	-0,2961111	0,2961111
0,5	0,0683333	0,4316667	0,4316667
0,5	0,1769444	0,3230556	0,3230556
1	0,3166667	0,6833333	0,6833333
0,5	0,6436111	-0,1436111	0,1436111
0,5	0,0169444	0,4830556	0,4830556
2,5	2,1877778	0,3122222	0,3122222
5	4,8161111	0,1838889	0,1838889
0,5	0,1472222	0,3527778	0,3527778
4	5,3513889	-1,3513889	1,3513889
0,5	0,5569444	-0,0569444	0,0569444
0,5	0,2216667	0,2783333	0,2783333
0,5	0,2630556	0,2369444	0,2369444
0,5	0,1838889	0,3161111	0,3161111
0,5	0,1294444	0,3705556	0,3705556
6	5,3297222	0,6702778	0,6702778
0,5	1,2408333	-0,7408333	0,7408333
1	2,8036111	-1,8036111	1,8036111
2,5	2,3038889	0,1961111	0,1961111
1	0,0652778	0,9347222	0,9347222
35	31,915	3,085	3,085
20	20,0066667	-0,0066667	0,0066667
0,5	0,2419444	0,2580556	0,2580556
7	9,2263889	-2,2263889	2,2263889
0,25	0,2913889	-0,0413889	0,0413889
22	18,5133333	3,4866667	3,4866667
0,5	0,4475	0,0525	0,0525
1,5	1,8211111	-0,3211111	0,3211111
0,5	1,3430556	-0,8430556	0,8430556
7	8,6372222	-1,6372222	1,6372222
1	1,0402778	-0,0402778	0,0402778
3	2,5408333	0,4591667	0,4591667
1,25	1,7338889	-0,4838889	0,4838889
12	11,285	0,715	0,715
1	2,7883333	-1,7883333	1,7883333
1	0,2969444	0,7030556	0,7030556
1	0,085	0,915	0,915
1	0,9680556	0,0319444	0,0319444
0,5	0,1580556	0,3419444	0,3419444
0,5	0,0541667	0,4458333	0,4458333
1,5	1,5419444	-0,0419444	0,0419444
0,5	0,1402778	0,3597222	0,3597222
0,5	0,505	-0,005	0,005
0,25	0,3075	-0,0575	0,0575
0,5	2,7961111	-2,2961111	2,2961111
5	4,5486111	0,4513889	0,4513889
0,5	0,5358333	-0,0358333	0,0358333
6	4,8572222	1,1427778	1,1427778
12	10,4436111	1,5563889	1,5563889
0,5	0,6622222	-0,1622222	0,1622222
0,5	0,2341667	0,2658333	0,2658333
0,4	0,3436111	0,0563889	0,0563889
1	1,1841667	-0,1841667	0,1841667
1	0,9594444	0,0405556	0,0405556
6	5,045	0,955	0,955
2	1,8469444	0,1530556	0,1530556
3	3,3594444	-0,3594444	0,3594444
0,5	0,4297222	0,0702778	0,0702778
0,5	0,3697222	0,1302778	0,1302778
1	0,2311111	0,7688889	0,7688889
1,5	3,915	-2,415	2,415
0,4	0,3483333	0,0516667	0,0516667
0,5	0,1438889	0,3561111	0,3561111
0,5	0,3622222	0,1377778	0,1377778
2	1,6669444	0,3330556	0,3330556
0,5	0,6380556	-0,1380556	0,1380556

3	2,4319444	0,5680556	0,5680556
1	0,9877778	0,0122222	0,0122222
0,5	1,1108333	-0,6108333	0,6108333
1	0,8630556	0,1369444	0,1369444
0,25	0,2627778	-0,0127778	0,0127778
0,5	0,4969444	0,0030556	0,0030556
1	0,2655556	0,7344444	0,7344444
0,5	0,08	0,42	0,42
40	33,1072222	6,8927778	6,8927778
0,5	0,0183333	0,4816667	0,4816667
0,5	0,6011111	-0,1011111	0,1011111
8	7,3619444	0,6380556	0,6380556
0,4	0,3333333	0,0666667	0,0666667
0,5	0,1647222	0,3352778	0,3352778
0,5	0,7002778	-0,2002778	0,2002778
0,5	2,9827778	-2,4827778	2,4827778
0,5	0,0230556	0,4769444	0,4769444
1	1,3322222	-0,3322222	0,3322222
0,5	2,7986111	-2,2986111	2,2986111
0,5	2,4763889	-1,9763889	1,9763889
0,5	2,9413889	-2,4413889	2,4413889
0,5	1,4455556	-0,9455556	0,9455556
0,4	0,355	0,045	0,045
38	35,2558333	2,7441667	2,7441667
0,5	2,2547222	-1,7547222	1,7547222
1	0,9544444	0,0455556	0,0455556
0,5	1,0938889	-0,5938889	0,5938889
27	29,5975	-2,5975	2,5975
0,5	0,6530556	-0,1530556	0,1530556
1	1,1258333	-0,1258333	0,1258333
0,5	0,5191667	-0,0191667	0,0191667
0,5	0,1808333	0,3191667	0,3191667
0,5	0,7902778	-0,2902778	0,2902778
3,5	2,8811111	0,6188889	0,6188889
0,4	0,3330556	0,0669444	0,0669444
3	2,8938889	0,1061111	0,1061111
0,5	0,2719444	0,2280556	0,2280556
1	1,2419444	-0,2419444	0,2419444
0,5	0,435	0,065	0,065
1	0,8702778	0,1297222	0,1297222
1	0,9069444	0,0930556	0,0930556
16	15,7988889	0,2011111	0,2011111
1	0,9563889	0,0436111	0,0436111
0,5	0,5322222	-0,0322222	0,0322222
2	1,8586111	0,1413889	0,1413889
0,5	0,2363889	0,2636111	0,2636111
0,5	0,3966667	0,1033333	0,1033333
0,5	0,0358333	0,4641667	0,4641667
52	37,0144444	14,9855556	14,9855556
0,5	0,2269444	0,2730556	0,2730556
0,5	0,6686111	-0,1686111	0,1686111
4	6,6241667	-2,6241667	2,6241667
0,5	0,2391667	0,2608333	0,2608333
0,5	0,0377778	0,4622222	0,4622222
0,5	0,1613889	0,3386111	0,3386111
0,5	0,1080556	0,3919444	0,3919444
0,5	0,4741667	0,0258333	0,0258333
1	1,0655556	-0,0655556	0,0655556
0,5	0,2166667	0,2833333	0,2833333
0,5	0,3761111	0,1238889	0,1238889
0,5	0,3891667	0,1108333	0,1108333
1	1,3369444	-0,3369444	0,3369444
1	0,9544444	0,0455556	0,0455556
0,5	1,4991667	-0,9991667	0,9991667
10	8,7533333	1,2466667	1,2466667
8	6,7708333	1,2291667	1,2291667
0,5	0,575	-0,075	0,075
12	11,9430556	0,0569444	0,0569444
0,5	1,3605556	-0,8605556	0,8605556
0,5	0,0844444	0,4155556	0,4155556
0,5	0,1008333	0,3991667	0,3991667
2	2,3308333	-0,3308333	0,3308333
0,5	1,1944444	-0,6944444	0,6944444
0,5	0,505	-0,005	0,005
0,5	0,1811111	0,3188889	0,3188889
2	1,6722222	0,3277778	0,3277778
0,5	0,1638889	0,3361111	0,3361111
5	4,2216667	0,7783333	0,7783333
1	0,2119444	0,7880556	0,7880556
0,5	0,5016667	-0,0016667	0,0016667
0,5	0,6213889	-0,1213889	0,1213889
17	16,2813889	0,7186111	0,7186111
0,5	0,1936111	0,3063889	0,3063889
0,4	0,3558333	0,0441667	0,0441667
1	1,2825	-0,2825	0,2825
0,5	0,1002778	0,3997222	0,3997222
0,5	0,1647222	0,3352778	0,3352778
54	50,8241667	3,1758333	3,1758333
6	6,1452778	-0,1452778	0,1452778
1	0,2316667	0,7683333	0,7683333
0,5	1,9236111	-1,4236111	1,4236111
8	6,0761111	1,9238889	1,9238889
0,5	0,0675	0,4325	0,4325
0,5	0,1508333	0,3491667	0,3491667
0,5	0,0391667	0,4608333	0,4608333
0,5	0,0536111	0,4463889	0,4463889
4	6,2291667	-2,2291667	2,2291667
4	3,6375	0,3625	0,3625
33	27,9941667	5,0058333	5,0058333
1,5	2,1144444	-0,6144444	0,6144444
6	6,7183333	-0,7183333	0,7183333

0,5	2,7052778	-2,2052778	2,2052778
0,5	1,2008333	-0,7008333	0,7008333
2	2,4508333	-0,4508333	0,4508333
0,5	0,1430556	0,3569444	0,3569444
18	17,2833333	0,7166667	0,7166667
0,5	0,0236111	0,4763889	0,4763889
2,5	2,0641667	0,4358333	0,4358333
0,25	0,2819444	-0,0319444	0,0319444
8	10,7130556	-2,7130556	2,7130556
0,5	0,5411111	-0,0411111	0,0411111
0,5	1,4958333	-0,9958333	0,9958333
0,75	1,9063889	-1,1563889	1,1563889
0,5	0,1475	0,3525	0,3525
2,5	2,5191667	-0,0191667	0,0191667
0,75	2,5525	-1,8025	1,8025
0,5	0,4777778	0,0222222	0,0222222
0,5	0,4777778	0,0222222	0,0222222
1	0,3275	0,6725	0,6725
2,75	3,4236111	-0,6736111	0,6736111
0,5	0,0958333	0,4041667	0,4041667
0,25	0,3102778	-0,0602778	0,0602778
0,5	1,4736111	-0,9736111	0,9736111
2	1,4397222	0,5602778	0,5602778
8	7,6772222	0,3227778	0,3227778
0,5	1,7252778	-1,2252778	1,2252778
0,5	0,0730556	0,4269444	0,4269444
1	0,8352778	0,1647222	0,1647222
0,5	0,7555556	-0,2555556	0,2555556
0,5	0,1091667	0,3908333	0,3908333
0,5	0,4038889	0,0961111	0,0961111
0,5	0,7961111	-0,2961111	0,2961111
2	2,7566667	-0,7566667	0,7566667
2,5	4,0277778	-1,5277778	1,5277778
2	3,0827778	-1,0827778	1,0827778
0,5	2,7719444	-2,2719444	2,2719444
1,5	1,3072222	0,1927778	0,1927778
6	4,8816667	1,1183333	1,1183333
40	34,0397222	5,9602778	5,9602778
0,5	2,5372222	-2,0372222	2,0372222
0,5	0,7341667	-0,2341667	0,2341667
0,5	0,3802778	0,1197222	0,1197222
10	9,9705556	0,0294444	0,0294444
0,5	0,5147222	-0,0147222	0,0147222
0,5	0,1272222	0,3727778	0,3727778
2	1,9280556	0,0719444	0,0719444
0,25	0,2802778	-0,0302778	0,0302778
0,5	0,2419444	0,2580556	0,2580556
0,5	0,0347222	0,4652778	0,4652778
10	8,3333333	1,6666667	1,6666667
0,5	1,1041667	-0,6041667	0,6041667
1	1,0786111	-0,0786111	0,0786111
0,5	1,6863889	-1,1863889	1,1863889
0,5	0,4797222	0,0202778	0,0202778
5	4,3338889	0,6661111	0,6661111
0,5	0,2180556	0,2819444	0,2819444
0,5	0,5497222	-0,0497222	0,0497222
4	3,3797222	0,6202778	0,6202778
10	9,4511111	0,5488889	0,5488889
0,5	0,1441667	0,3558333	0,3558333
0,5	1,3052778	-0,8052778	0,8052778
0,5	2,5663889	-2,0663889	2,0663889
1	1,2075	-0,2075	0,2075
0,25	0,2994444	-0,0494444	0,0494444
0,5	0,7861111	-0,2861111	0,2861111
0,5	1,0836111	-0,5836111	0,5836111
1	0,9427778	0,0572222	0,0572222
1	1,4825	-0,4825	0,4825
4	3,8011111	0,1988889	0,1988889
0,5	0,6158333	-0,1158333	0,1158333
1	0,8786111	0,1213889	0,1213889
39	31,3322222	7,6677778	7,6677778
0,5	0,4780556	0,0219444	0,0219444
0,5	0,1655556	0,3344444	0,3344444
0,5	0,7002778	-0,2002778	0,2002778
1	0,0441667	0,9558333	0,9558333
1	0,9130556	0,0869444	0,0869444
0,25	0,0205556	0,2294444	0,2294444
0,5	0,1994444	0,3005556	0,3005556
0,5	0,0555556	0,4444444	0,4444444
1,5	0,2508333	1,2491667	1,2491667
1	0,2647222	0,7352778	0,7352778
0,5	0,6855556	-0,1855556	0,1855556
0,5	0,4247222	0,0752778	0,0752778
0,5	0,1113889	0,3886111	0,3886111
1	2,7380556	-1,7380556	1,7380556
0,5	0,3791667	0,1208333	0,1208333
1	0,9316667	0,0683333	0,0683333
6	4,6475	1,3525	1,3525
3	3,0891667	-0,0891667	0,0891667
1	0,8305556	0,1694444	0,1694444
4,5	4,2938889	0,2061111	0,2061111
1	0,8194444	0,1805556	0,1805556
0,5	0,4327778	0,0672222	0,0672222
0,5	0,2272222	0,2727778	0,2727778
1	1,0255556	-0,0255556	0,0255556
3,5	2,7641667	0,7358333	0,7358333
2,5	1,9516667	0,5483333	0,5483333
2	2,0216667	-0,0216667	0,0216667
0,5	2,4097222	-1,9097222	1,9097222
1	0,0802778	0,9197222	0,9197222
1,5	1,4441667	0,0558333	0,0558333

7	5,1797222	1,8202778	1,8202778
0,5	0,0486111	0,4513889	0,4513889
1	1,6797222	-0,6797222	0,6797222
1	0,9958333	0,0041667	0,0041667
0,5	0,2175	0,2825	0,2825
1	0,9761111	0,0238889	0,0238889
0,5	0,1452778	0,3547222	0,3547222
4	3,785	0,215	0,215
1,5	1,4111111	0,0888889	0,0888889
1,5	4,3802778	-2,8802778	2,8802778
0,5	0,0491667	0,4508333	0,4508333
4,75	4,2927778	0,4572222	0,4572222
1	1,0233333	-0,0233333	0,0233333
0,5	2,4361111	-1,9361111	1,9361111
9	6,8958333	2,1041667	2,1041667
1	1,4933333	-0,4933333	0,4933333
4	3,8963889	0,1036111	0,1036111
1	1,0902778	-0,0902778	0,0902778
0,5	0,1161111	0,3838889	0,3838889
25	18,0363889	6,9636111	6,9636111
0,5	3,0391667	-2,5391667	2,5391667
2	4,6630556	-2,6630556	2,6630556
1	1,0608333	-0,0608333	0,0608333
0,5	0,4308333	0,0691667	0,0691667
0,5	1,5155556	-1,0155556	1,0155556
1	0,0280556	0,9719444	0,9719444
6	5,1797222	0,8202778	0,8202778
0,5	0,6197222	-0,1197222	0,1197222
0,5	1,3705556	-0,8705556	0,8705556
130	82,1613889	47,8386111	47,8386111
1,5	2,1661111	-0,6661111	0,6661111
0,5	0,0202778	0,4797222	0,4797222
2	1,8258333	0,1741667	0,1741667
1	1,5155556	-0,5155556	0,5155556
0,5	0,0416667	0,4583333	0,4583333
9	7,9180556	1,0819444	1,0819444
1,5	2,0094444	-0,5094444	0,5094444
0,5	0,0838889	0,4161111	0,4161111
0,5	0,235	0,265	0,265
7	6,1877778	0,8122222	0,8122222
5	5,0308333	-0,0308333	0,0308333
3	3,5833333	-0,5833333	0,5833333
0,5	0,5313889	-0,0313889	0,0313889
1	0,1266667	0,8733333	0,8733333
0,5	0,0688889	0,4311111	0,4311111
1	0,7247222	0,2752778	0,2752778
0,5	0,4519444	0,0480556	0,0480556
0,5	0,2408333	0,2591667	0,2591667
4	4,7944444	-0,7944444	0,7944444
0,5	0,4208333	0,0791667	0,0791667
0,5	0,1566667	0,3433333	0,3433333
0,5	0,4275	0,0725	0,0725
1	0,2822222	0,7177778	0,7177778
6	5,5316667	0,4683333	0,4683333
18	17,7683333	0,2316667	0,2316667
8,5	9,7019444	-1,2019444	1,2019444
0,5	0,3786111	0,1213889	0,1213889
1,5	1,0816667	0,4183333	0,4183333
7	5,255	1,745	1,745
0,5	0,6097222	-0,1097222	0,1097222
0,5	0,0783333	0,4216667	0,4216667
0,5	0,0783333	0,4216667	0,4216667
1	3,6627778	-2,6627778	2,6627778
0,5	0,63	-0,13	0,13
4	4,2066667	-0,2066667	0,2066667
0,5	0,0352778	0,4647222	0,4647222
0,5	3	-2,5	2,5
0,5	2,2555556	-1,7555556	1,7555556
0,5	0,0908333	0,4091667	0,4091667
1	1,5511111	-0,5511111	0,5511111
0,5	0,5666667	-0,0666667	0,0666667
0,5	1,5786111	-1,0786111	1,0786111
14	13,5141667	0,4858333	0,4858333
1	0,7275	0,2725	0,2725
0,5	3,0975	-2,5975	2,5975
0,5	0,6372222	-0,1372222	0,1372222
0,5	0,1363889	0,3636111	0,3636111
4	4,2269444	-0,2269444	0,2269444
0,5	0,4711111	0,0288889	0,0288889
0,5	2,1136111	-1,6136111	1,6136111
4	5,4466667	-1,4466667	1,4466667
1	1,0958333	-0,0958333	0,0958333
0,5	0,5144444	-0,0144444	0,0144444
5	3,7569444	1,2430556	1,2430556
0,5	0,6663889	-0,1663889	0,1663889
10	9,1730556	0,8269444	0,8269444
16	17,3252778	-1,3252778	1,3252778
0,25	0,6508333	-0,4008333	0,4008333
36	33,7536111	2,2463889	2,2463889
14	13,2644444	0,7355556	0,7355556
1,5	1,4275	0,0725	0,0725
0,75	0,6763889	0,0736111	0,0736111
1	0,8869444	0,1130556	0,1130556
0,5	0,0433333	0,4566667	0,4566667
3	2,3638889	0,6361111	0,6361111
1,5	0,0258333	1,4741667	1,4741667
5	5,6736111	-0,6736111	0,6736111
1	0,9241667	0,0758333	0,0758333
2	4,9825	-2,9825	2,9825
3	2,6244444	0,3755556	0,3755556
0,5	1,7844444	-1,2844444	1,2844444

1	1,4216667	-0,4216667	0,4216667
0,5	0,0725	0,4275	0,4275
1	1,2830556	-0,2830556	0,2830556
0,5	0,6044444	-0,1044444	0,1044444
0,5	0,0333333	0,4666667	0,4666667
2	1,4808333	0,5191667	0,5191667
0,5	0,105	0,395	0,395
0,5	0,4891667	0,0108333	0,0108333
0,5	0,4308333	0,0691667	0,0691667
0,5	0,4777778	0,0222222	0,0222222
10	10,725	-0,725	0,725
0,5	0,1063889	0,3936111	0,3936111
0,5	0,6030556	-0,1030556	0,1030556
0,5	0,6780556	-0,1780556	0,1780556
38	32,5794444	5,4205556	5,4205556
2	2,1033333	-0,1033333	0,1033333
1	0,9427778	0,0572222	0,0572222
2,5	3,1055556	-0,6055556	0,6055556
0,5	1,4861111	-0,9861111	0,9861111
0,5	0,0533333	0,4466667	0,4466667
0,5	1,0727778	-0,5727778	0,5727778
0,5	0,125	0,375	0,375
2	2,1872222	-0,1872222	0,1872222
1	0,9172222	0,0827778	0,0827778
8	7,7758333	0,2241667	0,2241667
88	68,4830556	19,5169444	19,5169444
12	12,1225	-0,1225	0,1225
0,5	0,5980556	-0,0980556	0,0980556
0,5	0,5716667	-0,0716667	0,0716667
0,5	0,25	0,25	0,25
0,5	0,0888889	0,4111111	0,4111111
1	0,9336111	0,0663889	0,0663889
0,5	0,1938889	0,3061111	0,3061111
0,5	0,4411111	0,0588889	0,0588889
0,25	0,3091667	-0,0591667	0,0591667
1,5	0,2577778	1,2422222	1,2422222
0,5	0,075	0,425	0,425
1	1,0580556	-0,0580556	0,0580556
2,5	2,0083333	0,4916667	0,4916667
1	0,9316667	0,0683333	0,0683333
3,5	3,4961111	0,0038889	0,0038889
0,5	0,6097222	-0,1097222	0,1097222
23	18,5252778	4,4747222	4,4747222
1	1,0866667	-0,0866667	0,0866667
0,4	0,3383333	0,0616667	0,0616667
9	8,3969444	0,6030556	0,6030556
1,5	0,2402778	1,2597222	1,2597222
1	1,085	-0,085	0,085
1	0,8336111	0,1663889	0,1663889
0,25	0,3069444	-0,0569444	0,0569444
0,5	1,7386111	-1,2386111	1,2386111
4	5,0583333	-1,0583333	1,0583333
10	8,1188889	1,8811111	1,8811111
0,25	0,2755556	-0,0255556	0,0255556
0,5	0,3691667	0,1308333	0,1308333
0,5	0,0675	0,4325	0,4325
9	8,7763889	0,2236111	0,2236111
0,5	0,0502778	0,4497222	0,4497222
9	7,5394444	1,4605556	1,4605556
3	2,8894444	0,1105556	0,1105556
0,5	0,5072222	-0,0072222	0,0072222
1,25	1,0338889	0,2161111	0,2161111
0,5	0,2247222	0,2752778	0,2752778
0,02	0,0247222	-0,0047222	0,0047222
6	8,3061111	-2,3061111	2,3061111
0,5	0,3886111	0,1113889	0,1113889
0,5	0,2497222	0,2502778	0,2502778
4	3,6547222	0,3452778	0,3452778
1	0,9294444	0,0705556	0,0705556
1	0,8452778	0,1547222	0,1547222
1	0,3402778	0,6597222	0,6597222
7	6,6755556	0,3244444	0,3244444
0,5	2,725	-2,225	2,225
0,5	0,2152778	0,2847222	0,2847222
0,5	0,1830556	0,3169444	0,3169444
0,5	0,4016667	0,0983333	0,0983333
0,5	0,6875	-0,1875	0,1875
1	0,8897222	0,1102778	0,1102778
6	4,6319444	1,3680556	1,3680556
5	6,3525	-1,3525	1,3525
1	0,7983333	0,2016667	0,2016667
0,5	0,1488889	0,3511111	0,3511111
8	7,3741667	0,6258333	0,6258333
3	3,2152778	-0,2152778	0,2152778
0,5	0,2344444	0,2655556	0,2655556
3	3,5986111	-0,5986111	0,5986111
82	62,265	19,735	19,735
17	13,5463889	3,4536111	3,4536111
2,5	3,3030556	-0,8030556	0,8030556
1	1,0658333	-0,0658333	0,0658333
1,5	2,3980556	-0,8980556	0,8980556
1,5	0,23	1,27	1,27
13	9,7313889	3,2686111	3,2686111
1	0,7955556	0,2044444	0,2044444
0,5	1,1663889	-0,6663889	0,6663889
0,5	0,2375	0,2625	0,2625
3	3,0911111	-0,0911111	0,0911111
1	0,7230556	0,2769444	0,2769444
1,5	2,1730556	-0,6730556	0,6730556
0,5	2,4738889	-1,9738889	1,9738889
0,5	0,1083333	0,3916667	0,3916667

0,5	1,7916667	-1,2916667	1,2916667
1	1,0569444	-0,0569444	0,0569444
0,5	0,2041667	0,2958333	0,2958333
0,5	0,2141667	0,2858333	0,2858333
0,25	0,3022222	-0,0522222	0,0522222
11	11,1233333	-0,1233333	0,1233333
0,5	1,2230556	-0,7230556	0,7230556
0,5	0,4108333	0,0891667	0,0891667
2	1,6761111	0,3238889	0,3238889
0,5	0,1647222	0,3352778	0,3352778
5	7,9680556	-2,9680556	2,9680556
1	0,7683333	0,2316667	0,2316667
0,5	1,8119444	-1,3119444	1,3119444
0,5	0,1072222	0,3927778	0,3927778
2	1,8277778	0,1722222	0,1722222
1	0,9786111	0,0213889	0,0213889
10	9,0727778	0,9272222	0,9272222
0,5	0,2172222	0,2827778	0,2827778
0,5	0,1605556	0,3394444	0,3394444
0,5	0,0308333	0,4691667	0,4691667
1	0,8827778	0,1172222	0,1172222
9	9,0913889	-0,0913889	0,0913889
0,5	0,115	0,385	0,385
0,5	0,1019444	0,3980556	0,3980556
0,5	0,1511111	0,3488889	0,3488889
1	0,8444444	0,1555556	0,1555556
4	5,0480556	-1,0480556	1,0480556
0,5	0,0552778	0,4447222	0,4447222
0,5	0,1536111	0,3463889	0,3463889
0,5	0,1980556	0,3019444	0,3019444
0,5	0,0797222	0,4202778	0,4202778
0,5	0,1275	0,3725	0,3725
0,5	0,0911111	0,4088889	0,4088889
1	1,4033333	-0,4033333	0,4033333
0,5	0,5613889	-0,0613889	0,0613889
0,5	0,4761111	0,0238889	0,0238889
0,5	0,1252778	0,3747222	0,3747222
0,5	0,2283333	0,2716667	0,2716667
0,4	0,3225	0,0775	0,0775
0,5	0,0302778	0,4697222	0,4697222
4	3,6833333	0,3166667	0,3166667
0,5	0,7891667	-0,2891667	0,2891667
0,4	0,3363889	0,0636111	0,0636111
0,5	0,5005556	-0,0005556	0,0005556
0,4	0,3497222	0,0502778	0,0502778
1	0,9066667	0,0933333	0,0933333
0,5	0,2127778	0,2872222	0,2872222
6	5,1908333	0,8091667	0,8091667
5,5	5,4016667	0,0983333	0,0983333
0,5	0,0305556	0,4694444	0,4694444
0,5	2,8772222	-2,3772222	2,3772222
1,5	1,8133333	-0,3133333	0,3133333
1	1,2402778	-0,2402778	0,2402778
2	0,2666667	1,7333333	1,7333333
0,5	0,6263889	-0,1263889	0,1263889
0,5	0,4513889	0,0486111	0,0486111
0,5	0,5577778	-0,0577778	0,0577778
1	1,5197222	-0,5197222	0,5197222
0,5	0,0430556	0,4569444	0,4569444
0,75	2,13	-1,38	1,38
0,5	0,4755556	0,0244444	0,0244444
5	4,2383333	0,7616667	0,7616667
1	1,0361111	-0,0361111	0,0361111
1,25	1,7661111	-0,5161111	0,5161111
0,5	0,5222222	-0,0222222	0,0222222
1	2,7866667	-1,7866667	1,7866667
1,25	1,7911111	-0,5411111	0,5411111
0,5	0,8208333	-0,3208333	0,3208333
1,5	1,9155556	-0,4155556	0,4155556
1	1,6386111	-0,6386111	0,6386111
0,5	0,1477778	0,3522222	0,3522222
1	0,7547222	0,2452778	0,2452778
0,5	0,6669444	-0,1669444	0,1669444
0,5	0,2433333	0,2566667	0,2566667
2	0,3375	1,6625	1,6625
1,5	1,8966667	-0,3966667	0,3966667
0,25	0,3238889	-0,0738889	0,0738889
0,5	1,2822222	-0,7822222	0,7822222
0,5	2,3691667	-1,8691667	1,8691667
0,5	1,7941667	-1,2941667	1,2941667
0,5	0,7555556	-0,2555556	0,2555556
0,5	0,2336111	0,2663889	0,2663889
2	0,2041667	1,7958333	1,7958333
1	0,8461111	0,1538889	0,1538889
0,5	1,4083333	-0,9083333	0,9083333
4	4,1602778	-0,1602778	0,1602778
0,5	0,4155556	0,0844444	0,0844444
90	67,3580556	22,6419444	22,6419444
25	27,25	-2,25	2,25
0,5	0,8208333	-0,3208333	0,3208333
9	8,0508333	0,9491667	0,9491667
0,5	0,0197222	0,4802778	0,4802778
1	1,5577778	-0,5577778	0,5577778
1	0,3508333	0,6491667	0,6491667
2	1,8258333	0,1741667	0,1741667
30	26,4216667	3,5783333	3,5783333
11	10,1255556	0,8744444	0,8744444
1	0,1644444	0,8355556	0,8355556
5	5,0797222	-0,0797222	0,0797222
1	0,8752778	0,1247222	0,1247222
0,5	0,5230556	-0,0230556	0,0230556

2	2,0122222	-0,0122222	0,0122222
4,5	3,2569444	1,2430556	1,2430556
25	23,8297222	1,1702778	1,1702778
3	2,3872222	0,6127778	0,6127778
1,5	3,7127778	-2,2127778	2,2127778
1	0,2958333	0,7041667	0,7041667
0,5	0,8144444	-0,3144444	0,3144444
1	2,8505556	-1,8505556	1,8505556
4	4,2319444	-0,2319444	0,2319444
1	1,02	-0,02	0,02
2	4,8905556	-2,8905556	2,8905556
8,5	6,8544444	1,6455556	1,6455556
0,5	0,1922222	0,3077778	0,3077778
3	4,0091667	-1,0091667	1,0091667
0,5	0,2530556	0,2469444	0,2469444
0,4	0,3363889	0,0636111	0,0636111
10	9,4533333	0,5466667	0,5466667
0,5	0,6625	-0,1625	0,1625
20	18,365	1,635	1,635
0,5	0,2030556	0,2969444	0,2969444
1	1,025	-0,025	0,025
2,5	2,3188889	0,1811111	0,1811111
1,5	1,2427778	0,2572222	0,2572222
1,5	3,7172222	-2,2172222	2,2172222
5	5,0205556	-0,0205556	0,0205556
8	7,6591667	0,3408333	0,3408333
0,5	0,1761111	0,3238889	0,3238889
1	0,0388889	0,9611111	0,9611111
8	6,11	1,89	1,89
4	5,5019444	-1,5019444	1,5019444
3	2,4130556	0,5869444	0,5869444
0,4	0,3355556	0,0644444	0,0644444
1	0,855	0,145	0,145
0,5	0,2538889	0,2461111	0,2461111
0,5	0,0555556	0,4444444	0,4444444
9	8,1797222	0,8202778	0,8202778
0,5	0,3858333	0,1141667	0,1141667
0,5	0,7141667	-0,2141667	0,2141667
1,5	3,3708333	-1,8708333	1,8708333
0,5	0,0336111	0,4663889	0,4663889
0,5	0,0627778	0,4372222	0,4372222
0,5	0,4272222	0,0727778	0,0727778
0,5	0,5361111	-0,0361111	0,0361111
0,5	0,1583333	0,3416667	0,3416667
1,5	1,3758333	0,1241667	0,1241667
0,5	1,3527778	-0,8527778	0,8527778
4	3,8208333	0,1791667	0,1791667
0,5	1,5316667	-1,0316667	1,0316667
6	6,7683333	-0,7683333	0,7683333
4	4,2005556	-0,2005556	0,2005556
9	8,6066667	0,3933333	0,3933333
0,5	2,4213889	-1,9213889	1,9213889
5	4,2469444	0,7530556	0,7530556
24	23,4911111	0,5088889	0,5088889
1	0,1863889	0,8136111	0,8136111
0,5	0,4447222	0,0552778	0,0552778
0,5	0,6508333	-0,1508333	0,1508333
0,5	1,3322222	-0,8322222	0,8322222
2	2,4825	-0,4825	0,4825
1	0,9022222	0,0977778	0,0977778
0,5	0,3625	0,1375	0,1375
0,5	0,2330556	0,2669444	0,2669444
1	0,8813889	0,1186111	0,1186111
0,5	0,03	0,47	0,47
1	0,2241667	0,7758333	0,7758333
0,5	0,0511111	0,4488889	0,4488889
1	0,0363889	0,9636111	0,9636111
0,5	1,7755556	-1,2755556	1,2755556
2	1,9494444	0,0505556	0,0505556
0,5	0,5147222	-0,0147222	0,0147222
0,5	0,2411111	0,2588889	0,2588889
0,5	1,4630556	-0,9630556	0,9630556
0,5	0,2338889	0,2661111	0,2661111
25	19,3747222	5,6252778	5,6252778
0,5	0,21	0,29	0,29
3	3,15	-0,15	0,15
1	1,3913889	-0,3913889	0,3913889
1	0,305	0,695	0,695
0,5	0,4230556	0,0769444	0,0769444
1	0,2105556	0,7894444	0,7894444
11	10,5294444	0,4705556	0,4705556
1,5	1,5613889	-0,0613889	0,0613889
0,5	0,1394444	0,3605556	0,3605556
4	3,3155556	0,6844444	0,6844444
0,5	0,0330556	0,4669444	0,4669444
1	0,9825	0,0175	0,0175
0,5	2,5644444	-2,0644444	2,0644444
0,5	0,1747222	0,3252778	0,3252778
1,5	1,3730556	0,1269444	0,1269444
1,5	1,0977778	0,4022222	0,4022222
10	8,3175	1,6825	1,6825
0,5	0,6972222	-0,1972222	0,1972222
1	1,0030556	-0,0030556	0,0030556
4	3,8525	0,1475	0,1475
7	6,5466667	0,4533333	0,4533333
0,5	0,1472222	0,3527778	0,3527778
0,5	0,17	0,33	0,33
10	9,0355556	0,9644444	0,9644444
36	32,7330556	3,2669444	3,2669444
0,5	0,0847222	0,4152778	0,4152778
8	7,2858333	0,7141667	0,7141667

0,5	0,125	0,375	0,375
0,5	0,4602778	0,0397222	0,0397222
2	1,8422222	0,1577778	0,1577778
0,5	2,4033333	-1,9033333	1,9033333
0,5	0,0969444	0,4030556	0,4030556
0,5	0,1205556	0,3794444	0,3794444
2	3,1127778	-1,1127778	1,1127778
1	1,0483333	-0,0483333	0,0483333
0,5	0,1133333	0,3866667	0,3866667
0,5	0,5833333	-0,0833333	0,0833333
2	0,31	1,69	1,69
0,5	1,84	-1,34	1,34
0,5	0,1288889	0,3711111	0,3711111
1	0,8777778	0,1222222	0,1222222
2,5	2,2036111	0,2963889	0,2963889
0,5	0,0633333	0,4366667	0,4366667
1	1,3405556	-0,3405556	0,3405556
0,5	0,07	0,43	0,43
1,5	2,0986111	-0,5986111	0,5986111
0,75	0,6697222	0,0802778	0,0802778
0,5	0,0538889	0,4461111	0,4461111
1	0,8827778	0,1172222	0,1172222
10	9,7227778	0,2722222	0,2722222
2	2,505	0,505	0,505
1	0,8861111	0,1138889	0,1138889
0,5	0,7627778	-0,2627778	0,2627778
0,5	0,4225	0,0775	0,0775
67	48,1633333	18,8366667	18,8366667
0,5	0,435	0,065	0,065
37	28,485	8,515	8,515
0,5	2,1125	-1,6125	1,6125
32	25,7838889	6,2161111	6,2161111
0,5	0,4747222	0,0252778	0,0252778
6	5,5058333	0,4941667	0,4941667
0,25	0,2677778	-0,0177778	0,0177778
0,5	0,0652778	0,4347222	0,4347222
1,5	1,5358333	-0,0358333	0,0358333
0,5	0,44	0,06	0,06
0,5	0,415	0,085	0,085
1	1,7211111	-0,7211111	0,7211111
7	6,9872222	0,0127778	0,0127778
0,5	1,1861111	-0,6861111	0,6861111
0,5	0,6583333	-0,1583333	0,1583333
0,5	0,0586111	0,4413889	0,4413889
0,5	0,7402778	-0,2402778	0,2402778
0,5	0,3630556	0,1369444	0,1369444
1	1,4441667	-0,4441667	0,4441667
3	2,2555556	0,7444444	0,7444444
2,5	2,6041667	-0,1041667	0,1041667
2	3,0458333	-1,0458333	1,0458333
0,5	0,0583333	0,4416667	0,4416667
0,5	0,185	0,315	0,315
4	4,37	-0,37	0,37
0,5	0,6636111	-0,1636111	0,1636111
0,25	0,2927778	-0,0427778	0,0427778
4	4,1072222	-0,1072222	0,1072222
0,5	1,2883333	-0,7883333	0,7883333
4,5	4,2938889	0,2061111	0,2061111
0,5	0,1675	0,3325	0,3325
9	8,4694444	0,5305556	0,5305556
10	10,1255556	-0,1255556	0,1255556
2	1,9347222	0,0652778	0,0652778
20	27,6930556	-7,6930556	7,6930556
5	5,2197222	-0,2197222	0,2197222
6	5,2127778	0,7872222	0,7872222
1	0,955	0,045	0,045
0,5	0,0513889	0,4486111	0,4486111
6	5,0797222	0,9202778	0,9202778
0,5	0,0316667	0,4683333	0,4683333
6	4,5427778	1,4572222	1,4572222
0,5	0,5344444	-0,0344444	0,0344444
4,5	5,0869444	-0,5869444	0,5869444
3	2,975	0,025	0,025
70	56,065	13,935	13,935
1	0,8286111	0,1713889	0,1713889
1,5	1,9747222	-0,4747222	0,4747222
0,5	0,0763889	0,4236111	0,4236111
0,5	0,7452778	-0,2452778	0,2452778
0,5	0,2372222	0,2627778	0,2627778
0,5	0,0877778	0,4122222	0,4122222
1	0,9872222	0,0127778	0,0127778
1	0,8894444	0,1105556	0,1105556
1	0,9566667	0,0433333	0,0433333
0,5	0,7086111	-0,2086111	0,2086111
0,5	2,1911111	-1,6911111	1,6911111
2,5	3,1794444	-0,6794444	0,6794444
0,5	0,3575	0,1425	0,1425
0,5	0,0655556	0,4344444	0,4344444
0,5	0,7480556	-0,2480556	0,2480556
9	8,5313889	0,4686111	0,4686111
1	1,6355556	-0,6355556	0,6355556
0,5	0,0994444	0,4005556	0,4005556
1	1,0691667	-0,0691667	0,0691667
4	3,3594444	0,6405556	0,6405556
3	3,2355556	-0,2355556	0,2355556
0,5	0,0227778	0,4772222	0,4772222
1	1,02	-0,02	0,02
11	10,3994444	0,6005556	0,6005556
1	0,9444444	0,0555556	0,0555556
0,5	0,6883333	-0,1883333	0,1883333
24	20,3477778	3,6522222	3,6522222

7	6,8072222	0,1927778	0,1927778
7	6,4388889	0,5611111	0,5611111
7	6,0466667	0,9533333	0,9533333
1	0,9575	0,0425	0,0425
3	3,1483333	-0,1483333	0,1483333
0,5	0,0377778	0,4622222	0,4622222
6	4,4033333	1,5966667	1,5966667
0,5	0,2194444	0,2805556	0,2805556
0,5	0,0380556	0,4619444	0,4619444
0,5	0,7408333	-0,2408333	0,2408333
2	2,6569444	-0,6569444	0,6569444
12	8,8355556	3,1644444	3,1644444
0,5	0,0588889	0,4411111	0,4411111
0,5	0,0230556	0,4769444	0,4769444
0,5	0,0597222	0,4402778	0,4402778
20	17,3252778	2,6747222	2,6747222
8	6,1566667	1,8433333	1,8433333
6	5,8805556	0,1194444	0,1194444
0,5	1,0769444	-0,5769444	0,5769444
0,5	0,0908333	0,4091667	0,4091667
0,4	0,3313889	0,0686111	0,0686111
2	0,3383333	1,6616667	1,6616667
0,5	0,1475	0,3525	0,3525
41	31,4108333	9,5891667	9,5891667
1	0,8819444	0,1180556	0,1180556
0,5	0,7386111	-0,2386111	0,2386111
0,5	0,0869444	0,4130556	0,4130556
0,5	0,3811111	0,1188889	0,1188889
0,5	0,7005556	-0,2005556	0,2005556
1	0,1780556	0,8219444	0,8219444
1	0,2580556	0,7419444	0,7419444
14,5	14,2952778	0,2047222	0,2047222
0,5	0,4463889	0,0536111	0,0536111
0,5	0,0686111	0,4313889	0,4313889
0,5	0,3727778	0,1272222	0,1272222
1	2,1344444	-1,1344444	1,1344444
0,5	1,325	-0,825	0,825
0,5	0,5119444	-0,0119444	0,0119444
23	22,9677778	0,0322222	0,0322222
5	4,5197222	0,4802778	0,4802778
90	57,6491667	32,3508333	32,3508333
1,5	1,5819444	-0,0819444	0,0819444
0,5	0,0533333	0,4466667	0,4466667
1	1,1044444	-0,1044444	0,1044444
1,5	1,8813889	-0,3813889	0,3813889
0,5	0,0672222	0,4327778	0,4327778
10	14,9355556	-4,9355556	4,9355556
1	2,9575	-1,9575	1,9575
0,5	0,1430556	0,3569444	0,3569444
0,5	0,3966667	0,1033333	0,1033333
2	1,7719444	0,2280556	0,2280556
0,5	2,4988889	-1,9988889	1,9988889
0,5	0,0602778	0,4397222	0,4397222
1	0,7630556	0,2369444	0,2369444
3	4,2263889	-1,2263889	1,2263889
1,5	1,7741667	-0,2741667	0,2741667
1,5	1,6719444	-0,1719444	0,1719444
0,5	0,1097222	0,3902778	0,3902778
2	1,7663889	0,2336111	0,2336111
0,5	0,1022222	0,3977778	0,3977778
1	1,2825	-0,2825	0,2825
0,5	0,2591667	0,2408333	0,2408333
6	5,7152778	0,2847222	0,2847222
10	9,1136111	0,8863889	0,8863889
1	3,0513889	-2,0513889	2,0513889
28	27,2827778	0,7172222	0,7172222
1	1,3402778	-0,3402778	0,3402778
0,5	0,6452778	-0,1452778	0,1452778
2	1,9166667	0,0833333	0,0833333
0,5	0,2116667	0,2883333	0,2883333
0,5	0,4461111	0,0538889	0,0538889
2,5	3,1491667	-0,6491667	0,6491667
43	35,6558333	7,3441667	7,3441667
1	0,7169444	0,2830556	0,2830556
0,5	0,7677778	-0,2677778	0,2677778
0,5	0,0952778	0,4047222	0,4047222
0,5	0,0458333	0,4541667	0,4541667
0,5	0,0555556	0,4444444	0,4444444
0,5	1,9363889	-1,4363889	1,4363889
1,5	3,8388889	-2,3388889	2,3388889
27	22,1452778	4,8547222	4,8547222
2	2,2033333	-0,2033333	0,2033333
0,5	0,4202778	0,0797222	0,0797222
1,5	1,3302778	0,1697222	0,1697222
0,5	2,3011111	-1,8011111	1,8011111
11	10,5702778	0,4297222	0,4297222
3	2,5477778	0,4522222	0,4522222
1	0,2205556	0,7794444	0,7794444
1,5	0,1130556	1,3869444	1,3869444
1	0,7361111	0,2638889	0,2638889
0,5	0,4691667	0,0308333	0,0308333
10	9,6605556	0,3394444	0,3394444
0,5	1,3380556	-0,8380556	0,8380556
0,5	0,6330556	-0,1330556	0,1330556
35	31,915	3,085	3,085
1	0,7716667	0,2283333	0,2283333
1	0,9933333	0,0066667	0,0066667
0,5	0,7980556	-0,2980556	0,2980556
0,5	0,6661111	-0,1661111	0,1661111
5	4,1975	0,8025	0,8025
1	0,0463889	0,9536111	0,9536111

0,5	1,2561111	-0,7561111	0,7561111
39	32,5280556	6,4719444	6,4719444
1,25	1,0091667	0,2408333	0,2408333
0,5	0,5961111	-0,0961111	0,0961111
6	5,1283333	0,8716667	0,8716667
0,5	0,1780556	0,3219444	0,3219444
10	8,3147222	1,6852778	1,6852778
1,5	1,2825	0,2175	0,2175
1	0,2266667	0,7733333	0,7733333
0,5	0,0336111	0,4663889	0,4663889
14	17,2747222	-3,2747222	3,2747222
0,5	0,0663889	0,4336111	0,4336111
0,5	0,0216667	0,4783333	0,4783333
1	0,3236111	0,6763889	0,6763889
75	57,8538889	17,1461111	17,1461111
1	0,9502778	0,0497222	0,0497222
2,75	4,2713889	-1,5213889	1,5213889
1	0,9686111	0,0313889	0,0313889
1,5	1,3802778	0,1197222	0,1197222
6	5,9213889	0,0786111	0,0786111
7	7,2383333	-0,2383333	0,2383333
9	7,8158333	1,1841667	1,1841667
1,5	1,2175	0,2825	0,2825
7	6,6061111	0,3938889	0,3938889
0,5	0,0516667	0,4483333	0,4483333
3	2,4988889	0,5011111	0,5011111
0,5	0,5411111	-0,0411111	0,0411111
3	3,7569444	-0,7569444	0,7569444
8	7,0766667	0,9233333	0,9233333
0,5	0,2102778	0,2897222	0,2897222
1,25	1,2572222	-0,0072222	0,0072222
25	23,0663889	1,9336111	1,9336111
1	0,7841667	0,2158333	0,2158333
0,5	2,0941667	-1,5941667	1,5941667
0,5	2,4122222	-1,9122222	1,9122222
50	43,4755556	6,5244444	6,5244444
0,5	1,4133333	-0,9133333	0,9133333
1	0,3341667	0,6658333	0,6658333
60	51,45	8,55	8,55
0,5	0,0391667	0,4608333	0,4608333
2	4,5608333	-2,5608333	2,5608333
10	9,4225	0,5775	0,5775
10	11,1708333	-1,1708333	1,1708333
0,5	0,4786111	0,0213889	0,0213889
0,5	0,4094444	0,0905556	0,0905556
1,5	1,8911111	-0,3911111	0,3911111
1	1,0363889	-0,0363889	0,0363889
0,5	0,6097222	-0,1097222	0,1097222
9	8,4052778	0,5947222	0,5947222
1	0,8094444	0,1905556	0,1905556
0,5	0,5419444	-0,0419444	0,0419444
1	0,9877778	0,0122222	0,0122222
1	1,4394444	-0,4394444	0,4394444
0,5	0,1033333	0,3966667	0,3966667
0,5	0,1491667	0,3508333	0,3508333
3	2,4702778	0,5297222	0,5297222
10	8,145	1,855	1,855
0,5	0,4986111	0,0013889	0,0013889
0,5	0,0191667	0,4808333	0,4808333
0,5	0,4330556	0,0669444	0,0669444
1	0,3511111	0,6488889	0,6488889
2,5	1,9269444	0,5730556	0,5730556
7	10,3266667	-3,3266667	3,3266667
0,5	1,9686111	-1,4686111	1,4686111
0,5	0,1138889	0,3861111	0,3861111
2	2,8775	-0,8775	0,8775
12	11,5136111	0,4863889	0,4863889
0,5	0,1458333	0,3541667	0,3541667
0,5	0,4280556	0,0719444	0,0719444
3	2,94	0,06	0,06
3	2,2913889	0,7086111	0,7086111
0,5	0,5508333	-0,0508333	0,0508333
0,5	0,4138889	0,0861111	0,0861111
2,5	2,0269444	0,4730556	0,4730556
7	5,58	1,42	1,42
0,25	0,3022222	-0,0522222	0,0522222
1	0,9608333	0,0391667	0,0391667
6	5,0472222	0,9527778	0,9527778
7	5,1836111	1,8163889	1,8163889
6	5,6247222	0,3752778	0,3752778
2	2,4402778	-0,4402778	0,4402778
1,5	1,4111111	0,0888889	0,0888889
1	1,4147222	-0,4147222	0,4147222
0,5	0,4861111	0,0138889	0,0138889
0,5	1,6016667	-1,1016667	1,1016667
1	1,7388889	-0,7388889	0,7388889
0,5	0,49	0,01	0,01
1,5	1,2916667	0,2083333	0,2083333
3	4,9997222	-1,9997222	1,9997222
9	7,6011111	1,3988889	1,3988889
0,5	0,2738889	0,2261111	0,2261111
3	4,2197222	-1,2197222	1,2197222
1	0,9955556	0,0044444	0,0044444
0,5	0,175	0,325	0,325
0,5	0,0802778	0,4197222	0,4197222
0,5	0,5802778	-0,0802778	0,0802778
0,5	0,4461111	0,0538889	0,0538889
4	3,7027778	0,2972222	0,2972222
1	1,0605556	-0,0605556	0,0605556
0,5	0,4419444	0,0580556	0,0580556
27	23,9652778	3,0347222	3,0347222

8	7,1247222	0,8752778	0,8752778
0,5	0,6858333	-0,1858333	0,1858333
3	2,2755556	0,7244444	0,7244444
0,5	0,1386111	0,3613889	0,3613889
1,5	1,4230556	0,0769444	0,0769444
0,4	0,3475	0,0525	0,0525
1	1,0388889	-0,0388889	0,0388889
10	9,5694444	0,4305556	0,4305556
0,5	0,2616667	0,2383333	0,2383333
0,5	0,3638889	0,1361111	0,1361111
7	6,2125	0,7875	0,7875
0,5	0,2097222	0,2902778	0,2902778
1	1,1911111	-0,1911111	0,1911111
2	3,0477778	-1,0477778	1,0477778
4	3,8183333	0,1816667	0,1816667
0,5	0,1738889	0,3261111	0,3261111
6	4,2977778	1,7022222	1,7022222
1	0,8841667	0,1158333	0,1158333
0,5	0,2347222	0,2652778	0,2652778
1	0,8680556	0,1319444	0,1319444
10	8,8355556	1,1644444	1,1644444
6	5,2505556	0,7494444	0,7494444
0,5	0,0975	0,4025	0,4025
0,5	0,6708333	-0,1708333	0,1708333
0,4	0,3286111	0,0713889	0,0713889
6	4,6161111	1,3838889	1,3838889
2	2,8230556	-0,8230556	0,8230556
38	28,785	9,215	9,215
2	2,5263889	-0,5263889	0,5263889
2	1,9847222	0,0152778	0,0152778
0,5	1,6094444	-1,1094444	1,1094444
5	4,525	0,475	0,475
0,4	0,3305556	0,0694444	0,0694444
4	5,3788889	-1,3788889	1,3788889
0,5	0,1280556	0,3719444	0,3719444
0,5	0,17	0,33	0,33
0,5	0,0519444	0,4480556	0,4480556
1	0,8316667	0,1683333	0,1683333
9	7,5672222	1,4327778	1,4327778
0,5	0,3630556	0,1369444	0,1369444
5	6,0972222	-1,0972222	1,0972222
10	9,6869444	0,3130556	0,3130556
5	4,9963889	0,0036111	0,0036111
0,5	0,6533333	-0,1533333	0,1533333
0,5	0,6533333	-0,1533333	0,1533333
15	14,9119444	0,0880556	0,0880556
8	6,77	1,23	1,23
5	5,045	-0,045	0,045
0,5	0,1530556	0,3469444	0,3469444
0,5	0,2541667	0,2458333	0,2458333
7	6,3066667	0,6933333	0,6933333
0,4	0,3997222	0,0002778	0,0002778
0,5	0,5027778	-0,0027778	0,0027778
0,5	0,1133333	0,3866667	0,3866667
0,5	0,1669444	0,3330556	0,3330556
0,5	0,1066667	0,3933333	0,3933333
1	0,8747222	0,1252778	0,1252778
0,5	0,4605556	0,0394444	0,0394444
1	0,9197222	0,0802778	0,0802778
1	0,9269444	0,0730556	0,0730556
1	0,9058333	0,0941667	0,0941667
3	3,6505556	-0,6505556	0,6505556
4	3,6758333	0,3241667	0,3241667
4	4,0405556	-0,0405556	0,0405556
0,4	0,35	0,05	0,05
0,5	0,1922222	0,3077778	0,3077778
1,5	1,9755556	-0,4755556	0,4755556
1	0,8941667	0,1058333	0,1058333
0,5	1,3155556	-0,8155556	0,8155556
1,5	1,0738889	0,4261111	0,4261111
12	8,5816667	3,4183333	3,4183333
0,5	0,0311111	0,4688889	0,4688889
0,5	0,2475	0,2525	0,2525
0,5	0,02	0,48	0,48
1	0,2813889	0,7186111	0,7186111
1,75	4,5038889	-2,7538889	2,7538889
1	0,9141667	0,0858333	0,0858333
0,5	0,4330556	0,0669444	0,0669444
0,5	0,4058333	0,0941667	0,0941667
1	0,2386111	0,7613889	0,7613889
0,5	0,7261111	-0,2261111	0,2261111
1	1,1675	-0,1675	0,1675
0,5	0,2005556	0,2994444	0,2994444
0,5	0,6133333	-0,1133333	0,1133333
0,5	0,0927778	0,4072222	0,4072222
0,5	2,0844444	-1,5844444	1,5844444
1	1,4455556	-0,4455556	0,4455556
1	0,7663889	0,2336111	0,2336111
1	0,8847222	0,1152778	0,1152778
0,5	0,7711111	-0,2711111	0,2711111
0,5	0,0441667	0,4558333	0,4558333
1	1,0611111	-0,0611111	0,0611111
0,5	0,1769444	0,3230556	0,3230556
0,5	2,2238889	-1,7238889	1,7238889
2	2,0047222	-0,0047222	0,0047222
8	7,1827778	0,8172222	0,8172222
0,5	0,2175	0,2825	0,2825
0,5	0,6069444	-0,1069444	0,1069444
2	1,97	0,03	0,03
0,5	0,4616667	0,0383333	0,0383333
32	26,5561111	5,4438889	5,4438889

1	1,1	-0,1	0,1
0,5	0,0230556	0,4769444	0,4769444
1	0,9877778	0,0122222	0,0122222
23	20,5952778	2,4047222	2,4047222
0,5	0,6255556	-0,1255556	0,1255556
0,5	0,1352778	0,3647222	0,3647222
8	7,9877778	0,0122222	0,0122222
0,5	0,8094444	-0,3094444	0,3094444
0,5	0,2727778	0,2272222	0,2272222
3	3,4830556	-0,4830556	0,4830556
1	0,8505556	0,1494444	0,1494444
0,5	0,0591667	0,4408333	0,4408333
1	0,7752778	0,2247222	0,2247222
1,5	0,2272222	1,2727778	1,2727778
0,5	0,6741667	-0,1741667	0,1741667
0,5	0,0544444	0,4455556	0,4455556
0,5	0,3741667	0,1258333	0,1258333
1,5	0,3077778	1,1922222	1,1922222
0,5	0,1683333	0,3316667	0,3316667
0,5	0,6333333	-0,1333333	0,1333333
1	0,7297222	0,2702778	0,2702778
0,5	0,1633333	0,3366667	0,3366667
1	1,4675	-0,4675	0,4675
1	3,4930556	-2,4930556	2,4930556
1	1,0141667	-0,0141667	0,0141667
1	1,0055556	-0,0055556	0,0055556
1	3,3494444	-2,3494444	2,3494444
0,5	0,0855556	0,4144444	0,4144444
0,5	0,4313889	0,0686111	0,0686111
0,5	2,0980556	-1,5980556	1,5980556
2,5	2,8794444	-0,3794444	0,3794444
19	14,8216667	4,1783333	4,1783333
0,5	0,5280556	-0,0280556	0,0280556
13	12,9566667	0,0433333	0,0433333
0,25	0,3022222	-0,0522222	0,0522222
1,5	4,2502778	-2,7502778	2,7502778
10	8,1702778	1,8297222	1,8297222
7	5,0572222	1,9427778	1,9427778
1	0,3463889	0,6536111	0,6536111
3	2,6877778	0,3122222	0,3122222
0,5	0,2625	0,2375	0,2375
0,75	0,9177778	-0,1677778	0,1677778
0,5	0,76	-0,26	0,26
0,5	1,2216667	-0,7216667	0,7216667
1	2,4297222	-1,4297222	1,4297222
1	0,8225	0,1775	0,1775
2	1,5630556	0,4369444	0,4369444
2,25	2,7822222	-0,5322222	0,5322222
9	6,9786111	2,0213889	2,0213889
0,5	0,1419444	0,3580556	0,3580556
2	2,9311111	-0,9311111	0,9311111
8	5,7988889	2,2011111	2,2011111
2	1,8880556	0,1119444	0,1119444
0,5	3,2030556	-2,7030556	2,7030556
0,5	0,1430556	0,3569444	0,3569444
5	4,3222222	0,6777778	0,6777778
13	12,7727778	0,2272222	0,2272222
0,5	0,2305556	0,2694444	0,2694444
0,5	0,2158333	0,2841667	0,2841667
0,25	0,2897222	-0,0397222	0,0397222
4	3,185	0,815	0,815
0,5	0,1938889	0,3061111	0,3061111
3	3,4241667	-0,4241667	0,4241667
0,5	0,2072222	0,2927778	0,2927778
0,25	0,2841667	-0,0341667	0,0341667
1	1,0138889	-0,0138889	0,0138889
0,75	0,6822222	0,0677778	0,0677778
4	5,0411111	-1,0411111	1,0411111
1	2,7961111	-1,7961111	1,7961111
0,5	1,3152778	-0,8152778	0,8152778
0,4	0,3527778	0,0472222	0,0472222
0,5	1,3430556	-0,8430556	0,8430556
0,5	0,7088889	-0,2088889	0,2088889
0,5	0,6616667	-0,1616667	0,1616667
0,5	2,7561111	-2,2561111	2,2561111
1	3,0444444	-2,0444444	2,0444444
4	3,2152778	0,7847222	0,7847222
15	21,9341667	-6,9341667	6,9341667
1	1,3705556	-0,3705556	0,3705556
3	2,7719444	0,2280556	0,2280556
0,5	0,5161111	-0,0161111	0,0161111
0,5	0,0597222	0,4402778	0,4402778
2	1,965	0,035	0,035
3	2,1722222	0,8277778	0,8277778
6	5,6438889	0,3561111	0,3561111
21	20,0738889	0,9261111	0,9261111
34	25,7488889	8,2511111	8,2511111
1	1,1477778	-0,1477778	0,1477778
1,5	0,0511111	1,4488889	1,4488889
1	1,6561111	-0,6561111	0,6561111
0,5	0,3908333	0,1091667	0,1091667
1,5	1,6447222	-0,1447222	0,1447222
4	5,3361111	-1,3361111	1,3361111
2	1,8488889	0,1511111	0,1511111
0,5	0,2152778	0,2847222	0,2847222
0,5	0,0744444	0,4255556	0,4255556
0,5	0,7725	-0,2725	0,2725
0,5	0,4841667	0,0158333	0,0158333
0,5	0,1211111	0,3788889	0,3788889
0,5	0,5016667	-0,0016667	0,0016667
0,5	0,0861111	0,4138889	0,4138889

0,5	0,0663889	0,4336111	0,4336111
4	3,9652778	0,0347222	0,0347222
17	15,2836111	1,7163889	1,7163889
1	0,0752778	0,9247222	0,9247222
0,5	0,6738889	-0,1738889	0,1738889
0,5	0,4713889	0,0286111	0,0286111
20	16,0991667	3,9008333	3,9008333
0,5	0,7652778	-0,2652778	0,2652778
9	8,5427778	0,4572222	0,4572222
11	10,2947222	0,7052778	0,7052778
0,5	0,4255556	0,0744444	0,0744444
5	3,5791667	1,4208333	1,4208333
3	3,6491667	-0,6491667	0,6491667
1	1,2613889	-0,2613889	0,2613889
1	2,5302778	-1,5302778	1,5302778
10	9,6644444	0,3355556	0,3355556
0,5	0,6380556	-0,1380556	0,1380556
1	0,9738889	0,0261111	0,0261111
1,5	1,6702778	-0,1702778	0,1702778
0,25	0,2775	-0,0275	0,0275
2	1,7833333	0,2166667	0,2166667
0,5	2,0083333	-1,5083333	1,5083333
0,5	0,0902778	0,4097222	0,4097222
1	1,0108333	-0,0108333	0,0108333
7	6,5675	0,4325	0,4325
32	37,0097222	-5,0097222	5,0097222
0,5	0,0708333	0,4291667	0,4291667
1	0,8533333	0,1466667	0,1466667
0,5	0,0455556	0,4544444	0,4544444
4,5	4,0166667	0,4833333	0,4833333
0,5	1,9811111	-1,4811111	1,4811111
1	0,3352778	0,6647222	0,6647222
2	1,7777778	0,2222222	0,2222222
11	10,4991667	0,5008333	0,5008333
4	3,6491667	0,3508333	0,3508333
1	2,1530556	-1,1530556	1,1530556
1	1,1225	-0,1225	0,1225
0,5	0,2238889	0,2761111	0,2761111
1,5	0,2908333	1,2091667	1,2091667
0,5	0,0897222	0,4102778	0,4102778
0,5	0,1494444	0,3505556	0,3505556
0,4	0,3419444	0,0580556	0,0580556
1	2,9833333	-1,9833333	1,9833333
1,5	2,2766667	-0,7766667	0,7766667
0,5	0,2552778	0,2447222	0,2447222
3,5	2,735	0,765	0,765
11	10,2411111	0,7588889	0,7588889
0,5	0,0188889	0,4811111	0,4811111
0,5	0,3763889	0,1236111	0,1236111
0,5	0,7769444	-0,2769444	0,2769444
0,25	0,2816667	-0,0316667	0,0316667
0,5	0,0608333	0,4391667	0,4391667
7	9,6833333	-2,6833333	2,6833333
0,5	0,65	-0,15	0,15
0,5	0,24	0,26	0,26
0,5	0,0505556	0,4494444	0,4494444
4	3,4122222	0,5877778	0,5877778
1,5	1,4891667	0,0108333	0,0108333
1	0,9705556	0,0294444	0,0294444
0,5	0,1502778	0,3497222	0,3497222
0,5	0,5219444	-0,0219444	0,0219444
0,5	0,1069444	0,3930556	0,3930556
1	1,1863889	-0,1863889	0,1863889
15	15,2158333	-0,2158333	0,2158333
1	1,0283333	-0,0283333	0,0283333
0,5	0,2094444	0,2905556	0,2905556
0,5	0,5025	-0,0025	0,0025
3	3,1683333	-0,1683333	0,1683333
5	4,5461111	0,4538889	0,4538889
0,5	0,4452778	0,0547222	0,0547222
0,5	0,2316667	0,2683333	0,2683333
0,25	0,2786111	-0,0286111	0,0286111
0,5	1,3802778	-0,8802778	0,8802778
0,5	0,02	0,48	0,48
19	16,2175	2,7825	2,7825
0,5	0,4705556	0,0294444	0,0294444
30	25,6636111	4,3363889	4,3363889
7	6,4944444	0,5055556	0,5055556
1,5	0,0430556	1,4569444	1,4569444
0,5	0,2108333	0,2891667	0,2891667
0,5	1,3211111	-0,8211111	0,8211111
1,5	2,3363889	-0,8363889	0,8363889
0,5	0,1494444	0,3505556	0,3505556
0,5	2,0969444	-1,5969444	1,5969444
0,5	0,4491667	0,0508333	0,0508333
0,5	0,0297222	0,4702778	0,4702778
1	0,0533333	0,9466667	0,9466667
8	7,4355556	0,5644444	0,5644444
0,5	0,6038889	-0,1038889	0,1038889
0,5	0,6372222	-0,1372222	0,1372222
7	6,3347222	0,6652778	0,6652778
8	7,5569444	0,4430556	0,4430556
0,5	0,5305556	-0,0305556	0,0305556
2	1,6375	0,3625	0,3625
7	6,4108333	0,5891667	0,5891667
3,5	3,3147222	0,1852778	0,1852778
0,5	1,4597222	-0,9597222	0,9597222
0,5	1,4044444	-0,9044444	0,9044444
0,5	0,0197222	0,4802778	0,4802778
0,5	2,0136111	-1,5136111	1,5136111
0,5	0,0780556	0,4219444	0,4219444

4	3,3263889	0,6736111	0,6736111
3	3,1702778	-0,1702778	0,1702778
1	0,9819444	0,0180556	0,0180556
3	2,4855556	0,5144444	0,5144444
1	0,7972222	0,2027778	0,2027778
1	2,8030556	-1,8030556	1,8030556
0,5	0,7047222	-0,2047222	0,2047222
0,5	0,0991667	0,4008333	0,4008333
2	2,6927778	-0,6927778	0,6927778
6	5,56	0,44	0,44
0,5	0,3736111	0,1263889	0,1263889
1	0,9697222	0,0302778	0,0302778
3	3,7477778	-0,7477778	0,7477778
0,5	0,79	-0,29	0,29
0,4	0,3325	0,0675	0,0675
1	1,1836111	-0,1836111	0,1836111
0,5	0,2013889	0,2986111	0,2986111
0,5	0,1141667	0,3858333	0,3858333
1	0,3244444	0,6755556	0,6755556
0,5	0,7388889	-0,2388889	0,2388889
6	5,4302778	0,5697222	0,5697222
0,5	2,3572222	-1,8572222	1,8572222
15	15,6855556	-0,6855556	0,6855556
0,5	0,6013889	-0,1013889	0,1013889
1	1,2286111	-0,2286111	0,2286111
0,5	0,1208333	0,3791667	0,3791667
10	9,5027778	0,4972222	0,4972222
2	1,7702778	0,2297222	0,2297222
0,5	0,6452778	-0,1452778	0,1452778
0,5	1,1097222	-0,6097222	0,6097222
0,4	0,3541667	0,0458333	0,0458333
0,5	0,7247222	-0,2247222	0,2247222
0,5	0,1808333	0,3191667	0,3191667
4	3,5283333	0,4716667	0,4716667
0,5	0,6633333	-0,1633333	0,1633333
1	0,0661111	0,9338889	0,9338889
0,5	0,4641667	0,0358333	0,0358333
1	1,1577778	-0,1577778	0,1577778
0,25	0,3127778	-0,0627778	0,0627778
0,5	0,0738889	0,4261111	0,4261111
15	15,1022222	-0,1022222	0,1022222
1	0,0369444	0,9630556	0,9630556
5	4,4091667	0,5908333	0,5908333
1	0,2038889	0,7961111	0,7961111
5	6,8719444	-1,8719444	1,8719444
0,5	1,0741667	-0,5741667	0,5741667
0,5	0,6022222	-0,1022222	0,1022222
20	18,6805556	1,3194444	1,3194444
0,5	0,2416667	0,2583333	0,2583333
2	1,7019444	0,2980556	0,2980556
0,5	0,4138889	0,0861111	0,0861111
0,5	0,4594444	0,0405556	0,0405556
0,5	0,71	-0,21	0,21
1	0,8194444	0,1805556	0,1805556
13	11,3363889	1,6636111	1,6636111
3	2,4213889	0,5786111	0,5786111
0,5	0,4005556	0,0994444	0,0994444
2	0,2341667	1,7658333	1,7658333
20	18,5297222	1,4702778	1,4702778
0,5	0,4958333	0,0041667	0,0041667
0,5	0,7105556	-0,2105556	0,2105556
0,5	0,0908333	0,4091667	0,4091667
5,5	4,1197222	1,3802778	1,3802778
1	0,8775	0,1225	0,1225
0,5	0,1822222	0,3177778	0,3177778
0,5	0,0330556	0,4669444	0,4669444
0,5	1,4441667	-0,9441667	0,9441667
0,5	0,3788889	0,1211111	0,1211111
3	2,4263889	0,5736111	0,5736111
0,5	0,3736111	0,1263889	0,1263889
8	7,7277778	0,2722222	0,2722222
0,5	0,1552778	0,3447222	0,3447222
7	5,2758333	1,7241667	1,7241667
0,5	0,1033333	0,3966667	0,3966667
0,5	0,4744444	0,0255556	0,0255556
0,5	2,5205556	-2,0205556	2,0205556
0,5	0,5677778	-0,0677778	0,0677778
6	5,9730556	0,0269444	0,0269444
46	37,0272222	8,9727778	8,9727778
0,5	0,0191667	0,4808333	0,4808333
0,5	0,1111111	0,3888889	0,3888889
1	0,9022222	0,0977778	0,0977778
1	0,7736111	0,2263889	0,2263889
0,5	0,1477778	0,3522222	0,3522222
0,5	0,4341667	0,0658333	0,0658333
4	3,2622222	0,7377778	0,7377778
0,5	0,4419444	0,0580556	0,0580556
1	1,1052778	-0,1052778	0,1052778
0,5	0,0219444	0,4780556	0,4780556
1	0,3352778	0,6647222	0,6647222
0,5	0,4177778	0,0822222	0,0822222
0,5	0,5580556	-0,0580556	0,0580556
3	3,0494444	-0,0494444	0,0494444
2	2,2797222	-0,2797222	0,2797222
6,5	6,8647222	-0,3647222	0,3647222
0,5	0,1947222	0,3052778	0,3052778
2	1,8966667	0,1033333	0,1033333
0,5	0,4211111	0,0788889	0,0788889
1	0,3275	0,6725	0,6725
8	7,2844444	0,7155556	0,7155556
3	3,0697222	-0,0697222	0,0697222

3	3,3797222	-0,3797222	0,3797222
0,5	0,1625	0,3375	0,3375
0,5	0,0969444	0,4030556	0,4030556
0,5	0,2466667	0,2533333	0,2533333
0,5	0,5813889	-0,0813889	0,0813889
0,5	1,5913889	-1,0913889	1,0913889
0,5	0,6502778	-0,1502778	0,1502778
0,4	0,3386111	0,0613889	0,0613889
0,5	0,65	-0,15	0,15
1	0,9108333	0,0891667	0,0891667
0,5	0,0416667	0,4583333	0,4583333
2	1,8422222	0,1577778	0,1577778
3	2,3294444	0,6705556	0,6705556
0,5	0,1611111	0,3388889	0,3388889
0,5	1,9908333	-1,4908333	1,4908333
1	0,3408333	0,6591667	0,6591667
1	1,5086111	-0,5086111	0,5086111
0,5	0,0480556	0,4519444	0,4519444
1,5	0,2266667	1,2733333	1,2733333
0,5	0,1205556	0,3794444	0,3794444
0,5	0,4969444	0,0030556	0,0030556
1	0,8352778	0,1647222	0,1647222
1,5	1,7916667	-0,2916667	0,2916667
2	1,985	0,015	0,015
3	2,3961111	0,6038889	0,6038889
2	2,3616667	-0,3616667	0,3616667
15	15,9816667	-0,9816667	0,9816667
0,5	0,0261111	0,4738889	0,4738889
0,5	0,5544444	-0,0544444	0,0544444
72	55,1105556	16,8894444	16,8894444
0,5	1,4311111	-0,9311111	0,9311111
3	2,6975	0,3025	0,3025
1	0,7455556	0,2544444	0,2544444
0,5	0,2027778	0,2972222	0,2972222
0,5	0,4102778	0,0897222	0,0897222
0,5	0,0183333	0,4816667	0,4816667
1	0,0772222	0,9227778	0,9227778
9	10,0941667	-1,0941667	1,0941667
20	20,2319444	-0,2319444	0,2319444
26	33,0644444	-7,0644444	7,0644444
1	0,9880556	0,0119444	0,0119444
0,5	0,0341667	0,4658333	0,4658333
0,5	0,0680556	0,4319444	0,4319444
0,5	0,3680556	0,1319444	0,1319444
0,5	0,8047222	-0,3047222	0,3047222
10	9,4133333	0,5866667	0,5866667
2	1,4633333	0,5366667	0,5366667
1	1,3636111	-0,3636111	0,3636111
0,7	0,6713889	0,0286111	0,0286111
5	4,5277778	0,4722222	0,4722222
1	0,7480556	0,2519444	0,2519444
0,5	0,5486111	-0,0486111	0,0486111
0,5	0,8116667	-0,3116667	0,3116667
4	3,6041667	0,3958333	0,3958333
55	48,8908333	6,1091667	6,1091667
3	2,7341667	0,2658333	0,2658333
0,5	0,5697222	-0,0697222	0,0697222
0,5	0,1311111	0,3688889	0,3688889
2	0,3602778	1,6397222	1,6397222
1,5	3,3425	-1,8425	1,8425
73	54,5108333	18,4891667	18,4891667
8	8,1958333	-0,1958333	0,1958333
7	6,2775	0,7225	0,7225
0,5	1,1569444	-0,6569444	0,6569444
2	1,9775	0,0225	0,0225
0,5	1,4055556	-0,9055556	0,9055556
0,5	0,1852778	0,3147222	0,3147222
1,5	0,3272222	1,1727778	1,1727778
1	1,0277778	-0,0277778	0,0277778
1	1,4705556	-0,4705556	0,4705556
20	22,0363889	-2,0363889	2,0363889
0,25	0,3430556	-0,0930556	0,0930556
0,5	0,3869444	0,1130556	0,1130556
1	1,1022222	-0,1022222	0,1022222
0,5	0,1533333	0,3466667	0,3466667
6	8,1013889	-2,1013889	2,1013889
10	8,5313889	1,4686111	1,4686111
8	5,8	2,2	2,2
1	0,8847222	0,1152778	0,1152778
2	1,5097222	0,4902778	0,4902778
9	9,0725	-0,0725	0,0725
2	1,6761111	0,3238889	0,3238889
1	0,8886111	0,1113889	0,1113889
2	0,3630556	1,6369444	1,6369444
5	4,3008333	0,6991667	0,6991667
0,5	0,3713889	0,1286111	0,1286111
0,5	1,3225	-0,8225	0,8225
1,5	0,1297222	1,3702778	1,3702778
0,75	2,0519444	-1,3019444	1,3019444
0,5	0,1586111	0,3413889	0,3413889
3	3,6647222	-0,6647222	0,6647222
1	0,0588889	0,9411111	0,9411111
1,5	1,5833333	-0,0833333	0,0833333
4	4,3977778	-0,3977778	0,3977778
0,5	0,2263889	0,2736111	0,2736111
10	9,0480556	0,9519444	0,9519444
1	0,0236111	0,9763889	0,9763889
20	23,6025	-3,6025	3,6025
1,5	2,1672222	-0,6672222	0,6672222
1	1,0905556	-0,0905556	0,0905556
2	2,1075	-0,1075	0,1075

0,5	0,0486111	0,4513889	0,4513889
6	6,0941667	-0,0941667	0,0941667
5	5,0627778	-0,0627778	0,0627778
5	5,1622222	-0,1622222	0,1622222
3	2,6611111	0,3388889	0,3388889
0,4	0,3536111	0,0463889	0,0463889
0,5	0,2188889	0,2811111	0,2811111
4	4,0644444	-0,0644444	0,0644444
0,5	2,2408333	-1,7408333	1,7408333
0,5	0,6322222	-0,1322222	0,1322222
1,5	1,3372222	0,1627778	0,1627778
0,5	0,5258333	-0,0258333	0,0258333
0,5	0,6361111	-0,1361111	0,1361111
2	1,9658333	0,0341667	0,0341667
0,5	0,2125	0,2875	0,2875
0,5	0,0536111	0,4463889	0,4463889
0,5	0,1441667	0,3558333	0,3558333
0,5	0,1755556	0,3244444	0,3244444
1	0,9197222	0,0802778	0,0802778
13	12,6016667	0,3983333	0,3983333
1,5	1,1816667	0,3183333	0,3183333
0,5	0,1833333	0,3166667	0,3166667
0,5	0,5258333	-0,0258333	0,0258333
7	5,5277778	1,4722222	1,4722222
15	14,9355556	0,0644444	0,0644444
0,5	0,0891667	0,4108333	0,4108333
0,5	0,5075	-0,0075	0,0075
4	5,7316667	-1,7316667	1,7316667
2	0,2305556	1,7694444	1,7694444
1	3,9666667	-2,9666667	2,9666667
3	3,1791667	-0,1791667	0,1791667
0,5	0,3808333	0,1191667	0,1191667
1,75	1,3480556	0,4019444	0,4019444
0,5	0,1697222	0,3302778	0,3302778
0,5	1,2194444	-0,7194444	0,7194444
0,25	0,3008333	-0,0508333	0,0508333
1	0,8680556	0,1319444	0,1319444
15	12,9566667	2,0433333	2,0433333
1	0,3136111	0,6863889	0,6863889
1	1,1438889	-0,1438889	0,1438889
0,5	0,0577778	0,4422222	0,4422222
0,5	0,4319444	0,0680556	0,0680556
1	1,0158333	-0,0158333	0,0158333
2,5	4,1072222	-1,6072222	1,6072222
0,75	0,6772222	0,0727778	0,0727778
0,5	0,1280556	0,3719444	0,3719444
1	0,0861111	0,9138889	0,9138889
0,4	0,3544444	0,0455556	0,0455556
0,5	0,6986111	-0,1986111	0,1986111
10	10,007778	-0,0077778	0,0077778
0,5	2,7511111	-2,2511111	2,2511111
0,5	0,5466667	-0,0466667	0,0466667
6	5,6744444	0,3255556	0,3255556
4	4,4313889	-0,4313889	0,4313889
0,5	0,4616667	0,0383333	0,0383333
0,5	0,36	0,14	0,14
14	10,9111111	3,0888889	3,0888889
0,5	0,7483333	-0,2483333	0,2483333
9	6,8072222	2,1927778	2,1927778
33	27,52	5,48	5,48
1	0,9069444	0,0930556	0,0930556
0,5	0,2113889	0,2886111	0,2886111
7	6,5913889	0,4086111	0,4086111
5,5	4,0386111	1,4613889	1,4613889
4,25	3,0616667	1,1883333	1,1883333
1	0,9605556	0,0394444	0,0394444
1	1,3030556	-0,3030556	0,3030556
0,5	1,9236111	-1,4236111	1,4236111
0,5	0,0780556	0,4219444	0,4219444
0,5	0,3913889	0,1086111	0,1086111
0,5	0,0658333	0,4341667	0,4341667
0,5	0,7891667	-0,2891667	0,2891667
0,5	0,5119444	-0,0119444	0,0119444
1	1,2725	-0,2725	0,2725
3	4,9525	-1,9525	1,9525
3	2,9183333	0,0816667	0,0816667
9	8,3125	0,6875	0,6875
27	23,6402778	3,3597222	3,3597222
0,5	0,2480556	0,2519444	0,2519444
0,4	0,3330556	0,0669444	0,0669444
0,5	0,0458333	0,4541667	0,4541667
0,5	0,7116667	-0,2116667	0,2116667
0,5	2,9658333	-2,4658333	2,4658333
2	2,0672222	-0,0672222	0,0672222
12	10,7783333	1,2216667	1,2216667
2	1,675	0,325	0,325
0,5	0,0936111	0,4063889	0,4063889
1	0,7513889	0,2486111	0,2486111
0,5	0,3625	0,1375	0,1375
6	5,0466667	0,9533333	0,9533333
0,25	0,2958333	-0,0458333	0,0458333
0,5	0,1430556	0,3569444	0,3569444
2	1,7452778	0,2547222	0,2547222
0,5	1,5963889	-1,0963889	1,0963889
0,5	0,1702778	0,3297222	0,3297222
1	0,7363889	0,2636111	0,2636111
0,5	0,4436111	0,0563889	0,0563889
0,5	0,6286111	-0,1286111	0,1286111
4,5	3,2211111	1,2788889	1,2788889
1	2,2727778	-1,2727778	1,2727778
2,5	2,2094444	0,2905556	0,2905556

2,5	2,0836111	0,4163889	0,4163889
0,5	1,2675	-0,7675	0,7675
0,5	2,7883333	-2,2883333	2,2883333
1	1,0905556	-0,0905556	0,0905556
1	0,8066667	0,1933333	0,1933333
0,5	0,0691667	0,4308333	0,4308333
1	0,8475	0,1525	0,1525
0,5	0,395	0,105	0,105
0,5	0,7605556	-0,2605556	0,2605556
0,5	2,4016667	-1,9016667	1,9016667
0,5	0,1919444	0,3080556	0,3080556
1,5	2,1136111	-0,6136111	0,6136111
0,5	1,5208333	-1,0208333	1,0208333
0,5	0,235	0,265	0,265
41	37,0341667	3,9658333	3,9658333
0,5	0,0622222	0,4377778	0,4377778
0,5	0,1602778	0,3397222	0,3397222
4	4,1072222	-0,1072222	0,1072222
0,5	0,1491667	0,3508333	0,3508333
2,5	3,3527778	-0,8527778	0,8527778
0,5	0,0266667	0,4733333	0,4733333
0,5	0,7663889	-0,2663889	0,2663889
0,5	0,1808333	0,3191667	0,3191667
0,5	0,0444444	0,4555556	0,4555556
0,5	0,6013889	-0,1013889	0,1013889
1	0,3280556	0,6719444	0,6719444
0,5	0,5411111	-0,0411111	0,0411111
1	1,5505556	-0,5505556	0,5505556
0,5	0,0177778	0,4822222	0,4822222
0,5	0,0255556	0,4744444	0,4744444
6	5,3583333	0,6416667	0,6416667
2	4,3466667	-2,3466667	2,3466667
2	2,1338889	-0,1338889	0,1338889
0,4	0,3444444	0,0555556	0,0555556
0,5	1,6080556	-1,1080556	1,1080556
0,5	0,1066667	0,3933333	0,3933333
2	0,3408333	1,6591667	1,6591667
7,5	9,4466667	-1,9466667	1,9466667
6	5,3788889	0,6211111	0,6211111
5	4,6925	0,3075	0,3075
1,5	1,8930556	-0,3930556	0,3930556
0,5	0,6986111	-0,1986111	0,1986111
0,5	0,2211111	0,2788889	0,2788889
0,5	0,4402778	0,0597222	0,0597222
2	2,1622222	-0,1622222	0,1622222
7	5,5947222	1,4052778	1,4052778
1	0,21	0,79	0,79
34	26,5561111	7,4438889	7,4438889
3	4,7758333	-1,7758333	1,7758333
1	1,0733333	-0,0733333	0,0733333
1	1,0658333	-0,0658333	0,0658333
0,5	0,5325	-0,0325	0,0325
1	0,7238889	0,2761111	0,2761111
0,5	0,0205556	0,4794444	0,4794444
28	27,25	0,75	0,75
1	0,8827778	0,1172222	0,1172222
4	4,1405556	-0,1405556	0,1405556
1	0,9755556	0,0244444	0,0244444
0,5	0,3952778	0,1047222	0,1047222
1	0,875	0,125	0,125
0,5	0,5066667	-0,0066667	0,0066667
1	0,875	0,125	0,125
1,5	0,3311111	1,1688889	1,1688889
0,5	0,51	-0,01	0,01
1	0,8372222	0,1627778	0,1627778
0,5	0,0752778	0,4247222	0,4247222
1	0,9027778	0,0972222	0,0972222
0,5	0,4211111	0,0788889	0,0788889
1	0,2919444	0,7080556	0,7080556
1	3,1194444	-2,1194444	2,1194444
1	0,9355556	0,0644444	0,0644444
0,5	0,4680556	0,0319444	0,0319444
1,5	2,4519444	-0,9519444	0,9519444
0,5	0,5577778	-0,0577778	0,0577778
23	18,0363889	4,9636111	4,9636111
0,75	2,1177778	-1,3677778	1,3677778
0,5	0,6483333	-0,1483333	0,1483333
0,5	1,4363889	-0,9363889	0,9363889
0,5	0,0369444	0,4630556	0,4630556
5	4,1752778	0,8247222	0,8247222
1,5	1,6258333	-0,1258333	0,1258333
0,5	0,5591667	-0,0591667	0,0591667
2	2,2577778	-0,2577778	0,2577778
1	0,7613889	0,2386111	0,2386111
1	0,8475	0,1525	0,1525
1	1,1875	-0,1875	0,1875
4	3,7586111	0,2413889	0,2413889
0,5	2,4219444	-1,9219444	1,9219444
0,5	0,215	0,285	0,285
1	1,0361111	-0,0361111	0,0361111
3	3,3563889	-0,3563889	0,3563889
1	0,9811111	0,0188889	0,0188889
0,5	0,1044444	0,3955556	0,3955556
15	11,6647222	3,3352778	3,3352778
1	1,1452778	-0,1452778	0,1452778
5	4,8163889	0,1836111	0,1836111
1	0,8888889	0,1111111	0,1111111
0,5	0,2319444	0,2680556	0,2680556
1,5	2,0177778	-0,5177778	0,5177778
1	0,9908333	0,0091667	0,0091667
2,5	3,4811111	-0,9811111	0,9811111

1,5	2,0986111	-0,5986111	0,5986111
0,5	0,1191667	0,3808333	0,3808333
0,5	0,2416667	0,2583333	0,2583333
0,5	2,2105556	-1,7105556	1,7105556
2	1,9697222	0,0302778	0,0302778
0,5	0,405	0,095	0,095
0,25	0,3241667	-0,0741667	0,0741667
0,5	0,0863889	0,4136111	0,4136111
0,5	0,4080556	0,0919444	0,0919444
28	32,7397222	-4,7397222	4,7397222
10	10,5297222	-0,5297222	0,5297222
0,5	0,1236111	0,3763889	0,3763889
2	3,3105556	-1,3105556	1,3105556
1	0,7977778	0,2022222	0,2022222
1	0,8458333	0,1541667	0,1541667
0,5	2,0980556	-1,5980556	1,5980556
15	12,0997222	2,9002778	2,9002778
1	1,5986111	-0,5986111	0,5986111
0,5	0,0472222	0,4527778	0,4527778
2	1,8672222	0,1327778	0,1327778
0,5	0,1327778	0,3672222	0,3672222
1	0,3175	0,6825	0,6825
0,5	0,0186111	0,4813889	0,4813889
0,5	0,7966667	-0,2966667	0,2966667
0,5	0,6144444	-0,1144444	0,1144444
0,5	0,0386111	0,4613889	0,4613889
1	0,7513889	0,2486111	0,2486111
0,5	0,1283333	0,3716667	0,3716667
0,5	2,2455556	-1,7455556	1,7455556
0,5	3,0452778	-2,5452778	2,5452778
1	1,0502778	-0,0502778	0,0502778
20	32,7663889	-12,7663889	12,7663889
0,5	0,2563889	0,2436111	0,2436111
20	18,5355556	1,4644444	1,4644444
0,5	0,0936111	0,4063889	0,4063889
0,5	0,0380556	0,4619444	0,4619444
0,5	0,1677778	0,3322222	0,3322222
0,5	0,03	0,47	0,47
0,5	0,2438889	0,2561111	0,2561111
0,5	0,08	0,42	0,42
0,5	0,4877778	0,0122222	0,0122222
30	23,2694444	6,7305556	6,7305556
3	3,0827778	-0,0827778	0,0827778
0,5	0,2530556	0,2469444	0,2469444
1	0,2783333	0,7216667	0,7216667
0,5	2,0172222	-1,5172222	1,5172222
0,5	0,1733333	0,3266667	0,3266667
0,5	0,0752778	0,4247222	0,4247222
4	3,8747222	0,1252778	0,1252778
3	2,7227778	0,2772222	0,2772222
2,5	3,1269444	-0,6269444	0,6269444
0,5	0,145	0,355	0,355
3	2,9975	0,0025	0,0025
1,5	1,2938889	0,2061111	0,2061111
0,5	0,0616667	0,4383333	0,4383333
0,5	0,5427778	-0,0427778	0,0427778
0,5	0,5011111	-0,0011111	0,0011111
0,5	1,8586111	-1,3586111	1,3586111
1	0,155	0,845	0,845
0,5	1,4122222	-0,9122222	0,9122222
10	9,6427778	0,3572222	0,3572222
0,5	0,0838889	0,4161111	0,4161111
6	4,3216667	1,6783333	1,6783333
3	3,8113889	-0,8113889	0,8113889
1,5	1,745	0,245	0,245
0,5	0,0694444	0,4305556	0,4305556
0,5	0,4766667	0,0233333	0,0233333
0,5	0,0516667	0,4483333	0,4483333
0,4	0,3394444	0,0605556	0,0605556
0,4	0,3361111	0,0638889	0,0638889
5	5,5280556	-0,5280556	0,5280556
5	4,7944444	0,2055556	0,2055556
0,5	0,3805556	0,1194444	0,1194444
3	3,5841667	-0,5841667	0,5841667
0,5	0,0455556	0,4544444	0,4544444
1	3,2658333	-2,2658333	2,2658333
0,5	0,1619444	0,3380556	0,3380556
0,4	0,335	0,065	0,065
0,5	0,6375	-0,1375	0,1375
0,5	0,7008333	-0,2008333	0,2008333
0,5	0,7569444	-0,2569444	0,2569444
0,5	0,2175	0,2825	0,2825
0,5	0,4380556	0,0619444	0,0619444
1	0,8775	0,1225	0,1225
1	0,9980556	0,0019444	0,0019444
0,5	0,2494444	0,2505556	0,2505556
5	4,2894444	0,7105556	0,7105556
1,5	1,9447222	-0,4447222	0,4447222
2	2,6283333	-0,6283333	0,6283333
0,5	0,7386111	-0,2386111	0,2386111
27	24,4888889	2,5111111	2,5111111
1	0,8438889	0,1561111	0,1561111
0,5	0,5794444	-0,0794444	0,0794444
2	0,2908333	1,7091667	1,7091667
0,25	0,3208333	-0,0708333	0,0708333
0,4	0,3566667	0,0433333	0,0433333
0,5	0,0597222	0,4402778	0,4402778
0,5	0,2305556	0,2694444	0,2694444
5	5,2455556	-0,2455556	0,2455556
0,5	0,5452778	-0,0452778	0,0452778
0,5	3,4380556	-2,9380556	2,9380556

5	3,6661111	1,3338889	1,3338889
2	1,9419444	0,0580556	0,0580556
12	11,6758333	0,3241667	0,3241667
0,5	0,1697222	0,3302778	0,3302778
2	1,4891667	0,5108333	0,5108333
0,5	1,6188889	-1,1188889	1,1188889
20	18,6630556	1,3369444	1,3369444
2	1,6355556	0,3644444	0,3644444
0,5	0,0986111	0,4013889	0,4013889
1	2,51	-1,51	1,51
0,5	1,1066667	-0,6066667	0,6066667
0,5	0,6761111	-0,1761111	0,1761111
0,5	1,3719444	-0,8719444	0,8719444
0,5	0,4975	0,0025	0,0025
0,5	0,0980556	0,4019444	0,4019444
1	1,2891667	-0,2891667	0,2891667
5	4,5197222	0,4802778	0,4802778
0,5	0,1677778	0,3322222	0,3322222
1	0,2927778	0,7072222	0,7072222
1,5	2,3441667	-0,8441667	0,8441667
1	2,5602778	-1,5602778	1,5602778
4	4,4669444	-0,4669444	0,4669444
7	6,3686111	0,6313889	0,6313889
0,5	2,0538889	-1,5538889	1,5538889
1	1,2469444	-0,2469444	0,2469444
10	9,5027778	0,4972222	0,4972222
0,5	0,4672222	0,0327778	0,0327778
4	3,4830556	0,5169444	0,5169444
0,5	0,0866667	0,4133333	0,4133333
0,25	0,2794444	-0,0294444	0,0294444
0,25	0,4952778	-0,2452778	0,2452778
16	14,5786111	1,4213889	1,4213889
6	7,7586111	-1,7586111	1,7586111
0,5	0,0183333	0,4816667	0,4816667
5	4,3975	0,6025	0,6025
2	2,0927778	-0,0927778	0,0927778
1,75	1,3575	0,3925	0,3925
1	0,7327778	0,2672222	0,2672222
0,4	0,3388889	0,0611111	0,0611111
0,5	0,5447222	-0,0447222	0,0447222
0,5	0,1652778	0,3347222	0,3347222
0,5	0,1483333	0,3516667	0,3516667
0,5	1,1802778	-0,6802778	0,6802778
0,5	0,5347222	-0,0347222	0,0347222
8	7,4425	0,5575	0,5575
0,5	0,0766667	0,4233333	0,4233333
0,5	0,7769444	-0,2769444	0,2769444
23	22,8211111	0,1788889	0,1788889
0,25	0,2691667	-0,0191667	0,0191667
1,5	1,3858333	0,1141667	0,1141667
0,5	1,5794444	-1,0794444	1,0794444
2	0,3466667	1,6533333	1,6533333
0,75	0,8541667	-0,1041667	0,1041667
2	1,5988889	0,4011111	0,4011111
7	6,5852778	0,4147222	0,4147222
0,4	0,3308333	0,0691667	0,0691667
0,5	2,4886111	-1,9886111	1,9886111
0,5	0,1288889	0,3711111	0,3711111
2	1,7638889	0,2361111	0,2361111
0,5	0,2177778	0,2822222	0,2822222
4	4,2469444	-0,2469444	0,2469444
0,5	0,4027778	0,0972222	0,0972222
0,5	0,0777778	0,4222222	0,4222222
1	0,0369444	0,9630556	0,9630556
0,5	0,0722222	0,4277778	0,4277778
10	9,2444444	0,7555556	0,7555556
0,25	0,2516667	-0,0016667	0,0016667
1	0,8208333	0,1791667	0,1791667
0,4	0,3761111	0,0238889	0,0238889
3	4,2263889	-1,2263889	1,2263889
1	1,0355556	-0,0355556	0,0355556
3	2,8519444	0,1480556	0,1480556
0,25	0,2988889	-0,0488889	0,0488889
0,5	0,0836111	0,4163889	0,4163889
4	3,3091667	0,6908333	0,6908333
0,5	1,2616667	-0,7616667	0,7616667
10	9,1205556	0,8794444	0,8794444
4	2,8891667	1,1108333	1,1108333
0,5	0,1875	0,3125	0,3125
1	0,8894444	0,1105556	0,1105556
5	4,4686111	0,5313889	0,5313889
0,5	0,145	0,355	0,355
0,5	2,9827778	-2,4827778	2,4827778
6	5,4205556	0,5794444	0,5794444
0,75	0,6822222	0,0677778	0,0677778
1	0,8355556	0,1644444	0,1644444
0,5	1,1086111	-0,6086111	0,6086111
1,5	2,0111111	-0,5111111	0,5111111
0,5	0,5686111	-0,0686111	0,0686111
0,5	0,5986111	-0,0986111	0,0986111
1	0,3591667	0,6408333	0,6408333
1	0,9377778	0,0622222	0,0622222
0,5	0,0925	0,4075	0,4075
4	3,3225	0,6775	0,6775
0,5	1,6369444	-1,1369444	1,1369444
0,5	0,6222222	-0,1222222	0,1222222
0,5	0,0688889	0,4311111	0,4311111
0,5	0,0302778	0,4697222	0,4697222
0,5	0,8091667	-0,3091667	0,3091667
0,5	0,5936111	-0,0936111	0,0936111
0,5	0,3763889	0,1236111	0,1236111

0,5	0,6791667	-0,1791667	0,1791667
0,5	0,3616667	0,1383333	0,1383333
0,5	0,1163889	0,3836111	0,3836111
0,5	0,4313889	0,0686111	0,0686111
0,5	0,0741667	0,4258333	0,4258333
1,5	3,8747222	-2,3747222	2,3747222
0,5	0,0722222	0,4277778	0,4277778
0,5	0,0275	0,4725	0,4725
0,5	0,1402778	0,3597222	0,3597222
0,5	0,1241667	0,3758333	0,3758333
0,5	1,8155556	-1,3155556	1,3155556
0,5	0,1325	0,3675	0,3675
0,5	0,1272222	0,3727778	0,3727778
0,5	0,4638889	0,0361111	0,0361111
0,5	1,8541667	-1,3541667	1,3541667
7	5,2005556	1,7994444	1,7994444
4	4,5483333	-0,5483333	0,5483333
10	9,4272222	0,5727778	0,5727778
3	2,94	0,06	0,06
1	0,9508333	0,0491667	0,0491667
0,5	1,4702778	-0,9702778	0,9702778
1,5	0,1994444	1,3005556	1,3005556
1,5	1,3622222	0,1377778	0,1377778
4	4,4402778	-0,4402778	0,4402778
1	1,4511111	-0,4511111	0,4511111
1,5	0,1927778	1,3072222	1,3072222
10	8,0541667	1,9458333	1,9458333
0,5	0,5413889	-0,0413889	0,0413889
0,5	0,0922222	0,4077778	0,4077778
0,5	0,1308333	0,3691667	0,3691667
0,5	0,6852778	-0,1852778	0,1852778
0,5	0,7077778	-0,2077778	0,2077778
1	1,4438889	-0,4438889	0,4438889
0,5	1,1258333	-0,6258333	0,6258333
47	38,8419444	8,1580556	8,1580556
0,5	2,1877778	-1,6877778	1,6877778
0,5	0,3769444	0,1230556	0,1230556
0,5	0,2222222	0,2777778	0,2777778
0,25	0,2866667	-0,0366667	0,0366667
0,5	2,8002778	-2,3002778	2,3002778
5	6,1319444	-1,1319444	1,1319444
1	0,0841667	0,9158333	0,9158333
2	1,4377778	0,5622222	0,5622222
1,5	1,8963889	-0,3963889	0,3963889
1,75	1,3758333	0,3741667	0,3741667
4	3,5397222	0,4602778	0,4602778
0,5	1,3458333	-0,8458333	0,8458333
4	3,8213889	0,1786111	0,1786111
0,5	0,7230556	-0,2230556	0,2230556
0,25	0,2777778	-0,0277778	0,0277778
0,5	0,1002778	0,3997222	0,3997222
1,5	2,0538889	-0,5538889	0,5538889
0,5	0,5388889	-0,0388889	0,0388889
0,5	0,6947222	-0,1947222	0,1947222
8	6,8780556	1,1219444	1,1219444
12	12,5033333	-0,5033333	0,5033333
10	11,1283333	-1,1283333	1,1283333
0,5	0,4336111	0,0663889	0,0663889
2	1,9663889	0,0336111	0,0336111
0,5	1,6441667	-1,1441667	1,1441667
0,5	1,5577778	-1,0577778	1,0577778
0,5	1,1983333	-0,6983333	0,6983333
0,5	1,8375	-1,3375	1,3375
30	32,2086111	-2,2086111	2,2086111
1,5	1,1558333	0,3441667	0,3441667
7	8,3338889	-1,3338889	1,3338889
0,5	0,205	0,295	0,295
0,5	0,0716667	0,4283333	0,4283333
2,5	2,9280556	-0,4280556	0,4280556
3	4,3219444	-1,3219444	1,3219444
0,5	0,0944444	0,4055556	0,4055556
0,5	1,5488889	-1,0488889	1,0488889
1	0,9566667	0,0433333	0,0433333
0,5	0,4147222	0,0852778	0,0852778
1	0,7563889	0,2436111	0,2436111
2	1,9863889	0,0136111	0,0136111
0,5	0,7136111	-0,2136111	0,2136111
0,5	0,0605556	0,4394444	0,4394444
0,4	0,3544444	0,0455556	0,0455556
0,5	0,5033333	-0,0033333	0,0033333
10	7,8388889	2,1611111	2,1611111
5	3,8983333	1,1016667	1,1016667
1	0,9991667	0,0008333	0,0008333
2	1,5466667	0,4533333	0,4533333
0,5	0,7983333	-0,2983333	0,2983333
0,5	2,5675	-2,0675	2,0675
1	1,6733333	-0,6733333	0,6733333
0,5	0,2025	0,2975	0,2975
0,4	0,3263889	0,0736111	0,0736111
0,5	0,4730556	0,0269444	0,0269444
1,5	1,5377778	-0,0377778	0,0377778
0,5	0,6038889	-0,1038889	0,1038889
0,5	0,1380556	0,3619444	0,3619444
0,5	0,2088889	0,2911111	0,2911111
52	46,3444444	5,6555556	5,6555556
1	1,0836111	-0,0836111	0,0836111
1	0,7302778	0,2697222	0,2697222
0,5	0,1816667	0,3183333	0,3183333
14	10,1802778	3,8197222	3,8197222
5	5,3622222	-0,3622222	0,3622222
0,5	0,0894444	0,4105556	0,4105556

0,5	0,2533333	0,2466667	0,2466667
0,5	0,2116667	0,2883333	0,2883333
8	6,1597222	1,8402778	1,8402778
9	8,3022222	0,6977778	0,6977778
0,5	1,275	-0,775	0,775
0,5	0,0433333	0,4566667	0,4566667
1,5	1,6369444	-0,1369444	0,1369444
0,5	0,1233333	0,3766667	0,3766667
0,5	0,1211111	0,3788889	0,3788889
12	11,1116667	0,8883333	0,8883333
4	3,4463889	0,5536111	0,5536111
19	16,8597222	2,1402778	2,1402778
7	8,005	-1,005	1,005
0,5	0,0319444	0,4680556	0,4680556
1	0,9044444	0,0955556	0,0955556
1	2,4183333	-1,4183333	1,4183333
0,5	0,5691667	-0,0691667	0,0691667
0,5	0,0597222	0,4402778	0,4402778
1	1,0233333	-0,0233333	0,0233333
0,5	0,1547222	0,3452778	0,3452778
0,5	2,9377778	-2,4377778	2,4377778
0,5	0,1711111	0,3288889	0,3288889
0,5	0,5188889	-0,0188889	0,0188889
0,5	0,4430556	0,0569444	0,0569444
8	7,6225	0,3775	0,3775
2	1,9011111	0,0988889	0,0988889
9	8,1405556	0,8594444	0,8594444
0,5	0,2116667	0,2883333	0,2883333
1,5	2,1108333	-0,6108333	0,6108333
1	0,9761111	0,0238889	0,0238889
0,5	0,0766667	0,4233333	0,4233333
0,5	0,2430556	0,2569444	0,2569444
0,5	0,1419444	0,3580556	0,3580556
1	2,4736111	-1,4736111	1,4736111
1	0,9058333	0,0941667	0,0941667
1	0,3161111	0,6838889	0,6838889
1	2,1877778	-1,1877778	1,1877778
0,5	0,4941667	0,0058333	0,0058333
1	1,0438889	-0,0438889	0,0438889
2	4,3238889	-2,3238889	2,3238889
0,5	0,7488889	-0,2488889	0,2488889
0,5	0,1425	0,3575	0,3575
5	7,1258333	-2,1258333	2,1258333
0,25	0,3236111	-0,0736111	0,0736111
1	0,9005556	0,0994444	0,0994444
1,25	1,0358333	0,2141667	0,2141667
6	5,185	0,815	0,815
100	79,2658333	20,7341667	20,7341667
1	0,9427778	0,0572222	0,0572222
0,5	0,1183333	0,3816667	0,3816667
2,5	3,785	-1,285	1,285
7	6,7316667	0,2683333	0,2683333
0,5	0,1083333	0,3916667	0,3916667
0,5	0,1066667	0,3933333	0,3933333
0,5	0,6205556	-0,1205556	0,1205556
0,5	0,0422222	0,4577778	0,4577778
0,5	0,4447222	0,0552778	0,0552778
0,5	2,0583333	-1,5583333	1,5583333
0,4	0,3547222	0,0452778	0,0452778
1	2,2708333	-1,2708333	1,2708333
10	9,2822222	0,7177778	0,7177778
0,5	0,7177778	-0,2177778	0,2177778
1	0,8827778	0,1172222	0,1172222
0,5	0,3711111	0,1288889	0,1288889
1,75	4,4022222	-2,6522222	2,6522222
3	2,8002778	0,1997222	0,1997222
0,4	0,3430556	0,0569444	0,0569444
4,5	4,91	-0,41	0,41
0,5	0,0347222	0,4652778	0,4652778
1	1,3580556	-0,3580556	0,3580556
0,25	0,3397222	-0,0897222	0,0897222
0,5	0,6552778	-0,1552778	0,1552778
0,5	1,2158333	-0,7158333	0,7158333
25	21,6255556	3,3744444	3,3744444
4	3,6736111	0,3263889	0,3263889
0,5	0,5466667	-0,0466667	0,0466667
5	4,1752778	0,8247222	0,8247222
1	1,0019444	-0,0019444	0,0019444
1,5	1,2552778	0,2447222	0,2447222
7	8,2180556	-1,2180556	1,2180556
8,5	7,2497222	1,2502778	1,2502778
4	3,8291667	0,1708333	0,1708333
0,5	0,8041667	-0,3041667	0,3041667
9	9,9669444	-0,9669444	0,9669444
1	0,3475	0,6525	0,6525
5	4,7466667	0,2533333	0,2533333
2	0,3455556	1,6544444	1,6544444
20	15,2836111	4,7163889	4,7163889
2	1,5411111	0,4588889	0,4588889
0,25	0,3213889	-0,0713889	0,0713889
0,5	0,6027778	-0,1027778	0,1027778
0,5	0,2111111	0,2888889	0,2888889
0,5	0,1083333	0,3916667	0,3916667
17	14,2952778	2,7047222	2,7047222
0,5	0,045	0,455	0,455
0,5	0,2725	0,2275	0,2275
0,5	0,0908333	0,4091667	0,4091667
0,5	1,6722222	-1,1722222	1,1722222
15	14,0491667	0,9508333	0,9508333
0,5	0,1111111	0,3888889	0,3888889
2	0,315	1,685	1,685

0,5	0,4986111	0,0013889	0,0013889
0,25	0,2902778	-0,0402778	0,0402778
1,5	2,1930556	-0,6930556	0,6930556
12	11,6116667	0,3883333	0,3883333
0,5	0,4530556	0,0469444	0,0469444
0,5	0,1205556	0,3794444	0,3794444
1	1,1391667	-0,1391667	0,1391667
1	2,7255556	-1,7255556	1,7255556
4	4,5486111	-0,5486111	0,5486111
1	0,8733333	0,1266667	0,1266667
50	40,9105556	9,0894444	9,0894444
11	10,9616667	0,0383333	0,0383333
0,5	2,4752778	-1,9752778	1,9752778
0,5	0,1922222	0,3077778	0,3077778
1	0,2033333	0,7966667	0,7966667
0,5	0,045	0,455	0,455
1	1,2047222	-0,2047222	0,2047222
0,5	0,6725	-0,1725	0,1725
0,5	0,4397222	0,0602778	0,0602778
0,5	1,2525	-0,7525	0,7525
1	0,9797222	0,0202778	0,0202778
0,5	0,2283333	0,2716667	0,2716667
1	2,1936111	-1,1936111	1,1936111
0,5	0,8208333	-0,3208333	0,3208333
0,5	0,4919444	0,0080556	0,0080556
1	0,2563889	0,7436111	0,7436111
0,5	0,3961111	0,1038889	0,1038889
0,25	0,3002778	-0,0502778	0,0502778
6	6,6186111	-0,6186111	0,6186111
0,5	0,7552778	-0,2552778	0,2552778
0,5	0,0588889	0,4411111	0,4411111
0,4	0,3402778	0,0597222	0,0597222
1,5	1,4697222	0,0302778	0,0302778
1,5	1,1713889	0,3286111	0,3286111
0,5	0,4611111	0,0388889	0,0388889
0,5	1,0769444	-0,5769444	0,5769444
1	0,7491667	0,2508333	0,2508333
0,5	0,1269444	0,3730556	0,3730556
0,5	0,0561111	0,4438889	0,4438889
0,5	0,0744444	0,4255556	0,4255556
3	3,6938889	-0,6938889	0,6938889
0,5	0,1022222	0,3977778	0,3977778
19	18,5188889	0,4811111	0,4811111
4	3,8383333	0,1616667	0,1616667
4,5	5,7833333	-1,2833333	1,2833333
1	1,0977778	-0,0977778	0,0977778
1	0,1697222	0,8302778	0,8302778
4	3,2783333	0,7216667	0,7216667
15	13,4575	1,5425	1,5425
0,5	2,3308333	-1,8308333	1,8308333
2	1,5238889	0,4761111	0,4761111
1	1,0263889	-0,0263889	0,0263889
2	3,04	-1,04	1,04
1	0,0819444	0,9180556	0,9180556
0,5	1,4111111	-0,9111111	0,9111111
0,5	0,1213889	0,3786111	0,3786111
0,5	1,1675	-0,6675	0,6675
1,5	1,2508333	0,2491667	0,2491667
0,5	3,1483333	-2,6483333	2,6483333
0,5	0,07	0,43	0,43
2,5	2,4738889	0,0261111	0,0261111
2	1,6177778	0,3822222	0,3822222
1,5	1,6761111	-0,1761111	0,1761111
0,5	1,3308333	-0,8308333	0,8308333
5	5,5180556	-0,5180556	0,5180556
2	2,1419444	-0,1419444	0,1419444
0,5	0,0727778	0,4272222	0,4272222
9	7,8388889	1,1611111	1,1611111
1	1	0	0
0,5	0,0675	0,4325	0,4325
1	3,2547222	-2,2547222	2,2547222
0,5	0,5291667	-0,0291667	0,0291667
2	1,4736111	0,5263889	0,5263889
0,5	0,0741667	0,4258333	0,4258333
0,5	0,3730556	0,1269444	0,1269444
0,5	0,615	-0,115	0,115
0,5	0,1283333	0,3716667	0,3716667
1	0,9952778	0,0047222	0,0047222
2	1,6616667	0,3383333	0,3383333
1,5	1,3855556	0,1144444	0,1144444
0,5	0,1569444	0,3430556	0,3430556
0,5	0,6833333	-0,1833333	0,1833333
2	0,2463889	1,7536111	1,7536111
0,5	2,4116667	-1,9116667	1,9116667
1	0,0441667	0,9558333	0,9558333
9	8,9991667	0,0008333	0,0008333
0,5	0,15	0,35	0,35
1	0,9769444	0,0230556	0,0230556
0,5	0,7002778	-0,2002778	0,2002778
0,5	0,7886111	-0,2886111	0,2886111
8	7,5125	0,4875	0,4875
0,5	0,0394444	0,4605556	0,4605556
0,5	0,1402778	0,3597222	0,3597222
1	0,8711111	0,1288889	0,1288889
0,5	0,1186111	0,3813889	0,3813889
1,5	0,1519444	1,3480556	1,3480556
7	6,2661111	0,7338889	0,7338889
0,5	0,2130556	0,2869444	0,2869444
10	9,5780556	0,4219444	0,4219444
0,5	1,2680556	-0,7680556	0,7680556
1	1,0272222	-0,0272222	0,0272222

1	0,8786111	0,1213889	0,1213889
0,5	0,5344444	-0,0344444	0,0344444
1	0,7569444	0,2430556	0,2430556
0,5	0,2216667	0,2783333	0,2783333
0,5	0,5361111	-0,0361111	0,0361111
0,25	0,2858333	-0,0358333	0,0358333
0,5	0,1941667	0,3058333	0,3058333
0,5	0,6294444	-0,1294444	0,1294444
1	0,8411111	0,1588889	0,1588889
0,5	0,2266667	0,2733333	0,2733333
0,5	0,37	0,13	0,13
3	3,1172222	-0,1172222	0,1172222
1	0,3477778	0,6522222	0,6522222
0,25	0,2925	-0,0425	0,0425
0,5	0,0241667	0,4758333	0,4758333
1	1,0458333	-0,0458333	0,0458333
0,5	0,4358333	0,0641667	0,0641667
0,75	3,2838889	-2,5338889	2,5338889
0,5	0,2258333	0,2741667	0,2741667
1	2,9172222	-1,9172222	1,9172222
0,5	0,4655556	0,0344444	0,0344444
0,5	0,2266667	0,2733333	0,2733333
0,5	0,4205556	0,0794444	0,0794444
0,5	0,2197222	0,2802778	0,2802778
0,5	0,0741667	0,4258333	0,4258333
6	6,2488889	-0,2488889	0,2488889
0,5	1,6552778	-1,1552778	1,1552778
3	3,2344444	-0,2344444	0,2344444
38	32,5555556	5,4444444	5,4444444
2	2,3011111	-0,3011111	0,3011111
8	7,4194444	0,5805556	0,5805556
8	6,0941667	1,9058333	1,9058333
0,5	0,1216667	0,3783333	0,3783333
0,5	0,2244444	0,2755556	0,2755556
0,5	0,1333333	0,3666667	0,3666667
0,25	0,3672222	-0,1172222	0,1172222
0,5	0,6961111	-0,1961111	0,1961111
4	3,9844444	0,0155556	0,0155556
0,5	1,1211111	-0,6211111	0,6211111
0,5	0,0666667	0,4333333	0,4333333
0,5	0,5755556	-0,0755556	0,0755556
3	4,2208333	-1,2208333	1,2208333
0,5	1,8825	-1,3825	1,3825
5	4,7522222	0,2477778	0,2477778
0,4	0,3508333	0,0491667	0,0491667
0,5	0,6497222	-0,1497222	0,1497222
0,5	0,5425	-0,0425	0,0425
32	25,1041667	6,8958333	6,8958333
2,5	2,0819444	0,4180556	0,4180556
7	6,8291667	0,1708333	0,1708333
0,5	1,2897222	-0,7897222	0,7897222
27	23,7547222	3,2452778	3,2452778
2	2,0980556	-0,0980556	0,0980556
1	0,7794444	0,2205556	0,2205556
0,5	0,1280556	0,3719444	0,3719444
0,5	0,2447222	0,2552778	0,2552778
0,5	0,0291667	0,4708333	0,4708333
0,5	0,1463889	0,3536111	0,3536111
0,5	0,5169444	-0,0169444	0,0169444
1,5	1,4055556	0,0944444	0,0944444
0,5	2,5980556	-2,0980556	2,0980556
6	5,685	0,315	0,315
1,5	1,5697222	-0,0697222	0,0697222
2	1,6719444	0,3280556	0,3280556
5	4,275	0,725	0,725
0,5	0,0755556	0,4244444	0,4244444
2	1,8972222	0,1027778	0,1027778
0,5	1,42	-0,92	0,92
0,5	0,2397222	0,2602778	0,2602778
0,5	1,5683333	-1,0683333	1,0683333
0,5	0,02	0,48	0,48
0,5	0,0333333	0,4666667	0,4666667
4,5	5,2469444	-0,7469444	0,7469444
0,5	0,07	0,43	0,43
1	1,4508333	-0,4508333	0,4508333
0,5	0,5508333	-0,0508333	0,0508333
2	2,085	-0,085	0,085
1	2,2433333	-1,2433333	1,2433333
1	1,2602778	-0,2602778	0,2602778
0,5	0,0652778	0,4347222	0,4347222
0,5	0,0586111	0,4413889	0,4413889
6	4,5725	1,4275	1,4275
0,5	0,0702778	0,4297222	0,4297222
8	7,9011111	0,0988889	0,0988889
10	9,0355556	0,9644444	0,9644444
1	0,1386111	0,8613889	0,8613889
7	7,0338889	-0,0338889	0,0338889
0,5	0,4911111	0,0088889	0,0088889
4	6,0180556	-2,0180556	2,0180556
1	0,8447222	0,1552778	0,1552778
0,5	1,4902778	-0,9902778	0,9902778
2	2,0472222	-0,0472222	0,0472222
0,5	1,2038889	-0,7038889	0,7038889
1	0,0241667	0,9758333	0,9758333
0,5	0,0816667	0,4183333	0,4183333
8	7,4069444	0,5930556	0,5930556
14	10,1802778	3,8197222	3,8197222
6	5,3297222	0,6702778	0,6702778
3	3,5683333	-0,5683333	0,5683333
0,5	0,5138889	-0,0138889	0,0138889
0,5	0,0402778	0,4597222	0,4597222

0,5	0,1113889	0,3886111	0,3886111
3	2,2511111	0,7488889	0,7488889
9	9,6894444	-0,6894444	0,6894444
3	3,2475	-0,2475	0,2475
2,5	3,3072222	-0,8072222	0,8072222
30	28,1397222	1,8602778	1,8602778
0,5	0,1361111	0,3638889	0,3638889
0,5	0,145	0,355	0,355
3	4,4455556	-1,4455556	1,4455556
7	6,8322222	0,1677778	0,1677778
1,5	3,2783333	-1,7783333	1,7783333
0,5	0,4563889	0,0436111	0,0436111
37	32,5280556	4,4719444	4,4719444
0,5	0,5913889	-0,0913889	0,0913889
3,5	3,6077778	-0,1077778	0,1077778
1	0,7288889	0,2711111	0,2711111
0,5	0,0633333	0,4366667	0,4366667
1	3,4147222	-2,4147222	2,4147222
7	7,2272222	-0,2272222	0,2272222
20	17,6638889	2,3361111	2,3361111
0,5	0,0755556	0,4244444	0,4244444
4	3,3169444	0,6830556	0,6830556
3	2,7783333	0,2216667	0,2216667
0,25	0,2988889	-0,0488889	0,0488889
1	4,0405556	-3,0405556	3,0405556
0,5	0,7838889	-0,2838889	0,2838889
1	1,5938889	-0,5938889	0,5938889
0,5	1,4477778	-0,9477778	0,9477778
0,5	0,4419444	0,0580556	0,0580556
1	2,8636111	-1,8636111	1,8636111
0,5	2,4183333	-1,9183333	1,9183333
7	6,1002778	0,8997222	0,8997222
1,5	1,5383333	-0,0383333	0,0383333
5	5,3441667	-0,3441667	0,3441667
0,5	1,1452778	-0,6452778	0,6452778
11	10,3869444	0,6130556	0,6130556
0,5	0,1669444	0,3330556	0,3330556
0,5	0,5913889	-0,0913889	0,0913889
0,5	0,0469444	0,4530556	0,4530556
0,5	0,0225	0,4775	0,4775
0,5	2,6169444	-2,1169444	2,1169444
0,5	0,2119444	0,2880556	0,2880556
0,5	0,2577778	0,2422222	0,2422222
6	6,4794444	-0,4794444	0,4794444
1	0,3466667	0,6533333	0,6533333
1	0,3016667	0,6983333	0,6983333
0,5	0,4552778	0,0447222	0,0447222
0,5	1,4036111	-0,9036111	0,9036111
0,5	0,44	0,06	0,06
0,5	0,2091667	0,2908333	0,2908333
0,5	2,8197222	-2,3197222	2,3197222
2	1,6386111	0,3613889	0,3613889
13	11,2641667	1,7358333	1,7358333
28	20,4116667	7,5883333	7,5883333
0,5	0,4330556	0,0669444	0,0669444
0,5	1,9011111	-1,4011111	1,4011111
10	9,6388889	0,3611111	0,3611111
2	1,4766667	0,5233333	0,5233333
0,5	0,37	0,13	0,13
7	6,5458333	0,4541667	0,4541667
0,5	0,0252778	0,4747222	0,4747222
0,5	0,6477778	-0,1477778	0,1477778
5	5,5077778	-0,5077778	0,5077778
0,5	0,5733333	-0,0733333	0,0733333
0,5	1,3308333	-0,8308333	0,8308333
2	1,6594444	0,3405556	0,3405556
1	0,1644444	0,8355556	0,8355556
0,5	0,0188889	0,4811111	0,4811111
10	10,3661111	-0,3661111	0,3661111
1	0,1563889	0,8436111	0,8436111
0,5	0,1936111	0,3063889	0,3063889
0,5	2,0980556	-1,5980556	1,5980556
6	5,4466667	0,5533333	0,5533333
0,5	0,4611111	0,0388889	0,0388889
9	8,2988889	0,7011111	0,7011111
0,5	0,2061111	0,2938889	0,2938889
0,5	0,0794444	0,4205556	0,4205556
0,5	0,0283333	0,4716667	0,4716667
0,5	0,1022222	0,3977778	0,3977778
0,5	1,0888889	-0,5888889	0,5888889
0,5	0,1594444	0,3405556	0,3405556
25	18,5552778	6,4447222	6,4447222
0,5	0,3711111	0,1288889	0,1288889
9	8,7286111	0,2713889	0,2713889
2	2,0027778	-0,0027778	0,0027778
0,5	0,3905556	0,1094444	0,1094444
4	5,56	-1,56	1,56
0,5	0,4016667	0,0983333	0,0983333
0,5	0,04	0,46	0,46
0,5	0,4538889	0,0461111	0,0461111
4	3,1188889	0,8811111	0,8811111
4	3,4311111	0,5688889	0,5688889
1	0,7841667	0,2158333	0,2158333
0,5	1,2736111	-0,7736111	0,7736111
2	2,4383333	-0,4383333	0,4383333
0,5	0,7408333	-0,2408333	0,2408333
1	0,8194444	0,1805556	0,1805556
0,5	0,4816667	0,0183333	0,0183333
7	5,42	1,58	1,58
0,5	0,5872222	-0,0872222	0,0872222
0,25	0,3191667	-0,0691667	0,0691667

0,5	0,2697222	0,2302778	0,2302778
1	2,3363889	-1,3363889	1,3363889
0,5	0,4275	0,0725	0,0725
0,5	1,8091667	-1,3091667	1,3091667
0,25	0,2980556	-0,0480556	0,0480556
0,5	0,1902778	0,3097222	0,3097222
0,5	0,0813889	0,4186111	0,4186111
7	6,7958333	0,2041667	0,2041667
60	51,9241667	8,0758333	8,0758333
13	12,0775	0,9225	0,9225
5	3,8708333	1,1291667	1,1291667
0,5	0,1919444	0,3080556	0,3080556
0,5	0,7986111	-0,2986111	0,2986111
1	0,9022222	0,0977778	0,0977778
0,5	0,3836111	0,1163889	0,1163889
1	0,9527778	0,0472222	0,0472222
0,8	0,6741667	0,1258333	0,1258333
7	6,5088889	0,4911111	0,4911111
0,5	0,0325	0,4675	0,4675
4	4,0377778	-0,0377778	0,0377778
10	9,9191667	0,0808333	0,0808333
5	4,1980556	0,8019444	0,8019444
5	3,8225	1,1775	1,1775
2	1,7163889	0,2836111	0,2836111
0,5	0,3863889	0,1136111	0,1136111
0,5	2,1161111	-1,6161111	1,6161111
0,5	0,8297222	-0,3297222	0,3297222
1	0,8091667	0,1908333	0,1908333
1	0,2902778	0,7097222	0,7097222
0,5	0,1044444	0,3955556	0,3955556
1,5	1,3216667	0,1783333	0,1783333
1	0,07	0,93	0,93
0,5	0,3938889	0,1061111	0,1061111
0,5	2,2252778	-1,7252778	1,7252778
10	11,4161111	-1,4161111	1,4161111
0,5	2,5372222	-2,0372222	2,0372222
0,5	0,4825	0,0175	0,0175
0,5	0,2041667	0,2958333	0,2958333
0,5	0,6469444	-0,1469444	0,1469444
3	3,335	-0,335	0,335
17	13,7716667	3,2283333	3,2283333
0,5	0,0744444	0,4255556	0,4255556
0,5	0,1772222	0,3227778	0,3227778
0,5	0,1444444	0,3555556	0,3555556
5	5,2366667	-0,2366667	0,2366667
0,5	0,2475	0,2525	0,2525
1	0,7713889	0,2286111	0,2286111
0,5	0,0361111	0,4638889	0,4638889
0,5	0,0727778	0,4272222	0,4272222
7	6,3347222	0,6652778	0,6652778
1,25	1,0177778	0,2322222	0,2322222
2,75	2,0355556	0,7144444	0,7144444
4	3,6288889	0,3711111	0,3711111
0,5	0,4705556	0,0294444	0,0294444
0,5	0,4488889	0,0511111	0,0511111
0,5	0,1580556	0,3419444	0,3419444
1	1,0116667	-0,0116667	0,0116667
1	0,9527778	0,0472222	0,0472222
0,75	0,6919444	0,0580556	0,0580556
6	5,8380556	0,1619444	0,1619444
1	0,3444444	0,6555556	0,6555556
0,5	0,1183333	0,3816667	0,3816667
0,5	0,1255556	0,3744444	0,3744444
3	2,635	0,365	0,365
0,5	0,4636111	0,0363889	0,0363889
0,5	0,2244444	0,2755556	0,2755556
0,5	0,1366667	0,3633333	0,3633333
0,5	0,4730556	0,0269444	0,0269444
1,75	1,3547222	0,3952778	0,3952778
0,5	0,2172222	0,2827778	0,2827778
2	1,9155556	0,0844444	0,0844444
0,5	0,2336111	0,2663889	0,2663889
20	22,4744444	-2,4744444	2,4744444
4	2,9752778	1,0247222	1,0247222
28	30,2161111	-2,2161111	2,2161111
0,5	0,6902778	-0,1902778	0,1902778
0,5	2,6725	-2,1725	2,1725
8	8,0211111	-0,0211111	0,0211111
0,5	0,0913889	0,4086111	0,4086111
67	51,45	15,55	15,55
1	1,0525	-0,0525	0,0525
7	5,6247222	1,3752778	1,3752778
0,5	0,4036111	0,0963889	0,0963889
0,5	0,1241667	0,3758333	0,3758333
0,5	1,1422222	-0,6422222	0,6422222
7	6,5102778	0,4897222	0,4897222
0,75	2,5797222	-1,8297222	1,8297222
4	3,2172222	0,7827778	0,7827778
0,25	0,2841667	-0,0341667	0,0341667
2	1,8694444	0,1305556	0,1305556
0,5	0,3580556	0,1419444	0,1419444
0,5	1,43	-0,93	0,93
1	0,8352778	0,1647222	0,1647222
0,5	0,6058333	-0,1058333	0,1058333
0,5	0,7480556	-0,2480556	0,2480556
0,5	2,0830556	-1,5830556	1,5830556
0,5	1,5383333	-1,0383333	1,0383333
2	2,7916667	-0,7916667	0,7916667
4	3,4741667	0,5258333	0,5258333
0,5	0,0897222	0,4102778	0,4102778
4	4,1027778	-0,1027778	0,1027778

0,5	0,3961111	0,1038889	0,1038889
0,5	0,3925	0,1075	0,1075
0,5	0,0488889	0,4511111	0,4511111
0,5	0,6141667	-0,1141667	0,1141667
0,5	2,9413889	-2,4413889	2,4413889
0,5	0,0691667	0,4308333	0,4308333
0,5	0,1255556	0,3744444	0,3744444
15	11,2113889	3,7886111	3,7886111
0,5	0,0594444	0,4405556	0,4405556
1	0,8755556	0,1244444	0,1244444
2	1,5044444	0,4955556	0,4955556
0,5	1,2191667	-0,7191667	0,7191667
0,5	0,0388889	0,4611111	0,4611111
0,5	0,3980556	0,1019444	0,1019444
5,5	8,1080556	-2,6080556	2,6080556
1,25	5,4791667	-4,2291667	4,2291667
27	26,9547222	0,0452778	0,0452778
0,5	0,0797222	0,4202778	0,4202778
0,5	0,1175	0,3825	0,3825
0,5	0,6475	-0,1475	0,1475
2	1,9447222	0,0552778	0,0552778
1	0,8886111	0,1113889	0,1113889
0,5	0,1680556	0,3319444	0,3319444
0,25	0,2944444	-0,0444444	0,0444444
1	0,3083333	0,6916667	0,6916667
8	7,2147222	0,7852778	0,7852778
1	0,7933333	0,2066667	0,2066667
1	0,0544444	0,9455556	0,9455556
0,5	0,4711111	0,0288889	0,0288889
1	0,8811111	0,1188889	0,1188889
0,5	1,7030556	-1,2030556	1,2030556
0,5	0,3622222	0,1377778	0,1377778
1	3,0475	-2,0475	2,0475
0,5	0,2177778	0,2822222	0,2822222
0,5	2,3305556	-1,8305556	1,8305556
4	3,6791667	0,3208333	0,3208333
0,5	0,5122222	-0,0122222	0,0122222
0,5	0,1472222	0,3527778	0,3527778
0,5	2,2336111	-1,7336111	1,7336111
0,5	0,4905556	0,0094444	0,0094444
1	0,9383333	0,0616667	0,0616667
8	7,2497222	0,7502778	0,7502778
0,5	0,4152778	0,0847222	0,0847222
0,5	0,0577778	0,4422222	0,4422222
0,5	1,9686111	-1,4686111	1,4686111
9	8,2527778	0,7472222	0,7472222
0,5	0,5411111	-0,0411111	0,0411111
25	20,3941667	4,6058333	4,6058333
2	0,2480556	1,7519444	1,7519444
1	0,1116667	0,8883333	0,8883333
1	0,0869444	0,9130556	0,9130556
4	3,06	0,94	0,94
8	7,9691667	0,0308333	0,0308333
6	5,2758333	0,7241667	0,7241667
6	5,7833333	0,2166667	0,2166667
0,5	1,2016667	-0,7016667	0,7016667
1	0,19	0,81	0,81
8	9,8852778	-1,8852778	1,8852778
31	28,0261111	2,9738889	2,9738889
0,5	0,045	0,455	0,455
0,5	1,7016667	-1,2016667	1,2016667
2	2,655	-0,655	0,655
0,5	0,1408333	0,3591667	0,3591667
2	2,1083333	-0,1083333	0,1083333
0,5	0,4816667	0,0183333	0,0183333
0,5	0,0805556	0,4194444	0,4194444
4	3,9933333	0,0066667	0,0066667
0,5	0,1558333	0,3441667	0,3441667
0,5	0,6991667	-0,1991667	0,1991667
0,5	0,5275	-0,0275	0,0275
1	2,4252778	-1,4252778	1,4252778
1	0,8305556	0,1694444	0,1694444
1	0,3541667	0,6458333	0,6458333
1,5	0,2116667	1,2883333	1,2883333
1	6,245	-5,245	5,245
10	10,4177778	-0,4177778	0,4177778
1	1,0075	-0,0075	0,0075
25	22,2827778	2,7172222	2,7172222
0,5	0,4952778	0,0047222	0,0047222
3	2,1766667	0,8233333	0,8233333
1,5	1,3927778	0,1072222	0,1072222
9	7,7716667	1,2283333	1,2283333
0,5	1,8277778	-1,3277778	1,3277778
12	14,7558333	-2,7558333	2,7558333
0,5	0,2305556	0,2694444	0,2694444
0,5	0,2327778	0,2672222	0,2672222
23	17,5222222	5,4777778	5,4777778
0,5	0,1111111	0,3888889	0,3888889
5	4,5233333	0,4766667	0,4766667
4	3,3925	0,6075	0,6075
5	5,5852778	-0,5852778	0,5852778
8	7,5672222	0,4327778	0,4327778
0,5	0,1922222	0,3077778	0,3077778
0,5	1,2497222	-0,7497222	0,7497222
0,5	0,1591667	0,3408333	0,3408333
0,5	1,6275	-1,1275	1,1275
0,5	0,1766667	0,3233333	0,3233333
0,5	0,0277778	0,4722222	0,4722222
0,5	1,2516667	-0,7516667	0,7516667
0,5	0,2747222	0,2252778	0,2252778
1	1,2497222	-0,2497222	0,2497222

3	2,9636111	0,0363889	0,0363889
0,5	1,5686111	-1,0686111	1,0686111
0,5	1,2888889	-0,7888889	0,7888889
0,5	0,1433333	0,3566667	0,3566667
0,5	0,2672222	0,2327778	0,2327778
0,4	0,3375	0,0625	0,0625
0,5	0,2580556	0,2419444	0,2419444
0,5	0,3691667	0,1308333	0,1308333
0,5	0,4638889	0,0361111	0,0361111
27	25,7336111	1,2663889	1,2663889
9	7,3972222	1,6027778	1,6027778
1	0,8763889	0,1236111	0,1236111
1,5	0,1163889	1,3836111	1,3836111
30	21,5263889	8,4736111	8,4736111
0,5	0,7655556	-0,2655556	0,2655556
0,5	0,5794444	-0,0794444	0,0794444
3	3,5833333	-0,5833333	0,5833333
1	0,9863889	0,0136111	0,0136111
6	5,4625	0,5375	0,5375
80	55,0591667	24,9408333	24,9408333
2	2,9163889	-0,9163889	0,9163889
0,5	0,1161111	0,3838889	0,3838889
0,5	0,1225	0,3775	0,3775
5	4,8869444	0,1130556	0,1130556
0,5	0,1077778	0,3922222	0,3922222
0,5	0,7925	-0,2925	0,2925
0,5	0,5444444	-0,0444444	0,0444444
1	2,5213889	-1,5213889	1,5213889
0,4	0,3455556	0,0544444	0,0544444
2	0,1272222	1,8727778	1,8727778
0,25	0,2822222	-0,0322222	0,0322222
8	8,1405556	-0,1405556	0,1405556
0,5	1,1836111	-0,6836111	0,6836111
0,25	0,2986111	-0,0486111	0,0486111
0,5	1,4961111	-0,9961111	0,9961111
0,5	0,0233333	0,4766667	0,4766667
1	0,1427778	0,8572222	0,8572222
1	0,9966667	0,0033333	0,0033333
1	1,0105556	-0,0105556	0,0105556
0,5	2,9138889	-2,4138889	2,4138889
0,5	0,1475	0,3525	0,3525
0,5	1,1352778	-0,6352778	0,6352778