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Communication Systems Group (CSG)

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Exercises in PMMC

Exercise 9

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1) Scheduling

1.1) What is scheduling? Name different scheduling methods and compare them with respect to their scheduling strategy.

1.2) A 100 MBit/s network link needs to be shared by five customers of an ISP. Each of them requests a network connection according to the table below. Distribute the available bandwidth to these customers according to the "max-min fairness" algorithm. Show each step of your solution.

Client	c_1	c_2	c_3	c_4	c_5
Requested Bandwidth	50	25	30	10	12

1.3) A 20 MBit/s network link needs to be shared by five customers of an ISP. Each of them requests a network connection and has a priority/weight according to the table below. Distribute the available bandwidth to these customers according to the "max-min fairness" algorithm. Show each step of your solution.

Client	c_1	c_2	c_3	c_4
Requested Bandwidth	10	2	3	10
Weight	1	2	3	4

2) Real-time Transport Protocol (RTP)

2.1) RTP is the Internet's standard protocol for the transport of real-time data, including audio- and video. It can be used for media on-demand as well as interactive services such as Internet telephony (VoIP).

a) Which are the main goals and operations enabled by the RTP protocol?

b) On which layer of the OSI model operates the RTP protocol? Explain your answer.

2.2) RTP ...

a) ... designed to handle real-time traffic on the Internet.

☐ true ☐ false

b) ... sources periodically send description messages providing additional information about themselves.

☐ true ☐ false

c) ... is built using TCP as a transport protocol.

☐ true ☐ false

d) ... sessions are established for each media stream.

☐ true ☐ false

e) supports the MPEG-4 multimedia format

☐ true ☐ false

f) supports the MJPEG multimedia format

☐ true ☐ false

g) supports the MPEG multimedia format

☐ true ☐ false

3) Resource Reservation Protocol (RSVP)

3.1) RSVP is a network control protocol designed to request a specific QoS **link-by-link communication** between participating end-systems on behalf of an application data stream.

a) What is the relation of RSVP to the following QoS Methods:

i) Resource Reservation
ii) Resource Association
iii) Admission Control.

b) In which layer of the OSI model operates the RSVP protocol?

c) Why is RSVP used with IntServ?

3.2) RSVP ...

a) ... reserves resources for bidirectional flows by source and destination IP addresses.

☐ true ☐ false

b) ... requires and admission control system per node, a packet classifier and scheduler.

☐ true ☐ false

c) Regarding the flexibility of RSVP reservation styles, a shared explicit style is used to reserve resources for a general type of flow, allowing that these flows share resources.

☐ true ☐ false