

Analysis Of Food Order Scheduling Dine-In In Sengkaling Culinary Malang

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Abstract

Sengkaling Culinary is a service company engaged in the culinary field of food and beverages. This study aims to find out and analyze how to schedule production at Sengkaling Kuliner Restaurant to minimize waiting time for orders. The analytical tool used is the priority rule method with the sorting method consisting of FCFS, SPT, LPT, EDD, and Gantt charts. The results showed that the SPT and EDD methods were the best methods that could be applied to restaurants with an average completion time of 9.02 minutes, 0.53% utilization, an average of 1.86 jobs, and a delay of 2.89 minutes. The advice given to the company is to make improvements to the Sengkaling Kuliner production process by using job sequencing based on the SPT and EDD methods.

Keywords— Gantt Chart, Priority Rule Method, Scheduling

Abstrak

Sengkaling Culinary merupakan perusahaan jasa yang bergerak di bidang kuliner makanan dan minuman. Penelitian ini bertujuan untuk mengetahui dan menganalisis bagaimana penjadwalan produksi pada Restoran Sengkaling Kuliner untuk meminimalkan waktu tunggu pesanan. Alat analisis yang digunakan adalah metode aturan prioritas dengan metode pengurutan yang terdiri dari grafik FCFS, SPT, LPT, dan EDD serta Gantt chart. Hasil penelitian menunjukkan bahwa metode SPT dan EDD merupakan metode terbaik yang dapat diterapkan pada restoran dengan rata-rata waktu penyelesaian 9,02 menit, utilisasi 0,53%, rata-rata pekerjaan 1,86 pekerjaan, dan penundaan 2,89 menit. Saran yang diberikan kepada perusahaan adalah melakukan perbaikan pada proses produksi Sengkaling Kuliner dengan menggunakan pengurutan pekerjaan berdasarkan metode SPT dan EDD.

Kata Kunci: Gantt chart, Priority Rule Method, Scheduling

INTRODUCTION

Scheduling is a very important activity in a company. Scheduling is the timing of an operational activity which includes activities of allocating facilities, equipment, and manpower and determining the sequence of implementation for an operational activity. Scheduling aims to minimize processing time,

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order waiting time, inventory levels, and efficient use of facilities, labor, and equipment. With the scheduling, activities can run according to what has been planned. Competition in the world of culinary business is currently increasing, this is indicated by the increasing number of large restaurants in Indonesia. In facing competition, every restaurant must have advantages compared to other restaurants such as taste, atmosphere, service, speed of handling consumer problems, and others (Prasetyo *et al.*, 2015).

The culinary business has become one of the industries that is relied upon for national economic growth. In this modern era, from the production process to the way it is presented, you must pay attention (Sopiandi & Junianto, 2021). The difference in presentation or service with other competitors can be an attraction to attract customers. However, during the implementation process, problems sometimes arise that make the service not optimal. Like the long waiting time for orders, the accumulation of orders in the kitchen resulted in wrong cooking sequences and mixed orders. The cook must implement a good queuing or scheduling system for all incoming orders to avoid the accumulation of orders in the kitchen (Prasetyo *et al.*, 2015).

Sengkaling Culinary is a business in the culinary services sector that was established in early 2016. Sengkaling Culinary has a large, comfortable place, and is coupled with the presence of large trees to make it cooler. This restaurant serves regular and non-regular orders. Regular services are provided by direct ordering and eating on the spot, while non-regular services are in the form of services *catering* various types of events (*buffet/rice box*). The problems faced by this restaurant are the long waiting time for orders and orders that are often exchanged. From this description, optimal scheduling is needed for the continuity of the restaurant's operational processes. Therefore, researchers evaluate the scheduling of food orders to improve restaurant scheduling in the future.

LITERATURE REVIEW

Scheduling is the process of determining the time when labor, equipment, other public facilities are needed to produce a product or service. Scheduling is the final stage in planning before the implementation of production. According to Heizer and Render (2016), scheduling is related to the allocation of resources within a certain time to achieve organizational goals. In other words, production scheduling is determining the time and place where a production process must be carried out to get the desired amount.

According to Heizer and Render (2016) short-term scheduling translates capacity decisions, aggregate plans, and master schedules into work sequences and specific work assignments, machines, and materials. Short-term scheduling relates to preparing schedules for product work to meet short-term demand or market demand. The goals of short-run scheduling are to minimize order lead time, minimize production process time, maintain inventory at low levels, and make effective use of personnel and advice.

According to Heizer and Render (2016) states that priority rules (*priority rule*) provide a guide for sorting the work to be done. This rule mainly applies to process-focused facility rules. Priority rules try to minimize turnaround time, number of jobs and systems, and job delays to maximize facility usage. Here are the most popular priority rules used: FCFS (*First Come, First Served*), the method of processing orders is based on arrival order, namely first come, first served. Jobs that come first to the work center will be processed first. SPT (*Shortest Processing Time*), an order processing method based on the shortest processing time. Jobs that have the fastest or shortest processing time are completed

first. LPT (*Longest Processing Time*), a method of sorting orders based on the longest processing time i.e. jobs with long processing times will be prioritized and prioritized. EDD (*Earliest Due Date*), the order processing method is based on the earliest deadline (due date), namely work with the earliest deadline will be done first.

According to Sudarsana (2008) a Gantt chart is a block diagram of activities depicted in a horizontal block arrangement. The length of the beam represents the amount of time needed to complete one operation in one order. The Gantt chart aims to adjust the actual work execution time compared to the schedule that has been prepared. If the implementation time is the same as the schedule, then the implementation is considered good. If it is not appropriate, the company must conduct an evaluation to find the cause of the non-conformity.

Services are something that is produced and consumed simultaneously. So, the presence or absence of services can only be seen after it has occurred. According to Kotler in Lupiyadi (2014), service is any action or performance offered by one party to another which is principally intangible and causes any transfer of ownership. In a service company, the customer is the input. Services or services provided by service providers cannot be carried out without the presence of the customer as the input for the service. Ownership of services can only be felt by customers. In addition, information as input is also needed in service companies. The service industry can also be measured the same as the manufacturing industry, namely productivity, service quality, and efficiency (Johnston, 2005).

Culinary services are services for providing food and drinks outside the home. Viewed from the aspect of preparation and presentation, this can be divided into 2 general categories, namely restaurants and catering services (*catering*). A restaurant is a place where food and beverage providers are provided where consumers come to visit, while catering services (*catering*) is a food and beverage provider who visits the consumer's location. The restaurant includes a type of food business that is located in part or all of a permanent building that sells and serves food and drinks to the public at its place of business, whether equipped with tools/equipment for the process of making and storing it or not and has received a decision letter as a restaurant/restaurant from building agency.

RESEARCH METHOD

The research was conducted at the Sengkaling Culinary Restaurant which is located on Jl. Raya Sengkaling No. 188, Sengkaling, Mulyoagung, Kec. Dau, Kab. Malang, East Java. This research uses the type of applied research (*applied research*) with the type of applied research used is evaluation research. The population in this study are customers of Sengkaling Kuliner who have made purchases in a buffet at a restaurant, while the sample used is 10 consumers taken randomly.

The analytical tool used is the priority rule method with 4 job sequencing methods. The research steps are as follows: Define order data, processing time, and due time; Determine the sequence of work to be carried out using 4 priority rules, namely: FCFS, SPT, LPT, and EDD. Process data based on priority rules using the following steps: Compute the flow of time for each order. In the system for this sequence, measuring the time required for each job will spend waiting time plus the time being processed; Calculating work delays. Job delays are obtained from the difference between the first-order time flow and the first-job deadline, the second-order time flow and the second-job deadline, and so on. If the flow of time is less than the due time then there is no delay, if the flow of time is greater than the due time then there is a delay equal to the difference. Calculates the total processing time; Calculate the amount of time flow; Calculate the total number of delays.

RESULT AND DISCUSSION

The first step in conducting data analysis in this study is to determine the order of data. After the order data already exists, then look for the execution time and maturity time. Order data, execution time, and maturity time are presented in table 1 below.

Table 1. Order Data, Execution Time, and Due Time

No	Cook	Order	Total	Processing Time	Due Time
1	C1	Grilled gourami	3	70 minutes	75 minutes
2	C2	Fried rice	17	90 minutes	100 minutes
3	C3	Meatball	4	20 minutes	25 minutes
		Fried noodles	8	35 minutes	40 minutes
		Samosa	1	15 minutes	20 minutes
4	C4	Moldcrispy	3	25 minutes	30 minutes
		Penyet chicken rice	4	20 minutes	25 minutes
		Cap jay rice	1	20 minutes	25 minutes
5	C5	<i>Hot tea</i>	11	20 minutes	30 minutes
		<i>Onion ring</i>	2	15 minutes	20 minutes
		Tomato juice	3	10 minutes	15 minutes
		Fruit ice	1	5 minutes	10 minutes
		Chicken soup rice	1	10 minutes	15 minutes
6	C6	It's loom	7	20 minutes	25 minutes
		Piscok single	4	15 minutes	20 minutes
		Rice nuggets with sauce <i>BBQ</i>	6	15 minutes	20 minutes
		Tofu tempeh penyet	1	15 minutes	20 minutes
7	C7	Baby spinach	4	25 minutes	30 minutes
		Dorry	2	15 minutes	20 minutes
		<i>Cold milo</i>	2	5 minutes	10 minutes
		Cheese cassava	1	15 minutes	20 minutes
		Watermelon juice	13	20 minutes	30 minutes
		Know petis	5	15 minutes	20 minutes
8	C8	Are you	6	10 minutes	15 minutes
		Fried prayer	1	15 minutes	20 minutes
		Lodo chicken rice	1	10 minutes	15 minutes
9	C9	<i>French fries</i>	7	15 minutes	20 minutes
		Soup each	7	30 minutes	35 minutes
		is degan	1	10 minutes	15 minutes
		<i>Chicken BBQ</i>	1	15 minutes	20 minutes

Source: *Primary data processed (2023)*

The company will summarize the processing time if in one order there are two or more cooks who process the order. Processing time is taken from the longest order processing time. A summary of customer orders is presented in table 2 below:

Table 2. Summary of Customer Orders

No	Order	Processing Time	Due Time
1	First Customer	90 minutes	100 minutes
2	Second Customer	90 minutes	100 minutes
3	Third Customer	55 minutes	65 minutes
4	Fourth Customer	90 minutes	100 minutes
5	Fifth Customer	90 minutes	100 minutes
6	Sixth Customer	90 minutes	100 minutes
7	Seventh Customer	35 minutes	45 minutes
8	Eighth Customer	50 minutes	60 minutes

9	Ninth Customer	90 minutes	100 minutes
10	Tenth Customer	45 minutes	55 minutes

Source: *Primary data processed (2023)*

Sort each job based on priority rules, namely the FCFS, SPT, LPT, and EDD methods which aim to find the appropriate method of serving consumers. The sorting results found that the first order processed was the order from the first customer then the second, third, fourth to tenth customer. Ordering orders using this method does not pay attention to processing time or due time. Application of the FCFS method (*First Come First Serve*) is considered to have fulfilled justice because it prioritizes orders that come first. However, the use of this method is considered not to meet the element of effectiveness for the company. The use of this method will affect the level of productivity of the company which makes the company less able to fulfill the company's main goal of generating maximum profit.

Work with the SPT method with the results of sorting found that the first order processed is the seventh customer order then the tenth, eighth, third, first, second, fourth, fifth, sixth, and ninth. Ordering orders using this method refers to the order processing time. In the calculation of the LPT method with the results of sorting, it was found that the first order processed was the first customer order, then the second, fourth, fifth, sixth, ninth, third, eighth, tenth, and seventh. Ordering orders using this method refers to the order processing time. The results of sorting with the EDD method found that the first order processed was the seventh customer order, then the tenth, eighth, third, first, second, fourth, fifth, sixth, and ninth. The ordering of orders using this method is based on the due date.

The next step is to calculate the time flow, process delay, total processing time, total time flow, total due time, and total process delay according to the sequence of work. Calculation of priority rules based on the FCFS method found that the total processing time for all jobs is 725 minutes, flow time is 4,285 minutes, due time is 825 minutes and delay time is 3,470 minutes. Calculation of priority rules based on the SPT method found that the total processing time for all jobs was 725 minutes, flow time was 3,430 minutes, due time was 825 minutes and delay time was 2,615 minutes. Calculation of priority rules based on the LPT method found that the total processing time for all jobs is 725 minutes, flow time is 4,545 minutes, due time is 825 minutes and delay time is 3,730 minutes. Calculation of priority rules based on the EDD method found that the total processing time for all jobs is 725 minutes, flow time is 3,430 minutes, due time is 825 minutes and delay time is 2,615 minutes.

*Making a Gantt chart based on job sequencing data based on FCFS, SPT, LPT, and EDD method priority rules. Making a Gantt Chart is a data analysis step to answer the first problem formulation. The purpose of making a chart is to facilitate the division of labor among the cooks. In the shape of Ganttchart scheduling work orders using the method First Come First Serve can be seen in the attached image 1 which is distinguished by the cook with each different color to make it easier for the cook to understand. On Ganttchart scheduling work orders using the method Shortest Processing Time can be seen in attached picture 2. Creating a Ganttch chart for scheduling orders using the method Processing Time can be seen in attached picture 3. Scheduling the execution of orders using the method Due Date can be seen in appendix 4 regarding the creation of a Gantt chart. FCFS Method Effectiveness Criteria (*First Come, First Served*). Based on the calculation results above, it can be entered into the effectiveness criteria table for the FCFS method as follows:*

Table 3. FCFS Effectiveness Criteria

Effectiveness Measure	<i>First Come First Serve</i>
Average turnaround time	428 minutes 30 seconds
Utilization	0,17 %

Effectiveness Measure	<i>First Come First Serve</i>
The average number of jobs	6 jobs
Average delay	347 minutes

Source: *Primary data processed (2023)*

Based on the calculation results above, it can be included in the effectiveness criteria table for the SPT method as follows:

Table 4. SPT Effectiveness Criteria

Effectiveness Measure	<i>Shortest Processing Time</i>
Average turnaround time	343 minutes
Utilization	0,21 %
Average number of jobs	5 jobs
Average delay	261 minutes 30 seconds

Source: *Primary data processed (2023)*

Based on the calculation results above, it can be included in the effectiveness criteria table for the LPT method as follows:

Table 5. LPT Effectiveness Criteria

Effectiveness Measure	<i>Long Processing Time</i>
Average turnaround time	454 minutes 30 seconds
Utilization	0,16 %
The average number of jobs	6 jobs
Average delay	373 minutes

Source: *Primary data processed (2023)*

Based on the calculation results above, it can be entered into the effectiveness criteria table for the EDD method as follows:

Table 6. EDD Effectiveness Criteria

Effectiveness Measure	<i>Earliest Due Date</i>
Average turnaround time	343 minutes
Utilization	0,21 %
Average number of jobs	5 jobs
Average delay	261 minutes 30 seconds

Source: *Primary data processed (2023)*

A comparison of effectiveness criteria was carried out to find out the most effective method that can be applied to Sengkaling Culinary Restaurant in reducing order delays. After the calculation is done, grouping is done for each method. The following is a grouping table of the 4 priority rule methods.

Table 7. Comparison of Effectiveness Criteria

Criteria	Scheduling Method			
	FCFS	SPT	LPT	EDD
Timesolution rate by rate	428 minutes 30 seconds	343 minutes	454 minutes 30 seconds	343 minutes
Utilization	0,17 %	0,21 %	0,16 %	0,21 %

Average number of jobs	6 jobs	5 jobs	6 jobs	5 jobs
Average job delay	347 minutes	261 min 30 seconds	373 minutes	261 min 30 seconds

Source: *Primary data processed (2023)*

Based on the analysis of scheduling criteria by comparing the results of calculating the effectiveness measure of the four priority rule methods, it can be concluded that the SPT method (*Shortest Processing Time*) under EDD (*Earliest Due Date*) is the best method to apply to the company. The SPT and EDD methods meet the four effectiveness criteria with the smallest average completion time, the greatest utilization, the smallest average number of jobs, and the smallest average delay. Selection of the best method is a data analysis step to answer the second problem formulation. The best method chosen is the most efficient method, while the most efficient method is the method with the fastest processing time for the order. The chosen method will later be applied to Sengkaling Culinary to fix scheduling problems.

The results of this study are supported by research by Safitri (2019) who analyzed a production scheduling system based on customer orders using the FCFS, LPT, SPT and EDD methods showing that the EDD and SPT methods are the most optimal methods. Stephany & Hadining's research (2022) which analyzed the production scheduling system based on customer orders using the sequencing method at PT XYZ shows that the best scheduling for carrying out the production process at PT XYZ is the SPT method (*Shortest Processing Time*).

Other research that supports the results of this study is Fadillah et al., (2023), which is the optimization of the production scheduling system to minimize production delays at PT Fahifa Prima Mandiri with the results of the most optimal method to be applied to companies, namely the SPT method (*Shortest Processing Time*). Research by Irvantoro & Ellyawati (2016), the application of the priority principle method to the production process of the study at the Batur Jaya Cooperative, Klaten Regency, Central Java Province with the results of the superior priority principle method, namely the SPT method (*Shortest Processing Time*).

CONCLUSION

Based on the research that has been done, it can be concluded that the answer to the first problem formulation, namely scheduling food orders at the Sengkaling Culinary Restaurant currently uses the FCFS method. Sequencing of work in this method is based on the customer ordering food first. The use of the FCFS method seems fair but is less effective because it has a longer waiting time for orders than the SPT and EDD methods. To answer the second problem formulation, it was found that an effective method applied in the company is the method *Shortest Processing Time* (SPT) and *Earliest Due Date* (EDD) to minimize order delays. From a comparison of the scheduling criteria, namely minimizing turnaround time, maximizing utilization, minimizing the amount of work, and minimizing the order waiting time on the four priority rule methods, the results show that the SPT and EDD methods have the smallest turnaround time, the biggest utilization, the smallest amount of work in the system, and the average delay smallest average.

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