# Quality of Service Lecture 5

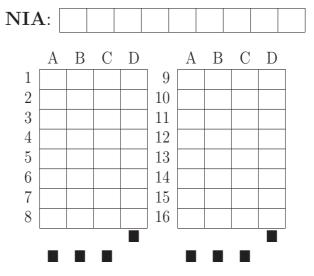
Date: Spring Duration: 15 min.

- There is only one correct answer for each multiple choice question.
- Each correct answer adds 1 point.
- Each incorrect answer has a penalty of  $\frac{1}{3}$  points.
- No score is awarded for unanswered questions, neither positive nor negative.
- Mark out your answers with an "X". Make sure that the "X" reaches the corners of the rectangle. ⊠
- No score is awarded if you mark more than one answer.
- Pad your NIA with 0s on the left to complete the NIA field.

Write your personal data clearly.

Last name:	
First name:	
Group:	

# Permutation: A



- 1.- What is the purpose of a packet queue?
  - (a) To absorb transient data bursts.
  - (b) To increase the delay.
  - (c) To discard packets.
  - (d) To change the order of packets.
- 2.- What is the reaction of TCP when a timeout expires?
  - (a) It doubles the congestion window.
  - (b) It halves the congestion window.
  - (c) It moves back to the slow start phase.
  - (d) It moves back to the congstion avoidance phase.
- 3.- What is the benefit of ECN?
  - (a) The TCP receiver does not need to send acknowledgement packets.
  - (b) Only the lesser important UDP packets are dropped.
  - (c) The size of the queues can be increased.
  - (d) The enpoints of a TCP flow can be notified about congestion without packet drop.
- 4.- What is the name of the queue that drops only those packets that arrive to an empty queue?
  - (a) High-five.
  - (b) Tailend.
  - (c) Dropbox.
  - (d) Taildrop.
- 5.- Why is bufferbloat a problem?
  - (a) Because it assumes a fluid model and data packets behave differently.
  - (b) Because the routers overheat and start dropping packets.
  - (c) Because it makes it difficult to separate traffic in different queues.
  - (d) Because it unnecessarily increases the delay.
- 6.- How does RED compute the dropping probability?
  - (a) As a function of the average queue occupancy, which is computed using a EWMA.
  - (b) Using the packet size and the packet delay.
  - (c) The dropping probability in RED is always one.
  - (d) As a function of a hash of the protocol field, two IP addresses and the two ports of the IP packet.
- 7.- What is window scaling?

- (a) A technique used to fill long fat pipes.
- (b) A technique to prevent that the queues fill up.
- (c) A technique to detect packet loss.
- (d) A technique to separate linux traffic from windows traffic.

# 8.- What should we do to prevent packet re-ordering?

- (a) Distribute the packets of a class of service among the different queues.
- (b) Have a different queue for each class of service.
- (c) Map all the packets of the same class of service to the same queue.
- (d) Use a policer to control the amount of traffic that is directed to each of the queues.

## 9.- In a weighted taildrop queue we have ...

- (a) different schedulers for large packets and small packets.
- (b) different queue sizes for in-contract and out-of-contract traffic.
- (c) different schedulers for in-contract and out-of-contract traffic.
- (d) different queue sizes for large packets and small packets.

#### 10.- What is the difference between RED and WRED?

- (a) In WRED the dropper marks the dropped packets with a flag.
- (b) WRED is used in core routers and RED in the edge routers.
- (c) In WRED different dropping profiles are applied to packets with different dropping precedence.
- (d) WRED supports larger bandwiths because it is more efficient than RED.

## 11.- To be used, ECN needs to be supported by ...

- (a) ... the core routers of the network.
- (b) ... the routers and the network administrator.
- (c) ... the routers and the endpoints'TCP stack.
- (d) ... the endpoints'TCP and UDP stacks.

## 12.- What are long fat networks?

- (a) Networks that are slow and it takes a very long time for a packet to reach the other end.
- (b) Networks that can contain a lot of data. TCP has to push a lot of data to fill the pipe.
- (c) Networks that use more than 100 Km of coaxial cable...
- (d) Networks with strict QoS constraints. A policer is needed to keep the traffic under control.

# 13.- What is a bad queue?

- (a) A queue that is always empty.
- (b) A queue that drop packets.
- (c) A queue that is always full.
- (d) A queue that is never full.
- 14.- What is a characteristic of Random Early Detection?
  - (a) It is unnecessary and should never be used.
  - (b) It drops (or marks with ECN flag) packets before the queue is full.
  - (c) It uses Weighted Deficit Round Robin.
  - (d) It detects congestion but it does not take any action.
- 15.- What is the reaction of TCP when a single packet is lost (detected thanks to the reception of duplicate acks)?
  - (a) Enabling quality of service.
  - (b) Activating the ECN flag.
  - (c) Halving the congestion window.
  - (d) Doubling the contention window.
- 16.- What kind of problems can appear in the absence of active queue management?
  - (a) TCP flow control.
  - (b) TCP global synchronization.
  - (c) Packet loss.
  - (d) Sustained link utilization.