

Self-assessment questions

- Basics of Computer Networks

1. Briefly describe the functionality of each layer of the four-layer TCP model and give an example of an implementation or protocol at each layer.
2. Which of the TCP/IP layers handles each of the following:
 - a. Breaking the transmitted bit stream into bytes.
 - b. Determining which route through the subnet to use.
3. The IP packets have to be examined by every IP device (routers) along the way from the source to the destination. Why?
4. What is TTL and what is its intended functionality?
5. Why do we need the protocol identifier in the IP header?
6. What is the minimal length of an IP header and why?
7. Define at least three fundamental characteristics of the Internet technology.
8. Why encapsulation is important and essential

mechanism in complex (possibly communication, but not necessary) model of a system?

9. Would you consider including security issues at the network layer? State some of your pros and cons.

10. Which fields of the IP header change from router to router?

11. TCP services are also known as *reliable stream transport services*. Why?

12. What is exactly understood whenever the attribute independence is given to the IP packets?

13. Categorize the types of failures that might be encountered by IP datagram?

14. Assume that a destination IP address is not correct. What kind of failure is this and how does the network respond in this situation? Why?

15. What is the difference between a connectionless and connection oriented service?

16. Enumerate and contrast the advantages and the corresponding pitfalls of the Internet Architecture (IA).

17. Enumerate and explain the fundamental security problems with TCP/IP nets.

18. What is a protocol in the context of computer (data

communication) networks?

19. What is an Ethernet address, state its main features and types of addresses?

20. State the main difference (s) between a hub and a switch?

21. What is the domain name system, its organization and components, as well as main features?

22. What is a router and routing (forwarding) table?

23. What is DHCP and what are the main objectives of this protocol.

24. Enumerate and explain the ways how one can assign (allocate) an IP address.

25. What is the ARP protocol, why and when it is needed and how it works.

26. We have two different types of routes. What are they and how they different from each other?

27. The identification of a specific application via the IP address + the process identification (as generated by the application) is not the right way to resolve this problem? Why and what is the prevalent solution today? When does UDP have a clear advantage over TCP? Explain!

28. Explain the mechanism of the three-way handshake

and the reasons behind it.

29. What happens when TCP opens a connection prior to data exchange?
30. What happens when TCP closes a connection?
31. Briefly describe the basic TCP services?
32. What is a zero-length segment and how much data it carries in its payload?
33. Why a two-way handshake is not sufficient for the termination of the TCP connection?
34. What is the essential and intrinsic characteristic of TCP that makes it reliable and capable of flow control?
35. What are the basic mechanisms used by TCP to control the flow of the data?
36. What helps in detecting congestion? Explain.
37. Why do we need congestion avoidance?
38. Any differences between sequence and acknowledgment numbers? If so, what are the later used for

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