(a)

OOP/ IT 2001/B. Tech (CSE&IT), DD (M. Tech/ MBA)/3rd /2015

Object Oriented Programming
Mid-Semester Examination -2015
School of Computer Engineering, KIIT University, Bhubaneswar-24

Time: 2hrs	*Full Mark:25*

(Answer any five questions including question No.1 which is compulsory. The figures in the margin indicate full marks.)

1. [1 × 5]

a) The formal parameter in copy constructor is always by reference – justify.

b) Differentiate between call by value and call by reference.

c) Differentiate between a member function and static member function of a class.

d) Write down the output of the following code

```cpp
#include<iostream>
using namespace std;
class A{
        static int x;
        public:
        A(){ x++;}
        void show(){ x++; cout<<x; }
};
int A::x=5;
int main(){
        A obj1;
        obj1.show();
        return 0;
}
```

e) Write down the output of the following code with proper explanation.

```cpp
#include<iostream>
using namespace std;
void func(int a=10, int b, float c=7.5){ float res=a+b+c; cout<<res; }
int main(){
func(10,20,50);
return 0;
}
```

2.

a) Overload the function find_perimeter() with one, two and three float parameters. The function with one parameter is used to return the perimeter of the circle. The function with two parameters is used to return the perimeter of the rectangle. The function with three parameter is used to return the perimeter of the triangle. Write the necessary c++ program to test the functionality of the above functions.   [3]

8.

(a) *Answer all*

b) Explain the properties of Object oriented programming language.   [2]

3.

a) Implement a Complex class having data members real and imaginary. Include the following member functions

(i) getdata () : is used to assign the data members.
(ii) show() : is used to display the complex number in a+ib format.
(iii) add() : is used to add two complex objects.

$$[(a+ib)+(c+id)=(a+c)+i(b+d)]$$

Write the necessary c++ program to test the functionality of the above class and functions.   [3]

b) Differentiate between procedure-oriented and object-oriented programming approach.[2]

4.

a) Implement a class Meter having data member value (private) and a member function getvalue() for initializing the data member. Similarly Implement another class CentiMeter having data member value (private) and a member function getvalue() for initializing the data member. Define a friend function Sum( ) to find out and display the summation of two distances of both classes.   [3]

b) Explain new and delete operators with suitable example.   [2]

5.

a) Create class PI with data members roll and name. Create another class AI with data members sub1 and sub2. Derive a class Student from PI and AI classes. Student class has one data member total to calculate the sum of sub1 and sub2. Create another class Sports with data members sport_type (indoor or outdoor) and sports_mark. Derive Result class from Student and Sports to display the final total score and the individual details. Create object of Result class.   [3]

b) Discuss the importance of virtual base class with suitable example.   [2]

6.

a) Create class Weight with private data members kilogram and gram with proper constructors. Overload "<=" operator to compare between two weights and display the smallest weight.   [3]

b) Explain the difference between pre-increment and post-increment operators in operator overloading using suitable example.   [2]

7. Write short notes (any two)   [2.5+2.5]
   a. Types of constructor
   b. Inline function
   c. Friend class

Mr. M.R.lenka

B. Tech
CN, IT 3001
[CSE & IT]

Mid-Semester Examination – 2016

COMPUTER NETWORKS

[IT 3001]

Full Marks: 25 Time : 2 Hours

(Answer any 5 questions, including Question no. 1)

1. Answer all the questions [1*5]

   i. In TCP, if the value of HLEN is 1011, explain how many bytes of options are included in the segment?

   ii. When an HTTP client receives a response message from an HTTP server, how does the client knows when all the headers have arrived and the body of the message is to follow.

   iii. Consider transferring a file of L bytes from Host A to Host B. What is the maximum value of L such that TCP sequence numbers are not exhausted.

   iv. Can a given destination port be associated with more than one TCP connection? If so, explain the same.

   v. Which one is a stronger sign of congestion i.e. timeout or three duplicate ACKs. Explain the reason for the same.

2. a) Mention the important records maintained by various DNS servers and describe the functionality of each of these records. State which type of records are maintained particulaly by authorative and non-authorative DNS servers along with the content of these records through an example? [3]

   b) Suppose N packets arrive simultaneously to a link at which no packets are currently being transmitted or queued. Each packet is of length L bits and the link has transmission rate R bps. What is the average queuing delay for the N packets? [2]

3. a) Explain, the messages exchanged during connection tear down through diagram. In TCP, assume the server initiates the connection tear down. In this scenario, state whether the client or the server enters into TIME_WAIT state and why in the TIME_WAIT state it will remain for 2MSL. [3]

b) Assume TCP is currently in "slow start" state and describe under what scenario TCP will enters into "fast recovery" state. Being in the "fast recovery" state it receives a new ACK then describe how it is going to handle this scenario.   [2]

4. a) If you are designing a Selective Repeat protocol with bandwidth of 100 kbps and has a one way delay of 4 seconds. Assuming each packet carries 1 KB of data, what is the minimum number of bits you need for the sequence number?   [3]

 b) Describe at least two reasons, why an application developer might choose to run an application over UDP rather than TCP.

[2]

5. a) A 20 Mbps satellite link has a propagation delay of 400 microsec. The transmitter employs the 'go-back-n ARQ' scheme with n set to 10. Assuming each packet is 100 bytes long. Calculate the maximum data rate possible?   [3]

 b) Compare and contrast TCP/IP model with OSI reference model.

[2]

6. Host A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 120. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 80 and 50 bytes of data, respectively. Host B sends an acknowledgement whenever it receives a segment from Host A.

i. If the first segment arrives before the second segment, what is the sequence number in the arriving segment? what is the acknowledgment number in the acknowledgement for the first arriving segment?   [2]

ii. If the second segment arrives before the first segment, in the acknowledgement for the first arriving segment, what is the acknowledgmentc number?   [1]

iii. Suppose the two segments sent by A arrive in order at B. The first acknowledgement is lost and the second acknowledgement arrives after the first timeout interval. Draw a timing diagram, showing these segments and all other segments and acknowledgements sent. (Assume there is no additional packet loss.) For each segment in your figure, provide the sequence number and the number of bytes of data; for each acknowledgement that you add, provide the acknowledgement number.   [2]

b) Distinguish
 ⌐nger sign of cong⌐

Supplementary Mid-Semester Examination – 2018
COMPUTER NETWORKS
[IT 3001]

Full Marks: 25   Time : 1.5 Hours

(Answer any 5 questions, including Question no. 1)

1. Answer all the questions   [1*5]
   i. Suppose N packets arrive simultaneously at a router every T seconds, the packets are of size S bits and the transmission rate of the router is R bps. What should the minimum value of T be such that the queuing delay does not grow without bound?

   ii. In Stop-and-Wait ARQ, the sequence numbers are based on modulo-2 arithmetic. Why?

   iii. What is the need of DF flag during data communication?

   iv. In what situations contention based MAC protocols are suitable?

   v. Specify under what conditions tcp state goes directly from FIN_WAIT_1 to TIME_WAIT?

2. a) Suppose a user wants to access a webpage with 5 embed objects all residing on the same server. Assume that length of the request messages is 100B, all objects are under 200B and TCP MSS of 1400B. How many RTT would it take to display the webpage fully for the followings.   [3]
   i. non-persistent HTTP with parallel TCP connections?
   ii. Persistent HTTP with pipelined TCP connections?

   b) If the bandwidth of the link is 256 mbps, Assume that sequence number field consists 32 bits. Find the wrap around time for sequence number.   [2]

3. a) A 100km long cable runs at 1.536 mbps. The propagation speed in the cable is 2/3 of speed of light. Calculate the number of bits that would be fit in the cable?   [3]

   b) Consider sending a packet from a source host to a destination host over a fixed route. List and Explain the delay components in the end-to-end delay. Which of these delays are constant and which are variable?   [2]

4. a) What is NAT and its responsibility? Briefly explain, how NAT works through an example.   [3]

   b) Distinguish between a time-out event and the three-duplicate-ACKs event. Which one is a stronger sign of congestion in the network and Why?   [2]

5. a) Suppose the maximum time an IP datagram can stay in the network before being delivered to the receiver is 40 sec. What is the maximum rate a host should send out datagrams so as to avoid confusion during reassembly of fragments at the receiver? Assume the datagram size of 1000 Bytes.   [3]

    b) In ftp, the control connection and the data connection are initiated by which entity in active mode of communication. Justify why there are two modes of communication?[2]

6. a) Explain how CRC is used in detecting Errors for the following polynomial, $g(x)=x3+x2+1$. Consider the information Sequence 10011010. Find the codeword corresponding to this sequence.   [3]

    b) Discuss CSMA/CD protocol. Explain, why it is not suitable for wireless LAN.[2]

7. a) An organization requires to setup 1000 hosts in a single network. Describe whether classful or classless addressing will be helpful in reducing the wastage of IP address assignment for this requirement? Also suggest a network id and netmask to fulfil this requirement.   [3]

    b) Explain Distance vector routing algorithm along with its limitation and how it has been overcome.   [2]

8.

(a) DHCP

(b)

Mid Semester Examination- 2017
School Of Computer Engineering
KIIT UNIVERSITY
Subject-COMPUTER NETWORK (IT-3001)

Time-1.5hr

Full Mark-25

(Answer any 5 questions, Question No.1 is compulsory)

1. a. What is a proxy server? Why it is used? What are the pros and cons of this?   [1X5]
   b. Define this address
      I.   Port Address
      II. IP Address
      III. MAC Address
      IV. DNS
   c. Can we have data transfer connection without a control connection in FTP? Justify your answer.
   d. Consider different activities related to email.
      m1: Send an email from a mail client to a mail server
      m2: Download an email from mailbox server to a mail client
      m3: Checking email in a web browser

Which is the application level protocol used in each activity?

e. Describe at least two reasons, why an application developer preferred UDP rather than TCP.

2. List all the layers in OSI hierarchy and discuss their functions. Why such hierarchical approach to networking in utilized. Compare OSI Model with TCP/IP reference model.   [5]

Q3. What is a HTTP REQUEST and RESPONSE Message header? Explain both of the header.   [5]

Q.4.a) what are different naming system used in a computer? Explain DNS naming mapping resolution and DNS caching.   [3]

b) Why in selective repeat protocol the maximum window size is 2^{m-1} while in Go-Back-N it is 2^m-1? Justify your answer.   [2]

Q.5.What are the flow and error control mechanism used in transport layer? Briefly explain. Suppose that the GBN protocol is used on a link with a bit rate of 64 kilobits per second and 20 milliseconds propagation delay. Assume that the transmission time for the acknowledgment and the processing time at nodes are negligible. What is the minimum frame size in bytes to achieve a link utilization of at least 100% for a window size of 7 .   [5]

Q.6. a) Two hosts A and B, are separated by 20,000 kilometers and are connected by a direct link of R = 2 Mbps with a propagation speed over the link of 2.5×10⁸ meters/sec. Consider sending a file of 800,000 bits from Host A to Host B. What is the maximum number of bits that will be in the link at any given time?   [2]

b) What are DNS Records? State which types of records are maintained particularly by authoritative and non authoritative DNS Server with a suitable example.   [3]

Q.7.Short Notes (Any two)   [2.5X2=5]
a) Packet switching vs. Circuit Switching
b) FTP
c) Client Server vs. P2P Architecture
d) Congestion Control

[2 × 4]

SUPPLEMENTARY EXAMINATION-2018
5th Semester B.Tech & B.Tech Dual Degree

COMPUTER NETWORK

IT-3001

(For 2015 & Previous Admitted Batches)

Time: 3 Hours   Full Marks: 60

Answer any SIX questions including question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and
all parts of a question should be answered at one place only.

1. (a) TCP, if the value of HLEN is 0111, how many bytes of [2 × 10] options are included in the segment?

   (b) Describe the importance of pseudoheader in calculating the checksum for IPV4 header.

   (c) Differentiate between routing and forwarding.

   (d) What is the significance of header length(HLEN) field of TCP segment. What will be its value when TCP header does not include any options and padding?

   (e) Define the terms Multicasting and Broadcasting.

   (f) Which field(s) in the datagram is(are) responsible for gluing together all fragments belonging to an original datagram?

   (g) Why is there no need for CSMA/CD on a full-duplex Ethernet LAN?

   (h) Can a machine with a single DNS Name have multiple IP Address? If yes then how could this occur?

   (i) Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not?

(i) A packet has arrived in which the offset value is 300 and the payload size is 100 bytes. What are the number of the first byte and the last byte?

2. (a) What is the function of SMTP? What is the difference between a user agent (UA) and a mail transfer agent (MTA)? How does MIME enhance SMTP? [4]

(b) What is IP addressing? How it is classified? Explain the need of subnetting. [4]

3. (a) Given the data word 1010001111 and the divisor 10111, show the generation of the CRC codeword at the sender site and receiver site. Find whether the data has correctly received by the receiver or not. [4]

(b) Draw the IPV4 datagram header format and describe the significance of each field in header. [4]

4. (a) Why FTP uses two port numbers to transfer file? Detail about the functions of FTP protocol. [4]

(b) In a network with fixed value for m>1(where m -> number of bits used for sequence number), we can either use the Go-Back-N or Selective Repeat protocol. Describe the advantage and the disadvantage of using each. [4]

5. (a) In following figure, frames are generated at node A and sent to node C through node B. Determine the minimum transmission rate required between nodes B and C so that the buffers at node B are not flooded, based on the following:

A---------4000km--------B---------1000km---------C

i. The data rate between A and B is 100 kbps.
ii. The propagation delay is 5 msec/km for both lines.
iii. There are full duplex, error free lines between the nodes.
iv. All data frames are 1000 bits long; ACK frames are separate frames of negligible length.
v. Between A and B, a sliding window protocol is used, with a window size of 3 (three).
vi. Between B and C, stop and wait is used.

(b) Differentiate between distance vector routing and link state routing protocol. [4]

6. (a) The ssthresh value for a Reno TCP station is set to 8 MSS. The station is now in the slow-start state with cwnd=5 MSS and ssthresh=8 MSS. Show the values of cwnd, ssthresh, and the current and the next state of the station after the following events: three consecutive nonduplicate ACKs arrived, followed by five duplicate ACKs, followed by two nonduplicate ACKs, and followed by a timeout. [4]

(b) Differentiate Router, Switches, and Bridges. How is the router responsible for routing packets in a computer network? [4]

7. (a) Data link protocols always put the CRC in a trailer rather than in a header. Why? Briefly explain few flow and error control mechanisms used in data link layer. [4]

(b) What is ARP? Describe, at what point of time a ARP request is generated. Explain why an ARP query is sent within a broadcast frame, whereas an ARP response is sent within a unicast frame? [4]

8.   Answer all questions.   [2 × 4]

   (a) DHCP
   (b) Multiple Access Links and Protocols
   (c) Minimal Spanning Tree
   (d) TTL

                          *****

Time: 3 Hour

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Candidates are

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SPRING END SEMESTER EXAMINATION-2015

6th Semester B.Tech & B.Tech Dual Degree

COMPUTER NETWORKS (IT-603)

(Regular-2012 & Back of Previous Admitted Batches)

Full Marks: 60   **Time: 3 Hours**

Answer any SIX questions including Question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and <u>all parts of a question should be answered at one place only</u>.

1. a) What is a Socket? How a socket is uniquely identified?   [2 × 10

   b) What is Hamming distance? What is Hamming distance between 100111 and 111001?

   c) In TCP, an end point remains for 2MSL in TIME_WAIT state. Explain.

   d) Compare and contrast flow control and Error control.

   e) What is the difference between connectionless and connection oriented services? Why connectionless service is used though of connection oriented service is available.

   f) What is the significance of TTL field in IPV4 Header?

   g) Why fragmentation is necessary during packet transmission?

   h) What is role of DHCP protocol?

   i) If all the network sources are bursty that they only occasionally have data to send. Would packet switching or circuit switching be more desirable in this case? Explain.

(1)

j) Suppose Computer A and B has IP addresses 10.105.1.1.113 and 10.105.1.91 respectively and they both use the same net-mask N. What is the values of N if A and B should belong to the same network?

2. a) Describe the various layers of OSI Model. Explain the functionality of for each layer. [4

b) Given the data word 10100111 and the divisor 10111, show the generation of the CRC codeword at the sender site and receiver site. Find whether the data has correctly received by the receiver or not. [4

3. a) What is DNS? Briefly explain the Directory Services. [4

b) What is Bandwidth delay Product? Consider a LAN with maximum distances of 2 km. At what bandwidth would propagation delay (at a speed of 2 X 10 m/s) equal transmit delay for 512 packets. What hat about 2000 byte packets? [4

4. a) What is virtual circuit network? How it is different from Circuit switching? [4

b) An Organization has a class C network 196.10.10.0 and wants to form subnets for five departments which having hosts are as 55 hosts,50 hosts,45 hosts and 25 hosts. Find the Subnet mask, Subnet ID and range of addresses. [4

5. a) Describe the E-mail architecture in detail. Explain why SMTP can not be used at the receiver end for receiving the E-mail. [4

b) Distinguish from the operational point of view between CSMA/CD and CSMA/CA protocol. Also explain why CSMA/CD is difficult to apply in wireless environments. [4

6. a) Illustrate with a figure where multiplexing and De-multiplexing takes place in the internet layers. [4

b) What is distance Vector routing Protocol? Explain with a suitable example of Count to infinity Problem. [4

7. a) What is stop and wait protocol? A Stop and wait protocol has a frame size of 100bits and transmission speed of 10 Mbps and ACK frame is 100bits.Distance and Velocity of Propagation is 100kms andm/sec respectively. Calculate bandwidth utilization of the link. [4

b) Difference between servers distributed large file and peer to peer based distribution of files among multiple clients. What is scalability of P2P architecture? [4

8. Write short notes on any four of the followings: [2 × 4

a) TCP Three-way Handshaking

b) UDP

c) NAT

d) Web Caching

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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)Modem e) None of these choices

Part B:

(a) What advantage does a circuit-switched network have over a packet-switched network? What [2 x 3] 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.
    (i) What are the main components of delay when we use packet switching and give details of [2+2+1] 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*

(a) Checksum   [2.5x4]
(b) DHTs in P2P
(c) Utilization of stop and wait ARQ
(d) Connection oriented vs Connectionless communication

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