

CENTRAL UNIVERSITY OF HARYANA

Sessional Test II: Aug-2022

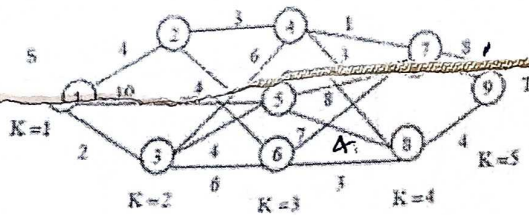
Programme: Master of Computer Applications
Semester: II
Course Title: Design and Analysis of Algorithms
Course Code: SBS CS 01 02 13 C 4004

Session: 2021-22
Max. Time: 1 Hr
Max. Marks: 20

10

Q 1. Attempt any two.

- (a) Write an algorithm to solve knapsack problem using greedy method after that find an optimal solution to the knapsack instance $n=7$ objects and the capacity of knapsack $m=15$. The profits and weights of the objects are -
 $(P_1, P_2, P_3, P_4, P_5, P_6, P_7) = (10, 5, 15, 7, 6, 18, 3)$
 $(W_1, W_2, W_3, W_4, W_5, W_6, W_7) = (2, 3, 5, 7, 1, 4, 1)$
- (b) Find the optimal solution for the 0/1 knapsack problem -
 $n=4, m=15, (p_1, p_2, p_3, p_4) = (10, 10, 12, 18), (w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$
- (c) Consider the multistage graph with $K=5$ (stages). Find the minimum cost from S to T.



10

Q2. Attempt any two.

- (a) What are the Prim's algorithm and Kruskal's algorithm for finding the minimum spanning tree of a graph?
- (b) What is Backtracking? Explain any problem based on it.
- (c) Write Short note on:
(i) P class problem
(ii) NP Class Problems

CENTRAL UNIVERSITY OF HARYANA
Sessional Test : II

Programme: Master of Computer Application (MCA)

Semester: 2nd

Course Title: ~~Software Engineering~~ Computer Graphics.

Course Code: SBS CS 01 02 12 C 4004

Session:

Max. Time: 1 Hrs

Max. Marks: 20

Attempt any two by selecting one from each unit.

Unit: I

Question no 1: Differentiate between translation, rotation and scaling with suitable example (in 2D).

Question no 2: Explain the liang barsky line clipping algorithm.

Unit: II

Question no 3: Explain the tree dimensional transformation. Also define its types.

Question no 4: Discuss the midpoint sub-division algorithm. A rectangle A(2,3), B(6,2), C(5,3) and D(2,3) is rotated by 45° about origin in anticlockwise direction. Find the new co-ordinates.

CENTRAL UNIVERSITY OF HARYANA

Sessional Test : I

Programme: Master of Computer Application (MCA)
Semester: 2nd
Course Title: Software Engineering
Course Code: SBS CS 01 02 12 C 4004

Session: 2021-2022
Max. Time: 1 Hrs
Max. Marks: 20

Attempt any two by selecting one from each unit.

Unit: I

Question no 1: Define software project estimation. List and explain the steps involved in project estimation.

OR
Question no 2: a). What is software crisis? What are the causes and how software engineering deals with it?

Question no 2: b). Explain the concept of measurement and metrics in software engineering. What are different types of process metrics?

Unit: II

Question no 3: Which Software process model can be applied when a client's requirements have uncertainties? Explain the model with neat diagram and discuss the advantages and disadvantages.

OR
Question no 4: a). Explain the term SRS? Discuss characteristics & components of SRS. Write the structure of SRS.

Question no 4: b). What is a risk? Briefly discuss about the Risk Management.

B

CENTRAL UNIVERSITY OF HARYANA

Second Semester Term End Examinations August- September 2022

Programme: MASTER OF COMPUTER APPLICATIONS

Session: 2021-22

Semester: II

Max. Time: 3 Hours

Course Title: Design & Analysis of Algorithms

Max. Marks: 70

Course Code: SBS CS 01 02 13 C 4004

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q 1.

(4X3.5=14)

- What are the basic properties of algorithms?
- Define space and time complexity.
- How to evaluate efficiency of an algorithm?
- Differentiate between knapsack and 0/1 knapsack problem.
- How quick sort algorithm is better than the merge sort algorithm?
- Explain the principle of optimality.
- Describe the branch and bound method.

Q 2.

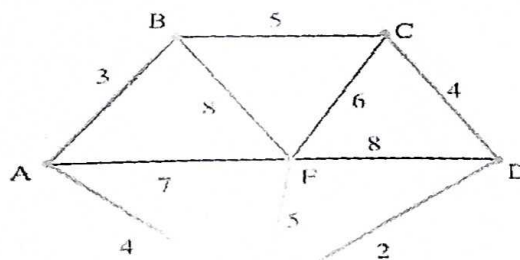
(2X7=14)

- What are the various asymptotic notations used to analyze the algorithm? Explain in detail. What is the significance of these notations ?
- Solve the given recurrence relations using the substitution method
 $T(n) = 2T(n/2) + n$
- Write down various applications of STACK and QUEUE in detail.

Q3.

(2X7=14)

- What is the divide and conquer technique? Write an algorithm for sorting elements in an efficient way using this technique with complexity.
- Solve the following Knapsack problem-
Input: 3 objects, $C = 50$ $w = \{15, 18, 25\}$ $p = \{30, 40, 16\}$
- What is the difference between Prim's algorithm and Kruskal's algorithm for finding the minimum spanning tree of a graph? Execute both Prim's and Kruskal's algorithms on the given graph.



CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH (HR)
Sessional Test : II

Programme: Master of Computer Application(MCA)
Semester: 2nd Semester
Course Title: Object Oriented Programming
Course Code: SBS CS 01 02 11 C 4004

Session: 2021-2022
Max. Time: 1 Hrs
Max. Marks: 20

Note: Attempt any two by selecting one from each unit.

Unit: I

Question no 1:

(5 X 2 =10 Marks)

- a) Differentiate between compile time and run time polymorphism.
b) Predict the output of following program.

i.	ii.
<pre>#include <iostream> using namespace std; class A { protected: int x; public: A() {x = 0;} friend void show(); }; class B: public A { public: B() : y (0) {} private: int y; }; void show() { A a; B b; cout << "The default value of A::x = " << a.x << " "; cout << "The default value of B::y = " << b.y; }</pre>	<pre>#include<iostream> using namespace std; class Point { private: int x, y; public: Point() : x(0), y(0) { } Point& operator()(int dx, int dy); void show() {cout << "x = " << x << " ", y = " << y; } }; Point& Point::operator()(int dx, int dy) { x = dx; y = dy; return *this; } int main() { Point pt; pt(3, 2); pt.show(); return 0; }</pre>

21522

CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH (HR)

Second Semester Term End Examinations August-September 2022

Programme: Master of Computer Application(MCA)

Semester: 2nd Semester

Course Title: Object Oriented Programming

Course Code: SBS CS 01 02 11 C 4004

Session: 2021-2022

Max. Time: 3 Hrs

Max. Marks: 70

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.

2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

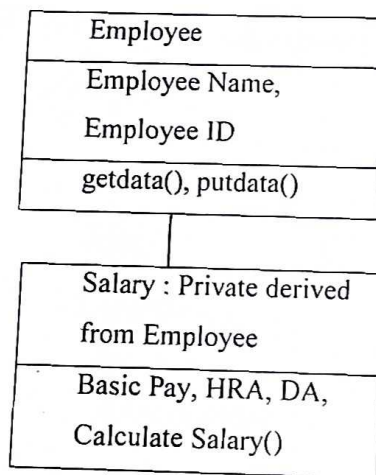
Q 1.

(4X3.5=14)

- What is virtual base class ?
- Explain any two forms of inheritance. Give an example of each.
- Write a C++ program to swap two numbers using pointer
- List and explain use of any four file mode parameters.
- Explain the use of friend function by writing a C++ program.
- State the use of scope resolution operator and its use in C++.
- Differentiate between compile time and run time polymorphism.

Q 2.

(2X7=14)



- Define classes to appropriately represent class hierarchy as shown in above figure. Use constructors for both classes and display Salary for a particular employee. Define a class named 'Train' representing following members:
Data members :- Train Number, Train Name, Source, Destination, Journey Date, Capacity
Member functions: Initialise Members, Input Train Data, Display Data
Write a C++ program to test the train class.
- What is data hiding? What are the different mechanisms for protecting data from external users of a class objects?
- What do you mean by allocation of memory ? compare static and dynamic allocation techniques ? also describe various function for dynamic allocation.

CENTRAL UNIVERSITY OF HARYANA

Sessional Test: Aug-2022

Programme: Master of Computer Application
Semester: II
Course Title: Design and Analysis of Algorithms
Course Code: SBS CS 01 02 13 C 4004

Session: 2021-22
Max. Time: 1 Hour
Max. Marks: 20

Q 1.

(1X10=10)

- (a) In quick sort, for sorting n elements, the $(n/4)^{\text{th}}$ smallest element is selected as pivot using an $O(n)$ time algorithm. What is the worst case time complexity of the quick sort?
(A) $\theta(n)$ (B) $\theta(n \log n)$
(C) $\theta(n^2)$ (D) $\theta(n^2 \log n)$
- (b) What is the time complexity of following function in worst case?
for ($i=0; i < n*n; i++$)
for ($j=1; j < i; j++$)
a = a+b;

OR

- (a) What is the return value of following function for $\text{arr}[] = \{9, 12, 2, 11, 2, 2, 10, 9, 12, 10, 9, 11, 2\}$ and n is size of this array?
int fun(int arr[], int n)
{
int x = arr[0];
for (int i = 1; i < n; i++)
x = x ^ arr[i];
}
- (b) Solve the following recurrences-
(i) $T(n) = T(2n/3) + 1$
(ii) $T(n) = 7T(n/2) + cn^2$

Q2.

(1X10=10)

Write Divide & Conquer recursive Quick sort algorithm and analyze the algorithm for average time complexity.

OR

- (a) Let $f(n) = \Omega(n)$, $g(n) = O(n)$ and $h(n) = \Theta(n)$. Then $[f(n). g(n)] + h(n)$ is:
(A) $\Omega(n)$ (B) $O(n)$ (C) $\Theta(n)$ (D) None of these
- (b) The increasing order of following functions in terms of asymptotic complexity is:
 $f_1(n) = n^{0.999999} \log n$
 $f_2(n) = 10000000n$
 $f_3(n) = 10000000n$
 $f_4(n) = n^2$
(A) $f_1(n); f_4(n); f_2(n); f_3(n)$ (B) $f_1(n); f_2(n); f_3(n); f_4(n)$
(C) $f_2(n); f_1(n); f_4(n); f_3(n)$ (D) $f_1(n); f_2(n); f_4(n); f_3(n)$

CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH (HR)
Term End Examinations January 2023

Programme: Master of Computer Applications(MCA)
Semester: III
Course Title: Internet and Java Programming
Course Code: SBS CS 01 03 21 C 4004

Session: 2022-23
Max. Time: 3 Hrs
Max. Marks: 70

Instructions:

1. Question no. 1 has seven parts and students are required to answer any four. Each part carries three and half Marks.
2. Question no. 2 to 5 have three parts and student are required to answer any two parts of each question. Each part carries seven marks.

Q1.

(4X3.5=14)

- a) Define URL class and its methods with the help of an example.
- b) Discuss the concept of Sockets at transport layer of TCP/IP Model.
- c) Discuss in detail the output of the following program:

```
public class Addition Byte
{
    public static void main(String[] args)
    {
        byte a = 30;
        byte b = 40;
        byte c = a + b;
        System.out.println("The c variable Value after Addition is : " + c);
    }
}
```

- d) Discuss in detail the output of the following program:

In the following code, choose 3 valid data-type attributes/qualifiers among final, static, native, public, private, abstract, and protected”

```
public interface Status
```

```
{
    /* insert qualifier here */ int MY_VALUE = 10;
}
```

- e) Explain how interface references can be created by writing a program.
- f) Differentiate between throw and throws keywords with appropriate example.
- g) Discuss the differences between Java AWT and Java Swing.

Q 2.

(2X7=14)

- a) Explain Client-Server communication by writing a suitable program in JAVA.
- b) Explain RARP protocol with the help of suitable example.
- c) Discuss using program how reliable communication is done by using TCP/IP protocol.

Q3.

(2X7=14)

- a) Discuss architecture of Java in Virtual Machine.
- b) Demonstrate Multi-dimensional array with the help of suitable example.
- c) We have to calculate the area of a rectangle, a square and a circle. Create an abstract class 'Shape' with three abstract methods namely 'RectangleArea' taking two parameters, 'SquareArea' and 'CircleArea' taking one parameter each. The parameters of 'RectangleArea' are its length and breadth, that of 'SquareArea' is its side and that of 'CircleArea' is its radius. Now create another class 'Area' containing all the three methods 'RectangleArea', 'SquareArea' and 'CircleArea' for printing the area of rectangle, square and circle respectively. Create an object of class 'Area' and call all the three methods.

Q 4.

(2X7=14)

- a) What is method overriding? Discuss any two rules from the following for method overriding with example
 - i. If the super-class overridden method does not throw an exception, subclass overriding method can only throws the unchecked exception
 - ii. The overriding method must have same return type
 - iii. Overriding abstract methods
- b) How constructor chaining is done using this keyword? Explain with suitable example.
- c) Discuss Dynamic Method Lookup with a suitable program in JAVA.

Q 5.

(2X7=14)

- a) Discuss checked and unchecked exceptions in detail.
- b) Explain with example the concept of multithreading.
- c) Write a Java Swing program having following functions:
 - i. Create a frame using association inside constructor
 - ii. A button with label "Click Me".
 - iii. A Textfield in which the text "Java Swing" appears as we click on button.