English for Computing

Spring 1404   Homework 4

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Question 1)

Section A)

- ✓ Broadcast – Transmitting a single message to many recipients at the same time.

  Example: During a TV broadcast, every viewer receives the same live feed of a news program.

- ✓ Circuit switching – A communication method that sets up a dedicated connection between two points for the entire duration of the exchange.

  Example: Landline telephone networks use circuit switching to maintain a stable voice call without interruptions.

- ✓ Packet– A small segment of data sent independently over a network, later reassembled into the original content.

  Example: When downloading a song, it is split into packets that take different routes before merging back into the full file.

- ✓ Router – A network device that forwards data packets to their destinations by choosing the best available path.

  Example: Routers help guide your online search request through multiple stops until it reaches the website's server.

- ✓ Latency – The time lag between initiating a data transfer and its completion.

  Example: Gamers notice latency when their actions take a moment to register on-screen due to slow response times.

- ✓ Bandwidth – The capacity of a network to transfer data within a given time, often measured in bits per second (bps).

  Example: Streaming in 4K requires high bandwidth to deliver the video smoothly without pauses.

- ✓ Internet backbone – The core high-speed infrastructure that links major networks and routes global internet traffic.

Example: Undersea cables and fiber-optic lines form the internet backbone, enabling cross-continental data transfers.

Section B)

1. Because radio broadcasts a single signal one-way to all receivers without needing packet delivery or two-way communication.

2. Circuit switching reserves a dedicated path for the entire call; packet switching sends packets independently without reserving a route.

3. Routers forward packets from one network to another, enabling them to cross boundaries between ISPs.

4. Packets may take different routes across the network.Another reason would be that each extra router (hop) adds delay, and some packets may be lost and retransmitted.

5. Because the video's speed is limited by the slowest part of the path between the server and each user.

Section C)

1. T

2. NG

3. F

4. T

5. F

Section D)

Packet switching is a fundamental internet technology that efficiently routes data by splitting it into small, independently transmitted units called packets. For example, a video file is divided into packets, each sent separately across networks via routers. This method ensures reliability—if a packet is lost, it can be resent—but poses challenges for streaming.

Since packets may take different paths, they can arrive out of order or with delays, leading to buffering or playback interruptions. This inconsistency, called latency, disrupts smooth viewing.

Additionally, streaming speed depends on the slowest part of the network, even if the source server is fast.

To mitigate these issues, Content Delivery Networks (CDNs) are used. CDNs cache video copies on distributed servers near users, reducing the distance data must travel. By minimizing network hops and latency, CDNs enhance delivery speed and reliability.

Question 2)

Section A)

1. PPI interfaces are large, flat, and lack deep binding pockets.

2. X-ray crystallography, NMR spectroscopy

3. It identifies small fragments with low affinity that can be optimized into effective drugs, reducing resource consumption.

4. Structure-based prediction methods.

5. Because they are often linked to diseases and can be modulated to restore normal cellular function.

Section B)

1. PPI interfaces are often broad and shallow, lacking well-defined pockets for small molecules to bind, making drug design difficult.

2. Machine learning integrates sequence and structural data to improve accuracy and manage challenges like data imbalance in PPI prediction.

3. De novo design allows full control over structure and function but is complex and uncertain. Modifying natural proteins is more reliable but offers less flexibility.

Section C)

1. flat

2. X-ray crystallography, NMR spectroscopy

3. fragments

4. Virtual

5. protein domain / short linear motif (SLiM)

6. protein domain / short linear motif (SLiM)

Section D)

1. B

2. C

3. False

4. B

Question 3)

Passage 1

1. A

2. D

3. B

4. C

5. 3

Passage 2

1. A

2. C

3. D

4. B

5. D