

Lecture 2 - Internet Design Principles Quiz

ANS

1. Which of the following best describes "Decentralized control" as an Internet design principle?

- A) A single central server controls all network traffic
- B) Each network device (e.g., router) runs independently without a central mastermind
- C) The government manages all network operations
- D) All routers must communicate with a master node before forwarding packets

ANS:

2. What is the "narrow waist" of the Internet?

- A) The slowest part of the network connection
- B) A physical constraint on cable diameter
- C) IP (Internet Protocol) being the only protocol at Layer 3
- D) The maximum bandwidth available on a single link

ANS:

3. How does demultiplexing at Layer 3 work?

- A) By encrypting packets so only the intended recipient can read them
- B) By adding a header field that tells the receiving end what the next higher-layer protocol is
- C) By splitting large packets into smaller pieces
- D) By routing packets along multiple paths simultaneously

ANS:

4. What is a "logical port" in networking?

- A) The physical cable connector on a network interface card
- B) A number identifying an application, existing in software
- C) A dedicated circuit established between two hosts
- D) The maximum speed a link can transmit data

ANS:

5. Why do well-known ports (like port 80 for HTTP) have fixed numbers?

- A) To reduce the size of packets
- B) To increase network security
- C) So that clients can find the server without pre-arrangement
- D) To limit the number of simultaneous connections

ANS:

6. What does the End-to-End Principle state?

- A) Reliability must be implemented at the end hosts, not solely in the network
- B) All packets must travel the same path from source to destination

- C) The network should guarantee delivery of every packet
- D) End hosts should trust routers to handle all error detection

ANS:

7. In the simple reliability protocol example, why is Solution 1 (reliability in the network) insufficient?

- A) It requires too much bandwidth
- B) Routers might be buggy, and the end host has no way to verify correctness
- C) It's incompatible with IP
- D) It increases packet size

ANS:

8. The End-to-End Principle can be broken for what reason?

- A) To reduce the complexity of end host implementations
- B) As a performance optimization, provided end-to-end checks still occur
- C) To simplify router implementations
- D) To reduce network congestion

ANS:

9. What is Statistical Multiplexing?

- A) Sending the same packet multiple times to ensure delivery
- B) Dynamically allocating resources to users based on their current demand
- C) Dividing network resources equally among all users at all times
- D) Multiplying the number of routers to handle more traffic

ANS:

10. In the Alice-and-Bob statistical multiplexing example, why is dynamic allocation more efficient than fixed allocation?

- A) It reduces the number of packets
- B) It uses less powerful hardware
- C) Peak of aggregate demand is less than the aggregate of peak demands
- D) It eliminates the need for routers

ANS:

11. What is Circuit Switching?

- A) Randomly selecting a path for each packet
- B) Explicitly reserving resources at connection start and releasing them at connection end
- C) Sharing network bandwidth equally among all active flows
- D) Switching between multiple network providers

ANS:

12. Which switching approach is more efficient for bursty traffic (e.g., web browsing)?

- A) Circuit switching, because it reserves capacity
- B) Packet switching, because it doesn't waste reserved capacity on idle periods
- C) Both are equally efficient
- D) Neither is efficient for bursty traffic

ANS:

13. What does "peak-to-average ratio" characterize?

- A) The number of routers in a network
- B) The ratio between a flow's peak demand and its average demand
- C) The speed difference between circuits and packets
- D) The probability of packet loss

ANS:

14. Why is Packet Switching better than Circuit Switching at handling network failures?

- A) Packet switching uses encryption to protect against failures
- B) Packet switching automatically reroutes packets; end hosts need not do anything extra
- C) Packet switching prevents routers from failing
- D) Circuit switching requires immediate manual intervention

ANS:

15. Which of the following is NOT an advantage of Packet Switching over Circuit Switching?

- A) More efficient for bursty traffic
- B) Better performance predictability for applications
- C) Simpler implementation
- D) Better handling of network failures

ANS: