In The Name of God, The Merciful, The Compassionate

Performance Modeling and Evaluation of Computer Systems
Department of Electrical and Computer Engineering
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Assignment
Due date: 88/04/25

Consider an Internet router in which a priority based scheduling mechanism has been implemented for sending packets on its outgoing link. There are two classes of packets and packets belonging to each priority class are queued separately. Packets of priority 2 are transmitted only when there is no packet in priority 1 queue to be transmitted. Suppose priority 1 packets arrive at rate λ_1, while priority 2 packets arrive at rate λ_2, according to the Poisson arrival process. Let the size of for priority 1 packets be EXP(μ_1) and for priority 2 be EXP(μ_2) and also let the bandwidth of the outgoing is 10 Mbps.

Assume that buffer size for priority 1 and priority 2 packets is 5 each (excluding the packet being transmitted). Model this system appropriately (i.e., define and draw, and specify completely). Analyze following measures through analytical model and through simulation.

 (a) The fraction of time spent by the link in transmitting priority 1 packets
(b) The fraction of time the link is idle
(c) Throughput (packets transmitted per unit time) of the link for priority 1 and 2 packets
Plot above measures against different value of input parameters (λ_1, λ_2, μ_1 and μ_2).