Mid-Semester Examination
School of Computer Engineering
KIIT University, Bhubaneswar-24

Time: 2hrs   *Full Mark: 50*

(Answer any 5 questions, Question 1 is compulsory)

Q.1.   [10]

(Question 1 has two parts, i.e., *Part A contains 4 marks* and *Part B contains 6 marks*)

Part A: (*You will not receive any points if you choose multiple answers.*)[8 x 0.5]

i) In the OSI networking stack, routing is performed by the _____.

ii) Four bits are used for sequence numbering in a sliding window protocol used in a computer network. What is the maximum window size?

iii) Which of the following TCP/IP protocols is used for remote terminal connection services?

     a) TELNET   b) FTP   c) RARP   d) UDP   e) None of these choices

iv)_____ protocol is used for sending email on the Internet?

v) Which one of the following uses the greatest number of layers in the TCP/IP stack?

     a) Switch   b) Repeater   c) Router   d) End Host   e) None of these choices

vi)_____ is the default port number for HTTP?

vii) A basic telephone network is an example of

a) Packet Switching   b) Cell Switching   c) Circuit Switching

d) Message Switching   e) none of these choices

viii) Which one of the following is used to communicate between different networks?

a) ADSL   b) HDSL   c) Gateway/Router   d)Modeme) None of these choices

     Part B: [2 x 3]

(a) What advantage does a circuit-switched network have over a packet-switched network? What advantages does TDM have over FDM in a circuit-switched network?

(b) Using Stop-and-Wait, how many bits are needed for the sequence number? Justify with proper example.

(c) Explain with proper diagram/example how cookies can be used for recommendations in e-commerce.

Q.2

     (a) Consider a packet switching architecture.   [2+2+1]

         (i) What are the main components of delay when we use packet switching and give details of each delay?

         (ii) What is the difference between transmission delay and propagation delay?

         (iii) How is propagation delay affected if the length of the packet is increased?

     (b) Consider two hosts, A and B, connected by a single link of rate R bps. Suppose that the [5] two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.

         a. Express the propagation delay, d_{prop}, in terms of m and s.

*Note: Branch can be represented as: B. Tech (CSE)/B. Tech (IT)/B. Tech (CSE&IT)/M. Tech (CSE)/ M. Tech (CSIS)/M. Tech (SE)/ M. Tech (DBE)/ M. Tech (Dual)/ MBA (Dual)

b. Determine the transmission time of the packet, d_{trans}, in terms of L and R.

c. Suppose Host A begins to transmit the packet at time $t = 0$. At time $t = d_{trans}$, where is the last bit of the packet?

d. Suppose d_{prop} is greater than d_{trans}. At time $t = d_{trans}$, where is the first bit of the packet?

e. Suppose $s = 2.5 \times 10^8$, $L = 120$ bits, and $R = 56$ kbps. Find the distance m so that d_{prop} equals d_{trans}.

Q.3   [5+3+2]

(a) What is the difference between pull and push network protocols? Explain the difference by using two example protocols.

(b) Describe how Web caching can reduce the delay in receiving a requested object. Will Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why?

(c) How "Rarest First" works in peer to peer?

Q.4   [5+3+2]

(a) Briefly describe what HTTP is and sketch its operation using a simple figure (i.e., the typical messages exchanged during operation of HTTP).

(b) What is DNS and what is it used for? If all DNS servers could be "crashed" (taken offline), what would happen to the Internet (be precise).

(c) Sketch the TCP connection initiation and connection termination packet flows using a timing diagram

Q.5   [5+3+2]

(a) What is the in-efficiency of Stop-and-Wait protocol and how is overcome in sliding window protocol? And justify with proper diagram why the window size in selective repeat ARQ should be 2^{m-1}, where m is the number of bits reserved for sequencing packets.

(b) Consider the use of 10 K-bit size frames on a 10 Mbps satellite channel with 270 ms delay. What is the link utilization for stop-and-wait ARQ technique assuming $P = 10^{-3}$?

(c) OSI is called as a model, whereas TCP/IP is called as a protocol suite. Be precise.

Q.6   *Answer all questions*   [2.5x4]

(a) Checksum
(b) DHTs in P2P
(c) Utilization of stop and wait ARQ
(d) Connection oriented vs Connectionless communication

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