DELHI TECHNOLOGICAL UNIVERSITY



STOCHASTIC PROCESSES

(MC-303)

PRACTICAL FILE

SUBMITTED TO:

PROF. H C TANEJA

MR. VINEET KUMAR

SUBMITTED BY:

NITYA MITTAL

(2K19/MC/089)

EXPERIMENT 10

# AIM

Demonstrate M/M/1 Queuing Model using a suitable example.

(a) Expected number of customers waiting in the queue/system

(b) Expected waiting time in the queue/system

(c) Expected number of idle/busy periods.

(d) Expected number of customers served in a busy period. (Incomplete example question)

Question used for implementation:

Consider an Airport runway for arrivals only, arriving aircraft join a single queue for the runway, Exponentially distributed service time with a rate, µ = 27 arrivals/hour, Poisson arrivals with a rate, λ = 20 arrivals/hourFind:

(a) Expected number of aircraft on the system

(b) Expected number of aircraft on the runway

(c) Average time spent on the system

(d) Average time spent on the runway

# THEORY

In queuing theory, a discipline within the mathematical theory of probability, an M/M/1 queue represents the queue length in a system having a single server, where arrivals are determined by a Poisson process and job service times have an exponential distribution. An M/M/1 queue is a stochastic process whose state space is the set {0, 1, 2, 3,} where the value corresponds to the number of customers in the system, including any currently in service.

* Arrivals occur at rate λ according to a Poisson process and move the process from state i to i + 1.
* Service times have an exponential distribution with rate parameter μ in the M/M/1 queue, where 1/μ is the mean service time.
* A single server serves customers one at a time from the front of the queue, according to a rst-come, Xrst-served discipline.
* The buffer is of infinite size, so there is no limit on the number of customers it can contain

## SOURCE CODE & OUTPUT

