

# Communications and Computer Networks

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## Exercise 1

### 1 Reference models

1. Which layer packs bits into bytes, bytes into frames, uses hardware addressing and implements error detection? Which device (network hardware) operates on this layer in principle?

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2. At which layer does the assignment of addresses and the forwarding of data packets from one end of the network to another take place? Which network hardware operates on this layer?

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3. Which layer is responsible for establishing, running and terminating a process communication between 2 systems?

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4. At which layer does data stream segmentation take place for communication between endpoints, is a mechanism for establishing/disestablishing virtual connections provided, and does detection and elimination of transport errors as well as flow control or congestion avoidance take place?

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5. Which layer determines signal levels, transmission speeds, and connector pinouts, and transmits bits in a transmission channel? Which network hardware operates on this layer?

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6. What boundary does the transport layer form between layers 5-7 and 1-3?

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7. Contrast the OSI layer model with the widely used TCP/IP layer model. Which layers correspond to each other?

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8. What are the addressing names of levels 2, 3, 4 and 7?

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9. Can collisions occur in point-to-point networks?

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10. How are computer networks classified according to their extent?

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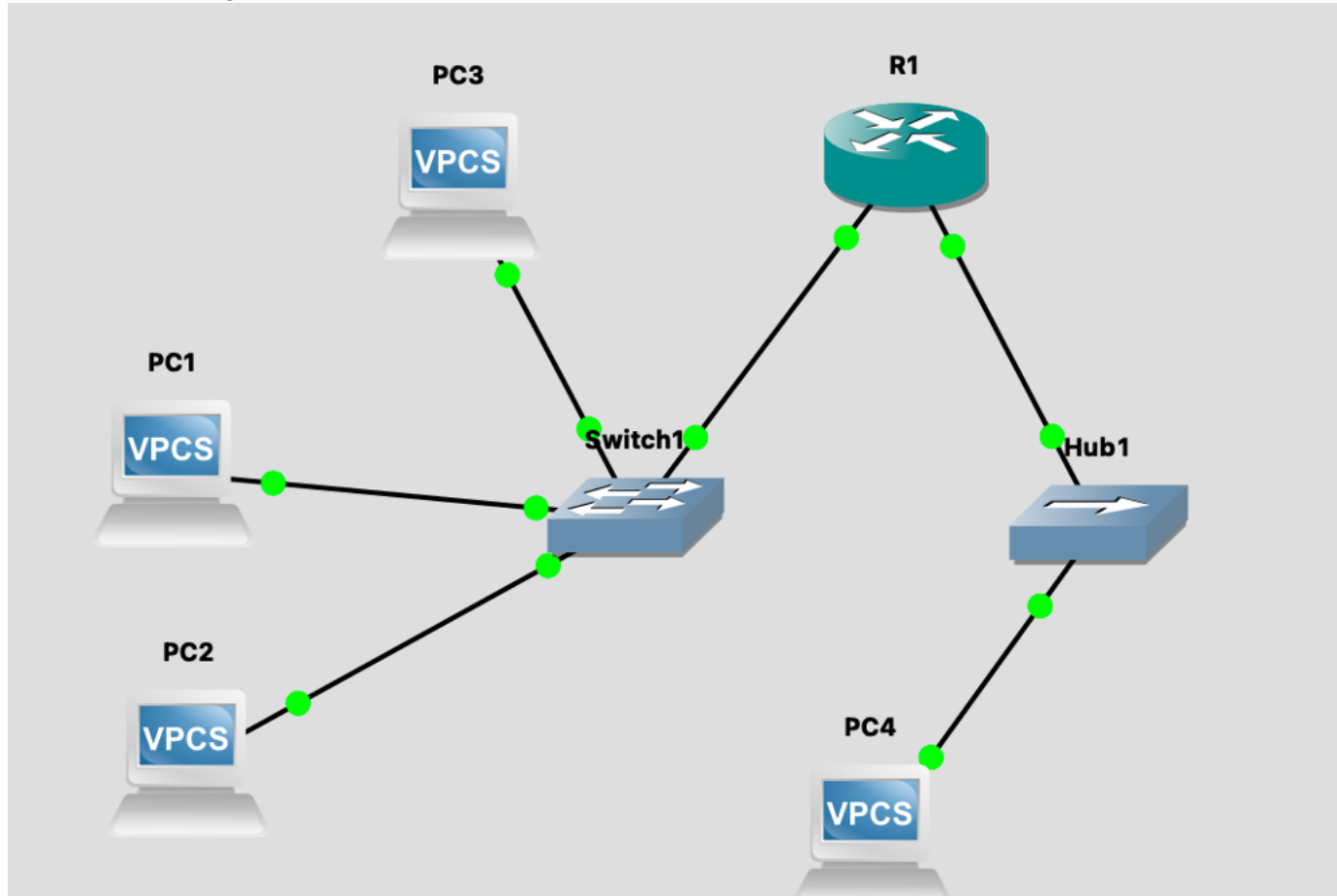
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## 2 Tools

11. Create the following network in GNS3



12. Create a packet capture in Wireshark with the following parameters:

- Stop after 68 seconds
- Create a ring buffer with 5 files
- Create a new pcapng file every 12 seconds or 150 kb.

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