

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**MODELLING PATIENT FLOW BASED ON MULTI-SERVER
QUEUING MODEL (M/M/S) AND SIMULATION**

WAN NUR ANIS AINA BINTI WAN ABDULLAH - 2019218608

NUR UMMI HUMAIRA BINTI ROSLAN - 2019291064

NURAMIRA BINTI RUSLI - 2019294662

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ABSTRACT

Some issues arise in clinics, especially about the long waiting time to get services from them. This situation has been a common complaint among patients in clinics. The longer waiting times contribute to dissatisfaction among the patients as well as have a huge impact on clinic operations. Therefore, the purpose of this research is to measure the patient's average waiting time by using a multi-server queuing model and to represent the data from this research by using the simulation technique. Arena simulation has been used for the model queuing system. The multi-server queuing model has been used in this research. The Arena software package version 16.0 is used in this research to analyse the research for the queuing system. The information gathered was used to analyse data on the patients' arrival times and service times from a clinic. The results obtained from the multi-server queueing model and simulation model show that long waiting times do not exist in the system. The result shows that the average patient's waiting time by using a mathematical model is 10.8819 minutes while the average patient's waiting time by using Arena simulation is 11.899 minutes. The highest average patient's waiting time is in Consultation Room 8, where the patients need to wait for 18.865 minutes before they get the services from the doctor. The model that has been used in this research can be effective for the system in the clinic and can be implemented in clinics. The researchers recommend clinics, especially those living in rural areas, to add more consultation rooms so that patients can receive services more quickly and easily. This recommendation also allows other rural health clinics to keep the average wait time for patients at no more than 60 minutes.