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II Semester M.C.A. Degree Examination, December - 2022

COMPUTER SCIENCE

The Design And Analysis of Algorithm
(CBCS Scheme Y2K20)

Paper : 2 MCA5

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Answer any Five questions from Section-A and any Four questions from Section-B

SECTION - A

I. Answer any FIVE questions. Each question carries SIX marks.

(5×6=30)

1. Obtain the time complexity of the code below:

for $i=0$ to $n-2$

for $j=i+1$ to $n-1$

If ($a[i]=a[j]$)



2. Discuss about Mathematical analysis of Non-recursive algorithm with an example.

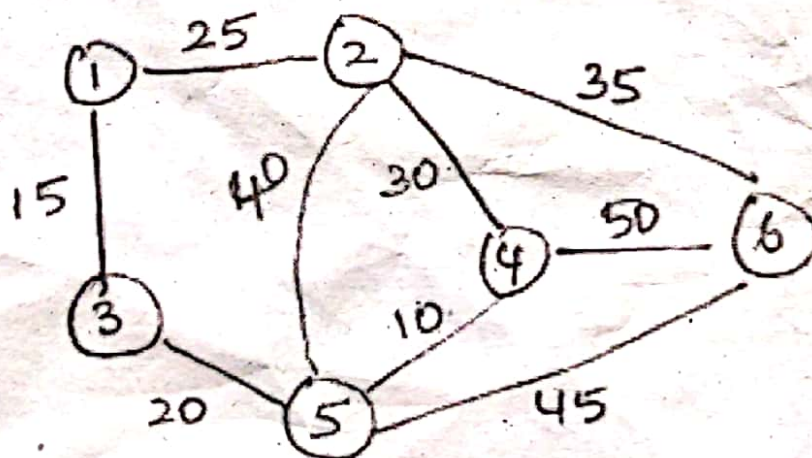
3. Explain Best case, Worst case and Average case of linear search.

4. Multiply the following two matrices using strassen's matrix multiplication.

$$A = \begin{bmatrix} 1 & 2 \\ 5 & 6 \end{bmatrix} \quad B = \begin{bmatrix} 8 & 7 \\ 1 & 2 \end{bmatrix}$$

5. Write Hoya's algorithm and analyze its time complexity.

6. Find the minimum spanning tree using prim's algorithm.



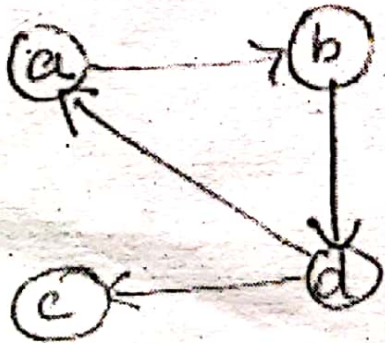
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7. Apply backtracking to solve the following instance of the subset-sum problem.
 $S = \{1, 3, 4, 5\}$ and $d = 11$.
8. State travelling sales person problem. Mention its applications.

SECTION - B

II. Answer any **FOUR** of the following questions. (4×10=40)

9. a) Define and explain various asymptotic notations. (6)
 b) Discuss Algorithm visualization. (4)
10. a) Explain Brute force string matching with an example. (6)
 b) Write a note on Branch and Bound method. (4)
11. Write the steps of
 a) Horspool's algorithm (5)
 b) Boyer-Moore algorithm (5)
12. Compute θ_c using dynamic programming and find its time complexity. (10)
13. Apply warshall's algorithm to compute transitive closure for the graph shown below: (10)



14. Write short notes on:
 a) Decision trees (5)
 b) Hamiltonian circuit problem (5)