



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q no. 2

What are the objectives of computer communication networks? What are the network components? Explain.

Q no. 3

Explain the characteristics of IP, TCP, UDP ?

Q no. 4

Imagine a network of 6 devices A, B, C, D, E and F. All devices are on same packet switch. If a computer A wants to send packet to computer E, How would packet switch forward this packet?

Q no. 5

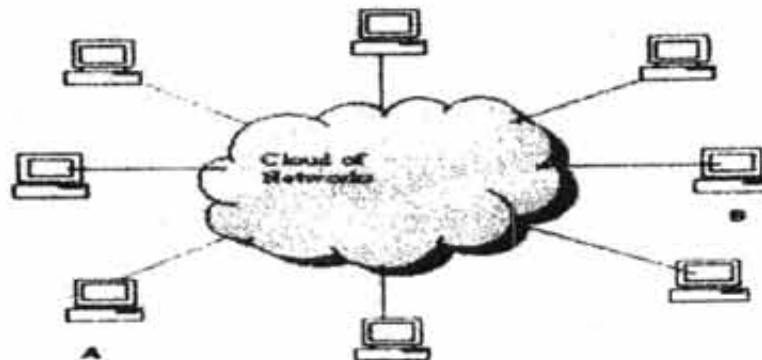
Write short notes on

- a. Packet Switching
- b. Message Switching

Q no. 6

Which two services are provided by the Transport layer for host-to-host delivery of segments? Explain in detail the characteristics of both and differentiate them with respect to the application layer protocols that they are used for.

Q no. 7



Consider the above figure, in which there is a **cloud of networks** having various networks.

Suppose there are **7 routers** in between **Host A** and **Host B**.

Identify

- a. How come host A knows the **addresses** of all the routers between **A** to **B**?
- b. What will be the value of the **TTL field** when the source **Host A** send the datagram **7th time** towards the destination **B**, and the **third router** in the path receive that datagram?
- c. How many times does the source **A** need to send the datagram so that it finally reaches at destination host **B**?
- d. What will be the value of the **TTL field** when the source **host A** send the datagram **4th time** towards the destination **B**, and the **second router** in the path receives that datagram?
- e. What will be the value of the **TTL field** when the source **Host A** sends the **datagram first time** towards the destination **B**, and the **first router** in the path receives that datagram?



UNIVERSITY OF THE PUNJAB

B.S. in Computer Science / Fourth Year : Annual-2022

Subject: Computer Networks

Paper: 18-N

Time: 30 Min. Marks: 15

Roll No. in Fig.

Roll No. in Words.

This Paper will be collected back after expiry of time limit mentioned above, then Subjective paper shall be attempted.

Signature of Supdt.:

ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1.5=15)

1. Internet Address or IP address with version 4 comprises of.....

- (A) 16
- (B) 24
- (C) 32
- (D) 48

2. NIC Address or Physical Address comprises of.....

- (A) 16 bits
- (B) 24 bits
- (C) 32 bits
- (D) 48 bits

3. Which layer is responsible for Process to Process Communication.....

- (A) Data Link Layer
- (B) Network Layer
- (C) Transport Layer
- (D) Presentation Layer

4. Any computer connected to a network is called... while any device connected to network...

- (A) node,node
- (B) host,host
- (C) node,host
- (D) host,node

5. Which is not transmission Impairment....

- (A) Crosstalk
- (B) Signal Modification
- (C) Signal weakness
- (D) Signal Regeneration

6. The standards which are automatically become the standards as convention are.....

- (A) legal standards
- (B) de facto
- (C) de jure
- (D) conventional

7. Logical addressing and routing is happened on the layer.....

- (A) Data Link Layer
- (B) Network Layer
- (C) Transport Layer
- (D) Session Layer

8. Walkie Talkie is an example of.....

- (A) simplex mode
- (B) Half Duplex
- (C) Full Duplex
- (D) It is not an example of transmission
- (E) Guided Media
- (F) None

9. Which Topology uses more connections to establish.....

- (A) Star
- (B) Ring
- (C) Tree
- (D) Mesh

10. ASCII and Unicode comprises of respectively....

- (A) 4,16 bits
- (B) 8,16 bits
- (C) 7,16
- (D) 4,8 bits



UNIVERSITY OF THE PUNJAB

B.S. in Computer Science / Fourth Year : Annual – 2022

Roll No.

Subject: Object Oriented Analysis & Design

Paper: 19

Time: 3 Hrs. Marks: 100

**NOTE: Attempt any FIVE Questions in all while Question No. 1 is compulsory.
All questions carry equal marks.**

Question 1: (20 marks)

Explain the following concepts with examples (Compulsory Question)

- A. Aggregation
- B. Use Case Model
- C. GRASP: Coupling
- D. Domain Model
- E. Inheritance

Question 2: (20 marks)

Define "Iterative Model", Name all the stages of the model, and explain details of each stage with detail?

Question 3: (20 marks)

List THREE Unified Modeling Language Diagrams, also define the use of these diagrams with a short example?

Question 4: (20 marks)

Write a short note on "Requirement Gathering Techniques" In Requirement Engineering Lifecycle?

Question 5: (20 marks)

Define "GRAY BOX" testing technique from Software Testing Models with detail, Also provide a suitable example to explain your answer?

Question 6: (20 marks)

Name any THREE GRASP Design Patterns? Define their Roles and use with help of suitable examples?

Question 7: (20 marks)

Carefully consider the following table of Domain Model Entities and draw a Domain Model Diagram based on them. Also establish relationships and cardinality in the diagram?

No.	Entity Name	Entity Description
1	USER	Chooses station and pays bus fare for the bus ticket
2	Bus Ticketing Machine	Ticketing machine displays list of bus stations and the fare
3	Bus Card	Contains user information and pre-paid card balance
4	Fare	The amount of cash needed to be paid using the cash box
5	Cash Box	Box that accepts currency notes for fare payment



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NOTE: Attempt all questions. All questions carry equal marks.

Q.3. Suppose a genetic algorithm uses chromosomes x of the form x = a b c d e f with a fixed length of six genes. Each gene can have any digit value between 0 and 9. Let the fitness value of an individual chromosome x be calculated with the following fitness function:

f(x) = (a * b + f) - (c * d) / (e)

and let the initial population consist of four individuals with the following chromosomes:

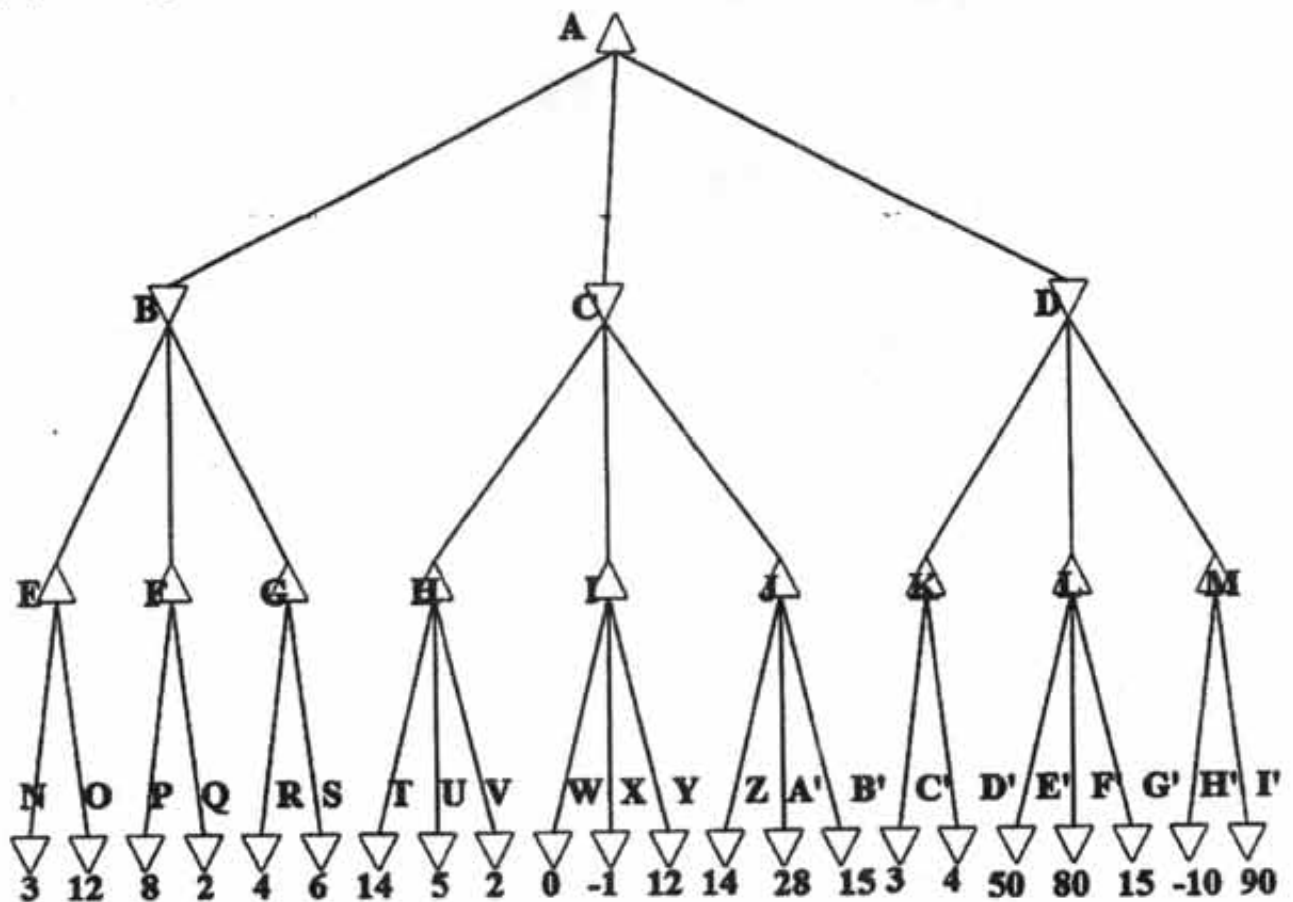
x1 = 4 5 4 1 3 5 x2 = 2 5 1 2 6 6 x3 = 6 6 9 2 1 2 x4 = 3 4 8 5 2 0

With this information, perform the following operations: [Marks distribution 12 + 5 + 3 = 20]

- i. Calculate the fitness value and perform evaluation on each chromosome using the provided fitness function.
ii. Also perform two-point crossover after cut-points 2 and 4 using the two fittest chromosome genes.
iii. Lastly, perform mutation on x4 by mutating gene at location 3 with the value of 9, and calculate its fitness.

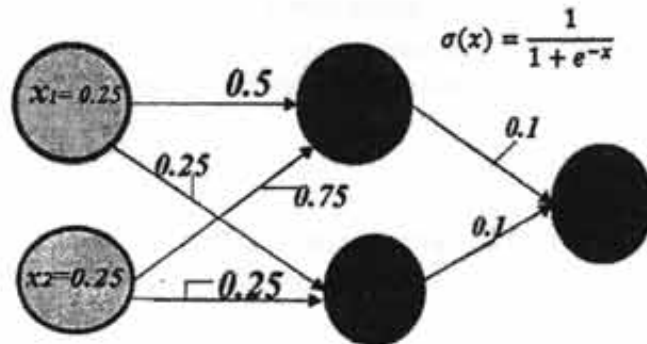
Q.4. Perform Alpha-beta-pruning [heuristics in games] to the given game-tree. Also list the utility value for max-player given the tree. [Marks distribution 16 + 4 = 20]

[In the given tree, simple triangle denotes max-player move while inverted triangle represents min-player move.]

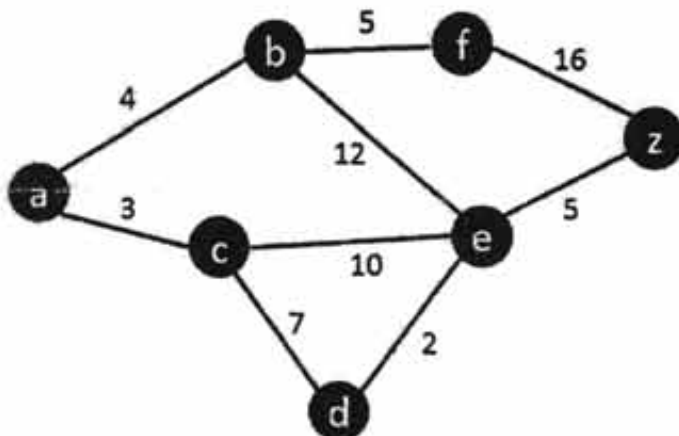


Q.5. Run a single execution of forward propagation and backward propagation on the given neural network. Actual output is zero. Assume sigmoid function as activation function on all neurons that is given below. [Marks distribution 5 + 15 = 20].

Note: Lines (without arrowheads) are added to clearly highlight the association/edge between neurons with the respective weight.



Q.6. Use the following graph and apply BFS, DFS and A* on it. Heuristic function values are provided in table separately. Run A* using both heuristics mentioned and discuss which heuristic function is better and why. [Marks distribution 4 + 4 + 6+ 6 = 20]. "a" is the starting node, whereas "z" is the goal node.



Nodes	h1	h2
a	13	10
b	11	7
c	10	7
d	5	2
e	3	1
f	10	1
z	0	0



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

NOTE: Attempt any **FOUR** questions. All questions carry equal marks.

Question # 2. (10*2 = 20 Marks)

1. Write a code to find a pair of elements in an array of size 'n' whose sum is maximum.
2. Write a program that reads a line of text as command line argument, tokenizes it using space as delimiters and print the count of words of length is greater than 3.

Question # 3. (4*5 = 20 Marks)

1. What is the purpose of DriverManager in JDBC?
2. What are implicit objects in java? List down any two.
3. What are the three stages of Servlet Lifecycle?
4. Differentiate between sequential execution and multithreading in java.

Question # 4. (5+15 = 20 Marks)

1. Explain any five parts of Http request with example.
2. A client wants to send a request to server to find the type of an alphabet provided by user. So, write a client server application in which client take an input from user as single character from the alphabet(a-z) and send the input to server. After receiving input from client server display whether the enter alphabet is Vowel or Consonant. If the user input is not an alphabet, or is a string of length > 1, server will print an error message.

Question # 5. (4*5 = 20 Marks)

1. What is the difference between web pages and web services?
2. Explain with example, how data is read and write into buffer in java?
3. How to write comments in HTML and JSP?
4. Write a function to find common elements between two list.

Question # 6. (4*5 = 20 Marks)

Write down the output of following programs.

1.

```
public class abc
{
    public static void main(String ags[]) {
        String.initial = "Hellol I am here", after = "";
        after = initial = initial.replace('e', 'a');
        System.out.println(initial + ", " + after);
    }
}
```

2.

```
public class abc {
    public static void main(String[] args) {
        int[] table = { 1, 2, 3, 4, 5 };
        table[1] = (table[2 * 1] == 2 - args.length) ? table[3] : 99;
        System.out.println(table[1]);
    }
}
```

3. //Assume the input is "I am studying at Punjab University"
import java.io.*;
public class Test {
 public static void main(String args[])throws IOException
 {
 InputStreamReader inp = null;
 inp = new InputStreamReader(System.in);
 char c;
 do {
 c = (char)inp.read();
 System.out.println(c);
 } while (c != '\n');
 }
}

4. String d = "Internet programming Punjab university ";
d.substring(10,21);
d = "exam" + d;
d.append(" Final");
System.out.println(d);

Question # 7.

(20 Marks)

Suppose a database "DB" contain an employee table and employee table have some characteristics as: emp_no, emp_name, salary, commission, job and hiredate. So, you are asked to Write a JSP program that take the data from employee table and print employee name, total salary and experience of working using hiredate information. Note: The color of the border of table must be green.