GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

ROLL NO:	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 % Max Marks: 20 Max Time: 1 hr. Monday, 24th September, 2018

TEST – 1

Odd Semester 2018-19 Course: **CSE 212 Analysis of Algorithms** V Sem. CSE

Instruction:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 2 M = 6 Marks)

1. Define an algorithm. Explain the notion of algorithm with a diagram
2. Design an algorithm to find the sum and average of three numbers
3. Analyze the running time efficiency of sequential search?

Part B

(2 Q x 4 M = 8 Marks)

4. Define big oh, big theta and big omega notations, with graphs.

   Solve and represent $10n^2+3$ in all three notations

5. Design an algorithm to compute GCD of two numbers.

   Compute the GCD of 8 and 16

Part C

(1 Q x 6 M = 6 Marks)

6. Design a recursive algorithm for solving the towers of Hanoi problem.

   Derive its time complexity.

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TEST 2

Odd Semester: 2018-19
Course Code: CSE 212
Course Name: Analysis of Algorithms
Branch & Sem: CSE & V Sem

Date: 27 November 2018
Time: 1 Hour
Max Marks: 20
Weightage: 20%

Instructions:

(i) ***Read the questions carefully***
(ii) *Show All steps of solutions*
(iii) *Non programmable calculators are allowed*

Part A

Answer the Questions. **Each** question carries **five** marks. (2X5=10)

1. Suggest and explain a suitable algorithm to sort an array of integers that applies divide and conquer paradigm. Compute its efficiency.
2. Define transitive closure. Design and analyze a dynamic programming based algorithm to find transitive closure of a graph.

Part B

Answer the Questions. Question carries **five** marks. (1X5=5)

3. Find shortest path between every pair of vertices in the given weight matrix. Name the algorithm you applied to solve this problem, what is its design paradigm? What is its efficiency?

0	3	999	2	6
5	0	4	2	999
999	999	0	5	999
999	999	1	0	4
5	999	999	999	0

Part C

Answer the Questions. Question carries **five** marks. (1X5=5)

4. Alladin went into a cave having many treasures. He carried a bag that could accommodate 6 kilograms. Treasures were as shown below. Help him by finding what is the maximum profit he can make by making an optimum selection

Treasure	weight	Value
Pearls	3	25
Diamonds	2	20
Gold coins	1	15
Silver coins	4	40
Rubies	5	50

Roll No.												

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END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 28 December 2018

Course Code: CSE 212 | **Time**: 2 Hours

Course Name: Analysis of Algorithms | **Max Marks**: 80

Programme & Sem: CSE & V Sem | **Weightage**: 40%

Instructions:

(i) ***Steps involved in solving problems carry marks***

(ii) ***Non programmable calculators are allowed***

Part A

Answer **all** the Questions. **Each** question carries **ten** marks. (4Qx10M=40)

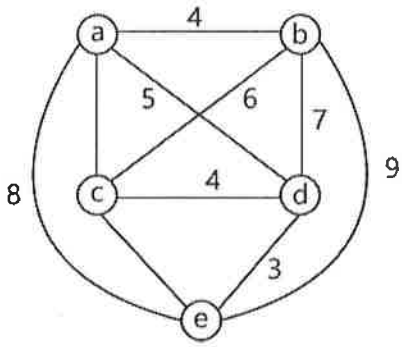


Figure 1

1. A travelling sales man is given the map of a city having 5 towns (a,b,c,d,e), they are connected by road as in the graph given above in figure 1. Cost of travelling each road is mentioned as the weight of the corresponding edge in the graph. He must start from the office located at a, and visit all towns and return to a. He must visit every town only once and must return to the office at a. He must also ensure that his total travel cost is minimum. Apply a suitable branch and bound algorithm to help the salesman, draw the decision tree. Also write the final round trip route with its cost.
2. Ram is arranging Queens of chess board on a special board having four cells on its sides. He wishes to arrange them in such a way that no two pawns must attack each other. Help him solve the puzzle by applying a suitable backtracking algorithm. Draw the decision tree.
3. A. generate all permutations of {a,b,c} by drawing a backtracking tree
   B. given a set {3,5,6,7} find all subsets whose elements sum up to 15. Draw the decision tree involved in finding the subsets. Draw the complete tree.
4. An algorithm designed to find the minimum spanning tree has the following features

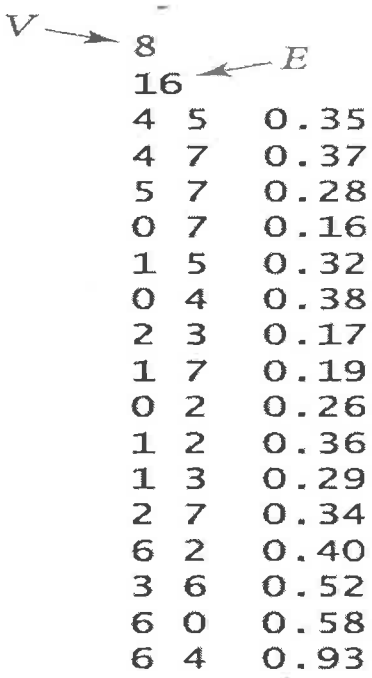
- It constructs the solution through a series of expanding subtrees
- Initial subtree consists of a single vertex
- On each iteration greedy approach is applied
- Each iteration adds a vertex that is closest but not in the subtree
- Algorithm stops when all vertices are included

Recognize this classic algorithm, write the algorithm and compute its efficiency.

Part B

Answer **both** the Questions. **Each** question carries **twenty** marks. (2Qx20M=40)

5. Apply a greedy algorithm to find the minimum spanning tree that first sorts the edges based on edge cost. Name the algorithm, apply the algorithm to the graph given in figure 2. Show all steps in the table.



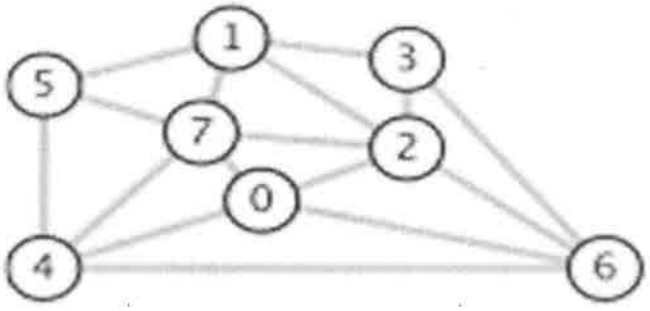


Figure 2

6. A Civil engineer is building a dam at 's' in the graph shown below in figure 3. The dam is meant to irrigate four cities named t, x, y, z in the graph. Possible canals and their distances are as shown in the graph as edges. Help the engineer solve the problem by selecting minimum length canals connecting the dam and every other city. Select a suitable greedy algorithm. Name the algorithm, solve the problem showing all steps.

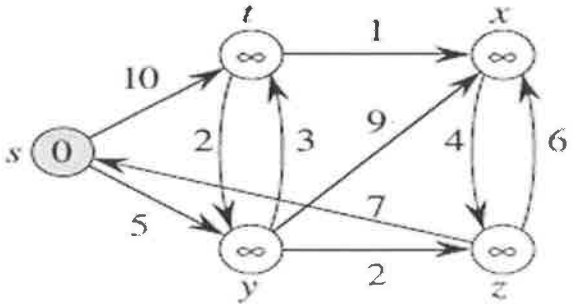


Figure 3