EE5150: Communication Networks

August - December 2017

1. Implement a weighted fair queueing (WFQ) packet GPS multiplexer that handles packets for four different queues or customers. Let $C = 1000$ bits per second be the fixed capacity of the multiplexer and suppose that the multiplexer has infinite buffer. We will assume that the weights for the four queues are $\phi_1 = 0.1, \phi_2 = 0.2, \phi_3 = 0.3$ and $\phi_4 = 0.4$.

   Guidelines:

   - The virtual time process $V(t)$ is simulated, as if there were a GPS scheduler operating.
   - When a packet arrives into the scheduler, it is marked with its virtual finish time in the GPS scheduler.
   - When a packet is selected for transmission, it is transmitted completely.
   - After completion of service of a packet, the next packet to be transmitted is the one that has the smallest virtual finish time among all the packets in the multiplexer. (Ties can be broken in various ways - for example, by smallest queue index if the tie is between packets of several queues).

   Suppose that the input to the WFQ multiplexer is defined in a file input.txt as shown below. Each line describes the following details of a packet (delimited by a semi-colon) - id of the packet (int);time of arrival in seconds (float);the size of the packet in bits (integer); the queue to which it belongs to (1 or 2 or 3 or 4).

   input.txt
   Line1: 1;0.2;1000;1
   Line2: 2;0.4;1500;2
   Line3: 3;0.92;1000;4
   Line4: 4;2.1;1500;4
   Line5: 5;3.4;1000;3
   Line6: 6;5.1;1000;2

   The code must output the time of departure of the packets (identified by their id) for the GPS and the WFQ multiplexer.

Instructions:

1. Submit the assignment as a zip file.

2. Kindly submit the code (preferably in C or C++). Kindly add comments in the code to enable review.

3. The deadline for the submission is 7 October 2017.

4. The assignment carries 3 marks.