

# Homework 3

- Write simulation program to examine the performance of the following system:
  - Consider there high priority and low priority arrival packets to a router with mean rates of 20 packets/sec. and 30 packets/sec., respectively. Both arrivals are Poisson distributed. There are two output links and the packet transmitted rate is also Poisson distributed with mean 30 packets/sec for each link. It is assumed that the transmitting packet can not be preempted. The high priority packet has higher priority to be transmitted with probability  $p$ . And the queuing buffer is assumed to be infinite.
  - Due date: 2022/01/14 23:59

## Homework 3

- Please provide the following simulation results by letting  $p$  be 0.7, 0.8, 0.9, and 1.0, respectively.
  - The mean waiting time in the system for both high priority and low priority packets v.s. the analytical numerical results from the equation of M/M/1 priority queuing system results (as there is only one server, the mean transmission rate is 60 packets/sec.)
  - The percentages of the idle time, serving high priority packets, serving low priority packets.

Mean waiting  
time in the system

4 curves:

- High priority
- Low priority
- Numerical results (one high priority, one low priority  
note: they are constants because of  $p=1$ )

$p$

Percentages

3 curves:

- Idle time
- Serving high priority time
- Serving low priority time

$p$

# Delivery

- Software code with description comments (in appendix)
- Simulation results with discussions:
  - For example: will the high priority packets occupy  $p$  portion of the server busy time?
- Please zip all your document into one file with the student ID for the file name.
- Mail (with subject: “Queuing-3”) to the teacher [ywchen@ce.ncu.edu.tw](mailto:ywchen@ce.ncu.edu.tw) before 2022/01/14