

Advanced Systems Lab Exercises

Queuing Exercises 01

Presented on: **27th Nov 2012**

Exercise 1

Instrumentation on a network gateway indicates that on average it receives 125 packets per second. The gateway takes 2ms to forward each packet. Compute (show your working and how you model the problem):

- a) Service time
- b) Server utilization
- c) Average number of packets in gateway
- d) Mean waiting time
- e) Mean response time

Exercise 2

A disk has an average response time of 50ms. What is the maximum rate of I/O operations that the disk can support?

Exercise 3

Assume a server can be modeled as a queue. If the maximum response time allowed is 2 seconds and the server has enough memory to hold 10 jobs, including the one being processed, what is the maximum request rate that can be supported?

Exercise 4

Prove that the average number of jobs in the service of a general queue equals the offered load.

Exercise 5

You want to send an e-mail message. You observe that the e-mail server has at any point in time about 100 messages waiting to be sent. The number of messages to be sent arriving at the server is about 5 per millisecond. About how long will it take for your e-mail to be sent? Show your working.

Exercise 6

If the offered load on that e-mail server (Exercise 5) is 40%, how long does it take to process each e-mail message and how long is the message actually waiting to be processed? Show your working