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Communication Systems Group (CSG)

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Exercises in PMMC

Exercise 2

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1) Protocol Stack

1.1) Entities of the *n*th layer ...

a) ... offer services to entities of the *n+1*th layer.
☐ true ☐ false
b) ... and the *n+1*th layer have to use the same protocol to exchange services.
☐ true ☐ false

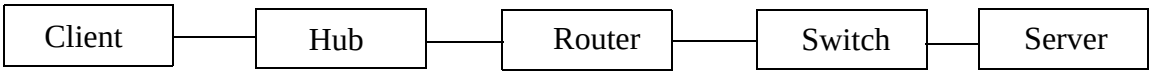
1.2) Explain the term Out-of-Band Signaling in at most two sentences.

1.3) Name two advantages and one drawback of layered network models (e.g. ISO/OSI Basic Reference Model or TCP/IP Reference Model).

1.4) Classify the following protocols in the protocol stack of the ISO/OSI Basic Reference Model: HTTP, IP, Ethernet, TCP, 802.11, FTP, SIP, UDP, SMTP, ICMP.

1.5) At which layers of the protocol stack operate the devices router, switch, and hub, typically? Give the main function of each device in one sentence respectively.

1.6) The picture below shows a network topology with five devices, each of which implements certain layers of the protocol stack. Draw the implemented layers for each of the devices and the dataflow for a message from Server to Client.



2) Specific Protocols

2.1) Characterize TCP and UDP with respect to the dimensions connection-orientation, reliability of communication, flow control, and congestion control.

2.2) Argue if TCP or UDP is better suited to transmit real-time communication data, e.g., VoIP application data.

2.3) SIP ...

a) ... allows to determine the location/IP address for a given user ID.
☐ true ☐ false
b) ... is a session description protocol.
☐ true ☐ false