STATISTICS and PROBABILITY Math234E PROJECT
Deadline 13/05/2019 23:59

1. (100 point) A multiserver system (computer lab, customer service, telephone company) consists of n = 4 servers (computers, customer service representatives, telephone cables). Every server is able to process any job, but some of them work faster than the others. The service times are distributed according to the table.

Server	Distribution	Parameters
I	Gamma	$\alpha = 7, \ \lambda = 3 \ min^{-1}$
II	Gamma	$\alpha = 5, \ \lambda = 2 \ min^{-1}$
III	Exponential	$\lambda = 0.3 \ min^{-1}$
IV	Uniform	$a = 4 \ min, \ b = 9 \ min$

The jobs (customers, telephone calls) arrive to the system at random times, independently of each other, according to a Poisson process. The average interarrival time is 2 minutes. If a job arrives, and there are free servers available, then the job is equally likely to be processed by any of the available servers. If no servers are available at the time of arrival, the job enters a queue. After waiting for 6 minutes, if the service has not started, the job leaves the system. The system works 10 hours a day, from 8 am till 6 pm.

Run at least 1000 Monte Carlo simulations and estimate the expected values of:

 (a) the total time each server is busy with jobs;

 (b) the total number of jobs served by each server;

 (c) the average waiting time;

 (d) the longest waiting time;

 (e) the number of withdrawn jobs;

 (f) the number of times a server was available immediately (this is also the number of jobs with no waiting time);

 (g) the number of jobs remaining in the system at 6:03 pm.

NOTE! Write your code in Java or C. Upload your project as zip file including your code and project. File naming should be *StudentID_StudentName_Project.zip* format.