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Roll No. .....

CBB-2945-T

M C A Second Semester

(End Semester)

Examination, 2019

COMPUTER SCIENCE AND APPLICATION

Paper - CSA-CC-222

(Data Structure)

Time : Three Hours] [Maximum Marks : 60

Note :– Attempt all questions.

[P. T. O.

SECTION-A

(Objective Type Questions) 10×1=10

Note :– Choose the correct option.

1. $f(n) = \Theta(g(n))$ if and only if :

(a) $g(n)\, G \leq f(n) \leq C_2\, g(n)$

(b) $g(n) \leq C_2 f(n)$

(c) Both (a) and (b)

(d) None of above

2. Time complexity of algorithm depends on :

(A) RAM size

(B) CPU speed

(C) Processor

(D) All of above

3. Reverse string and CPU scheduling uses :

(a) Stack, stack

(b) Queue, queue

(c) Stack, queue

(d) Queue, stack

4. Number of pointers in DLL are :

(a) 4

(b) 2

(c) 3

(d) 5

5. Heap is implemented by :

(A) DEQUE

(B) Priority Queue

(C) Circular Queue

(D) All of above

6. Operater use in circular queue is :

(a) *

(b) %

(c) +

(d) –

7. Height balanced tree was developed by :

(a) Danish Ritche

(b) Bill Gate

(c) Adelson Velenski and Landis

(d) All of above

8. Greatest element in BSI is in :

(a) Left most

(b) Right most

(c) Left right most

(d) Right most left

9. Time complexity for binary search is :

(a) $0 (\log_2 n)$

(b) $0 (n^2)$

(c) n

(d) $0 (n^4)$

10. Which only is valid for adjacecy matrix elements :

(a) $aij = \begin{cases} 1 & if\ Ti\ Tj \\ 0 & otherwise \end{cases}$

(b) $aij = \begin{cases} 1 & if\ anedge \\ 0 & otherwise \end{cases}$

(c) $aij = \begin{cases} -1 & if\ Ti\ to\ Tj \\ 0 & otherwise \end{cases}$

(d) $aij = \begin{cases} 0 & if\ Ti\ to\ Tj \\ 1 & otherwise \end{cases}$

SECTION-B

(Short Answer Type Questions) 4×5=20

Note ;– Attempt any **four** questions. All questios carry equal marks.

1. Construct sparse matrix and find its transpose.

$$A = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 3 & 0 & 0 & 9 \\ 5 & 2 & 0 & 0 \\ 0 & 15 & 0 & 0 \\ 4 & 3 & 0 & 7 \end{bmatrix}$$

Show all steps.

2. Write function for following operation in SLL :

(a) Insert at end

(b) Delete afternode

3. Explain DEQUE model with diagram.

4. Construct Binarry tree using.

(A+B)* (C/D) + E*F

5. Given A [10] = {3, 9, 2, 5, 17, 11, 7, 13, 10, 6}

Key = 7, 13

Apply binary search and show all steps.

6. Construct BST and find inorder and preorder of :

9, 25, 3, 2, 11, 5, 13, 4, 6, 22

SECTION - C

(Long Answer Type Questions) 3×10=30

Note :– Attempt any **three** questions. All questios carry equal marks.

1. Explain Asymptotic notations with example.

2. How to represent polynomial in SLL? Support your answer with an example. Write an algorithm for addition of two polynomial P_1 (x) and P_2 (x).

3. (a) Convert infix to postfix using stack

A + (B*C – (D/E ↑ F) * G) * H

(b) Ackerman function defined as :

A (m, n) = n+1 if m=o

A (m – 1, 1) if m≠ 0 but n = 0

A (m – 1, A (m, n –1) if m≠ 0 and n≠ 0

Find A (1, 3) and a (2, 3)

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4. (a) Explain AVL tree with example. Write various rotation in AVL tree.

(b) Find the minimum number of nodes in AVL tree with height 8.

5. Suppose a weight group G is maintained in memory by a node DATA and c weight matrix W as follows.

DATA : V_1, V_2, V_3, V_4

$$W = \begin{bmatrix} 0 & 0 & 3 & 0 \\ 5 & 0 & 1 & 7 \\ 2 & 0 & 0 & 4 \\ 0 & 6 & 8 & 0 \end{bmatrix}$$

Draw graph G and find shortest path from V_1 to all nodes using dijkstra's algorithm.