Lecture 4 – Routing Principles Quiz

1. Why do we need routing protocols instead of using a full-mesh topology where every device connects directly to every other device?

A) Full-mesh topology uses less bandwidth
B) Full-mesh topology doesn't scale well; adding a new machine requires many new links
C) Routing protocols are always faster than direct connections
D) Full-mesh topology cannot handle packet loss

Answer:

2. What is the primary role of a router in a network?

A) To generate and send data packets
B) To receive and forward packets toward their destinations
C) To encrypt all network traffic
D) To replace the need for end hosts

Answer:

3. How is a network typically modeled for routing purposes?

A) As a linear chain of computers
B) As a graph where edges represent links and nodes represent machines
C) As a single server with multiple clients
D) As concentric circles radiating from a central router

Answer:

4. What are the three main challenges that make routing a hard problem?

A) Packet size, transmission speed, and router cost
B) Changing topologies, distributed protocols, and best-effort links
C) Physical cable length, electrical interference, and signal attenuation
D) Multiple protocols, encryption standards, and authentication methods

Answer:

5. What is intra-domain routing?

A) Routing between different countries on the Internet
B) Routing within a single network (also called Interior Gateway Protocols or IGPs)
C) Routing used only by end hosts
D) Routing that doesn't require routers

Answer:

6. Which protocol has the Internet used for inter-domain routing since the 1990s?

A) OSPF
B) RIP

C) BGP (Border Gateway Protocol)
D) ISIS

Answer:

7. What is destination-based forwarding?

A) Forwarding packets only to their final destination without using routers
B) Each router uses a table mapping destinations to next hops; forwarding decisions depend only on the destination address
C) Forwarding packets based on the source address
D) Forwarding all packets to a central routing server

Answer:

8. What is the difference between routing and forwarding?

A) There is no difference; the terms are interchangeable
B) Routing is local while forwarding is global
C) Routing is global (determines table contents via router communication); forwarding is local (looks up destination and sends packet)
D) Forwarding is global while routing is local

Answer:

9. What makes a global routing state valid?

A) It uses the least-cost path to every destination
B) It encrypts all packets for security
C) It has no dead ends and no loops
D) It prioritizes packets from important sources

Answer:

10. What is a dead end in routing?

A) A packet reaching its destination
B) A packet arriving at a router with no forwarding entry for that destination
C) A router with no incoming links
D) A link that fails

Answer:

11. What is a loop in routing?

A) A path that returns to the same destination
B) A packet cycling around the same set of routers infinitely
C) A backup link that reconnects to the same router
D) A router that sends packets back to the sender

Answer:

12. What is least-cost routing?

A) Minimizing the financial cost of network equipment
B) Assigning costs to edges and finding paths with the lowest total cost to destinations
C) Using the cheapest routers available
D) Forwarding only low-cost packets through the network

Answer:

13. What properties must link costs have in least-cost routing protocols?

A) They must be arbitrary real numbers
B) They must always be negative or zero
C) They must be positive integers and symmetrical
D) They must vary based on the time of day

Answer:

14. What is a direct route in a router's forwarding table?

A) A route that requires no forwarding decisions
B) A hard-coded entry for a destination the router is directly connected to
C) A route calculated by a routing protocol
D) A route that bypasses other routers

Answer:

15. What is a static route?

A) A route that never changes because the network topology is fixed
B) A hard-coded forwarding table entry for a destination (not necessarily directly connected)
C) A route that is automatically optimized by routers
D) A route used only during network initialization

Answer: