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A Queue System Analysis of Police Clearance Certificate Services at the Semarang Metropolitan Police Department, Indonesia

Clarissa Adristi[1], Sugito[2*], Bagus Arya Saputra[3], Hasbi Yasin[4]

[1,2,3,4] Department of Statistics, Faculty of Science and Mathematics, Universitas Diponegoro, Semarang, Indonesia

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Corresponding Author:
Sugito

ABSTRACT

One of the services provided by the Semarang Metropolitan Police Department is the service of making a Police Clearance Certificate (PCC). However, queue problems were found, causing the service to be not optimal. Queuing theory can be applied with the aim of knowing the model and performance of an efficient queuing system for visitors and officers. The variables used are inter-arrival time (λ) and service time (μ). Because of this, the author conducted research using the queuing analysis method and Monte Carlo simulation on PCC services at Semarang Police. The Monte Carlo method provides more efficient results for each counter compared to signal analysis. The results of this research reduce the capacity of the Lq, Ls, Wq, Ws calculation system by decreasing the level of maintenance equipment utilization. The model built from sample data and Monte Carlo simulation data is the same, namely. New model PCC registration counter, and PCC renewal registration with a queue model (M/G/2):(GD/∞/∞), at the fingerprint counter with a queue model (M/G/1):(GD/∞/∞), on re-research, issuance of new PCC, and issuance of PCC extension with queue model (M/M/2):(GD/∞/∞).

KEYWORDS: Queue system; Semarang Metropolitan Police Department; System Performance Measures; Monte Carlo Simulation; Police Clearance Certificate.

I. INTRODUCTION

The total population of Semarang City in 2022 is estimated by the Semarang City Central Statistics Agency at 1,656,564 people, with a population including the labor force of 1,034,794 people. This is an early indication of the urgency of the request for the creation of a Police Clearance Certificate (PCC) document at the Semarang Metropolitan Police Department. The online PCC program has been implemented since 2019 with the aim of making it easier for the community in the administrative management process. However, the strategy of the online PCC program in meeting the needs of public services is still not running effectively and efficiently. This is because there are still many people who do not have mastered smartphones, applications that cannot be accessed, and people who do not know about online registration. Based on the results of direct observation at the Semarang Police, there are still people who are willing to wait to get services.

The waiting situation that occurs is due to the demand for services being more than the available facilities. Queue problems can lead to customer loss, so an effort is needed to overcome the problem. Efforts to provide additional services may reduce or prevent queues from forming. However, the costs incurred to provide additional services will reduce profits, a drop below an acceptable level may occur.

Queue theory can examine the activities of a service facility in a random set of conditions of a queue system that occur with the aim of finding the most efficient way to optimize resources based on the characteristics of the service. Measurements with queue theory show a more detailed mathematical analysis, so that they can be used as evaluation material in improving services. Simulation is a way that can be used to solve problems, if real systems are difficult to observe directly (Saputra et al, 2017). Monte Carlo simulations refer to various statistical sampling techniques used to estimate answers to quantitative problems. The results of the analysis can be the basis for an in-depth study of the prediction of the queue system, decision-making, and the development of effective services for the future (Apri et al., 2019).

In a study conducted by Efrendi (2018) with phenomenological analysis, it was found that responsiveness is still lacking due to slow response, causing the queue number to get longer. Therefore, the queue system in PCC services at the Semarang Metropolitan Police Department is the focus of research with the purpose of the research to find out the average level of customer arrival, the average level of service, the waiting time in the queue, and the waiting time in the system that shows the characteristics of PCC services at the Semarang Metropolitan Police Department.

The remainder of this article is organised as follows. Section 2 explains the ARIMA and Double Exponential Smoothing (DES) models, complete with parameter estimation methods and hypothesis testing. In Section 3, we present the research methodology we used. Section 4 presents the results of data processing and analysis related to JII stock data forecasting. Section 5 presents the findings.

II. METHOD DETAILS

The Semarang Metropolitan Police Department was established on December 31, 2009 in accordance with the Decree of the National Police Chief No. Pol: Kep 15/XII/2009. The Regulation of the National Police Chief Number 18 of 2014 said that the Semarang Metropolitan Police Department has the responsibility to carry out the main tasks of the police of the Republic of Indonesia, one of which is to provide services for making PCC. The Semarang Metropolitan Police Department has 2 types of PCC services, namely services for making new PCC which consists of registration counters, fingerprints, re-research, and issuance and PCC validity extension services consisting of registration counters, fingerprints and issuance. Queue problems were found in some of these services.

According to Bronson and Wospakrik (1996), a queue is a queue of people waiting to get services from one or more facilities. The goal of queue theory is to develop a model that can achieve a balance between system responses and services that occur randomly (Kakiay, 2004). The model is stated in Kendall's notation, namely:

$$(a/b/c): (d/e/f), \qquad (1)$$

The explanation of these symbols is as follows:

a : Distribution of arrivals time
b : Distribution of service time
c : Number of service counters (with, *c=1.2,* 3,..., ∞)
d : Service discipline e.g. FIFO, LIFO, SIRO, PS
e : The maximum limit of customers allowed in the system
f : Source of summons (Kakiay, 2004)

The system is said to be stable or steady state if $\rho = 1$, can be defined as the ratio between the rate of arrival time (λ) and the rate of service (μ) multiplied by the number of service facilities (c) or it can be written as follows:

$$\rho = \frac{\lambda}{c\mu}, \qquad (2)$$

The queue process is usually assumed to be the arrival time and the service time are Exponential distributed (M), or it can be expressed as the number of arrivals and the number of services distributed Poisson (M) (Gross *et al*, 2008). The assumptions of the Poisson process include independence, homogeneity, and regularity (Praptono, 2008). The number of arrivals occurring at time interval *t* is a random variable that follows the Poisson distribution by means λt and the n probability of arrivals at time interval *t* is

$$P_n(t) = \frac{(\lambda t)^n e^{-\lambda t}}{n!}, \qquad (3)$$

If the arrival process follows the Poisson process with the parameter λ, then a random variable that expresses the time between consecutive arrivals follows the exponential distribution with the parameter $\frac{1}{\lambda}$. If suppose T is a random variable that expresses the time between consecutive arrivals, then:

$$\mathrm{P}\{T > t\} = \mathrm{P}\{\text{no arrival at time t}\} = \mathrm{P}_0(t) = \exp(-\lambda t)$$

or use $F(t)$ as the cumulative distribution function of T obtained:

$$F(t) = \mathrm{P}\{T \le t\} = 1 - \mathrm{P}\{T > t\} = 1 - \exp(-\lambda t)$$

So it is known that $\mathrm{P}\{T > t\}$ and $\mathrm{P}_0(t)$ have the same meaning, or prove that there is a relationship between the Poisson distribution and the Exponential distribution.

The observed research data needs to be carried out a goodness of fit test, one of which is the Kolmogorov-Smirnov test to see the extent of the observed research data in accordance with the proposed distribution. Here are the steps:

a. Determining the hypothesis:

H_0 : The distribution of the research sample is according to the set distribution

H_1 : The distribution of the research sample is not in accordance with the set distribution

b. Determine the level of significance: α

c. Test Statistics

$$D = \underset{1 \le i \le r}{Max}\{Max[|F_0(x_i) - S(x_i)|.|F_0(x_i) - S(x_{i-1})|]\}$$

where:

r : the number of different x-values
$S(x_i)$: Cumulative Chance Function of the Third Sample of the Population
$S(x_{i-1})$: Cumulative Probability Function of the 1st Sample of the Population
$F_0(x_i)$: the cumulative distribution function of the hypothetical distribution

d. Test Criteria

Reject H_0 if $D \ge D_{N;\alpha}$ or if $Sig. < \alpha$ (Daniel, 1989).

If the arrival pattern or service pattern does not follow the Poisson distribution or the Exponential distribution or referred to as *the General* (G) distribution, then a goodness of fit test will be carried out with other distributions. One example is the Weibull distribution. Weibull distribution was introduced in 1939 by Wallodi Weibull. Its density function can be formulated as follows:

$$f(x,\alpha,\beta) = \frac{\alpha}{\beta}\left(\frac{x}{\beta}\right)^{\alpha-1} exp\left(-\left(\frac{x}{\beta}\right)^{\alpha}\right), x > 0 \quad (4)$$

while the cumulative distribution function is as follows:

$$F(x,\alpha,\beta) = 1 - exp\left(-\left(\frac{x}{\beta}\right)^{\alpha}\right) \quad (5)$$

α =*shape* parameter > 0
β =*Scale* parameter > 0

Mean and variance of the Weibull distributions are (Walpole and Myers, 2012):

$$\mu = \beta\Gamma\left(1+\frac{1}{\alpha}\right) \quad (6)$$

$$\sigma^2 = \beta^2\left\{\Gamma\left(1+\frac{2}{\alpha}\right) - \Gamma^2\left(1+\frac{1}{\alpha}\right)\right\} \quad (7)$$

Furthermore, it develops a model and analyses the performance of the system accordingly. According to Taha (1996), if the applicant arrival pattern and service pattern are Markov distributed (Poisson or Exponential), the number of facilities is *c*, the queue discipline is first come first served (FCFS), and the capacity and source of calls are infinite, then the queue model is expressed as (M/M/c):(GD/∞/∞). System performance measures are as follows:

1. The average number of customers in the queue
   $L_q = \left(\frac{r^c\rho}{c!(1-\rho)^2}\right)P_0$, and $P_0 = \left[\sum_{n=0}^{c-1}\frac{r^n}{n!} + \frac{r^c}{c!}\left(\frac{1}{1-\frac{r}{c}}\right)\right]^{-1}$
2. The average number of customers in the system
   $L_s = L_q + r$
3. The estimated time the customer waits in the queue
   $W_q = \frac{L_q}{\lambda}$
4. The estimated time the customer waits in the queue
   $W_s = \frac{L_s}{\lambda}$, with $r = \frac{\lambda}{\mu}, \rho = \frac{\lambda}{c\mu}$

I If the arrival pattern is Markov distributed while the service pattern is General distributed or general distribution with a number of facilities of 1, then the queue model is expressed as (M/G/1):(GD/∞/∞). System performance measures are as follows:

1. The average number of customers in the queue
$L_q = L_s - \lambda E[t]$
2. The average number of customers in the system
   $L_s = \lambda E[t] + \frac{\lambda^2(E^2[t]+var\{t\})}{2(1-\lambda E\{t\})}$
3. The estimated time the customer waits in the queue
   $W_q = \frac{L_q}{\lambda}$
4. The estimated time the customer waits in the queue
   $W_s = \frac{L_s}{\lambda}$, with $E[t] = \frac{1}{\mu}$ and variance = Var[t]

However, if the service pattern is General distributed with a number of facilities c, then the queue model is expressed as (M/G/c): (GD/∞/∞). System performance measures are as follows:

1. The average number of customers in the queue
   $L_q = \lambda W_q$
2. The average number of customers in the system
   $L_s = \lambda W_s$
3. The estimated time the customer waits in the queue

$$W_q = \frac{\lambda^c E[t^2](E[t])^{c-1}}{2(c-1)!\left(c-\lambda(E[t])\right)^2} \cdot \frac{1}{\left[\sum_{n=0}^{c-1}\frac{(\lambda E[t])^n}{n!} + \frac{(\lambda E[t])^c}{(c-1)!\,(c-\lambda E[t])}\right]}$$

4. The estimated time the customer waits in the queue
   $W_s = \frac{L_s}{\lambda}$, with $E[t] = \frac{1}{\mu}$ and variant = var[t]

Optimization of the queue system can be done with Monte Carlo simulation. Probabilistic simulations will be carried out following sample data by taking samples from random processes (Yunita *et al.*, 2009). Here are the steps to be taken:

1. Determine and create a probability distribution for each variable to be simulated, e.g. Exponential distribution and Weibull distribution with parameters obtained from the previous sample.
2. Create a cumulative probability distribution for each variable.
3. Specifies the random number interval where the lower and upper bounds are obtained from the probability distribution that has been created.
4. Generate random numbers with the help of a computer device.
5. Create a simulation of the data generation experiment.

The research data analysis was conducted with R software, which is a freely available and open-source software (Tirta, 2015). A programme that allows the creation of web-based user interfaces (Chang et al., 2019). R Shiny allows the creation of interactive web pages, so users can access R through a graphical user interface on the web, although R actually operates through a command line interface (Sievert, 2019).

III. RESEARCH METHODS

This study uses primary data, namely direct observation data from the research object. The research was carried out at the Semarang Metropolitan Police Department for 5 days, starting from November 21 to 24, 2023, and continued on November 27, 2023, with a research period from 08.00 to 14.00 WIB. The variables analyzed included the time between the arrival of the PCC applicant and the time of PCC service at the Semarang Metropolitan Police Department for each counter. The data processing steps are expressed in the following steps:

1. Prepare and input the empirical data, consisting of customer interarrival times and service times.

2. Conduct initial simulation, including the addition of servers if necessary, to ensure that the queueing system reaches a steady-state condition.
3. Verify steady-state behavior.
   - If steady-state is not achieved, repeat the simulation adjustment.
   - Otherwise, proceed with distributional analysis.
4. Perform Kolmogorov–Smirnov goodness-of-fit tests on the interarrival time data.
   - If the data follow a Poisson distribution, assign the Poisson (M) arrival model.
   - Otherwise, classify the arrival pattern as General (G) and test for any alternative distributions.
     - If a specific distribution is detected, adopt it;
     - If not, retain the General (G) classification.
5. Perform Kolmogorov–Smirnov goodness-of-fit tests on the service time data.
   - If the data follow an Exponential distribution, assign the Exponential (M) service model.
   - Otherwise, classify the service pattern as General (G) and test for possible specific distributions.
     - If a specific distribution is identified, adopt it;
     - If not, retain the General (G) classification.
6. Determine the complete queueing model by combining the identified arrival and service distributions (e.g., M/M/1, G/M/1, M/G/1, G/G/1, etc.).
7. Compute analytical queue performance measures, such as expected waiting time, queue length, and server utilization, according to the selected model.
8. Construct a simulation model of the queueing system and estimate system performance through simulation outputs.
9. Compare analytical results with simulation outcomes to assess model adequacy and system efficiency.
10. Formulate conclusions regarding system performance and the suitability of the identified queueing model.

IV. RESULTS AND DISCUSSION

A stable state is achieved if the value is $\rho < 1$, which indicates that the applicant's arrival rate is smaller than the rate of service provided. If the rate of arrival of the applicant exceeds the rate of service, the *server* will not be able to handle it effectively and there will be accumulation. The stability measures of each pendant with a time interval of 60 minutes are expressed in the following table:

Table 1. Facility Usability Level

Service Counter		c	λ	μ	ρ=λ/cμ
New	Registration	2	4.0547	59.5271	0.0341
	Fingerprint	1	3.6741	24.0025	0.1531
	Re-Research	2	3.6713	70.4545	0.0261
	Publishing and payment	2	3.6151	11.2527	0.1606
Extension	Registration	2	3.1703	71.5540	0.0221
	Publishing and payment	2	2.8762	13.5516	0.1061

The results of the analysis in Table 1 are known that ρ at each PCC service counter at the Semarang Metropolitan Police Department is less than 1, so it can be concluded that all counters have met the condition of steady state.

Next, a distribution fit test was carried out with the Kolmogorov-Smirnov test to see whether the arrival time and service time variables follow the Exponential (Markov) distribution or not. If not, the test will be carried out again with another distribution approach. Firstly, it will be tested to follow the Exponential distribution with a time interval of 60 minutes:

Table 2. Exponential Distribution Fit Test for Arrival Time

Service Counter		D	*p-value*
New	Registration	0.09868	0.33606
	Fingerprint	0.12336	0.12617
	Re-Research	0.11949	0.14929
	Publishing and payment	0.11624	0.17133
Extension	Registration	0.11762	0.22541
	Publishing and payment	0.07392	0.77267

Based on the results of the analysis in Table 2, it was concluded that with a significance level of $\alpha = 5\%$ of the arrival time of PCC applicants at all counters are follow the Exponential distribution.

Table 3. Exponential Distribution Match Test for Uptime

Ticket window		D	*p-value*
New	Registration	0.31560	0.00000*
	Fingerprint	0.49229	0.00000*
	Re-Research	0.07343	0.66998
	Publishing and payment	0.06156	0.85103
Extension	Registration	0.32629	0.00000*
	Publishing and payment	0.06041	0.91153

Next, the same test was carried out on the service time variable. The result in Table 3 were concluded that with a significance level of $\alpha = 5\%$ of the service time variable at the registration new PCC counter, the fingerprint counter, and the registration extension PCC counter were not exponentially distributed (*General*) so that a compatibility test was carried out with other distributions that matched the data pattern. The results of the Weibull distribution compatibility test using *EasyFit* software are as follows:

Table 4. Weibull Distribution Fit Test for the Service Time

Service Counter		D	*p-value*
New	Registration	0.06297	0.8317
	Fingerprint	0.06020	0.8686
Extension	Registration	0.05121	0.9764

Referring to Table 4, at the significance level of α=5%, the results were obtained that the service time at the registration new PCC, fingerprints new PCC, and registration for PCC extension are follow the Weibull distribution.

Furthermore, based on the distribution of arrival times and service times at each counter, a model is formed in accordance with the results of the analysis that has been carried out, and the results are shown in Table 5. Then, the system performance measures of each model in Table 5 are presented in Table 6.

Table 5. Queue Models in PCC Services

Service Counter		c	Type
New	Registration	2	(Exponential/Weibull/2): (FCFS/∞/∞)
	Fingerprint	1	(Exponential/Weibull/1): (FCFS/∞/∞)
	Re-Research	2	(Exponential/Exponential/2) : (FCFS/∞/∞)
	Publishing and payment	2	(Exponential/Exponential/2) : (FCFS/∞/∞)
Extension	Registration	2	(Exponential/Weibull/2): (FCFS/∞/∞)
	Publishing and payment	2	(Exponential/Exponential/2) : (FCFS/∞/∞)

Table 6. Performance Measures of Queuing System for PCC Services

	Service Counter					
	New				Extension	
	C11	C12	C13	C14	C21	C22
P_r	0.0659	0.1531	0.0508	0.2768	0.0433	0.1919
P_0	0.9341	0.8469	0.9492	0.7232	0.9567	0.8081
Lq	0.0000	0.0142	0.0000	0.0085	0.0000	0.0024
Ls	0.0682	0.1673	0.0521	0.3298	0.0443	0.2147
Ws	0.0168	0.0455	0.0142	0.0912	0.0139	0.0746
Wq	0.0000	0.0039	0.0000	0.0024	0.0000	0.0008

The results of the analysis in Table 6 show that the new PCC issuance service has a total applicant estimated to wait in line (Lq) of 0.0228≈1, the total applicant estimated to wait in the system (Ls) is 0.6174≈1, the total waiting time in the system (Ws) is 10.0661 minutes, and the total waiting time in line (Wq) is 0.3747 minutes. Meanwhile, the PCC extension service has a total applicant who is expected to wait in line (Lq) of 0.0024≈1, the total applicant who is expected to wait in the system (Ls) is 0.259≈1, the total time the applicant waits in the system (Ws) is 5.3167 minutes, and the total time the applicant waits in line (Wq) is 0.0507 minutes.

A Monte Carlo simulation will be carried out with the interval of generation data following the distribution that is already known in the sample data. In this case, random data will be generated following the Exponential distribution and Weibull distribution, with parameters according to the results of the previous analysis. After obtaining the simulation result data, the queue system will be analysed with the same steps as in the sample data.

A steady state is reached if the value of $\rho < 1$, which indicates that the applicant arrival rate is smaller than the system service rate. If the arrival rate of applicants exceeds the service rate, the server cannot handle them effectively, and there will be a backlog. The stability measures for each counter with a time interval of 60 minutes are stated in Table 7.

Table 7. Facility Usability Level of Simulation Data

Service Counter		c	λ	μ	ρ=λ/cμ
New	Registration	2	3.7939	66.5682	0.0285
	Fingerprint	1	3.4029	24.9995	0.1362
	Re-Research	2	3.4507	81.6984	0.0211
	Publishing and payment	2	3.3708	13.2943	0.1267
Extension	Registration	2	3.0089	79.5159	0.0182
	Publishing and payment	2	2.7086	15.6006	0.0868

The results of the analysis in Table 7 show that ρ at each PCC service counter at Semarang Police Station is less than 1, so it can be concluded that all counters have fulfilled steady-state conditions. Furthermore, the model for each counter in accordance with the results of the analysis that has been done is presented in Table 8. Then the performance measures of the queuing system based on simulation data are presented in Table 9.

Table 8. Queue Models in SKCK Services (Simulation Data)

Service Counter		c	Type
New	Registration	2	(Exponential/Weibull/2): (FCFS/∞/∞)
	Fingerprint	1	(Exponential/Weibull/1): (FCFS/∞/∞)
	Re-Research	2	(Exponential/Exponential/2) : (FCFS/∞/∞)
	Publishing and payment	2	(Exponential/Exponential/2) : (FCFS/∞/∞)
Extension	Registration	2	(Exponential/Weibull/2): (FCFS/∞/∞)

	Publishing and payment	2	(Exponential/Exponential/2) : (FCFS/∞/∞)

The results of the analysis in Table 9 show that the new PCC making service has a total applicant who is expected to wait in line (Lq) of 0.01521≈1, a total applicant who is expected to wait in the system (Ls) of 0.50421≈1, a total waiting time in the system (Ws) of 8.8179 minutes, and a total waiting time in line (Wq) of 0.2689 minutes. Meanwhile, the extension service of SKCK has a total applicant who is expected to wait in line (Lq) of 0.0013≈1, a total applicant who is expected to wait in the system (Ls) of 0.2128≈1, a total waiting time in the system (Ws) of 4.6299 minutes, and a waiting time in line (Wq) of 0.0294 minutes.

Table 9. Performance Measures of Queuing System for PCC Services (Simulation Data)

	Service Counter					
	New				Extension	
	C11	C12	C13	C14	C21	C22
P_r	0.0554	0.1361	0.0414	0.2250	0.0371	0.1598
P_0	0.9446	0.8639	0.9586	0.7750	0.9629	0.8402
Lq	0.0000	0.0110	0.0000	0.0041	0.0000	0.0013
Ls	0.0570	0.1471	0.0423	0.2577	0.0378	0.1749
Ws	0.0150	0.0432	0.0122	0.0764	0.0125	0.0646
Wq	0.0000	0.0032	0.0000	0.0012	0.0000	0.0005

So it can be seen that there is a decrease in the level of utilisation of service facilities and a decrease in waiting time in the results of system performance measures using Monte Carlo simulation data compared to the results of system performance measures using research data. The comparison can be seen in Tabel 10:

Table 10. Comparison of Queue System Performance Measures in Services

Service Counter		Pr	P0	Lq	Ls	Ws	Wq
Sample	C11	0.0659	0.9341	0.0000	0.0682	0.0168	0.0000
	C12	0.1531	0.8469	0.0142	0.1673	0.0455	0.0039
	C13	0.0508	0.9492	0.0000	0.0521	0.0142	0.0000
	C14	0.2768	0.7232	0.0085	0.3298	0.0912	0.0024
	C21	0.0433	0.9567	0.0000	0.0443	0.0139	0.0000
	C22	0.1919	0.8081	0.0024	0.2147	0.0746	0.0008
Si	C11	0.0554	0.9446	0.0000	0.0570	0.0150	0.0000
	C12	0.1361	0.8639	0.0110	0.1471	0.0432	0.0032
	C13	0.0414	0.9586	0.0000	0.0423	0.0122	0.0000
	C14	0.2250	0.7750	0.0041	0.2577	0.0764	0.0012
	C21	0.0371	0.9629	0.0000	0.0378	0.0125	0.0000
	C22	0.1598	0.8402	0.0013	0.1749	0.0646	0.0005

The use of Monte Carlo simulations is considered effective to produce more optimal system performance measures without having to make direct changes to the service system. These results can be used as study and evaluation materials for improving PCC services at the Semarang Metropolitan Police Department.

V. CONCLUSION

Based on the results of the analysis that has been carried out, it is concluded that the PCC service counter queue system at the Semarang Metropolitan Police Department has been stable or meets the steady state because it has a utility value of less than one. The final model for the queue and Monte Carlo simulation at the PCC service counter for the new PCC registration counter is (Exponential/Weibull/2):(FSFS/∞/∞), fingerprint counter is (Exponential/Weibull/1):(FCFS/∞/∞), re-research counter is (Exponential/Exponential/2): (FSFS/∞/∞), issuance of new PCC is (Exponential /Exponential/2): (FCFS/∞/∞), registration for extension PCC is (Exponential/Weibull/2):(FCFS/∞/∞), and the issuance of PCC extensions is (Exponential/Exponential/2):(FCFS/∞/∞). Overall, it can be concluded that the new PCC service and the extension PCC have good conditions, which can be seen in the performance measure. The results of the Monte Carlo simulation at each counter indicated a decrease in the level of utilization of service facilities and the measure of system performance, which results in an increase in the probability of the system being idle at each counter. Therefore, the use of Monte Carlo simulation is considered to produce a more optimal value compared to research data and can be used as a prediction of how the optimal queuing system for PCC services at the Semarang Metropolitan Police Department.

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