Tibuana
Journal of applied Industrial Engineering-University of PGRI AdiBuana
p-ISSN 2622-2027
DOI : https://doi.org/10.36456/tibuana.7.01.7938.23-34 *e*-ISSN 2622-2035

Applied of The Simulation of The Queue System in Restaurant Mie Gacoan Branch Gresk Using Arena 14.0

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Abstract—**A system design certainly cannot be separated from the term simulation. There is no need to calculate the simulation manually because a system called the Arena application is available. The Arena is a Windows-based simulation software used to simulate and analyze a system. This study aims to enable the practitioner to know and run a queuing system simulation into the tools in the Arena 14.0 software, which in turn can be applied in real conditions to the queuing system at Mie Gacoan Restaurant Gresik Branch. The method used in this case is the simulation queuing method. The queuing model consists of 2 single servers consisting of a general queue and an online ojek queue. The simulation queuing presentation uses the FIFO (first in, first out) rule. That is, consumers who come first to make payments are the first to be served by the system. The analysis results show that the queue rate on server 2 (online ojek queue) has a slightly longer time difference than on server 1 (general queue).**

Keywords: Simulation System, Queue, Arena 14.0

I. INTRODUCTION

Talking about a system design cannot be separated from the term simulation. In any system, experiments or simulations are required first to get an idea of how the system will run, whether or not it is necessary to repair or feel that it is following the system's main purpose.Like the relationship between students and BAA counter staff, during taking care of KRS, all students will come in droves and take care of the re-registration of their lectures at the BAA office. Of course, there will be student queues, more than on usual days. Assuming the average service for each student is 5 minutes, trying out several alternative systems is necessary. Such as service with one counter clerk or three counter clerks. By simulating several alternative systems, decision-making with the best solution will be obtained.

Making simulations does not need to be calculated manually along with very rapid technological developments, so it is considered not difficult. However, the developing technology has a great influence on changing human life. One of the technological developments implemented in changing the order of human life is the Arena 14.0 application, which assists in the process of making system simulations.

Arena 14.0 is a Windows-based simulation software used to simulate and analyze a system. Arena 14.0 provides a good combination of usage, flexibility, and modeling of a real system to make it look more realistic. Important things that need to be considered in making a real system model are related to system operation, material flow, resource work, operation logic, and work trajectories. The output displayed in the Arena when performing the simulation is an animated activity, and the results are in the form of tables and graphs. The tables or graphs that are displayed make it easier to analyze the system created by the model. Thus, as an industrial engineering student, it is necessary to learn how to simulate a system because this knowledge will be very useful to be applied in the company where you work. As for the intricacies of the ProModel software, it will explain the steps for completing some early-stage exercises

II. LITERATURE REVIEW

a. System Basic Concept

The system is interpreted simply as a collection (set) of elements, organized variables, and components, interacting with each other, dependent on each other, and integrated(Wang*et.al*, 2014).In general, the elements that represent the system are input, process, and output.

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Another concept that can describe the system is the concept of synergy. This concept provides an understanding in the form of the total output produced in an organization which is expected to be greater than the individual output and the output of each part(Ucer*et.al*, 2019).The system is a term that is still common and widely used. The system is formed from integrated components to achieve goals(Bahadori *et.al*, 2014). In line with the general understanding of the system, the components in the system become a single unit starting from the input, process, to the output(Stanford*et.al*, 2014). Therefore, the system concept can be directly applied to information systems design.

b. System Characteristics

The system must have certain characteristics or properties (Wulandari*et.al*, 2021):

1. Component consists of several components that interact with each other, several sub-systems or sub-sections(Guo*et.al*, 2014).
2. The boundary is between the system and the external environment(Kurniawan *et.al*, 2023).
3. Output is the result of the energy processing process and is grouped into useful results and discarded waste. Output can be ideas for other sub-systems or super-systems(Rinaldi*et.al*, 2015).
4. The process of a system has a processing section or the system itself that acts as a processor. This processing process converts input into output(Aksin *et.al*, 2022).
5. The environment outside the system (Environment) is anything outside the system's boundaries that can affect the system's operation. The environment outside the system can be beneficial or detrimental to the system(Ilyas*et.al*, 2017).
6. A Liaison System is a medium that connects one sub-system with other sub-systems. Connectors open options for the possibility of processing the flow of data sources from one sub-system to another(Yang*et.al*, 2014).
7. Input is the energy entered into the system—input in the form of improvement of input and signal input(Berhan, 2015).
8. Goals and Objectives of the System A system must have goals and objectives. A system that does not have a target will make the system's operation useless(Rondini*et.al*, 2017).

c. Components System

Components that must be understood in the system, including(Wulandari*et.al*, 2021):

1. The entity is part of the system, which becomes an important component and becomes the main concern of the real system situation for further identification and processing(Wang*et.al*, 2014).
2. Attributes are characteristics or properties of an entity whose characteristics are uniquely attached to the entity(Bahadori *et.al*, 2014).
3. An event is a condition that can change the condition of the system in a short time. However, events can also be interpreted as temporary conditions that result in significant state changes in the system(Rinaldi*et.al*, 2015).
4. Activity is a process that changes the system, which also affects changing entities and attributes(Stanford*et.al*, 2014).
5. State of Variables are variables that gather to describe the system over time and are not uniquely attached to entities(Ilyas*et.al*, 2017).

d. Basic Concept of Model

Simulations are not known to many people and are difficult to do. However, simulation can predict the system's behavior observed at a certain time, producing observational data(Rondini*et.al*, 2017). More broadly, simulation is not just a solution to a problem created by a model (miniature or data) in such a way as to produce the expected value. Instead, prediction results from system simulation can be used as a reference in making important decisions regarding problems in the simulation model(Berhan, 2015).

The system contains elements or elements that function as components of a real situation by grouping interrelated studies. Selection is made on the system maker's components based on the study's purpose(Koeswara*et.al*, 2018). Therefore, the system is a miniature of a simple form under real conditions.

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e. Basic Concept of Simulation

Simulation is a method of describing or duplicating features, characteristics, and appearances based on a real system(Guo*et.al*, 2014; Ucer*et.al*, 2019). Based on this, simulation is considered the right tool to be implemented to find the best comments from system components when conducting experiments.The system's behavior must be described in detail regarding how the existing components interact and have interrelationships so that the model truly describes the behavior in the system(Yang*et.al*, 2014). If the model has been confirmed to be following real conditions, the model that has been made can be transformed into a computer program to create a simulation with a clearer picture.

f. Simulation Model Application

Simulation models can be applied to several things, including(Aksin *et.al*, 2022):

1. Design and analysis of manufacturing system.
2. Hardware and software requirements on the computer system.
3. The process of evaluating weapons systems in the military field.
4. Set up the inventory system.
5. Design the transportation system.
6. Create a communication system design.
7. Evaluating the banking service system.
8. Evaluating the financial and economic system.

g. Activity Cycle Diagram

The activity Cycle Diagram describes the interaction between entities in the system as outlined in the form of a conceptual model(Berhan, 2015; Rinaldi*et.al*, 2015).In the queue simulation process, several types of graphs can describe the existence of the system as a whole(Koeswara*et.al*, 2018; Wulandari*et.al*, 2021):

1. For example, the Q (t) graph shows the number of queues.
2. Graph B(t) is a graph of the existence of the server
3. Graph S(t) is a graph depicting the two conditions above

h. Event graph

*An event graph*is a graph used to describe discrete events in a simulation model(Wang*et.al*, 2014; Rondini*et.al*, 2017). These charts are known as "Simulation Graphs" and have a minimalistic design with one point type and two border types that can provide three different options(Kurniawan *et.al*, 2023).

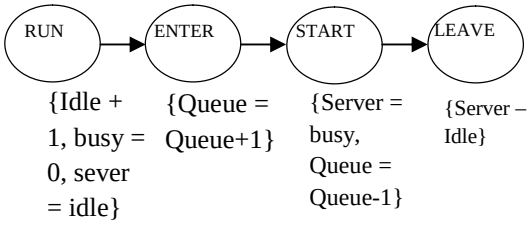
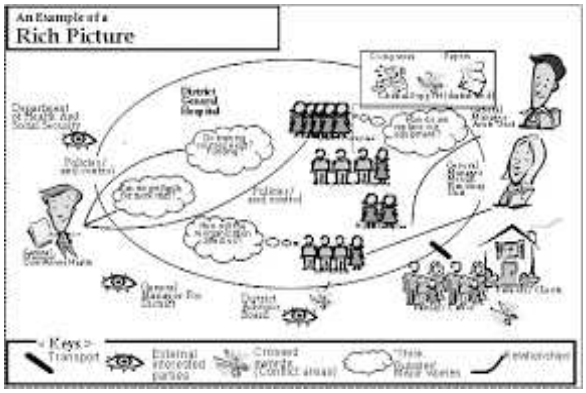


Figure 1. Event Graphs

i. Rich Picture

A rich Picture is one of the media that describes a situation, problem, or model in a cartoon format based on a summary that the model maker has known to the system described with a brief description (glance description)(Yang*et.al*, 2014).

Figure 2. Rich Picture



j. Software Arena 14.0

Software Arena is software published by the System Modeling Corp. that serves to assist humans in creating simulation models. The Arena software base is object-oriented, providing templates and modifiable alternatives to the graphical simulation model(Bahadori *et.al*, 2014; Ilyas*et.al*, 2017).Software Arena uses a drag-drop system and can create 2D animations with good compatibility. In addition, animations in Arena can be supported using files from other applications such as AutoCAD. Software Arena was created specifically to solve Discrete System Simulation problems. The Arena can process statistical data even though it is incomplete, in addition to preventing model damage by predicting consequences based on new

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conditions, rules, and implementation strategies(Stanford*et.al*, 2014).

Figure 3. Sofware Arena 14.0

k. Queue Theory

Queuing theory is a model theory of queues and waiting for lines related to mathematical studies(Guo*et.al*, 2014; Aksin *et.al*, 2022). Waiting is a phenomenon that arises due to the randomness of facility service operations. Generally, the customer's service time and the next time are unknown(Ucer*et.al*, 2019). Therefore, the queuing situation involves the basic elements: the customer and service (server).

When explained with the basic concept of the system, the queue system has input in the form of customers who come at a constant or variable rate to get service, or customers will wait to get service if the server is still busy, then processed with service, and has an output where the customer will leave the system. after receiving service(Berhan, 2015).

l. Calculation Formulas

1. Average Inter–Arrival Time

$$= \frac{t \quad ti \quad b \quad a}{(n \quad o \quad c \quad) - 1}$$

2. Average Processing Time

$$= \frac{t \quad p \quad ti}{n \quad o \quad c}$$

3. Average Customer Waiting Time (Queue Time)

$$= \frac{t \quad q \quad ti}{n \quad o \quad c}$$

4. Average Process Waiting Time (Delay Time)

$$= \frac{t \quad p \quad d \quad ti}{n \quad o \quad c}$$

5. Average Queue Length

$$= \frac{n \quad o \quad c \quad whic \, c}{t \quad s \quad ti}$$

6. Average Customer Time in the System

$$= \frac{t \quad c \quad ti \quad i \; the \; s}{n \quad o \quad c}$$

7. Probability of Customers Waiting in System

$$= \frac{t \quad c \quad q \quad g}{n \quad o \quad c}$$

8. System Utilities

$$= 1 - \frac{t \quad s \quad d \quad ti \quad 1}{t \quad o \quad ti}$$

III. RESEARCH METHOD

The stages carried out in conducting research, namely identifying problems and setting goals, field studies, literature studies, data collection, data processing, and data analysis, then simulating the proposed model and its analysis.

a. Problem identification and Goal Setting
   In identifying problems from observations that will be made to answer problems from the formulation of existing problems and achieve the desired goals related to systems, models, and simulation approaches.
b. Field Study
   This observation is carried out directly in the field on an object to be observed to obtain data based on facts which are then processed and analyzed. We conducted a field study at the Gacoan Noodle Restaurant on Jl in this system, model, and simulation approach. Panglima Sudirman No. 161, Kramatandap, Gapurosukolilo, Kec. Gresik, Gresik Regency, East Java.
c. Study of Literature
   In addition to direct observations, we also conduct literature studies by reading and collecting theories related to this problem on the internet.
d. Data Collection
   The data in this study are primary data taken by the observation method, namely by collecting data by observing directly in the field on the observed research object. Observation results can be used as a reference in analyzing and making decisions. The data collected in the observations are as follows:

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1. Customer Arrival Time Data
2. Service Start Time Data
3. Service End Time Data

e. Data Processing

Data processing is carried out by calculating the data obtained from observations at Mie Gacoan Gresik according to the calculation stages in the literature study. The calculations carried out include, among others, calculating the average time between arrivals, calculating the average service time, calculating the average customer waiting time, calculating the average server waiting, calculating the average queue length, calculating the average customer time in the system, calculate the probability of customers waiting in the system, and calculate system utility and in addition, making a model of the customer service queuing system at Mie Gacoan Gresik with the help of the Arena 14.0 software and then simulating it to get the average queue results and so on.

f. Data Analysis

The results of customer service attrition system data processing at Mie Gacoan Gresik using Arena 14.0 software were analyzed based on the values of instantaneous resource utilization, resource number busy, and so on and then interpreted descriptively using numbers so that it could be known specifically the results obtained from processing data at the queue system. Mie Gacoan Gresik customer service. The final result of the data analysis is concluded to make it easier to read the research results.

This observation was carried out at the Gacoan Noodle Restaurant on Jl. Panglima Sudirman No. 161, Kramatandap, Gapurosukolilo, Kec. Gresik, Gresik Regency, East Java.On Tuesday, May 17, 2022, it will take approximately 1 hour, starting at 18:30 WIB – 19:25 WIB.The type of data used in this study is quantitative data in the form of numbers or the form of numbers so that it can be calculated or measured in the optimal facility path, the service time performance at the optimal level when ordering food at Mie Gacoan, more precisely on Jl. Panglima Sudirman No. 161, Kramatandap, Gapurosukolilo, Kec. Gresik, Gresik Regency, East Java.

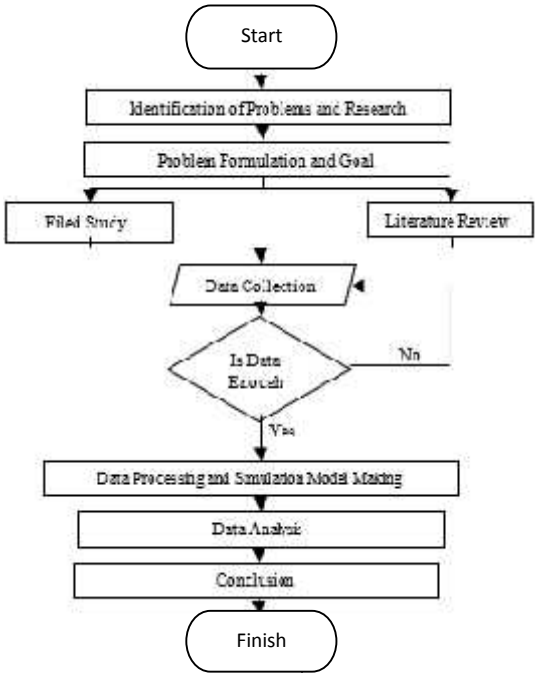

Figure 3. Research Flowchart

IV. RESULT AND DISCUSSION

a. *System Description*

The queuing system observed at Mie Gacoan Restaurant, more precisely at the Gresik branch, is the food ordering service system at Mie Gacoan. In this system, 2 servers will perform customer service, namely normal customers and online customers. This queuing system serves consumers starting from 09.00 WIB - 21.00 WIB.

The queuing system found at the Mie Gacoan Restaurant Gresik branch is included in the Multi-channel - single phase queue model, which has two servers with one service using FIFO (first in, first out) discipline, namely consumers who come first to make payments, then the first to be served by the system.

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b. *System Components*

Table 1. System Components

System	Entity	Attribute	Activities	Event	State of Variables
Mie Gacoan Service	Chasier Restaurant Mie Gacoan (*Permanent*)	1. ID card 2. Uniform 3. Cash register Receipt	The server processesorders that consumers want	Service	Numbers of servers busy serving
	Customer (*Temporary*)	Food and drinks on the mie can menu	Make the payment according to the amount stated on the receipt	Arrivals and departures	Number of customers waiting in line

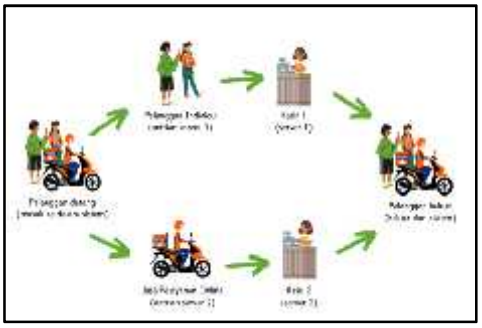
Components systemsconsist of entities, attributes, activities, activities, and the number of variations of the variables. For example, the Mie Gacoan service system has entities like cashiers and consumers. The cashier has attributes such as an ID Card, uniform, cash register, and purchase receipt. Consumers have attributes in the form of various foods and beverages on the menu. The activity carried out by the cashier is processing orders, while the activities carried out by consumers are payments based on orders that have been made. The main activity of the cashier is to provide services to consumers and consumers in the form of arrivals and departures from the system. The number of variables at the cashier is determined by the number of busy servers, while the consumer is the number of consumers waiting in line.

c. *System Process*

The following system processes that occur in the queue system at Mie Gacoan Restaurant Gresik Branch are as follows:

1. First, consumers come and enter a queue.
2. Next, consumers choose a server and enter the type of service they want.
3. Finally, consumers mention the desired food menu.
4. The server enters the data that consumers want to buy
5. Consumers make payments to the server
6. The server provides a receipt as a valid proof of payment
7. The cashier or restaurant employee provides a table number to make it easier for the waiter to deliver food (if choosing a server to eat on the spot)
8. Consumers get out of line

d. *Rich Picture*



Picture 4. *Rich Picture Diagram of Gacoan System*

The following is a system process that occurs in the queue system at Mie Gacoan Restaurant Gresik Branch as follows:

1. First, consumers come and enter the queue.
2. Next, consumers choose one of the servers as needed, and then enter the queue.
3. Finally, consumers say what menu they want.
4. The server enters the menu that consumers want
5. Consumers make payments to the server
6. The server provides a purchase receipt as valid proof of payment to the buyer.
7. Consumers get a table number to make it easier for waiters to deliver food.
8. Consumers get out of line.

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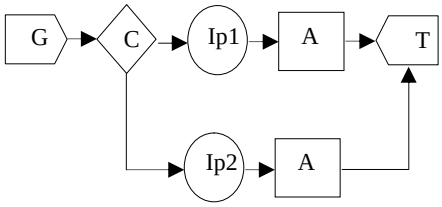
e. ***Activity Cycle Diagram (ACD)***

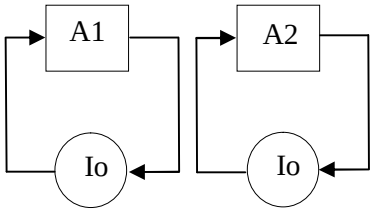
1. ACD (*Activity Cycle* Diagram) *Temporary*



Picture 5. *Activity Cycle Diagram*

Information:
G = consumer arrival
C =Possible alternatives
Ip =Idle/waiting for customer
A_1 = Server service process1
A_2 = Server service process 2
T = The customer leaves the server

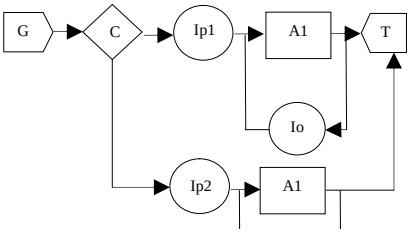
2. ACD (*Activity Cycle* Diagram) *Permanent*



Picture 6. Activity Code Diagram

Information:
A_1 = Server service process 1
A_1 = Server service process 2
I_o = Idle / waiting for operator

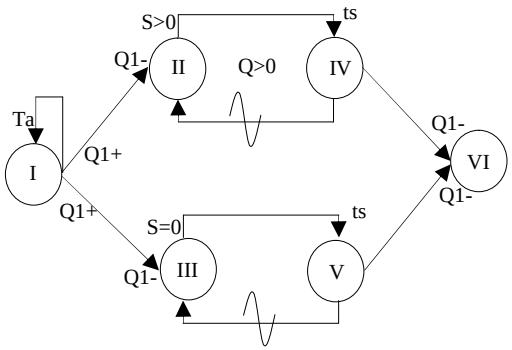
3. ACD (*Activity Cycle* Diagram) *System*



Picture 7. Activity Cycle Diagram

Information:
G = Customer arrival
C = Possible alternative
I_o = Idle / waiting for operator
I_p = Idle / waiting for the first customer
I_k = Idle / waiting for a second customer
A_1 = Server service process 1
A_2 = Server service process 2
T = Indicates the consumer leaves the system

f. ***Event Graphs***



Picture 8. *Event Graphs*

Information:
I = Customer arrival
II = Start server 1
III = Start server 2
IV = End server 1
V = End server 2
VI = Outgoing customer
ta = Show customer arrival time

S>0 = Indicates server started service
Q>0 =Indicates the occurrence of a queue
Q1+ =The first customer queue
Q1- = No queue
Ts = Show operator activity time
= Operator who is interrupting

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g. *Data Collection*

Table 2. Observation Data of Mie Gacoan Queue System Gresik Branch

Time of Arrival	WAD (s)	Server 1			Server 2			Queue Time (s)		Delay Time(s)		Consumers' Time in the System (s)
		WMP	WSP	WP (s)	WMP	WSP	WP (s)	Server 1	Server 2	Server 1	Server 2	
18:29:47	0:00:00	18:34:17	18:34:38	21	18:39:23	18:40:10	47	270	576	7	2	68
18:30:12	0:00:25	18:34:45	18:35:16	31	18:40:12	18:40:49	37	277	600	7	1	68
18:30:34	0:00:22	18:35:23	18:36:01	38	18:40:50	18:41:25	35	289	76	5	8	73
18:32:24	0:01:50	18:36:06	18:36:32	26	18:41:33	18:42:42	69	222	549	8	3	95
18:34:00	0:01:36	18:36:40	18:37:20	40	18:42:45	18:43:35	50	160	525	5	27	90
18:34:17	0:00:17	18:37:25	18:38:25	60	18:44:02	18:44:55	53	188	585	5	3	113
18:34:17	0:00:00	18:38:30	18:41:39	189	18:44:58	18:46:02	64	253	641	33	4	253
18:34:58	0:00:41	18:42:12	18:42:42	30	18:46:06	18:47:02	56	434	668	6	3	86
18:35:27	0:00:29	18:42:48	18:42:53	5	18:47:05	18:48:34	89	441	698	3	12	94
18:37:24	0:01:57	18:42:56	18:43:22	26	18:48:46	18:49:21	35	332	682	8	3	61
18:40:32	0:03:08	18:43:30	18:44:03	33	18:49:24	18:49:58	34	178	532	3	4	67
18:40:48	0:00:16	18:44:06	18:44:42	36	18:50:02	18:52:11	199	198	554	63	3	235
18:41:13	0:00:25	18:45:45	18:46:12	27	18:52:14	18:53:11	57	272	661	5	40	84
18:41:56	0:00:43	18:46:17	18:48:58	161	18:53:51	18:55:09	78	450	715	7	2	239
18:42:36	0:00:40	18:49:05	18:51:01	116	18:55:11	18:58:02	171	650	95	2	2	287
18:43:04	0:00:28	18:51:03	18:51:48	45	18:58:04	18:59:36	92	479	900	24	3	137
18:43:55	0:00:51	18:52:12	18:53:11	59	18:59:39	19:01:24	105	497	944	4	1	164
18:47:32	0:03:37	18:53:15	18:54:07	52	19:01:25	19:03:12	107	343	833	3	5	159
18:50:31	0:02:59	18:54:10	18:55:15	65	19:03:17	19:04:58	101	219	766	8	2	166
18:52:42	0:02:11	18:55:23	18:56:08	45	19:05:00	19:06:14	74	161	738	5	2	119
18:52:55	0:00:13	18:56:13	18:57:55	102	19:06:16	19:08:32	136	198	801	15	2	238
18:52:58	0:00:03	18:58:10	18:58:48	38	19:08:34	19:09:13	39	312	936	13	3	77
18:53:13	0:00:15	18:59:01	19:02:31	390	19:09:16	19:12:08	172	348	963	4	4	562
18:53:28	0:00:15	19:02:35	19:03:25	50	19:12:12	19:13:26	74	547	1124	3	3	124
18:53:56	0:00:28	19:03:28	19:04:46	78	19:13:29	19:13:58	29	572	1173	2	7	107
18:54:22	0:00:26	19:04:48	19:06:01	73	19:14:05	19:16:38	153	626	1183	9	3	226
18:54:47	0:00:25	19:06:10	19:07:32	82	19:16:41	19:17:48	67	683	1314	6	4	149
18:55:34	0:00:47	19:07:38	19:09:11	93	19:17:52	19:18:13	21	724	1338	2	4	114
18:56:21	0:00:47	19:09:13	19:09:58	45	19:18:17	19:20:14	117	772	1316	5	2	162
18:56:49	0:00:28	19:10:03	19:11:04	61	19:20:16	19:22:34	138	794	1407	0	0	199

The data collected includes consumer arrival time, service start time, and service end time. In addition, the data produces processed calculations of inter-arrival time, length of service time on each server, consumer time when waiting in line, lag time, and the total time required by consumers in the system.

h. *Data Processing*

1. Data Calculation
   a) The average time between arrivals

$$= \frac{t \quad ti \quad b \qquad a}{(n \quad o \quad c \qquad) - 1} \frac{1}{(6)-1}$$

$= 27{,}49$

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b) Average service time
   a. Servers 1
      = $\frac{t \quad s \quad s_i \quad ti \quad 1}{t \quad s \quad c \quad 1}$
      = $\frac{2}{3}$
      = 70,57 seconds/person
   b. Servers 2
      = $\frac{t \quad s \quad s_i \quad ti \quad 2}{t \quad s \quad cu: \quad 2}$
      = $\frac{2}{3}$
      = 83,3 seconds/person

c) Average customer waiting (queue time)
   a. Servers 1
      = $\frac{t \quad q \quad ti \quad s \quad 1}{ni \quad o \quad c \quad s \quad 1}$
      = $\frac{1}{3}$
      = 396,3 seconds/person
   b. Servers 2
      = $\frac{t \quad q \quad ti \quad s \quad 2}{ni \quad o \quad c \quad s \quad 2}$
      = $\frac{2}{3}$
      = 796,43 seconds/person

d) Average server wait (delay time)
   a. Servers 1
      = $\frac{t \quad d \quad ti \quad s \quad 1}{ni \quad o \quad c \quad s \quad 1}$
      = $\frac{2}{3}$
      = 9 *seconds*
   b. Servers 2
      = $\frac{t \quad d \quad ti \quad s \quad 2}{ni \quad o \quad c \quad s \quad 2}$
      = $\frac{1}{3}$
      = 5,4 seconds

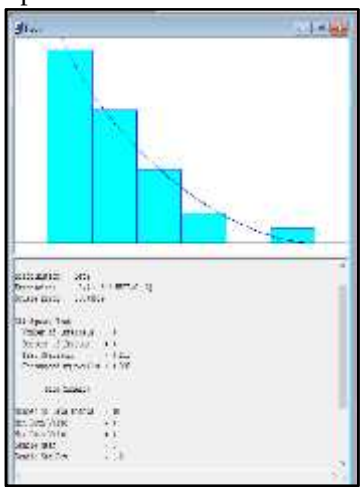
e) Average queue length
   a. Servers 1
      = $\frac{ni \quad o \quad c \quad q \quad f \quad s \quad 1}{t \quad s \quad ti \quad f \quad s \quad 1}$
      = $\frac{3}{2}$
      = 0,*012*person/seconds
   b. Servers 2
      = $\frac{ni \quad o \quad c \quad q \quad f \quad s}{2t \quad ls \quad ti \quad f \quad s \quad 2}$
      = $\frac{3}{2}$
      = 0,*0013*person/second

f) Average customer time in the system
   = $\frac{t \quad c \quad ti \quad li \quad the \quad s}{ni \quad o \quad c}$
   = $\frac{4}{6}$
   = 76,93 seconds/person

g) Probability of customers waiting in the system
   a. Servers 1
      = $\frac{t \quad c \quad q \quad s \quad 1}{ni \quad o \quad c}$
      = $\frac{3}{6}$
      = 50%
   b. Servers 2
      = $\frac{t \quad c \quad q \quad f \quad s \quad 2}{ni \quad o \quad c}$
      = $\frac{3}{6}$
      =50%

h) System Utilities
   a. Servers 1
      = 1 - $\frac{t \quad s \quad d \quad ti \quad 1}{t \quad o \quad ti}$
      = 1 - $\frac{2}{3}$
      = 0,91
   b. Servers 2
      = 1 - $\frac{t \quad s \quad d \quad ti \quad 2}{t \quad o \quad ti}$
      = 1 - $\frac{1}{3}$
      = 0,95

2. Simulation using*Sofware* ARENA 14.0
   a) Inter–Arrival Time Analyzer (WAD) Input Result



Picture 9. Input Analyzer WAD

The data entered in the input analyzer is obtained from the time between the arrivals of the consumers. The results show that the inter-arrival time data that we collect is distributed in Beta with the expression -0.5 + 6 * BETA(0, 0) and Square Error: 0.003529

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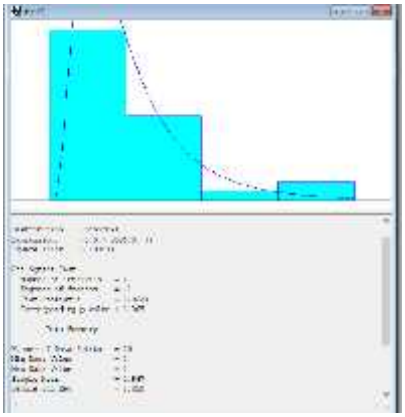
DOI : https://doi.org/10.36456/tibuana.7.01.7938.23-34 *e*-ISSN 2622-2035

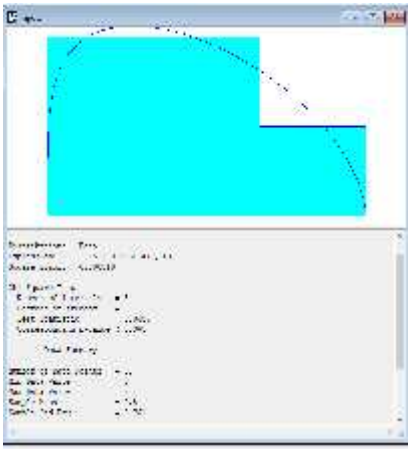
1. Server Service Time 1



Picture 10. Server Service Analyzer Input Result 1

Then the data entered in the input analyzer is obtained when the customer service server 1 is. The result is that the inter-arrival time data that we collect has a Lognormal distribution with Expression -0.5 + LOGN(0, 0) and Square Error: 0.003574

2. Server Service Time 2

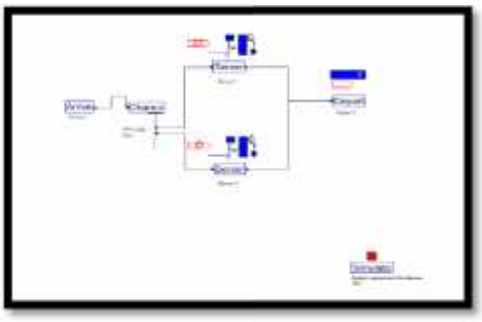


Picture 11. Server Service Analyzer Input Result

Then the data entered in the input analyzer is obtained when the customer service server 2 is obtained. The result is that the inter-arrival time data that we collect is distributed in Beta with Expression -0.5 + 3 * BETA(0, 0) and Square Error: 0.000510

3. Queue System Model on ARENA14.0. Software

The following shows the overall queuing system in the Arena 14.0 application.



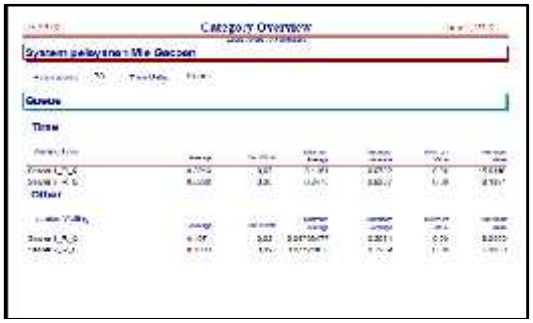
Picture 12. ServiceQueue System for Mie Gacoan Gresik Branch

i. ***Result of ARENA 14.0 Software***

Picture 13. Key Performance Indicator Result

From the results of running the service simulation model at the Mie Gacoan Restaurant, Gresik Branch, the following results were obtained:

Number Out, on average, is 333 entities that come out of the system, meaning that from the queue data sample that we took and then processed, this service system, on average, can serve 333 visitors in a unit of time

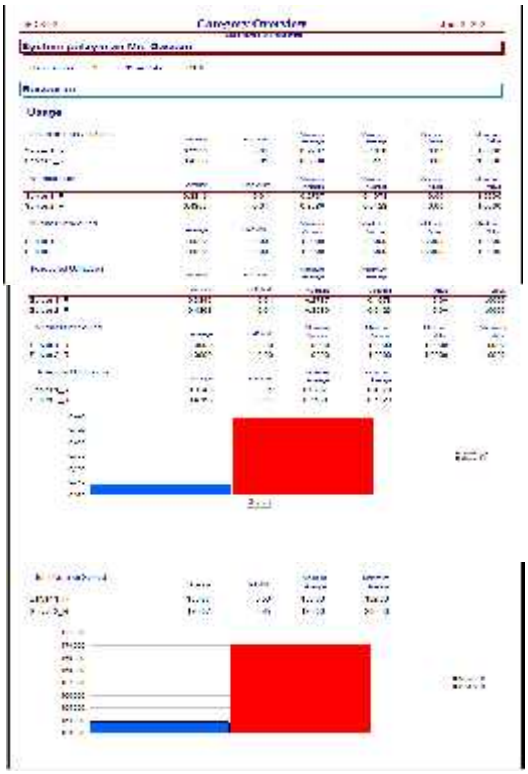


Picture 14. Result of Service Queuing System for Mie Gacoan Gresik Branch

From the picture above, it can be seen that the Queue Waiting time, from the simulation results of ARENA - the average waiting time on server 1 is 0.3243 seconds. So on server 1, the

p-ISSN 2622-2027
DOI : https://doi.org/10.36456/tibuana.7.01.7938.23-34 *e*-ISSN 2622-2035

average customer queues for 0.3243 seconds. While the waiting time on server 2 is 0.5238 seconds, meaning that on server 2, the average customer queues for 0.5238 seconds.



Picture 15. Result of the Service QueueSystem for the Mie Gacoan Gresik Branch

1. Resource Instantaneous Utilization, from the ARENA simulation results, the average queue on server 1 is 0.3346 people, and the average queue on server 2 is 0.4363
2. Resource Number Busy from the ARENA simulation results, the average queue on server 1 is 0.3346 people, and the average queue on server 2 is 0.4363
3. Resource Number Scheduled from the ARENA simulation results, the average queue on server 1 is 1 person, and the average queue on server 2 is 1 person.
4. Resource Scheduled Utilization, from the ARENA simulation results, the average queue on server 1 is 0.3346 people, and the average queue on server 2 is 0.4363
5. Resource Total Number Seized, from the ARENA simulation results, the average queue on server 1 is 163.87 people, and the average queue on server 2 is 170.07 people.

V. CONCLUSION

Based on the results obtained from observing the service at the Mie Gacoan Restaurant, Gresik Branch, more precisely on Jl. Panglima Sudirman No. 161, Kramatandap, Gapurosukolilo, Kec. Gresik, Gresik Regency, East Java 61111, the following conclusions can be drawn: The average inter-arrival time is 27.49 seconds. The average service time on server 1 is 70.57 people/second and on server 2 is 83.3 people/second. The average customer wait (queuing time) on server 1 is 396.3 seconds, and on server 2 is 796.3 seconds. The average server wait (delay time) on server 1 is 9 seconds and on server 2 is 5.4 seconds. The average queue length on server 1 is 0.012 seconds/person and on server 2 is 0.0013 seconds/person. The average customer time in the system is 76.93 seconds/person.

The probability of a customer waiting in the system on server 1 is 50% and on server 2 is 50%. System availability on server 1 is 0.91 and on server 2 is 0.95

VI. SUGGESTION

Suggestions for further practitioners so that research can run smoothly are as follows:

1. Read more literature or references related to the system to be observed so as not to experience confusion when taking data in the field so that the data taken is appropriate and sufficient.
2. Pay attention to the assistant's explanation of the mechanism and method of implementation as well as how to operate the ARENA 14.0 software so that there are no problems when managing data.
3. Understand the ARENA 14.0 software that is used to assist data processing at the time so that it is easy to model the queue system simulation

p-ISSN 2622-2027
DOI : https://doi.org/10.36456/tibuana.7.01.7938.23-34 *e*-ISSN 2622-2035

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