NAME - GUNANK SUKDEVE

University roll no.- 30010221904 2

Semester - 3rd

Branch - C.S.E

Section - A

Subject : Data structure & Algorithms

[BOOO311(022)]

Sign -

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1(a)

i) [redacted] Graphs

ii) [redacted] Linked List

iii) [redacted] $O(n^2)$

iv) [redacted] $O(n)$

1(b)

Sol⇒ To find address of $A[4,3]$

given matrix = $A[0:6, 0:6]$

$B = 400$ (Base address)
$L_r = 2$ (lower Limit of row)
$U_r = 6$ (upper limit of row)
$L_c = 0$ (lower limit of column)
$U_c = 6$ (upper limit of column)
$W = 4$ bytes (Storage size)

no. of row $\Rightarrow M = (U_r - L_r) + 1 = (6-2) + 1 = 5$

no. of column $\Rightarrow N = (U_c - L_c) + 1 = (6-0) + 1 = 7$

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Row Major

$$A[4][3] = B + w * [N * (i - Lr) + (j - Lc)]$$

$$= 400 + 4 * [7 * (4 - 2) + (3 - 0)]$$

$$= 468.$$

Column Major

$$A[4,3] = B + w * [(i - Lr) + M * (j - Lc)]$$

$$= 400 + 4 * [(4 - 2) + 5 * (3 - 0)]$$

$$= 468$$

1(c)

Array	Linked lists
i) An Array is a collection of elements of a similar data type.	Linked List is an ordered collection of elements of the same type in which each element is connected to the next using pointers.
ii) Array elements can be accessed randomly using the array index	Random accessing is not possible in linked lists. The elements will have to be accessed sequentially.

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3) Data elements are stored in contiguous locations in memory.	New element can be stored anywhere and a reference is created for the ~~the~~ new element using pointers.
(4) Insertion and Deletion operation are costlier since the memory locations ~~are~~ consecutive and fixed.	Insertion and Deletion operation are fast and easy in a linked list.

2(0)

i) Stack

ii) O(1)

iii) Queue

iv) Stack

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2(b)

/*Assuming that the circular queue is stored in QU with size N. Check if Queue already filled or not*/

1. If (FRONT = 0 AND REAR = N-1) or (FRONT = REAR+1) Then
{ Write "Overflow!!"
}
Else
{
2. If FRONT = NULL Then
{ Set FRONT = 0 [QU is initially empty]
REAR = 0
}
3. Else IF REAR = N-1 Then
Set REAR = 0
Else
4. Set REAR = REAR + 1
} // End of If
5. Set QU[REAR] = I_ITEM // (to insert the new item I_ITEM)
6. END.

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2(d)

Post fix	Evaluation	
4	4	
2	4, 2	
3	4, 2, 3	
^	4, 8	[2^3 = 8]
-	-4	[4-8 = -4]
3	-4, 3	
2	-4, 3, 2	
^	-4, 9	[3^2 = 9]
2	-4, 9, 2	
-	-4, 7	[9-2 = 7
+	3	[-4+7 = 3]
2	3, 2	
^	9	[3^2 = 9]