

322552(22)

**B. E. (Fifth Semester) Examination, April-May/
Nov.-Dec. 2020**

(New Scheme)

(CSE Branch)

ANALYSIS & DESIGN of ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory. Part (a) of each question is compulsory and carry 2 marks. Attempt any two from part (b), (c) and (d) and carry 7 marks.

Unit-I

1. (a) Define all the types of asymptotic notation. 2
- (b) State master theorem and explain it using examples. 7

[2]

(c) Solve the recurrence equation using substitution method. 7

$$T(n) = 2T\left(\left\lfloor \frac{n}{2} \right\rfloor + 16\right) + n$$

(d) Find big oh (O) notation for following equation : 7

(i) $f(n) = 10n^2 + 7$

(ii) $f(n) = 2^n + 6n^2 + 3n$

Unit-II

2. (a) Define divide & conquer method. 2

(b) Use Strassen's algorithm to compute the matrix product. 7

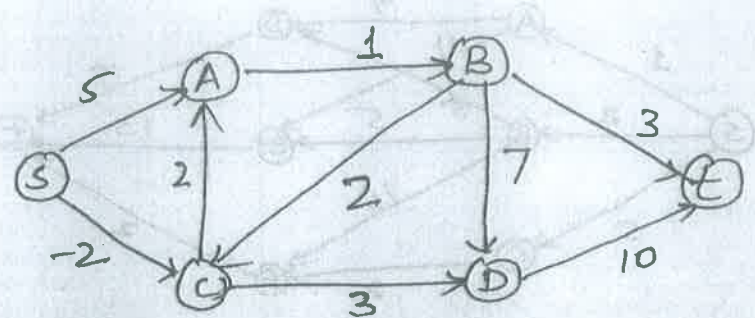
$$A = \begin{bmatrix} 1 & 5 \\ 3 & 8 \end{bmatrix} \quad B = \begin{bmatrix} 7 & 4 \\ 6 & 2 \end{bmatrix}$$

(c) Explain Huffmann algorithm with suitable example. 7

(d) Solve following graph for single source shortest path using Bellman Ford algorithm. 7

322552(22)

[3]



Unit-III

3. (a) Explain AND/OR graph. 2

(b) Explain BFS with suitable example. 7

(c) The 6 no. of matrix are given

$$A_1 = 30 \times 35, A_2 = 35 \times 15, A_3 = 15 \times 5,$$

$$A_4 = 5 \times 10, A_5 = 10 \times 20, A_6 = 20 \times 25$$

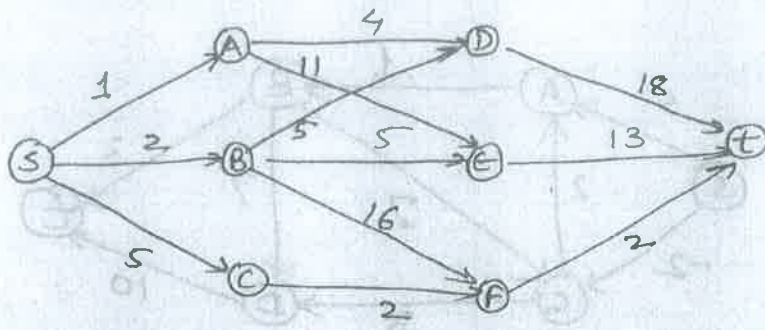
Solve using chained matrix multiplication method to find an optimal parenthesization of a matrix. 7

(d) Consider a multistage graph to find the minimum cost path from s to t node. 7

322552(22)

PTO

[4]



Unit-IV

- 4. (a) Write 2 application of back tracking. 2
- (b) Explain n queens problem with suitable examples. 7
- (c) For a given set $s = \{5, 10, 15, 20, 25, 30\}$ and $X=45$. Obtain the subset sum problem using back tracking. 7
- (d) Explain Hamiltonian cycle problem using suitable example. 7

Unit-V

- 5. (a) Explain NP Hard. 2
- (b) Write & explain Cook's theorem. 7

[5]

- (c) Explain 15 puzzle problem with suitable example. 7
- (d) Given three items along with their weights & respective values as

Item	W	V
I_1	1	2
I_2	2	3
I_3	3	4

for Knapsack of capacity $W = 3$. Solve using Branch & Bound technique to so as to give maximum possible value. While considering all constraints. 7

322555(22)

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UNIX & SHELL PROGRAMMING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) is compulsory of 2 marks. Attempt any two from parts from (b), (c) and (d) is of 7 marks.

Unit-I

1. (a) Write a brief note on the features of Unix operating system. 2
- (b) Explain the architecture of Unix operating system. 7

[2]

- (c) Explain the following Unix commands : 7
- (i) cp
 - (ii) ls
 - (iii) mv
 - (iv) cat
 - (v) script
 - (vi) tee
 - (vii) cmp
- (d) Write short notes on : (any two) 7
- (i) Vi-editor & its modes
 - (ii) Security levels in Unix
 - (iii) Changing permission (chmod)

Unit-II

2. (a) What is Shell? List the names of standard shells used in Unix today. 2
- (b) Write notes on : (any two) 7
- (i) Redirection
 - (ii) Predefined variables
 - (iii) Sorting
 - (iv) Translating characters

322555(22)

[3]

- (c) What do you mean by the term metacharacter? Explain in detail the use of "Quotes" in Unix. 7
- (d) What is Filter? Explain in detail the commands used for displaying the beginning and end of a file. Also describe the command used to count the characters, words, or lines in a document. 7

Unit-III

3. (a) List the names of three utilities in the grep family. 2
- (b) Describe the grep command in detail. Also explain its operations with examples. 7
- (c) What is Sed? Explain the commands used in sed. 7
- (d) What is the format of the awk command? How many types of patterns are defined for awk? 7

Unit-IV

4. (a) Name two special files of UNIX that can be used by any shell. 2
- (b) Explain various Korn shell features. 7

322555(22)

PTO

[4]

- (c) How Korn shell implements multiway selection? Write a Korn shell script to print the spelling of a digit between 0-9 using case statement. 7
- (d) Write short notes on : (any two) 7
- (i) Command Execution Process
 - (ii) Eval Command
 - (iii) Repetition in Korn Shell

Unit-V

5. (a) Define Inodes. 2
- (b) Write an algorithm for conversion of a path name to an Inode. 7
- (c) Explain various decision making statements used in C-shell with suitable example. 7
- (d) Write short notes on : (any two) 7
- (i) Environmental variables in C-shell
 - (ii) For each loop in C-shell (with example)
 - (iii) System call-lseek

Printed Pages – 5

Roll No. :

322556(22)

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DATABASE MANAGEMENT SYSTEM

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) and (d). State assumptions clearly (if any).

Unit-I

1. (a) What is Data Independence? 2

- (b) Explain ANSI/SPARC 3 level architecture of DBMS. 7

322556(22)

PTO

- (c) Explain Strong and Weak entity sets with example. 7
- (d) Draw an ER diagram for keeping track of the exploits of your favorite sports team. You should store the matched played, the scores in each match, the players in each match and individual player statistics with each match. Summary statistics should be modeled as derived attributes. 7

Unit-II

2. (a) What is an Unsafe Query? Explain with example. 2
- (b) Explain 6 basic operations of Relation Algebra with example. 7
- (c) What is a View? What are the advantages and disadvantages of using a VIEW? 7
- (d) Consider a relation schema :
- EMP (Empno, Ename, Job, Sal, Deptno)
DEPT (Deptno, Dname, Location)
- Write the following queries in Relational Algebra. 7
- (i) Display employee name of employee who works for SALES Department.

- (ii) Display employee name whose salary is greater than RAHUL.
- (iii) Display department wise minimum salary of each department.
- (iv) Display department name in which RAHUL is working.
- (v) Display the job title which is present in department 10 and 20.
- (vi) Update the employees so that RAHUL now work in department 20.
- (vii) Delete the employee whose salary is less than 10,000.

Unit-III

3. (a) Explain GROUP BY clause with example. 2
- (b) Explain various integrity constraints specified on SQL with example. 7
- (c) What is a Cursor? Explain cursor attributes with example. 7
- (d) Given a relation schema below :
- Supplier (sno, sname, status, city)

[4]

Parts (pno, pname, color, weight)

Supplies (sno, pno, qty)

Write SQL queries for following :

7

- (i) Get supplier names for suppliers who supply part P2.
- (ii) Get supplier numbers for suppliers who supply at least one red part.
- (iii) Get all shipments where the quantity is between 400 and 850 inclusive.
- (iv) Get all part number which are supplied to supplier who live in London.
- (v) Get supplier number who supplies maximum quantity.
- (vi) Increase the quantity of part P1 by 10%.
- (vii) Change the color of Red parts to Green.

Unit-IV

4. (a) Explain trivial functional dependency with example. 2
- (b) Explain 3NF and BCNF with example. 7
- (c) Explain 2 phase locking protocol with example. 7

[5]

- (d) Consider a relation schema $R(A, B, C, D, E)$ with a set of functional dependencies $F = \{AB \rightarrow C, B \rightarrow D, CD \rightarrow E, E \rightarrow A\}$. Find the candidate keys of R . 7

Unit-V

5. (a) What is Log Record? 2
- (b) Explain deferred update method for recovery of database with example. 7
- (c) Explain B+ tree index with example. 7
- (d) Explain different types of database storage failures. 7