L.J Institute of Engineering and Technology, Ahmedabad.

Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
1	1	User defined data type is also called?	B	1	Primitive	Non-primitive	Identifier	None of these
2	1	Non Primitive data Structures are those which define set of _____.	B	1	Static Elements	Derived Elements	Primitive Elements	None of these
3	1	Which of the following is not a primitive data structure?	C	1	Boolean	Integer	Arrays	Character
4	1	Which of the following is a primitive data structure?	B	0.5	Stack	Integer	Arrays	Queue
5	1	The data structure used in hierachical data model is	D	1	Array	Stack	Graph	Tree
6	1	If elements of the data structure forms a sequence of list then it is called as _____.	A	0.5	Linear data structure	Primitive data structure	Non-primitive data structure	None of these
7	1	Which of the following is a linear data structure?	A	1	Array	AVL trees	Binary Trees	Graphs
8	1	The data structure which is active only at one end is……..	B	1	queue	stack	linked list	tree
9	1	The way in which the data item or items are logically related defines……	B	1	storage structure	data structure	data Relationship	data operation
10	1	Float is a _____ data type.	A	1	Primitive	Non Primitive	Linear	Non Linear
11	1	Which of the following is the advantage of the array data structure?	B	1	Elements of mixed data types can be stored.	Easier to access the elements in an array	Index of the first element starts from 1.	Elements of an array cannot be sorted
12	1	Which of the following is a non linear data structure?	D	1	Array	Linked list	Stack	Tree
13	1	Which of the following is the disadvantage of the array?	C	0.5	Stack and Queue data structures can be implemented through an array.	Index of the first element in an array can be negative	Wastage of memory if the elements inserted in an array are lesser than the allocated size	Elements can be accessed sequentially.
14	1	Which of the following data structure can't store the non-homogeneous data elements?	A	1	Arrays	Records	Objects	None of the above
15	1	A Data structure which displays the relationship of adjacency between elements is said to be	A	1	Linear data structure	Trees	Non Linear data structure	None of these
16	1	Which of the following are linear type of data structure? i) Linked list ii) Stack iii) Binary Tree iv) Array v) Queue	C	1	i, ii, iii and iv only	ii, iii, iv and v only	i, ii, iv and v only	All i, ii, iii, iv and v
17	1	Match the following properties of an array with their descriptions. a) Homogeneous i) the list size is constant. b) Ordered ii) there is a first and last element. c) Finite iii) there is a next and previous in the natural order of the structure d) fixed-length iv) every element is the same.	D	1	a-i, b-ii, c-iii, d-iv	a-ii, b-iii, c-iv, d-i	a-iii, b-i, c-ii, d-iii	a-iv, b-iii, c-ii, d-i
18	1	In which Data Structure, Insertion and Deletion can be performed at the one end?	C	1	queue	Linkedlist	Stack	Tree
19	1	In given array A [-3…5] [-1…3], what is the value of Upper Bound of Row Index?	B	1	-3	5	8	-1
20	1	In Column major, how is the following matrix stored in memory? 32 36 35 31 34 33 37 39 38	A	1	32 31 37 36 34 39 35 33 38	39 35 33 38 32 31 37 36 34	37 36 34 39 35 33 38 32 31	33 37 39 38 32 36 35 31 34
21	1	Given array A[9], base address 150, storage size = 1 byte, Find the location of A[3].	B	1	156	153	159	154
22	1	The elements of a linked list are stored	C	0.5	In a structure	In an array	Anywhere the computer has space for them	In contiguous memory locations
23	1	If the address of A[1][1] and A[2][1] are 1000 and 1010 respectively and each element occupies 2 bytes then the array has been stored in _____ order.	A	1	row major	column major	matix major	none of these
24	1	Given array A[0..2][0..2], base address=1000, storage size=1 byte. Find the location of A[1][1], if array is stored in row wise?	A	1	1004	1008	1012	1010
25	1	The largest subscript of an array index is called its	C	1	lower bound	range	upper bound	All of these
26	1	The given array is P[-4…6][-2…10] is a integer type array. An elements are stored in ROW MAJOR order. Calculate how many no of columns are in this array, if base address is 70.	A	1	13	11	12	15
27	1	The Smallest subscript of an array index is called its	A	1	lower bound	range	upper bound	All of these

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28	1	A programmer can access a particular element of an array by using one or more_____.	D	1	Indices	Subscripts	Single-dimensional array	Both (a) and (b)
29	1	If more than one subscript is used, an array is known as a_____.	C	0.5	One- dimensional array	Single dimensional array	Multi- dimensional array	None of the above
30	1	Each element in an array is associated with a unique subscript value, starting from_____.	B	0.5	1 to size-1	0 to size-1	-1 to size-0	None of the above
31	1	If row-major order is used, how is the following matrix stored in memory? a b c d e f g h i	B	1	ihgfedcba	abcdefghi	cfibehadg	adgbehcfi
32	1	If column-major order is used, how is the following matrix stored in memory? a b c d e f g h i	D	1	ihgfedcba	abcdefghi	cfibehadg	adgbehcfi
33	1	Row -major order in two -dimentional array refers to an arrangement where	A	1	all elements of a row are stored in memory in sequence followed by next row in sequence,and so on	all elements of row are stored in memory in sequence followed by next column in sequence ,and so on	all elements of column are stored in memory in sequence followed by next column in sequence, and so on	none of the above
34	1	Consider a 2-D array x with 11 rows and 4 columns, with each element storing a value equivalent to the product of row number and column number. The array is stored in row-major format. If the first element x[0][0] occupies the memory location with address 1000 and each element occupies only one memory location, which all locations(in decimal) will be holding a value of 10?	B	1	1018, 1019	1022, 1041	1017, 1036	1000, 1399
35	1	In an array of 2N elements that is both 2-ordered and 3-ordered ,what is the maximum number of positions that an element can be from its position if the array were 1-ordered?	D	1	1	2	N/2	2N-1
36	1	A one dimensional array A has indices 1....75. Each element is a string and takes up three memory words. The array is stored at location 1120 decimal. The ending address of A[49] is	D	1	1264	1266	1164	1267
37	1	Given an array, arr[1……10][1……15] with base value 100 and the size of each element is 1 Byte in memory. Find the address of arr[8][6] with the help of row-major order?		2				
38	1	Consider a two dimensional array A[20][10]. Assume storage size=4 bytes, the base address of array A is 100, elements are stored in row-major order and first element is A[0][0]. What is the address of A[11][5] ?		2				
39	1	The given array is P[-4…3][2…13] is a integer type array. An elements are stored in COLUMN MAJOR order. Calculate the address of 25th Element if base address is 100.		1				
40	1	Given array A[3][4], base address=100, storage size=2 bytes. Find the location of A[2][1], if array is stored in column wise?	D	1	118	120	115	110
41	1	Given array A[3][4], base address=100, storage size=2 bytes. Find the location of A[2][1], if array is stored in Row wise?	A	1	118	120	115	110
42	1	Calculate the address of M[-3]. Where given array is M[-9,7] with base address 1002. Consider the size of single element as 4Byte.	C	1	1004	1020	1026	1030
43	1	10 11 13 12 14 17 15 16 18 If column major order given then the sequence of element stored in memory.	A	1	10 12 15 11 14 16 13 17 18	10 11 15 12 14 16 13 17 18	10 11 12 15 14 16 13 17 18	10 11 14 11 15 16 13 17 18

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44	1	Given array is A [4…7] [-1…3] and storage size = 2 with BA= 100 and calculate the address of A [6] [2] an element stored in column major order.	A	1	128	125	126	127
45	1	If given array is A[-57---- 42] with base address 1050 & array is integer type of array. Calculate the total no of elements in Array.	A	1	100	102	99	98
46	1	If the address of A[1][1] and A[2][1] are 1024 and 1040 respectively and each element occupies 4 bytes then the array has been stored in _____ and the number of elements in between the elements A[1][1] and A[2][1] is _____.	A	1	RMO, 3	CMO, 5	RMO, 4	CMO, 4
47	1	Given array A[3][4], base address=100, storage size=2 bytes. Find the location of A[2][1], if array is stored in column wise?	A	1	118	120	115	110
48	1	In a compact single dimensional array representation for lower triangular matrices (i.e all the elements above the diagonal are zero) of size n×n, non-zero elements, (i.e elements of lower triangle) of each row are stored one after another, starting from the first row, the index of the (i,j)th element of the lower triangular matrix in this new representation is:	C	1	i+ j	i+j-1	(j-1) + i(i-1)/2	i + (j(j-1))/2
49	1	Array elements are stored in	A,B	1	row major	column major	major matrix	minor row
50	1	If the address of A[2][2] and A[3][2] are 2020 and 2024 respectively and each element occupies 4 bytes then the array has been stored in _____ order.	B	1	row major	column major	major matrix	minor row
51	1	Let A be a two dimensional array declared as follows: A : array [1... 10] [1... 15] of integer; Assuming that each integer takes one memory locations the array is stored in row-major order and the first element of the array is stored at location 100, what is the address of the element A[i] [j]?	A	1	15i+j+84	15j+i+84	10i+j+89	10j+i+89
52	1	Data elements grouped in an array can be of any basic data type like:	D	1	Integer	Float	Any user-defined data type	All of the above
53	1	Consider a lower triangular Matrix A [-25....+25, -25....+25], base address (BA) = 0, size of element = 100 Byte. Find the location of a [-20][-21] using RMO?		2				
54	1	Given array A [-4…3] [2…13] is an integer type array having base address 150. The elements are stored in column major order. Find the address of the 36th element of the array.		2				
55	1	The given array is A[4][4] is a floating type array. An elements are stored in COLUMN MAJOR order. Calculate the address of 11th Element if base address is 1020.		3				
56	1	Linear arrays are also called…	A	1	One-dimensional array	Vertical Array	Horizontal Array	All of the above
57	1	Consider a lower triangular Matrix A [-25....+25, -25....+25], base address (BA) = 0, size of element = 100 Byte. Find the location of a [-25][-20] using CMO?		2				
58	1	Calculate the address of a[6][3] if the given array is a[9][10]with the base address 102 and floating type array. Find the answers of row major and column major representation respectively.		1				
59	2	Entries in a stack are “ordered”. What is the meaning of this statement?	D	1	A collection of stacks entries is sorted	Stack entries can be compared with the ‘< ‘operation	The entries can always be stored in non - contiguous memory allocation only	There is a Sequential entry that is one by one

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60	2	The following operation performed on a stack of size 5. Push(1); Pop(); Push(2); Push(3); Pop(); Push(4); Pop(); Pop(); Push(5); After the completion of all operation, the total number of elements present in stack is?	A	1	1	2	3	4

61	2	Consider the following stack implementation.
		class Stack
		{
		static size = 9;
		int arr[size];
		int top = -1;
		}
		What would be the minimum value of the top such that the “overflow of the stack” message would be printed on screen?
			B	1	9	8	10	7

62	2	Which of the following is an application of stack.	D	1	balancing of symbols	UNDO/REDO	recursion	All of these
63	2	Stack underflow checking condition for PEEP operation is _____	A	1	TOP-I+1 ≤ 0	TOP+I+1 ≤ 0	TOP-I+3 ≤ 0	I+TOP+I+1 ≤ 0
64	2	Which statement is false for stack?	B	1	PUSH means insert one element in stack	POP means change position of element in stack	PEEP means search ith element in stack from top	CHANGE means change ith element in stack from top
65	2	TOP>=N means _____ and TOP=0 means _____ (As per Algorithm)	A	1	overflow, underflow	underflow, overflow	overflow, overflow	underflow, underflow
66	2	There are two stacks, stack1 and stack2. In the beginning both stacks are empty. Then we insert elements P, Q, R, S and T in same order in stack1. Now stack1 is popped 3 times and after each pop operation the popped element from stack1 is pushed into stack2. Now at this stage if I perform one pop operation on stack2 and print it on screen then what is the output on screen?	C	1	P	Q	R	S
67	2	In peep() pseudo code, which condition is to be called to check underflow	A	1	TOP – I + 1<=0	TOP – I + 1>=0	TOP – 1 + I<=0	TOP – 1 + I<=0
68	2	When stack is empty, which operation is not able to execute?	B	1	PUSH	POP	TOP = TOP + 1	TOP++
69	2	When data is to be deleted from data structure, but there is no element in stack, this situation is called ……	C	1	Overfull	Saturated	Underflow	Overflow
70	2	Which of the following real-world scenarios would you associate with a stack data structure?	A	1	Piling up of chairs one above the other	People standing in a line to be serviced at a counter	Offer services based on the priority of the customer	Tatkal Ticket Booking in IRCTC
71	2	Match the following: 1. PUSH A. S[TOP-I+1] = X 2. CHANGE B. TOP+=1, S[TOP]=X 3. POP C. Return S[TOP-I+1] 4. PEEP D. TOP -=1, Return S[TOP+1]	A	1	1-B,2-A,3-D,4-C	1-A,2-B,3-D,4-C	1-B,2-A,3-C,4-D	1-C,2-A,3-D,4-B
72	2	The data structure required to check whether an expression contains a balanced parenthesis is?	A	1	Stack	Queue	Arrays	Trees
73	2	Which of the following conditions hold true when a stack is underflow on peep and the index of that array starts from 0.	A	1	Top-i+1<=0	Top>=N-1	Top-i+1=1	Top-i+1<=-1
74	2	User perform following operations on stack of size 5: push(1); pop(); push(2); push(3); pop(); push(2); pop(); pop(); push(4); pop(); pop(); push(5); then	B	1	Overflow Occurs	Underflow Occurs	Stack operations will occur smoothly	ArrayLimitsOutOfBounds Error is thrown

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75	2	A stack is declared having a size of 10 elements, where the index of the stack starts from 0 and reaches upto 9 elements. If a stack has the following elements in it in the order bottom to top -> 11, 22, 33, 44, 55. If I want to change the value of the 2nd element from the top of the stack to element 99, then which of the following element value will be changed to element 99?	A	1	44	22	33	55

76	2	Consider the following pseudocode:
		declare a stack of characters
		while (there are more characters in the word to read)
		{
		read a character
		push the character on the stack
		}
		while (the stack is not empty)
		{
		write the stack's top character to the screen
		pop a character off the stack
		}
		What is written to the screen for the input "carpets"?
			C	1	serc	carpets	steprac	ccaarrppeettss

77	2	The five items: A,B,C,D, and E are pushed in a stack, one after the other starting from A. The stack is popped four times and pushed back on the stack by popped order. Now one item is popped from the stack. The popped item is	B	1	A	B	C	D
78	2	The stack has the following order of elements inserted from bottom of stack to top of the stack -> 10, 20, 30, 40, 50. If the 2nd element is to be peeped then which of the following is the correct option if the array index used to implement the stack starts from 1?	A	1	40	30	20	10
79	2	Which one of the following is the process of inserting an element in the stack?	C	1	Insert	Add	Push	All of the above
80	2	When the user tries to delete the element from the empty stack then the condition is said to be a ____	B	1	Overflow	Underflow	Garbage collection	Global connection
81	2	If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as___	A	1	Overflow	Underflow	Garbage collection	Global connection
82	2	Which one of the following is not the application of the stack data structure	D	1	String reversal	Recursion	Backtracking	Asynchronous data transfer
83	2	Which data structure is mainly used for implementing the recursive algorithm?	B	1	Queue	Stack	Binary tree	Linked list
84	2	Which of the following is not the correct statement for a stack data structure?	B	1	Arrays can be used to implement the stack	Stack follows FIFO	Elements are stored in a sequential manner	Top of the stack contains the last inserted element
85	2	If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal?	B	1	1234	4321	2134	2143
86	2	The minimum number of arrays required to implement a stack is __	A	1	1	3	2	5
87	2	Stack is a _____	A & C	1	LIFO	FIFO	FILO	LILO
88	2	Which function places an element on the stack?	B	1	pop	push	peep	isempty
89	2	_____ function is defined as a function that calls itself	B	1	Library function	Recursion	Stack	None of these
90	2	_____ operation returns the value of ith element from the top of the stack.	C	1	push	pop	peep	change
91	2	Perform following test case on given stack of size 5. At the end of last operation, total number of elements present in the stack are – push(5); push(4); push(3); pop(); pop(); push(2); pop(); push(1);pop();	C	1	3	4	2	1
92	2	If the sequence of operations – push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop are performed on a stack, the sequence of popped out values are…	A	1	2, 2, 1, 1, 2	2, 2, 1, 2, 2	2, 1, 2, 2, 1	2, 1, 2, 2, 2
93	2	In CHANGE pseudo code “Procedure CHANGE(S, TOP, I, X) “, Where Stack is represented by S, TOP is a pointer, X is a new element to change and I is_____.	C	1	Vector	Array Pointer	Element’s Index from the TOP	Element’s Index from the BASE

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94	2	Which of the following is very useful Data structure when data have to stored and then retrieved in reverse order.	C	1	queue	LL	Stack	Tree
95	2	Recursive function are implemented using _____	C	1	Library function	Recursion	Stack	None of these
96	2	A function which calls itself	A	1	Recursion	Iteration	Algorithm	flowchart
97	2	Recursion occurs till _____	A	1	Stack overflow	Queue underflow	Linklist overflow	None of these
98	2	In a recursive program if there is no Termination condition, the program will	D	1	Gives Error	Terminate	Compile time error	Execute infinitely

99	2	What will be output for the following code?
		class Demo
		{ { public static void main(String args[]){
		System.out.println("Hello");
		Demo d = new Demo(); d.main();
		}
			B	1	Hello is printed once	Error because Recusion in java do not allow infinite loop	Hello is not printed at all	no output

100	2	Which of the following is the advantage of the recursion?	A	1	Recursion reduce the length of code.	Recursive functions are generally slower than non-recursive function.	It may require a lot of memory space to hold intermediate results on the system stacks.	Hard to analyze or understand the code.
101	2	When any function is called from main(), the memory is allocated to it on the stack.	A	1	TRUE	FALSE	Can be true or false	memory not required

102	2	What will be the output of this code?
		class ABC{
		int n = 1;
		void fun1() {
		if (n <= 20) {
		System.out.println(n);
		n++;
		fun2(); } }
		void fun2() {
		if (n <= 20) {
		System.out.println(n);
		n++;
		fun1(); } }
		public static void main(String args[]) {
		fun1(); }}
			A	1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1	210	11 12 13 14 15 16 17 18 19 20

103	2	Consider the following recursive function.
		int function (int x,int y)
		{ if(y<=0)
		return x;
		return function(y,x%y);
		}
		The above recursive function computes_____.
			C	1	x*y	error	GCD of x and y	LCM of x and y

104	2	Consider the following recursive function.
		void get(int n)
		{
		if(n<1) return;
		get(n-1);
		get(n-3);
		System.out.println(n);
		}
		if get(6) function is being called in main() then how many times will the get () function be invoked before returning to the main()?
			B	1	15	25	35	45

105	2	What does the following function do? int fun(int x, int y) { if (y == 0) return 0; return (x + fun(x, y-1)); }	C	1	x + y	x + x*y	x*y	x^y

106	2	What does the following function print for n = 25?
		void fun(int n){
		if (n == 0)
		return;
		System.out.print(n%2);
		fun(n/2);}
			B	1	11001	10011	11111	1010

107	2	Recursion is not needed when you need to do which of the following operations?	A	1	Simply add two numbers 2 and 3	Find factorial of number 5	Find the GCD of 64 and 62	To solve 2 raised to 15
108	2	Recursion is similar to which of the following?	B	1	Switch Case	Loop	If-else	Array

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109	2	What is the output of the following code?
		class Test {
		static int fun (int n) {
		if (n==4)
		return n;
		else
		return 2*fun(n+1); }
		public static void main(String args[]) {
		System.out.print(fun(2)); } }
			C	1	4	8	16	24

110	2	Consider the following recursive function fun(x, y). What is the value of fun(4, 3)?
		int fun(int x, int y) {
		if (x == 0)
		return y;
		return fun(x - 1, x + y) ; }
			A	1	13	12	9	10

111	2	Which of the following recursive formula can be used to find the factorial of a number?	D	1	fact(n) = n * fact(n)	fact(n) = n * fact(n+1)	Both A&B	fact(n) = n * fact(n-1)

112	2	What is the output of the following code?
		class Test {
		static void fun(int n)
		{
		if(n == 0)
		return;
		System.out.print(n+ " ");
		fun(n-1);
		}
		public static void main(String args[])
		{
		fun(10);
		}}
			C	1	10	1	10 9 8 7 6 5 4 3 2 1	10 9 8 7 6

113	2	……. is very useful linear Data Structure in situation when data have to stored and then retrieved in reverse order.	A	1	Stack	Queue	Linked list	list
114	2	Adding element to stack means _____.	B	1	Placing element at the rear end	Placing element at the top	Placing element at the front end	both A or C
115	2	What is the result of the following operation: Top (Push (S, X)) , where S is Stack	B	1	Change X at Bottom	Add X at Bottom	Add X at Top	Change X at Top
116	2	When new data are to be inserted into a data structure, but there is not available space, this situation is usually called ……	B	1	underflow	overflow	houseful	saturated
117	2	Inserting an item into the stack when stack is not full is called……. Operation and deletion of item from the stack, when stack is not empty is called …… Operation.	A	1	push, pop	pop, push	peep, change	push, peep
118	2	Write a pseudo-code for PUSH and POP operations of stack.		6				
119	2	Write an algorithm for POP operation of Stack Data Structure		2				
120	2	Consider the stack S of characters, where S is allocated 8 memory cells. S: A,C,D, F, K, _, _, _ Describe the stack as the following operations take place. Pop(), Pop() ,Push(L), Push(P), Pop(), Push(R), Push (S), Pop()		3				
121	2	Write an algorithm for inserting an element and deleting an element in a stack.		7				
122	2	Write an algorithm for deleting an element from the stack.		3				
123	2	Write an algorithm for PEEP Operation and CHANGE Operation in a stack.		3				
124	2	List out different operations performed on stack and explain all with algorithm		7				
125	2	Write an algorithm to reverse a string using stack.		5				
126	2	Write a Java program to implement a stack with all necessary overflow and underflow checks using array .		7				
127	2	Write a program to implement stack operations using an array (Operations: push, pop, peep, change, Display)		7				

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Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
128	2	What is recursion? Write any program which follows recursion		5				
129	2	Write a program to find factorial of a given number using recursion		4				
130	2	Write a program to print fibonacci series for 10 numbers using recursion		4				
131	2	Write a program to print answer of x^y using recursion (Ex:- x=2, y=3, 2^3=8)		4				
132	2	Write a program to find GCD of two numbers using recursion		4				
133	2	Write a program to calculate sum of digits of given number using recursion		4				
134	3	Consider the usual algorithm for determining whether a sequence of parentheses is balanced.The maximum number of parentheses that appear on the stack at any one time when the algorithm analyzes:(( )(( ))(( ))) ?	C	1	1	2	3	4
135	3	Which is the correct algorithmic sequence for the conversion of an expression from Infix to Prefix? A. Change of every '(' (opening bracket) by ')' (closing bracket) and vice-versa. B. Reversal of an infix expression. C. Conversion of the modified expression into postfix form. D. Reversal of postfix expression.	C	1	A, B, C, D	C, A, D, B	B ,A, C, D	D, B, A, C
136	3	Assume that the operators +, −, × are left associative and ∧ is right associative. The order of precedence (from highest to lowest) is ∧, ×, +, −. The postfix expression corresponding to the infix expression a+b×c−d∧e∧f is	B	1	abc×+de∧f∧−	abc×+def∧∧−	ab+c×d−e∧f∧	− +a×bc∧∧def
137	3	Which of the following is the correct order of evaluation for the below expression? z=x+y∗z/4%2−1	A	1	∗/%+−=	∗/%+=−	/%+−=*	∗/−=+%
138	3	What would be the solution to the given prefix notation? - * 1 5 / * / 6 3 6 2	C	1	1	0	-1	-2
139	3	Consider the postfix expression 4 5 6 a b 7 8 a c, where a, b, c are operators. Operator a has higher precedence over operators b and c. Operators b and c are right associative. Then, equivalent infix expression is	C	1	4 a 5 6 b 7 8 a c	4 a 5 c 6 b 7 a 8	4 b 5 a 6 c 7 a 8	4 a 5 b 6 c 7 a 8
140	3	The equivalent prefix expression and value for the postfix form 10, 2, +, 24, 8, /, 2, *, - will be _____	A	1	-, +, 10, 2, *, /, 24, 8, 2 and 6	.=+, -, 10, 2, *, /, 24, 8, 2 and -6	-, +, 10, 2, /, *, 24, 8, 2 and 6	-, +, 2, 10, *, /, 24, 8, 2 and -6
141	3	The type of expression in which operator succeeds its operands is?	C	1	Infix Expression	Prefix Expression	Postfix Expression	Suffix Expression
142	3	What is the correct postfix expression for the following expression? a+b*(c^d-e)^(f+g*h)-i	C	1	abc^de-fg+*^*+i-	abcde^-fg*+*^h*+i-	abcd^e-fgh*+^*+i-	ab^-dc*+ef^gh*+i-
143	3	The following postfix expression with single digit operands is evaluated using stack. 8 2 3 ^ / 2 3 * + 5 1 *- The top two elements of stack after the first * operator evaluated are.	A	1	6,1	5,7	3,2	1,5
144	3	What is the value of postfix expression 6324++*	D	1	Something between -5 and -15	Something between 5 and -5	Something between 5 and 15	Something between 15 and 100
145	3	Infix To reverse polish conversion for given example: A+(B*C-D)+(E*(F/G-H))	B	1	ABCD*-+EFG/H+-*	ABC*D-+EFG/H-*+	AB*CD+-EFG/H-+*	ABCDEF/+-*GH-+*
146	3	Given the following prefix expression: * + 3 + 3 ↑ 3 + 3 3 3 What is the value of the prefix expression?	C	1	2178	2199	2205	2232
147	3	Here is an infix expression: 4+3*6*3-12. Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols will appear on the stack AT ONE TIME during the conversion of this expression? (Consider the sylbols given in expression only , not # Empty symbol)	C	1	1	2	3	5

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
148	3	Which of the followings are valid RPN? I. abc*- II. abc+ III. ab+cd-* IV. abd/+-	D	1	I only	I, II only	I, II, III only	I, III
149	3	What is the value of following suffix? A B + C D / * G H * + (where A=2, B=4, C=6, D=3, G=8, H=7)	D	1	40	280	140	68
150	3	Transform the following postfix expression into its equivalent infix expression. A B C * D E F ^ / G * - H * +	C	1	(A + (((B*C) - ((D ^ (E/F)) * G)) * H))	(A + (((B*C) - ((D / (E^F)) / G)) * H))	(A + (((B*C) - ((D / (E^F)) * G)) * H))	(A * (((B+C) - ((D / (E^F)) * G)) * H))
151	3	The postfix for / + - a / b c e + a b	D	1	a b c / + e – a b + /	a b / c e – a b + + /	a b / c e - + a b + /	a b c / - e + a b + /
152	3	Convert 2 * 3 / (2 - 1) + 5 * 3 into Postfix form	B	1	2 3 * 2 1 - * 5 3 / +	2 3 * 2 1 - / 5 3 * +	2 3 * 2 1 + / 5 3 * -	2 3 / 2 1 - * 5 3 * +
153	3	Construct the infix for / - A B * C ^ D E	C	1	A – B / C ^ D * E	A – B * C / D ^ E	(A – B) / (C * D ^ E)	A – (B * C ^ D) / E
154	3	Consider the following infix expression which is to be converted to postfix expression using stack. (((P+Q)∗(R+S))/T)+(A∗(B+C)) What is the preferable size of stack? (Considering only those symbols which are given in the expression, no extra symbols used in Algorithm)	A	1	5	6	7	8
155	3	Here is an infix expression: 4 + 3*(6*3-12). Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation. The maximum number of symbols of the given expression that will appear on the stack AT ONE TIME during the conversion of this expression?	D	1	1	2	3	4
156	3	Convert the infix notation into Polish notation using stack (tabulation) method. A-B+(M$N)*(O+P)-Q/R^S*T+Z		3				
157	3	Convert the INFIX expression to POSTFIX expression and evaluate that POSTFIX expression by using following values. A+(B*(C-D))^ E $(F/G) A= 1, B= 2, C= 3, D= 1, E=2, F=1, G=2.		2				
158	3	Compute the post fix equivalent of the following expression 3∗log(x+1)−(a/2)		2				
159	3	1. Using Stack, evaluate the following expression: a+(b*(c-d))^e$(f/g) where a=1, b=2, c=3, d=1, e=2, f=1 and g=2. Show all the steps/iterations in the tabulation method. 2. Convert the following expression from prefix to postfix: ++/a^bc/*d^efg^k$hj		2				
160	3	Evaluate- 623+-382/+*2^3+		2				
161	3	What would be the polish notation for the given equation? (A*B) +(C+D)	A	1	+*AB+CD	AB*CD*+	**AB+CD	AB+CD**
162	3	What is the postfix expression for the corresponding infix expression? a+(b*(c*(d/e^f)*g)*h)	B	1	ab*cdef/^*g-h+	abcdef^/*g*h*+	abcd*^ed/g*-h*+	abc*de^fg/*-*h+
163	3	Choose correct reverse polish notation for the following expression? a+b*(c^d-e)^(f+g*h)-i	C	1	abc^de-fg+*^*+i-	abcde^-fg*+*^h*+i-	abcd^e-fgh*+^*+i-	ab^-dc*+ef^gh*+i-
164	3	What would be the solution to the given prefix notation? * * + 1 2 / 4 2 + 3 5	D	1	40	8	50	48
165	3	The result of postfix expression 5 3 * 9 + 6 / 8 4 / + is _____	B	1	8	6	10	9
166	3	What would be the reverse polish notation for the given expression? a + (b * c – d) + (e * (f / g – h))	A	1	abc*d-+efg/h-*+	abc*d-+efg/h-+*	abc*d-+efg/h-*+	abc*d+-efg/h-*+
167	3	Convert following infix expressions to the postfix expressions. Shows stack trace. (A+B) *D+E / (F+G*D) + C		3				
168	3	Transform the following expression to postfix and evaluate the expression by assuming A=1, B=2, C=3, D=4, E=6, F=6, G=1, I=3, J=3 Expression: - A + B – C * D / E + F $ G / (I + J)		3				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
169	3	Convert (A+B) *C-D^E^(F*G) infix expression into prefix format showing stack status after every step-in tabular form.		3				
170	3	Convert following infix expressions to the Reverse Polish notation. Shows stack trace. A + B * (C ^ D – E) ^ (F + G * H) - I		2				
171	3	Convert P $ Q $ R / S * T * U – V + W infix expression into prefix format showing stack status after every step in tabular form.		2				
172	3	Evaluate the following infix expression using stack trace. 2 $ 3 + 5 * 2 $ 2 – 6 / 6 (To solve this apply concept of evaluation of prefix expression).		1				
173	3	Evaluate the following postfix expression using stack. 1 2 3 2 3 ^ ^ * + 6 2 / 4 * –		2				
174	3	Convert following Infix expression to Polish format showing stack status after every status after every step in tabular form.A + (b / (B + a) ^ B * b) $ a * (A + B)		3				
175	3	Which data structure is required to convert the infix to prefix notation?	B	1	Queue	Stack	Binary tree	Linked list
176	3	Which of the following is the infix expression?	A	1	A+B*C	+A*BC	ABC+*	None of the above
177	3	Which of the following is the prefix form of A+B*C?	D	1	A+(BC*)	+AB*C	ABC+*	+A*BC
178	3	What is the outcome of the prefix expression +, -, *, 3, 2, /, 8, 4, 1?	C	1	12	11	5	4
179	3	_____ is used to convert infix expression into postfix expression?	A	1	Stack	Linklist	Array	Queue
180	3	The result evaluating the postfix expression 10 5 + 60 6 / * 8 - is	C	1	284	213	142	71
181	3	The best data structure to check whether an arithmetic expression has balanced parentheses is ……	A	1	Stack	Linklist	Array	Queue
182	3	Which of the following is essential for converting an infix expression to the postfix form efficiently?	A	1	An operator stack	An operand stack	A or B	None of these
183	3	Which of the following is the correct order of evaluation for the below expression? z=x+y∗z/4%2−1	A	1	∗/%+−=	∗/%+−	/%+−=*	∗/−=+%
184	3	Evaluate the following postfix expression using stack AB+CD/*GH*+ ((where A=2,B=4,C=6,D=3,G=8,H=7)		4				
185	3	Trace the conversion of infix to postfix form in tabular for (A+B*C/D-E+F/G/(H+I))		5				
186	3	Convert (A+B)*C-D^E^(F*G) infix expression into prefix format showing stack status after every step in tabular form.		5				
187	3	Convert the following infix expression to postfix form using Stack. ((A – (B + C)) × D) / (E + F)		5				
188	3	Convert following infix expressions to the postfix expressions. Shows stack trace. A/B$C+D*E/F-G+H		5				
189	3	Convert following infix expressions to the postfix expressions. Shows stack trace. (A+B)*D+E/(F+G*D)+C		5				
190	3	Write a program to evaluate the given postfix expression.		7				
191	3	Evaluate the following postfix expression in tabular form showing stack after every step. 7 6 + 4 * 4 10 + - 5 +		5				
192	3	Convert following infix expressions to the postfix expressions. Shows stack trace. A + B / C + D * (E - F) ^ G		7				
193	3	Convert the infix expression (A + B) × (C + D) into Prefix or Polish notation?		5				
194	3	Convert the infix expression A × B + A × (B × D + C × E) into Polish notation using stack.		5				
195	3	Convert the infix expression A × (B + C × (D + E)) / F × (G + H) into prefix notation?		5				
196	3	Evaluate the prefix expression or polish expression × 5 – 4 3 using stack?		3				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
197	3	Evaluate the Polish expression - + - x 4 3 2 50 / x 7 8 4 using stack?		7				
198	3	Convert the infix notation A × B + C × D + E × F into Postfix Notation or Reverse Polish Notation?		5				
199	3	Convert the infix notation (A – B + C × (D × E – F)) / G + H × K into postfix notation?		7				
200	3	Evaluate the post fix expression or reverse polish expression 50 4 3 × 2 – + 7 8 × 4 / – using stack?		7				
201	3	Convert given expression from infix to postfix A / B ^ C + D * E - A * C		3				
202	3	Convert given expression from infix to postfix (6 +2) * 8/4		3				
203	3	Convert ((A – (B + C)) * D) î (E + F) infix expression to postfix form.		7				
204	3	convert 2*3/(2-1)+5*3 into Postfix form		5				
205	3	Evaluate the following postfix expression using a stack. Show the stack contents. AB*CD$-EF/G/+ A=5, B=2, C=3, D=2, E=8, F=2, G=2		5				
206	3	Evaluate- 623+-382/+*2^3+		3				
207	3	Write a program to evaluate the given prefix expression.		7				
208	4	A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as _____	A	1	Queue	Stack	Tree	Linked list
209	4	A queue follows _____	A	1	FIFO (First In First Out) principle	LIFO (Last In First Out) principle	Ordered array	Linear tree
210	4	Circular Queue is also known as _____	A	1	Ring Buffer	Square Buffer	Rectangle Buffer	Curve Buffer
211	4	If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed?	A	1	ABCD	DCBA	DCAB	ABDC
212	4	A normal queue, if implemented using an array of size MAX_SIZE, gets full when?	A	1	Rear = MAX_SIZE – 1	Front = (rear + 1)mod MAX_SIZE	Front = rear + 1	Rear = front
213	4	What is the term for inserting into a full queue known as?	A	1	overflow	underflow	null pointer exception	program won’t be compiled

214	4	Following is pseudo code of a function that takes a Queue as an argument, and uses a stack S to do processing.
		void fun(Queue Q)
		{
		Stack S; // Say it creates an empty stack S
		// Run while Q is not empty
		while (!isEmpty(Q))
		{
		// deQueue an item from Q and push the dequeued item to S
		push(S, deQueue(Q));
		}
		// Run while Stack S is not empty
		while (!isEmpty(S))
		{
		// Pop an item from S and enqueue the poppped item to Q
		enQueue(Q, pop(S));
		}
			D	1	Removes the last from Q	Keeps the Q same as it was before the call	Makes Q empty	Reverses the Q

215	4	How many stacks are needed to implement a queue. Consider the situation where no other data structure like arrays, linked list is available to you.	B	1	1	2	3	4
216	4	How many queues are needed to implement a stack. Consider the situation where no other data structure like arrays, linked list is available to you.	B	1	1	2	3	4

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D

217	4	void insert(Q, x) {
		push (S1, x);
		}
		
		void delete(Q){
		if(stack-empty(S2)) then
		if(stack-empty(S1)) then {
		System.out.println("Q is empty");
		return;
		}
		else while (!(stack-empty(S1))){
		x=pop(S1);
		push(S2,x);
		}
		x=pop(S2);
		}
		Let n insert and m (<=n) delete operations be performed in an arbitrary order on an empty queue Q. Let x and y be the number of push and pop operations performed respectively
			A	1	n+m <= x <= 2n and 2m <= y <= n+m	n+m <= x <= 2n and 2m<= y <= 2n	2m <= x < 2n and 2m <= y <= n+m	2m <= x <2n and 2m <= y <= 2n

218	4	Consider the following pseudo code. Assume that IntQueue is an integer queue. What does the function fun do?
		void fun(int n)
		{
		IntQueue Q // creates new integer queue
		enqueue(Q,0);
		enqueue(Q,1);
		for (int i = 0; i < n; i++)
		{
		int a = dequeue(Q);
		int b = dequeue(Q);
		enqueue(Q, b);
		enqueue(Q, a + b);
		print(a);
		}
		}
			C	1	Prints numbers from 0 to n-1	Prints numbers from n-1 to 0	Prints first n Fibonacci numbers	Prints first n Fibonacci numbers in reverse order

219	4	Suppose implementation supports an instruction REVERSE, which reverses the order of elements on the stack, in addition to the PUSH and POP instructions. Which one of the following statements is TRUE with respect to this modified stack?	C	1	A queue cannot be implemented using this stack.	A queue can be implemented where ENQUEUE takes a single instruction and DEQUEUE takes a sequence of two instructions.	A queue can be implemented where ENQUEUE takes a sequence of three instructions and DEQUEUE takes a single instruction.	A queue can be implemented where both ENQUEUE and DEQUEUE take a single instruction each.
220	4	Consider the following statements: i. First-in-first out types of computations are efficiently supported by STACKS. ii. Implementing QUEUES on a circular array is more efficient than implementing QUEUES on a linear array with two indices. iii. Last-in-first-out type of computations are efficiently supported by QUEUES. Which of the following is correct?	A	1	Only (ii) is true	(i) and (ii) are true	(iii) and (iv) are true	Only (iii) is true
221	4	Consider a standard Circular Queue 'q' implementation (which has the same condition for Queue Full and Queue Empty) whose size is 11 and the elements of the queue are q[0], q[1], q[2].....,q[10]. The front and rear pointers are initialized to point at q[2] . In which position will the ninth element be added?	A	1	q[0]	q[1]	q[9]	q[10]
222	4	In a circular queue, how do you increment the rear end of the queue?	B	1	rear++	(rear+1) % CAPACITY	(rear % CAPACITY)+1	rear–
223	4	What is the need for a circular queue?	A	1	effective usage of memory	easier computations	to delete elements based on priority	implement LIFO principle in queues
224	4	Let the following circular queue can accommodate maximum six elements with the following data front = 2 rear = 4 queue = __, L, M, N, ___, ___ What will happen after ADD O operation takes place?	A	1	front = 2 rear = 5 queue = _____; L, M, N, O, ___	front = 3 rear = 5 queue = L, M, N, O, ___	front = 3 rear = 4 queue = _____; L, M, N, O, ___	front = 2 rear = 4 queue = L, M, N, O, ___

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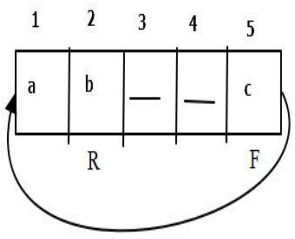
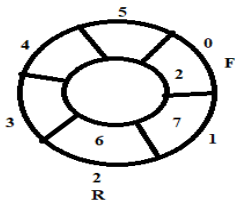
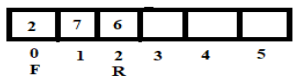
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
225	4	If the MAX_SIZE is the size of the array used in the implementation of circular queue. How is rear manipulated while inserting an element in the queue?	C	1	rear=(rear%1)+MAX_SIZE	rear=rear%(MAX_SIZE+1)	rear=(rear+1)%MAX_SIZE	rear=rear+(1%MAX_SIZE)
226	4	If the MAX_SIZE is the size of the array used in the implementation of circular queue, array index start with 0, front point to the first element in the queue, and rear point to the last element in the queue. Which of the following condition specify that circular queue is FULL?	B	1	Front=rear= -1	Front=(rear+1)%MAX_SIZE	Rear=front+1	Rear=(front+1)%MAX_SIZE
227	4	A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6, and rear is 9. The insertion of next element takes place at the array index.	A	1	0	7	9	10
228	4	If the MAX_SIZE is the size of the array used in the implementation of circular queue, array index start with 0, front point to the first element in the queue, and rear point to the last element in the queue. Which of the following condition specify that circular queue is EMPTY?	B	1	Front=rear=0	Front= rear=-1	Front=rear+1	Front=(rear+1)%MAX_SIZE
229	4	An array of size MAX_SIZE is used to implement a circular queue. Front, Rear, and count are tracked. Suppose front is 0 and rear is MAX_SIZE -1. How many elements are present in the queue?	D	1	Zero	One	MAX_SIZE-1	MAX_SIZE
230	4	Match the following:- A. Linear Queue (i). delete element from queue B. Circular Queue (ii). If (R == size – 1), Queue is full. C. Enqueue (iii). If (R== F+1 || (R==size-1 && F==0)), Queue is full D. Dequeue (iv). Insert element into queue	D	1	A-(iii), B-(ii), C-(iv), D-(i)	A-(iv), B-(iii), C-(ii), D-(i)	A-(i), B-(iii), C-(iv), D-(ii)	A-(ii), B-(iii), C-(iv), D-(i)
231	4	The initial configuration of circular queue as follows  What is status or states of queue contents after the following sequence of steps enqueue x, dequeue, enqueue y, dequeue, dequeue	C	1	x,y,____,_____,____	x,___,y,____,____	____,_____, x ,y,____	_____,x,y,_____,_____
232	4	What will the final value of Front and Rear pointer value after given below operation for linear and circular queue.   enqueue(10), enqueue(20), enqueue(70), dequeue, dequeue, enqueue(25), enqueue(15), dequeue	A	1	linear: F=3, R=5 circular: F=3, R=1	linear: F=3, R=5 circular: F=3, R=2	linear: F=5, R=5 circular: F=3, R=1	linear: F=3, R=3 circular: F=3, R=1

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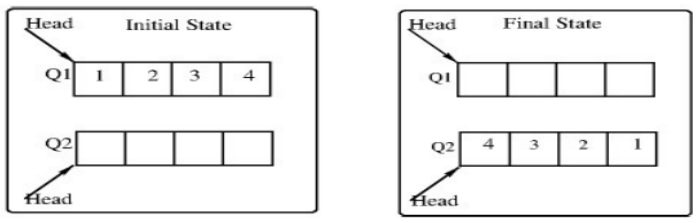
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
233	4	Consider the double ended queues Q1 containing four elements and Q2 containing none (shown as the Initial State in the figure). The only operations allowed on these two queues are Enqueue(Q, element) and Dequeue(Q).The r p t s 	A	1	0	1	2	3
234	4	Consider a standard Circular Queue 'q' implementation (which has the same condition for Queue Full and Queue Empty) whose size is 11 and the elements of the queue are q[0], q[1], q[2].....,q[10]. The front and rear pointers are initialized to point at q[2] . In which position will the 8th element be added?	D	1	q[0]	q[1]	q[2]	q[10]
235	4	Identify the data structure which allows deletions at both ends of the array but insertion at only one end.	A	1	Input restricted dequeue	Output restricted dequeue	Priority queues	Stack
236	4	Write an algorithm to perform Enqueue operation in simple Queue		3				
237	4	Write an algorithm to perform Dequeue operation in simple Queue		3				
238	4	Write an algorithm to perform Enqueue operation in Circular Queue		4				
239	4	Write an algorithm to perform Dequeue operation in Circular Queue		4				
240	4	Write an algorithm for circular queue that insert an element at rear end		4				
241	4	What is the advantage of circular queue over simple queue?		3				
242	4	Write an algorithm for inserting ‘A’,’B’,’C’,delete ‘A’ and ‘B’and insert ‘D’ and‘E’ in circular queue		7				
243	4	Consider the following queue, where queue is a circular queue having 6 memory cells. Front=2, Rear=4 Queue: _, A, C, D, _, _ Describe queue as following operation take place: F is added to the queue Two letters are deleted R is added to the queue S is added to the queue One letter is deleted		3				
244	4	Perform following operations in a circular queue of length 4 and give the Front, Rear and Size of the queue after each operation. 1) Insert A, B 2) Insert C 3) Delete 4) Insert D		3				
245	4	Write an algorithm/program to implement Insert & Delete operation into a Circular Queue using array representation of Queue.		7				
246	4	Write algorithm for INSERT, DELETE and DISPLAY function of the QUEUE.		7				
247	4	Write a program to perform insert and delete routines on a queue.		7				
248	4	Write a JAVA program to implement a circular queue using array with all necessary overflow and underflow checks		7				
249	4	Write a JAVA functions for insertion and deletion operation in simple queue.		7				
250	4	What is the need for a circular queue?	A	1	effective usage of memory	easier computations	to delete elements based on priority	implement LIFO principle in queues

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Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
251	4	You are given a QUEUE containing 'N' integers and an integer 'K'. You need to reverse the order of the first 'K' elements of the queue, leaving the other elements in the same relative order. You can only use the standard operations of the QUEUE STL: 1. enqueue(x) : Adds an item x to rear of the queue 2. dequeue() : Removes an item from front of the queue 3. size() : Returns number of elements in the queue. 4. front() : Finds the front element. For Example: Let the given queue be { 1, 2, 3, 4, 5 } and K be 3. First K integers of Queue which are 1, 2, and 3. Thus, the final response will be { 3, 2, 1, 4, 5 }. Write an algorithm to perform the above implementation.		4				
252	4	Consider a circular queue of size 6. Let Front =2, Rear =4, and Queue : __, L, M, N, __, __ Describe the queue as following operations are performed. 1) Add O 2) Add P 3) Delete 4) Delete 5) Add Q, R, S 6) Delete	A	1	R=4 and F=2	R=3 and F=6	R=3 and F=4	Queue Overflow

253	4	Suppose you are given an implementation of a queue of integers. The operations that can be performed on the queue are:
		i. isEmpty (Q) — returns true if the queue is empty, false otherwise.
		ii. delete (Q) — deletes the element at the front of the queue and returns its value.
		iii. insert (Q, i) — inserts the integer i at the rear of the queue.
		Consider the following function:
		void f (queue Q) {
		int i;
		if(!isEmpty(Q)){
		i = delete(Q);
		f(Q);
		insert(Q, i);
		} } What operation is performed by the above function f ?
			B	1	Leaves the queue Q unchanged	Reverses the order of the elements in the queue Q	Deletes the element at the front of the queue Q and inserts it at the rear keeping the other elements in the same order	Empties the queue Q

254	4	Consider the following pseudo code implementation of Enqueue and Dequeue operations using two initially empty very large stacks P and Q, with primitive stack operations PUSH and POP.
		Stack P, Q;
		Enqueue(key k)
		PUSH(k,P);
		Dequeue( ) {
		if(Q is empty)
		{
		while(P is not empty)
		MISSING STATEMENT ;
		}
		return POP(Q);
		}
		Choose the correct statement in place of MISSING STATEMENT. (Ignore error handling).
			A	1	PUSH(POP(P),Q)	PUSH(POP(P))	PUSH(P)	PUSH(POP(Q))

255	4	Which among the following data structure may give overflow error, even though the current number of elements in it is less than its size.	D	1	Circular queue	Stack	Adaptive queue	Simple queue
256	4	Queues serve major role in ____	C	1	Simulation of recursion	Simulation of heap sort	Simulation of limited resource allocation	None of these

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
257	4	Suppose a queue is maintained by a circular array holding 10 elements. Find the number of elements in the queue after the following operations 1) front=3, rear=7 2) front=9, rear=4 3) Front =4, rear=5 and then two elements are deleted.	A	1	0	1	2	3
258	4	I have implemented the queue with a circular array, keeping track of first, last, and count (the number of items in the array). Suppose first is zero, and last is SIZE-1. What can you tell me about count?	D	1	count must be zero.	count must be SIZE	count must be SIZE-2	count could be 1 or SIZE, but no other values could occur.
259	4	Suppose we have a circular array implementation of the queue type, with ten items in the queue stored at data [2] through data [11]. The current SIZE is 22. Where does the insert method place the new entry in the array?	C	1	data[1]	data[22]	data[12]	data[11]
260	4	The problem of false alarm about overflow of linear queue is removed by the application of_____.	D	1	deque	Stack	Array	Circular Queue
261	4	A linear list of elements in which deletion can be done from both end and insertion can take place only at one end is known as _____.	D	1	priority queue	LIFO	IRD	ORD

262	4	Queue – enqueue() Array implementation. Assume that the queue is having atleat one element.
		void enqueue (int data)
		{
		if (capacity== rear)
		return;
		else
		arr[rear]=data;
		return;
		}
			B	1	The code might try to insert elements even when the queue is full which will lead to an overflow	the code overwrites existing records when we try to insert new data	the code doesn't check if the data is empty	the code doesn't update the front of the queue

263	4	Provided the space is available, then to insert an element in the queue, we can use for the following structure class queue { int Q[20]; int f, r; }Q;	B	1	$++Q.Q[Q.r] = x;	Q.Q[++Q.r] = x;	Q.Q[Q.r]++ = x;	Syntax error
264	4	Write a JAVA function for circular queue for the below operations. 1)To check Overflow condition 2)To check Underflow condition		2				
265	4	Write a JAVA function to implement Circular queue insertion.		2				
266	5	Consider a deque given below which has LEFT=1, RIGHT=5 _ A B C D E _ _ _ _ . Now perform the following operations on the deque and trace values of LEFT and RIGHT respectively. 1. Add F on the left. 2. Add G on the right. 3. Add H on the right. 4. Delete two alphabets from left 5. Add I on the right	A	1	2,8	1,8	1,7	2,7
267	5	After performing these set of operations in double ended queue, what does the final list look contain? InsertFront(10); InsertFront(20); InsertRear(30); DeleteFront(); InsertRear(40); InsertRear(10); DeleteRear(); InsertRear(15); display();	D	1	10 30 10 15	20 30 40 15	20 30 40 10	10 30 40 15
268	5	Which one of the following is an application of Queue Data Structure?	D	1	When a resource is shared among multiple consumers.	When data is transferred asynchronously (data not necessarily received at same rate as sent) between two processes	Load Balancing	All of the above

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
269	5	What is a deque?	A	1	A queue with insert/delete defined for both front and rear ends of the queue	A queue implemented with a doubly linked list	A queue implemented with both singly and doubly linked lists	A queue with insert/delete defined for front side of the queue
270	5	Which of the following can not be used to implemenet priority queue?	D	1	Arrays	Linked List	Heaps	None of these
271	5	If priority queue is implemeneted using arrays then which of the following is not the basic operation of the queue?	A	1	enqueue	dequeue	peek	Reverse
272	5	Which of the following data structure follows FIFO technique?	D	1	Priority Queue	deque	Both of these	None of these
273	5	A Double-ended queue supports operations such as adding and removing items from both the sides of the queue. They support four operations like addFront(adding item to top of the queue), addRear(adding item to the bottom of the queue), removeFront(removing item from the top of the queue) and removeRear(removing item from the bottom of the queue). You are given only stacks to implement this data structure. You can implement only push and pop operations. What are the total number of stacks required for this operation?(you can reuse the stack)	B	1	1	2	3	4
274	5	Write an algorithm to insert item from front of Double ended Queue.		3				
275	5	Write an algorithm to insert item from rear of Double ended Queue.		3				
276	5	Write an algorithm to delete item from front of Double ended Queue.		3				
277	5	Write an algorithm to delete item from rear of Double ended Queue.		3				
278	5	Write a program to implement Deque Operations		7				
279	5	Write a function to insert and delete items from double ended queue from front		4				
280	5	Write a function to insert and delete items from double ended queue from rear		4				
281	5	Is Queue a priority queue? Justify.		2				
282	5	Consider a Double Ended Queue given below which has F=3, R=4 and size = 8 _ _ B C _ _ _ _ Now perform the following operations on the dequeue (Insert A at front, Insert D at front, Insert E at rear , Delete two alphabets from front) What is the value of F and R?	A	1	3,5	3,6	1,5	2,5
283	5	Given an initially empty Deque named D, perform the operations below in the order shown, then answer the questions below Deque < int > D; D. insertAtREAR(42) ; D. insertAtREAR(17) ; D. insertAtFront(12); D. insertAtREAR (87) ; D. removeFromFront(); D. insertAtREAR (23) ; D. removeFromFront(); D. insertAtREAR (99) D. insertAtFront (88) ; D. insertAtFront (44) ; D. removeFromREAR (); (a) How many elements are in the deque? (b) What value is at the front of the deque? (c) What value is at the rear of the deque?	D	1	element=0,f=44,r=17	element=1,f=23,r=88	element=5,f=99,r=88	element=5,f=44,r=23
284	5	Write a Pseudo code to Delete an element from rear and Insert an element from front in Double Ended queue.		3				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
285	6	Which of the following is not a disadvantage to the usage of array?	D	1	Fixed size	There are chances of wastage of memory space if elements inserted in an array are lesser than the allocated size	Insertion based on position	Accessing elements at specified positions
286	6	A linear collection of data elements where the linear node is given by means of reference is called?	A	1	Linked list	Node list	Primitive list	Unordered list
287	6	In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?	C	1	reference to character	reference to integer	reference to node	Node
288	6	Linked list is considered as an example of _____ type of memory allocation.	A	1	Dynamic	Static	Compile time	Heap
289	6	In Linked List implementation, a node carries information regarding _____	C	1	Data	Link	Data and Link	Node
290	6	Linked list data structure offers considerable saving in _____	C	1	Computational Time	Space Utilization	Space Utilization and Computational Time	Speed Utilization
291	6	Which of the following points is/are not true about Linked List data structure when it is compared with an array?	D	1	Arrays have better cache locality that can make them better in terms of performance	It is easy to insert and delete elements in Linked List	Random access is not allowed in a typical implementation of Linked Lists	Access of elements in linked list takes less time than compared to arrays

292	6	What is the output of following function for start pointing to first node of following linked list?
		1->2->3->4->5->6
		void fun(Node start)
		{
		if(start == null)
		return;
		System.out.print(" " + start.data);
		if(start.next != null)
		fun(start.next.next);
		System.out.print(" "+ start.data);
		}
		Note - Cosnider inner class Node has outer class Linkedlist and having two data memeber data(to store the data) and next (to store the reference of the next Node). First of a given likedlist is passed as an argument to the given function
			D	1	1 4 6 6 4 1	1 3 5 1 3 5	1 2 3 5	1 3 5 5 3 1

293	6	What is the output of following function where head pointing to first node of following linked list?
		10->20->30->40->50
		void fun(Node head)
		{
		int x=25;
		System.out.print(" " +head.info);
		head=head.link.link;
		if(head.info<=x)
		System.out.print(" " +head.info);
		}
			B	1	25	10	20	20 30

294	6	Given reference to a node X in a singly linked list. Only one reference is given, reference to first node is not given, can we delete the node X from given linked list?	A	1	Possible if X is not last node	Possible if size of linked list is even	Possible if size of linked list is odd	Possible if X is not first node
295	6	A variant of linked list in which last node of the list points to null?	A	1	Singly linked list	Doubly linked list	Circular linked list	Multiply linked list
296	6	In Singly linked list each node contain _____ fields.	B	1	One	Two	Three	Four
297	6	Which of the following points is/are true about Linked List data structure when it is compared with array	D	1	Arrays have better cache locality that can make them better in terms of performance.	The size of array has to be pre-decided, linked lists can change their size any time.	Random access is not allowed in a typical implementation of Linked Lists	All of the Given
298	6	You are given pointers to first and last nodes of a singly linked list, which of the following operations are dependent on the length of the linked list?	C	1	Delete the first element	Insert a new element as a first element	Delete the last element of the list	Add a new element at the end of the list

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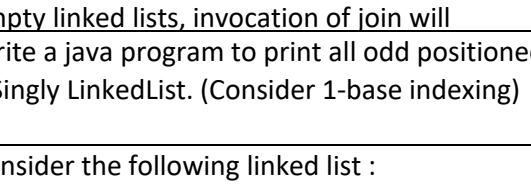
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
299	6	Write a JAVA program to count the number of nodes in a singly linked list		5				
300	6	Write a JAVA program to Delete the node whose value = Y		5				
301	6	Consider singly linked storage structures, Write a java program which performs an insertion at the end of a linked linear list.		5				
302	6	Write a java program for deletion in Singly Linked List.		5				
303	6	Write a function for insert in the queue implementation using Linked list.		2				
304	6	Consider a single linked list where F and L are pointers to the first and last elements respectively of the linked list. The time for performing which of the given operations depends on the length of the linked list?  	C	1	Delete the first element of the list	Interchange the first two elements of the list	Delete the last element of the list	Add an element at the end of the list
305	6	Write a method for insert at end in singly Linked list.		3				
306	6	Write a program to search an element in a linked list.		5				

307	6	What will be the output of the following code segment if list is: 10->20->30->40->50->60?
		void solve(Node root) {
		int s = 0;
		while(root.next != null) {
		s += root.val;
		root = root.next;
		}
		System.out.println(s);}
		Cosnider the Node inner class of SLinkedList is having two data member - val, next
			C	1	120	210	150	60

308	6	Consider the Java code fragment given below.
		void join(Node m, Node n){
		Node p = n;
		while(p.next != null)
		{
		p = p.next;
		}
		p.next = m;}}
		Assuming that m and n point to valid null terminated, non empty linked lists, invocation of join will
			A	1	append list m to the end of list n	append list n to the end of list m	always gives null pointer dereference for all inputs	depends on the input

309	6	Write a java program to print all odd positioned nodes from a Singly LinkedList. (Consider 1-base indexing)		3				
310	6	Consider the following linked list : class Node { int info; Node link; }head = null; What will be the value of the following statement? Head.link.link.link.info; 10-> 12-> 14-> 16-> 20	D	1	10	12	14	16

311	6	The following Java function takes a singly-linked list as input argument. It modifies the list by moving the last element to the front of the list and returns the modified list. Some part of the code is left blank.
		Node move_to_front(Node head)
		{
		Node p, q;
		if ((head == null) || (head.next == null))
		return head;
		q = null;
		p = head;
		while (p.next != null)
		{
		q=p;
		p=p.next;
		}
		_____
		return head; }
		Choose the correct alternative to replace the blank line.
			D	1	q=null;p.next=head;head=p;	q.next=null;head=p;p.next=head;	head=p;p.next=q;q.next=null;	q.next=null;p.next=head;head=p;

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312	6	What does the following code snippet do?
		int solve (ListNode list) {
		ListNode fast = list;
		ListNode slow = list;
		while(fast.next != null && fast.next.next != null) {
		fast = fast.next.next;
		slow = slow.next;
		}
		return slow.data;
		}
		}
			A	1	Find middle element in the linked list.	Find last element in the linked list	Find first element in the linked list	No elements

313	6	In the linked list implementation of the queue, where does the insert method place the new entry on the linked list?	B	1	At the head	At the tail	After all other entries that are greater than the new entry	After all other entries that are smaller than the new entry
314	6	Suppose cursor refers to a node in a linked list. What Boolean expression will be true when cursor refers to the tail node of the list?	A	1	cursor.next == null	cursor == null	cursor.data == null	cursor.data == 0

315	6	What is the output of the following function when it is called?
		void disp(node first)
		if(first != null)
		{
		System.out.println(" "+first.data);
		disp(first.next);
		}
			B	1	Display the data of next node always in the list	Display the data of all nodes of the list	Does not execute	Display the data of the first node only

316	6	node start=head;
		Suppose start is a reference to the head of one SLL.
		class node{
		int data;
		node next;
		}
		
		Consider the above code and predict what will be the output by following piece of code
		System.out.println(start.next.data);
			B	1	Print the “data” field of 1st node	Print the “data” field of 2nd node	Print the “data” field of 3rd node	Print the “data” field of 4th node

317	6	What does the following function do for a given Linked List with first node as head?
		
		void fun1(Slinkedlist head)
		{
		if(head==NULL)
		return;
		fun1(head.next);
		System.out.println(" "+head.data);
		}
			B	1	Prints all nodes of linked lists	Prints all nodes of linked list in reverse order	Prints alternate nodes of Linked List	Prints alternate nodes in reverse order

318	6	What is the output, if a SLL:1→2→3→4→5 is passed in the above Java code if the inner class node contains int data memeber and node next member?
		void print(node ptr)
		{
		if(ptr!= null)
		{
		System.out.print(ptr.data);
		do{
		System.out.print(ptr.data);
		} while(ptr.next != null);
		}
		}
		Assume Head reference at node 1
			C	1	1 2 3 4 5	5 4 3 2 1	1 1 1 1 1…..	1 2 3 4

319	6	If the Queue is implemented using singly linked list, keeping track of a front and rear reference, which of these references will change during an insertion into a non-empty queue?	D	1	Neither of the pointer change	Only front Pointer changes	Both of the pointers changes	Only rear Pointer changes

320	6	Consider the Java code fragment given below.
		boolean f(Node p){
		return
		((p == NULL) || (p.next == NULL) || ((p.data <= p.next.data) && f(p.next)));
		}
		For a given linked list p, the function f returns true if and only if
			B	1	not all elements in the list have the same data value.	the elements in the list are sorted in non-decreasing order of data value	the elements in the list are sorted in non-increasing order of data value	all elements in the list have the same data value.

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321	6	What is the output of following function for start refered to first node of following linked list? 1->2->3->4->5->6
		void fun(Node start)
		{
		if(start == null)
		return;
		System.out.print(start.next.data);
		
		if(start.next != null)
		fun(start.next.next);
		System.out.print(start.data);
		}
			A	1	2 4 6 5 3 1	1 3 5 5 3 1	2 4 6 6 4 2	2 4 6 3 1

322	6	The following java function takes a single-linked list of integers as a parameter and rearranges the elements of the list. The function is called with the list containing the integers 1, 2, 3, 4, 5, 6, 7 in the given order. What will be the contents of the list after the function completes execution?
		class Node {
		int value;
		Node next; };
		void rearrange(Node list) {
		Node p,q;
		int temp;
		if ((list!=null) || list.next!=null)
		return;
		p = list;
		q = list.next;
		while(q != null) {
		temp = p.value;
		p.value = q.value;
		q.value = temp;
		p = q.next;
		if(p.next != null){
		q = p.next;}
		else { q = null;} } }
			B	1	1,2,3,4,5,6,7	2,1,4,3,6,5,7	1,3,2,5,4,7,6	2,3,4,5,6,7,1

323	6	Write a recursive java function named “displayfromend()” which displays the contents of the linked list from the end in singly Linkedlist		1				
324	6	Write a JAVA function that copies one linked list to another linked list. The original linked list should be starting at the pointer “head” and the newly created linked list must have starting pointer “begin”. It should work for the following test case where 3 nodes are already created having data 12, 14 and 16 in a linked list pointed by head. The newly created linked list must have the data 12 at the place where “begin” points followed by 14 and 16. Write the output of the following test case.		2				

325	6	Consider the following function to traverse a linked list. Choose the correct missing statement at the place of ? to write the function correctly for traverse the list.
		void traverse(Node head)
		{
		??????????????????
		while (t != null)
		{
		System.out.print(“ ”+ t.data);
		t = t.next;
		}
		}
			D	1	t=thead;	head=t;	Node=head;	Node t=head;

326	6	In linked list implementation of a stack, where does a new element be inserted?	A	1	At the head of link list	At the center position in the link list	At the tail of the link list	At any position in the linked list
327	6	In linked list implementation of a simple queue, front and rear reference of nodes are tracked. Which of these references will change during an insertion into EMPTY and NONEMPTY queue respectively?	C	1	EMPTY: Only front pointer NONEMPTY: Only front pointer	EMPTY: Only front pointer NONEMPTY: Only rear pointer	EMPTY: Both front and rear pointer NONEMPTY: Only rear pointer	EMPTY: Both front and rear pointer NONEMPTY: Both front and rear

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D

328	6	Consider the following recursive implementation of linked list, which of the following lines should be inserted to complete the above code and what a function do?
		class Node
		{
		int data;
		Node next;
		}
		int function (Node t, int value)
		{
		if (t == null)
		return 0;
		if (t.data == value)
		return 1;
		return _____;
		}
			D	1	function(1), nothing	function(0), nothing	1, error	function (t.next, value), search

329	6	Which of the following statements are false?	D	1	random access of elements at linked list is not possible	arrays have better cache locality than linked list	size of linked list is dynamic and can be changed as	random access of elements at array is not possible

330	6	What will be the value of “count” after the following code snippet terminates?
		Consider head as the reference of the satrting Node of the Linkedlist.
		void puzzel(Node head) {
		/*
		The LinkedList is defined as:
		head.val = value of the node
		head.next = address of next element from the node
		The List is 1 -> 2 -> 3 -> 4 -> 5
		*/
		int count = 0;
		while(head.next != null) {
		count += head.val;
		head = head.next;
		}
		System.out.prinln(count);
		}
			A	1	10	5	1	2

331	6	The following function reverse() is supposed to reverse a singly linked list. There is one line missing at the end of the function.
		/* Inner class contains int data, Node next*/
		
		/* head_ref is a reference which points to head (or start) node of linked list */
		void reverse (node head_ref)
		{
		node prev = null;
		node current = head_ref;
		node n1;
		while (current != null)
		{
		n1 = current.next;
		current.next = prev;
		prev = current;
		current = n1; }
		/*ADD A STATEMENT HERE*/
		}
		What should be added in place of "/*ADD A STATEMENT HERE*/", so that the function correctly reverses a linked list.
			A	1	head_ref=prev;	head_ref=current;	head_ref=next;	head_ref=n1;

332	6	Write a program to implement stack (PUSH, POP, DISPLAY) functions with main function using link list.		4				
333	6	Write a JAVA Function for PUSH operation of Stack using Link List.		2				
334	6	Write a java Program for insertion in Ordered Singly Link list.		3				
335	6	In implementation of Queue data structure using Linked list, Dequeue operation of queue is equivalent to _____ operation of Linked list.	B	1	Deletion not possible	Delete at first	Deletion in descending order	Cannot be implemented using LL
336	6	Write a program to count the number of nodes in a singly linked list		3				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
337	6	The following steps in a linked list, where getnode() method creates a node. p = getnode() info (p) = 10 next (p) = list list = p Result in which type of operation?	C	1	pop operation in stack	removal of a node	inserting a node	modifying an existing node
338	7	Which of the following is false about a doubly linked list?	D	1	We can navigate in both the directions	It requires more space than a singly linked list	The insertion and deletion of a node take a bit longer	Implementing a doubly linked list is easier than singly linked list

339	7	Consider the following Doubly Linked List:
		
		If head points to the first node of the linked list then what will be the output of the following node?
		
		head=head.next.next.next.prev;
		head.next.next.prev=head;
		S.O.P(head.next.next.prev.next.value);
		1 --> 3 --> 5 --> 7 --> 9 --> NULL
			D	1	1	3	5	7

340	7	What is a memory efficient double linked list?	A	1	Each node has only one pointer to traverse the list back and forth	the list has breakpoints for faster traversal	An auxiliary singly linked list acts as a helper list to traverse through the doubly linked	A doubly linked list that uses bitwise AND operator for storing addresses
341	7	In doubly linked lists, traversal can be performed?	C	1	Only in forward direction	Only in reverse direction	In both directions	None
342	7	Which of the following operations is performed more efficiently by doubly linked list than by linked list singly?	A	1	Deleting a node whose location in given	Searching of an unsorted list for a given item	Inverting a node after the node with given location	Traversing a list to process each node
343	7	In a circular linked list	B	1	Components are all linked together in some non sequential manner.	There is no beginning and no end.	Components are arranged hierarchically.	Forward and backward traversal within the list is permitted.
344	7	A variant of linked list in which last node of the list points to the first node of the list is?	C	1	Singly linked list	Doubly linked list	Circular linked list	Multiply linked list
345	7	A variation of linked list is circular linked list, in which the last node in the list points to first node of the list. One problem with this type of list is?	C	1	It waste memory space since the inter head already points to the first node and thus the list node does not need to point to the first node.	It is not possible to add a node at the end of the list.	It is difficult to traverse the list as the pointer of the last node is now not NULL	None of these
346	7	A variant of the linked list in which none of the node contains NULL pointer is?	A	1	Circular linked list	Singly linked list	Doubly linked list	None
347	7	In circular linked list, insertion of node requires modification of how many pointers while isnerting into last?	B	1	One Pointer	Two pointer	Three Pointer	None
348	7	Which of the following application makes use of a circular linked list?	B	1	Undo operation in a text editor	Allocating CPU to resources	Recursive function calls	Implement Hash Tables
349	7	What differentiates a circular linked list from a normal linked list?	A	1	You may or may not have the ‘next’ pointer point to null in a circular linked list	It is faster to traverse the circular linked list	You may have the ‘next’ pointer point to null in a circular linked list	Head node is known in circular linked list but not in Singly LL
350	7	Which of these is an application of linked lists?	D	1	To implement file systems	For separate chaining in hash-tables	To implement non-binary trees	All of the mentioned
351	7	Linked lists are not suitable to for the implementation of?	C	1	Insertion sort	Radix sort	Binary search	Polynomial manipulation

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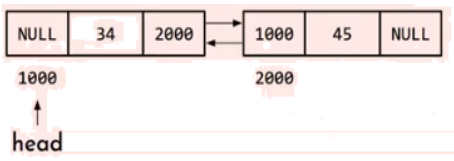
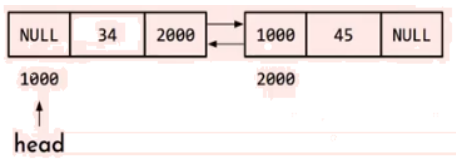
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
352	7	Which of the following segment of code adds a new node in front of the last node of doubly linked list? (Assume that new pointer is pointing to the new node to be added) 	B	1	temp=head; temp=temp.next; new.next=temp; temp.new=head;	tem= head; new.prev=temp; new.next=temp.next; temp.next.prev=new; temp.next=new;	temp= head; head.next=new;	New.next=temp.next.prev;
353	7	Consider the following doubly linked list: How the resultant linked list looks like after performing the following sequence of operation?  Temp=head; temp= temp->next; temp->data= temp->prev->data;	D	1	34->45	45->34	34->34	45->45
354	7	Write JAVA functions to implement DELETE_FIRST_NODE and TRAVERSE operations in doubly linked list.		5				
355	7	Write a Program for inserting and deleting an element into circular linked list.		5				
356	7	Write program to perform INSERT_FIRST (to insert a node at the first position) and REVERSE_TRAVERSE (to display the data in nodes in reverse order) operations in doubly linked list.		5				
357	7	Write JAVA functions to implement INSERT_FIRST (to insert a node at the first position), DELETE_FIRST (to delete a node from the first position), DELETE_LAST (delete a node from the last position) and TRAVERSE (to display the data in nodes) operations in circular linked list.		5				
358	7	Write a JAVA function to find maximum element from doubly linked list.		5				
359	7	Write an function to delete an element from a doubly link list		5				
360	7	Write functions to: (1) insert a node at the end (2) delete a node from the beginning of a doubly linked list.		5				
361	7	Write a Program for all (create, insert, delete, display) the operations in a circular linked list.		5				
362	7	Write a program to insert a new node into orderly doubly linked list.		5				
363	7	Write an program for insertion of a node in Doubly Linked List.		5				
364	7	Write a program to insert a node in a Circular Link List at the FIRST position.		5				
365	7	Write a program to insert a node at last position in doubly linked list.		5				
366	7	Write user defined function to insert and delete a node at/from end in doubly linked list.		5				
367	7	Which of the following statements about linked list data structure is/are TRUE?	B	1	Addition and deletion of an item to/ from the linked list does not require modification of the existing pointers	The linked list pointers do not provide an efficient way to search an item in the linked list	Linked list pointers always maintain the list in ascending order	The linked list data structure provides an efficient way to find kth element in the list
368	7	Under what circumstances are Linked Lists useful?		2				
369	7	Write a program to delete all odd positioned nodes from a circular linked list. (Consider 1-based indexing).		5				
370	7	What differentiates a circular linked list from a normal linked list?	A	1	You cannot have the 'next' pointer point to null in a circular linked list	It is faster to traverse the circular linked list	You may or may not have the 'next' pointer point to null in a circular linked list	Head node is known in circular linked list

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
371	7	Consider a small circular linked list. How to detect the presence of cycles in this list effectively?	B	1	Keep one node as head and traverse another temp node till the end to check if its 'next points to head	Have fast and slow pointers with the fast pointer advancing two nodes at a time and slow pointer advancing by one node at a time	Cannot determine, you have to pre-define if the list contains cycles	Circular linked list itself represents a cycle. New Cycles can be generated anytime
372	7	A node in a double linked list comprises of:	C	1	information field	information field and next pointer	information field, next Pointer and thread field	information field, next pointer, previous pointer & previous pointer pointer and thread field
373	7	In circular linked list, nodes contains _____fields and In Doubly linked list, nodes contains ____fields?	D	1	2, 2	3, 2	1, 2	2, 3
374	7	A linear list in which each node has pointer to the previous and next node is called?	D	1	singly Linked list	singly circular Linked list	circular Linked list	Doubly Linked list
375	7	If a Doubly linked list is declared as class Node { int info; Node Fwd; Node Bwd; } Then to insert a node in the middle of the list, requires how many changes to various next and prev pointers?	A	1	2 next, 2 prev	1 next, 2 prev	1 next, 1 prev	2 next, 1 prev

376	7	Consider Circular Linked list With 4 nodes: 100, 200, 300, 400 and first is a pointer that pointing to first node in the list. What is missing_____ in following code to display this data?
		void display()
		{
		node temp;
		temp = first;
		while(temp.link != first)
		{
		System.out.println(temp.info);
		_____
		}
		System.out.println(temp.info);
		}
			A	1	temp = temp.link;	temp = temp.link.link;	temp = temp.info.info;	temp = temp.link.info;

377	7	What does the following code snippet do?
		Node solve(Node head) {
		Node prev = null;
		if(head == null) {
		return head;
		}
		if(head.next == null) {
		return head;
		}
		Node curr = head.next;
		while(head != null) {
		head.next = prev;
		prev = head;
		head = curr;
		if(curr != null) {
		curr = curr.next;
		}
		}
		return prev; } }
			B	1	Returns the original linked list	Returns the linked list after reversing it	Returns a linked list containing elements at odd indices only	print all the nodes of linked list

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D

378	7	How do you count number of nodes in circular linked list?	B	1	int count (node head)
					{
					Node t=head;
					int c=0;
					if (t = = null)
					return 0;
					while (t != NULL)
					{
					c++;
					t = t .next;
					}
					return c;}
						int count (Node head)
						{
						Node t=head.next;
						int c=1;
						if (t= = null)
						return 0;
						while (t != head)
						{
						c++;
						t = t.next;
						}
						return c;
						}
							int count (Node head)
							{
							Node t=head;
							int c=0;
							if (t= = null)
							return 0;
							while (t != head.next)
							{
							c++;
							t = t.data;
							}
							return c;
							}
								int count (Node head)
								{
								Node head=t;
								int c=0;
								if (t= = null)
								return 0;
								while (t != NULL)
								{
								c++;
								t = t.next;
								}
								return c;
								}

379	7	What is a memory efficient double link list?	A	1	Each node has only one pointer to traverse the list back and forth	The list has break points for faster traversal	An auxiliary singly linked list acts as a helper list to traverse through the doubly linked	A doubly linked list that uses bitwise AND operator for storing addresses
380	7	Is it possible to create a doubly linked list using only one pointer with every node?	B	1	Not Possible	Yes, possible by storing XOR of addresses of previous and next nodes.	Yes, possible by storing XOR of current node and next node	Yes, possible by storing XOR of current node and previous node
381	7	Write a java function to calculate the sum of all data elements of all nodes from given circular linked list.		1				

382	7	A doubly linked list is declared as
		class Node {
		int Value;
		Node Fwd;
		Node Bwd;
		};
		Where Fwd and Bwd represent forward and backward link to the adjacent elements of the list. Which of the following segments of code deletes the node pointed to by X from the doubly linked list, if it is assumed that X points to neither the first nor the last node of the list?
			A	1	X.Bwd.Fwd = X.Fwd; X.Fwd.Bwd = X.Bwd ;	X.Bwd.Fwd = X.Fwd ; X.Fwd.Bwd = X.Bwd ;	X.Bwd.Fwd = X.Bwd ; X.Fwd.Bwd = X.Bwd ;	X.Bwd.Fwd = X.Bwd ; X.Fwd.Bwd = X.Fwd;

383	7	Write a method to delete an element from Doubly Link list.		3				

384	7	Consider the following function that takes reference to head of a Doubly Linked List as parameter. Assume that a node of doubly linked list has previous pointer as prev and next pointer as next.
		void fun(Node head_ref)
		{
		Node temp = null;
		Node current = head_ref;
		while (current != null)
		{
		temp = current.prev;
		current.prev = current.next;
		current.next = temp;
		current = current.prev; }
		if(temp != null)
		head_ref = temp.prev; }
		Assume that reference of head of following doubly linked list is passed to above function 1 <--> 2 <--> 3 <--> 4 <--> 5 <-->6. What should be the modified linked list after the function call?
			C	1	2 <--> 1 <--> 4 <--> 3 <--> 6 <-->5	5 <--> 4 <--> 3 <--> 2 <--> 1 <-->6	6 <--> 5 <--> 4 <--> 3 <--> 2 <--> 1	6 <--> 5 <--> 4 <--> 3 <--> 1 <--> 2

385	7	Write a Java program to print all odd positioned nodes from a doubly LinkedList. (Consider 1-base indexing)		2				
386	7	Is it possible to check whether the given linked list is either NULL-terminated or ends in a cycle (cyclic)? Describe any method if exists and justify your answer.		1				
387	7	Write a recursive JAVA function named “displayfromend()” which displays the contents of the linked list from the end in a Doubly Linkedlist		1				

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388	7	The Unix editor vi (visual) allows searching in both directions, with wrap around if necessary. If the sequence of lines is stored as a linked list, then which will be the type of linked list?	B	1	Singly Linked List	Doubly Linked List	Circular Linked List	Circular Doubly List
389	7	Which amongst the following segment of code counts the number of elements in the double linked list, if it is assumed that X points to the first element of the list and ctr is the variable which counts the number of elements in the list?	A	1	for(ctr=1; X!=NULL; ctr++) X=X.fwd	for(ctr=1; X!=NULL; ctr++) X=X.bwd	for(ctr=1; X.fwd!=NULL; ctr++) X=X.fwd	for(ctr=1; X.bwd!=NULL; ctr++) X=X.bwd

390	7	The following is the class for which type of linked list?
		Node list
		{
		Node link;
		int value;
		}
			A, C	1	Singly Linked List	Doubly Linked List	Circular Linked List	None of these

391	7	Which type of linked list stores the address of the head node in the next pointer of the last node?	C	1	singly linked list	doubly linked list	circular linked list	stack implemented using linked list
392	7	In a doubly linked list the number of pointers affected for an insertion operation (insert before particular value) will be	A	1	4	0	1	depends upon the nodes of doubly linked list
393	8	A strictly binary tree with 10 leaves	B	1	cannot have more than 19 nodes	has exactly 19 nodes	has exactly 17 nodes	has exactly 20 nodes
394	8	Which of the following is a true about Binary Trees	B	1	Every binary tree is either complete or full.	Every complete binary tree is also a full binary tree.	Every full binary tree is also a complete binary tree.	None of the above
395	8	In a full binary tree, if the height of tree is 5 then total number of nodes in tree is ___?	C	1	32	16	63	14
396	8	The preorder traversal = {7, 1, 0, 3, 2, 5, 4, 6, 9, 8, 10 }, Inorder traversal = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10} What is the Post order traversal?	D	1	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	7, 6, 5, 4, 3, 2, 1, 9, 8, 10, 0	7, 1, 0, 3, 2, 5, 4, 6, 9, 8, 10	0, 2, 4, 6, 5, 3, 1, 8, 10, 9, 7
397	8	In a full binary tree if number of internal nodes is I, then number of nodes N are?	A	1	N = 2*I + 1	N = I + 1	N = I – 1	N = 2*I - 1
398	8	If binary trees are represented in arrays, what formula can be used to locate parent node?	B	1	(i+1)/2	(i-1)/2	i /2	2*i/2
399	8	Consider a binary tree T which has X number of nodes with 1 child and Y number of nodes with 2 children. If total number of nodes in tree T is N then value of N can be expressed as:	B	1	X+Y	X+2Y+1	2X+Y+1	2X+2Y+1
400	8	In a binary tree, the number of internal nodes of degree 1 is 5, and the number of internal nodes of degree 2 is 10. The number of leaf node in the binary tree is	D	1	10	12	13	11
401	8	The no of external nodes in a full binary tree with n internal nodes is?	B	1	n	n+1	n/2	2n
402	8	In a binary tree with n nodes, every node has an odd number of descendants. Every node is considered to be its own descendant. What is the number of nodes in the tree that have exactly one child?	B	1	1	0	(n-1)/2	3
403	8	The postorder traversal of a binary tree is 8,9,6,7,4,5,2,3,1. The inorder of the same is 8,6,9,4,7,2,5,1,3. The height of the tree is the length of the longest path from the root to any leaf. The height of the binary tree above is_____.	A	1	4	1	6	3
404	8	What is the number of binary tree with 3 nodes which when traversed in post-order give the sequence A, B, C ?	D	1	2	3	4	5
405	8	The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 4 are	D	1	63,6	63,5	32,6	31,5
406	8	In a binary tree, the number of internal nodes of degree 1 is 3, and the number of internal nodes of degree 2 is 6. The number of leaf node in the binary tree is	A	0.5	5	6	7	8
407	8	The postorder traversal of a binary tree is 8, 9, 6, 7, 4, 5, 2, 3, 1. The inorder traversal of the same tree is 8, 6, 9, 4, 7, 2, 5, 1, 3. The height of a tree is the length of the longest path from the root to any leaf. The height of the binary tree above is _____ .	D	0.5	1	2	3	4
408	8	In a complete k-ary tree, every internal node has exactly k children or no child. The number of leaves in such a tree with n internal nodes is:	C	0.5	nk	(n – 1) k+ 1	n(k – 1) + 1	n(k – 1)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
409	8	Consider the following nested representation of binary trees: (X Y Z) indicates Y and Z are the left and right sub stress, respectively, of node X. Note that Y and Z may be NULL, or further nested. Which of the following represents a valid binary tree?	C	1	(1 2 (4 5 6 7))	(1 (2 3 4) 5 6) 7)	(1 (2 3 4)(5 6 7))	(1 (2 3 NULL 4) (4))
410	8	A strictly binary tree with 12 leaves …….	C	1	cannot have more than 19 nodes	has exactly 19 nodes	has exactly 23 nodes	has exactly 17 nodes
411	8	Construct binary tree from given postorder inorder pair. After constructing Binary tree (i) Find Pre-order of Tree (ii) Height of node G, depth of node H (iii) Which element is present at lowest level Post order: - I-D-B-G-C-H-F-E-A Inorder:- B-I-D-A-C-G-E-H-F (Show all steps)		3				
412	8	Draw binary expression tree for given below expression and find pre-order and post order for the same (show all steps) ((a * b ^ c) – (d + e)) * (f ^ k – h)		3				
413	8	Construct an Expression tree for a*b-c*d-e/f+g-h/i and give its postorder traversal.		2				
414	8	A scheme for storing binary trees in an array X is as follows. Indexing of X starts at 1 instead of 0. the root is stored at X[1]. For a node stored at X[i], the left child, if any, is stored in X[2i] and the right child, if any, in X[2i+1]. To be able to store any binary tree on n vertices the minimum size of X should be.	D	1	log2n	n	2n + 1	2^n — 1
415	8	Draw a binary expression tree for the following and perform preorder traversal for the same: ((A*B^C)-(D+E)*(F$K-H)		2				
416	8	Construct a Binary tree from the traversals given below: Inorder: 1,10,11,12,13,14,15,17,18,21 Postorder: 1,11,12,10,14,18,21,17,15,13		2				
417	8	The number of structurally different possible binary trees with 6 nodes is	A	1	132	127	130	200
418	8	What are null nodes filled with in a threaded binary tree?	B	1	right node with preorder predecessor and left node with inorder successor information	inorder predecessor for left node and inorder successor for right node information	some other values randomly	inorder successor for left node and inorder predecessor for right node information
419	8	Draw a Binary expression tree for the following and perform preorder traversal: a * (b + c) + (d * e) / f + g * h		5				
420	8	Consider the expression v1*v2-(v3+v4^v5). Show the tree corresponding to the expression.		5				
421	8	The post order traversal of binary tree is DEBFCA. Find out the pre order traversal.		5				
422	8	A tree with no nodes is known as _____	D	1	General tree	NULL tree	Empty Tree	Both NULL and Empty Tree
423	8	Out degree of leaf node is_____.	B	1	2	0	3	1
424	8	How many nodes are available at level L in complete binary tree ?	B	1	L^2	2^L	2L	$2L^2$
425	8	What is a full binary tree?	A	1	Each node has exactly zero or two children	Each node has exactly two children	All the leaves are at the same level	Each node has exactly one or two children
426	8	What is the maximum number of children that a binary tree node can have?	C	1	0	1	2	3
427	8	What is the traversal strategy used in the binary tree?	B	1	depth-first traversal	breadth-first traversal	random traversal	Priority traversal
428	8	++a*bc*+defg is an?	C	1	postfix expression	infix expression	prefix expression	invalid expression
429	8	Which indicates pre-order traversal?	C	1	Left sub-tree, Right sub-tree and root	Right sub-tree, Left sub-tree and root	Root, Left sub-tree, Right sub-tree	Right sub-tree, root, Left sub-tree
430	8	What is a threaded binary tree traversal?	D	1	a binary tree traversal using stacks	a binary tree traversal using queues	a binary tree traversal using stacks and queues	a binary tree traversal without using stacks and queues

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Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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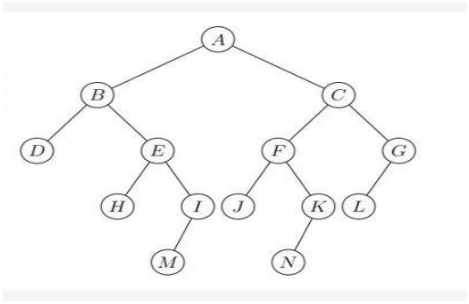
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
431	8	In general, the node content in a threaded binary tree is _____	A	1	leftchild_pointer, left_tag, data, right_tag, rightchild_pointer	leftchild_pointer, left_tag	leftchild_pointer, left_tag, right_tag, rightchild_pointer	leftchild_pointer, left_tag, data
432	8	The leaves of an expression tree always contain?	B	1	operators	operands	null	expression
433	8	What may be the content of a node in threaded binary tree?	A	1	leftchild....pointer, left....tag, data, right....tag, rightchild....pointer	leftchild....pointer, left....tag	leftchild....pointer, left....tag, right....tag, rightchild....pointer	leftchild....pointer, left....tag, data
434	8	The postorder traversal of a binary tree is 8, 9, 6, 7, 4, 5, 2, 3, 1. The inorder traversal of the same tree is 8, 6, 9, 4, 7, 2, 5, 1, 3. The height of a tree is the length of the longest path from the root to any leaf. The height of the binary tree above is _____ .	B	1	3	4	5	6
435	8	A binary search tree is constructed by inserting the following numbers in order : 60, 25, 72, 15, 30, 68, 101, 13, 18, 47, 70, 34 The number of nodes in the left sub tree is :	C	1	5	6	7	8
436	8	Construct a binary tree from the traversals given below: Inorder: 1 3 4 6 7 8 10 13 14 Preorder: 8 3 1 6 4 7 10 14 13		5				
437	8	The inorder and preorder traversal of binary tree are d b e a f c g a b d e c f g respectively. Construct a binary tree and find its postorder traversal.		5				
438	8	Define Threaded Binary tree and write java Class of Threaded Binary tree.		3				
439	8	Draw a binary expression tree for the following and perform preorder traversal for the same: (A + B $ C) + (D + E * F)		2				
440	8	Obtain the expressin tree from the following postfix representation. ab + cde + **		3				
441	8	Write JAVA representation of a Threaded Node.		2				
442	8	Assuming that the tree's height starts from 0. Then number of nodes in a tree of height h will be?	C	1	(2^h)	$(2^h - 1)$	$(2^{h+1} - 1)$	$(2^{h-1} - 1)$
443	8	If 11, 6, 7, 9,10,8,12,15 is inserted in the tree, so what will the height of the binary search tree?	A	1	4	3	2	1
444	8	The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 5 are	A	1	63 and 6, respectively	64 and 5, respectively	32 and 6, respectively	31 and 5, respectively
445	8	Binary expression tree: a*b/c+e/f*g+k-x*y and perform the preorder traversal.		2				
446	8	Let us consider the two given arrays as pre[] = {1, 2, 4, 8, 9, 5, 3, 6, 7} and post[] = {8, 9, 4, 5, 2, 6, 7, 3, 1}. Construct a Full binary Tree from above given traversals.		2				
447	8	Suppose there are 11 nodes in a binary tree. Find the number of unlabeled binary trees if the number of nodes either in the left sub tree or in the right sub tree is divisible by 4.		2				
448	8	The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum number of nodes in a binary tree of height 8 are	A	1	511 and 9	512 and 8	255 and 9	256 and 9
449	8	Suppose that the figure to the right is a binary search tree. The letters indicate the names of the nodes, not the values that are stored. What is the predecessor node, in terms of value, of the root node A?  	A	1	B	C	L	F

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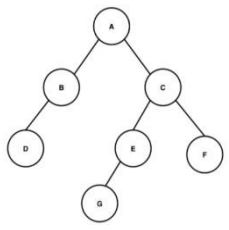
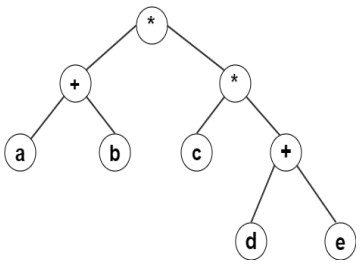
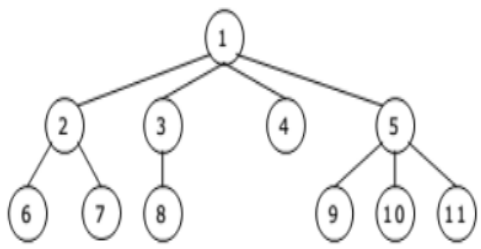
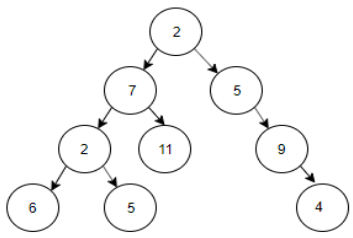
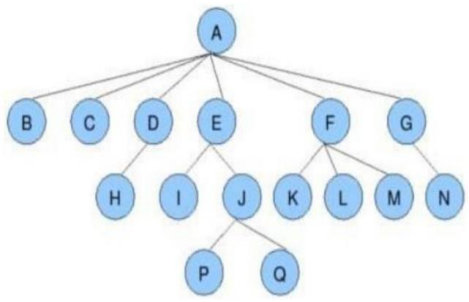
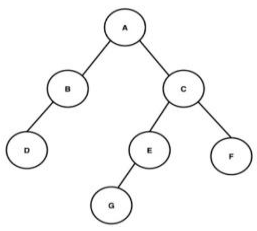
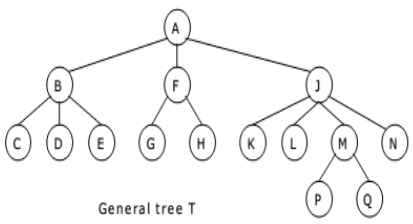
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
450	8	Height of the following Tree is _____. 	A	1	3	2	1	0
451	8	What is the postfix expression for the following expression tree? 	B	1	abcde++**?	ab+cde+**?	abc+de+**?	abcd+*e+*
452	8	Construct a Binary tree from given General tree. Give its inorder and preorder. 		3				
453	8	For the tree below, write the in-order traversal. 		2				
454	8	Draw a binary tree for given figure. 		1				
455	8	Height of tree is _____ 	A	1	3	2	1	0
456	8	Convert given General tree into binary tree : 		2				

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Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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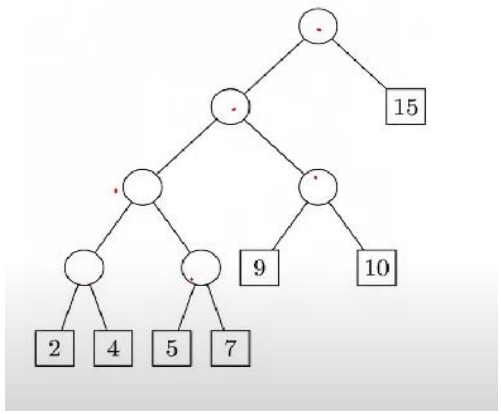
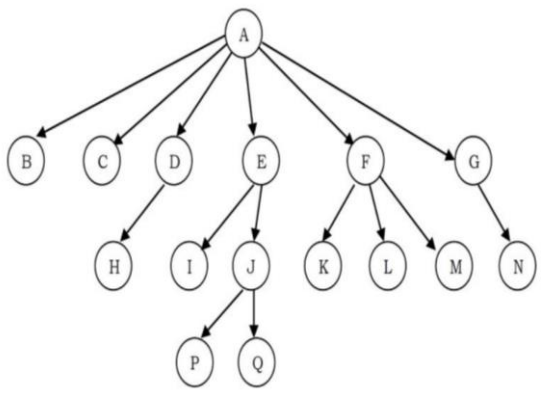
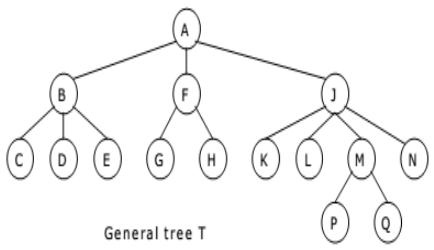
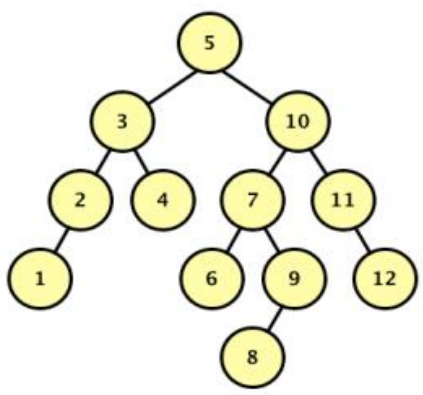
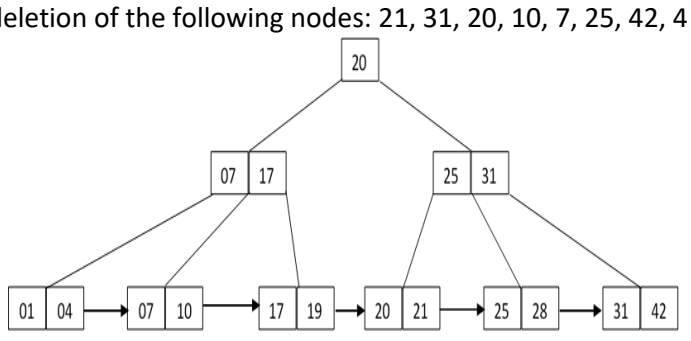
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
457	8	The weighted external path length of the binary tree in figure is_____. 	C	1	123	12	144	145
458	8	Convert the following Generic Tree to a Binary Tree and write the Preorder and Post order traversals for the same. 		2				
459	8	For the general tree shown below: 1. Find the corresponding binary tree T. 2. Find the preorder, postorder, inorder traversal of T.  General tree T		3				
460	9	Delete node 5,3 from given AVL tree. 		1				
461	9	The following is a B+ Tree of order 4. Show step wise deletion of the following nodes: 21, 31, 20, 10, 7, 25, 42, 4 		2				

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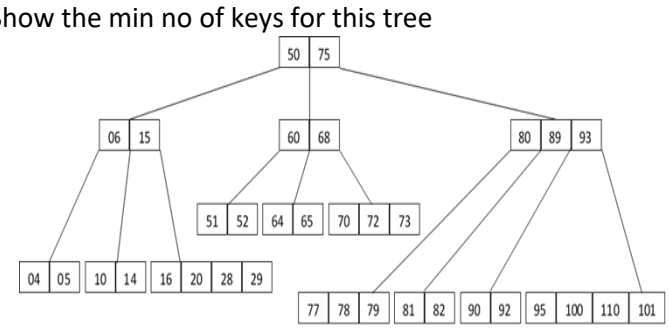
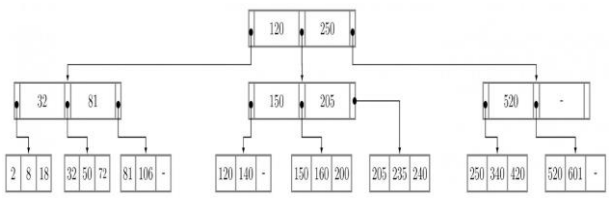
Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
462	9	The following is a B-Tree of order 5. Show each and every step in details for the deletion of the nodes: 70, 10, 81, 65 and 75. Show the min no of keys for this tree 		3				
463	9	The below figure shows a B+ tree where only key values are indicated in the records. Each block can hold upto three records. A record with a key value 34 is inserted into the B+ tree. Obtain the modified B+ tree after insertion 		1				
464	9	A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24 The number of the node in the left sub-tree and right sub-tree of the root, respectively, is	B	1	(4, 7)	(7, 4)	(8, 3)	(3, 8)
465	9	Suppose that we have numbers between 1 and 100 in a binary search tree and want to search for the number 55. Which of the following sequences CANNOT be the sequence of nodes examined?	C	1	{10, 75, 64, 43, 60, 57, 55}	{90, 12, 68, 34, 62, 45, 55}	{9, 85, 47, 68, 43, 57, 55}	{79, 14, 72, 56, 16, 53, 55}
466	9	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree ?	C	1	7 5 1 0 3 2 4 6 8 9	0 2 4 3 1 6 5 9 8 7	0 1 2 3 4 5 6 7 8 9	9 8 6 4 2 3 0 1 5 7
467	9	While inserting the elements 71, 65, 84, 69, 67, 83 in an empty binary search tree (BST) in the sequence shown, the element in the lowest level is	B	1	65	67	69	83
468	9	Construct binary search tree for the following data and perform in-order and post-order traversals: - 50, 40, 80, 20, 0, 30, 10, 90, 60, 70		5				
469	9	Create a binary search tree for inserting the following data : 50, 45, 100, 25, 49, 120, 105, 46, 90, 95 Explain deleting node 45 in the resultant binary search tree.		5				
470	9	The pre-order traversal of a Binary search tree is 15,10,12,11,20,18,16,19. Which one of the following is the post order traversal of the tree?	B	1	10,11,12,15,16,18, 19,20	11,12,10,16,19,18, 20,15	20,19,18,16,15,12, 11,10	19,16,18,20,11,12, 10,15
471	9	In delete operation of BST, we need inorder successor (or predecessor) of a node when the node to be deleted has both left and right child as non-empty. Which of the following is true about inorder successor needed in delete operation?	B	1	Inorder Successor is always a leaf node	Inorder successor is always either a leaf node or a node with empty left child	Inorder successor may be an ancestor of the node	Inorder successor is always either a leaf node or a node with empty right child
472	9	How many distinct binary search trees can be created out of 4 distinct keys?	B	1	4	14	24	42
473	9	Which of the following traversal outputs the data in sorted order in a BST?	B	1	PreOrder	Inorder	Postorder	LevelOrder
474	9	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?	C	1	7 5 1 0 3 2 4 6 8 9	0 2 4 3 1 6 5 9 8 7	0 1 2 3 4 5 6 7 8 9	9 8 6 4 2 3 0 1 5 7
475	9	The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?	B	1	2	3	4	6

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
476	9	What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.	B	1	2	3	4	5
477	9	Which of the following traversals is sufficient to construct BST from given traversalsWhich of the following traversals is sufficient to construct BST from given traversals 1) Inorder 2) Preorder 3) Postorder	B	1	Any one of the given three traversals is sufficient	Either 2 or 3 is sufficient	2 and 3	1 and 3
478	9	While inserting the elements 71, 65, 84, 69, 67, 83 in an empty binary search tree (BST) in the sequence shown, the element in the lowest level is	C	1	65	67	69	83
479	9	Which of the following is true about AVL?	C	1	AVL trees are self-balancing binary search trees.	In AVL trees, balancing factor of each node is either 0 or 1 or -1.	Both	None of the above
480	9	A B+ tree can contain a maximum of 7 pointers in a node. What is the minimum number of keys in leaves?	B	1	6	3	4	7
481	9	Which of the following is false?	A	1	A B+ -tree grows downwards	A B+ -tree is balanced	In a B+ -tree, the sibling pointers allow sequential searching	B+ -tree is shallower than B-tree
482	9	Which of the following is true?	C	1	B + tree allows only the rapid random access	B + tree allows only the rapid sequential access	B + tree allows rapid random access as well as rapid sequential access	B + tree allows rapid random access and slower sequential access
483	9	In a B+ tree, both the internal nodes and the leaves have keys.	B	1	TRUE	FALSE	Sometimes	Both 1 and 3
484	9	2-3 tree is a specific form of _____	A	1	B tree	B+ tree	AVL tree	Heap
485	9	Create 2-3 Tree for the following sequence: 50, 100, 150, 200		5				
486	9	Construct a height balanced binary tree (AVL tree) for the following data 42,06,54,62,88,50,22,32,12,33		5				
487	9	Insert the following letters into an empty B-tree of order 5: C N G A H E K Q M F W L T Z D P R X Y S		5				
488	9	Obtain an AVL tree by inserting one integer at a time in the following sequence. 150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180. Show all the steps.		5				
489	9	Construct 2-3 tree for the following data 12, 50, 85, 6, 10, 37, 100, 120, 25, 70		5				
490	9	Construct B tree of order 5 for the following data 1,7,6,2,11,5,10,13,12,20,16,24,3,4,18,19,14,25.		5				
491	9	Construct AVL tree for following data 10,20,30,40,50,60,70,80		5				
492	9	Construct the AVL search tree by inserting the following elements in the order of their occurrence. 64, 1, 44, 26, 13, 110, 98, 85		5				
493	9	Insert the following elements in a B-Tree. a, g, f, b, k, c, h, n, j		5				
494	9	Construct a binary search tree for the following sequence. also do the Inorder and Postorder traversal for the same. 45,56,39,12,34,78,54,67,10,32,89,81		2				
495	9	Construct B tree of order 5 for following data 1,6,7,2,11,5,10,13,12,20,16,24,3,4,18,19,14,25 Also delete node 7,10.		2				
496	9	Create an AVL tree for following sequence of numbers. 14,17,11,7,53,4,13,12,8,60,19,16,20		2				
497	9	consider following data. 10,12,15,18,19,20,21,22,23,30,31,33,45,47,48,50,52 1) create B+ tree of order 5 using above data 2) delete node 52,30,23,20,31 from above generated B+ tree		3				
498	9	Construct B tree of order 5 for the following data: 1,12,8,2,25,6,14,28,17,7,52,16,48,68,3,26,29,53,55,45,67. Also draw the final B tree after deleting value 45.		3				
499	9	Insert the following elements in a B-tree. A, G, F, B, K, D, H, M, J, E, S, I. R, X, C, L, N, T, U, P given order is 5.		3				
500	9	How can we insert into a 2-3 tree: (i) if the parent has 2 children and (ii) if the parent has 3 children		5				

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
501	9	Write 'C' functions for: inserting a node, postorder traversal and counting total number of nodes for binary search tree		5				
502	9	Insertion sequence of names is Norma, Roger,John,Bill,Leo,Paul, Ken and Maurice. Show the behavior of creating a lexically ordered binary tree. Insert Kirk. Show the binary tree. (iii)Delete John. Show the binary tree		5				
503	9	Create a binary search tree for inserting the following data. 50, 45, 100, 25, 49, 120, 105, 46, 90, 95 Explain deletion in the above tree.		5				
504	9	Create a Binary Search Tree for the following data and do in-order, Preorder and Post-order traversal of the tree. 40, 60, 15, 4, 30, 70, 65, 10, 95, 25, 34		5				
505	9	binary tree T has 9 nodes. The inorder and preorder traversals of T give the following sequence of nodes. Inorder: E A C K F H D B G Preorder: F A E K C D H G B Draw the tree T		5				
506	9	Construct an expression tree for the following expression A+(B+C*D+E)+F/G. Make a preorder traversal of the resultant tree.		5				
507	9	Write a non-recursive algorithm for Preorder traversal of a binary tree.		5				
508	9	Create a binary search tree for the following data : 50 ,25 ,75, 22,40,60,80,90,15,30		5				
509	9	Given the following traversals create a binary tree from that. Also give the postorder traversal for the same. preorder = {7,10,4,3,1,2,8,11}, inorder = {4,10,3,1,7,11,8,2}		5				
510	9	Create a Binary Search Tree for the following data and do Inorder, Preorder and Postorder traversal of the tree.40, 65,25, 55, 10,70,30,50,15,80,75		5				
511	9	Construct binary search tree for the following data: 10,3,15,22,6,45,65,23,78,34,5 Find its inorder, preorder and postorder traversal		5				
512	9	Construct a binary search tree for the following and perform inorder and postorder traversals: 5 9 4 8 2 1 3 7 6		5				
513	9	Construct a binary tree from the traversals given below: Inorder: 1, 10, 11, 12, 13, 14, 15, 17, 18, 21 Postorder: 1, 11, 12, 10, 14, 18, 21, 17, 15, 13		5				
514	9	Write an algorithm to traverse a tree in preorder manner.		5				
515	9	Consider following statements: S1: Rotation operation in AVL always preserves the Inorder ordering. S2: The median of all elements in AVL tree is always at root or one of its two children. S3: If every node in BST has either 0 or 2 children,then searching is O(logn) S4: In a 3 array tree. If number of internal node is 20 then number of Leaves are 41. True Statements ?		3				
516	9	Let T be a binary search tree with n nodes and Sn be the average number of comparisons required for successful search and Un be the average number of comparison required for an unsuccessful search. Then what is the relation between Sn, Un and n		3				
517	9	Consider the following elements inserted into an empty AVL tree in the following order 25, 10, 15, 17, 30, 35, 40, 21, 28 If [L(d)] be the sum of elements on left side of root and (Rd) be the sum of elements on right side of root, then the value of [(Rd) – (Ld) + Root] is _____.		3				
518	9	Suppose we have an AVL tree of n nodes and any change in the tree violates the AVL tree property then :- S1: If we insert an element in the tree, maximum 2 Rotations are required to make the Tree AVL again. S2: If we delete an element from the tree, maximum 2 Rotations are required to make tree AVL again Which are correct statements?		3				
519	9	In what order we should insert the following elements into an empty AVL tree so that we don't have to perform any rotation on it. 1, 2, 3, 4, 5, 6, 7 A. 4, 2, 1, 6, 3, 5, 7 B. 4, 2, 6, 1, 3, 5, 7 C. 6, 4, 5, 7, 1, 2, 3 D. 4, 5, 3, 2, 1, 6, 7		3				

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Data Structures (DS) Question Bank (SEM-II-2023 CE,IT,CSD,AIML,AIDS,CS&IT,CSE,CST,CEA Engineering)

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
520	9	The number of rotations required to insert a sequence of elements 9, 6, 5, 8, 7, 10 into an empty AVL tree is?	D	1	0	1	2	3

521	9	Consider the pseudo code:
		int avl(binarysearchtree root):
		if(not root)
		return 0
		left_tree_height = avl(left_of_root)
		
		if(left_tree_height== -1)
		return left_tree_height
		
		right_tree_height= avl(right_of_root)
		
		if(right_tree_height==-1)
		return right_tree_height
		Does the above code can check if a binary search tree is an AVL tree?
			A	1	Yes	No	Cant say exactly	None of the above

522	9	Suppose you were implementing a data structure to store information about the paintings on display at an art dealer's showroom. Of the following data structures, which one is the right one to use?	D	1	Unordered array	Sorted array	Linkedlist	It Depends
523	9	Given an empty AVL tree, how would you construct AVL tree when a set of numbers are given without performing any rotations?	B	1	just build the tree with the given input	find the median of the set of elements given, make it as root and construct the tree	use trial and error	use dynamic programming to build the tree
524	9	Consider the below left-left rotation pseudo code where the node contains value pointers to left, right child nodes and a height value and Height() function returns height value stored at a particular node. avltree leftrotation(avltreenode z): avltreenode w =x-left x-left=w-right w-right=x x-height=max(Height(x-left),Height(x-right))+1 w-height=max(missing)+1 return w	A	1	Height(w-left), x-height	Height(w-right), x-height	Height(w-left), x	Height(w-left)
525	9	Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are:	B	1	4 and 15 respectively	3 and 14 respectively	4 and 14 respectively	None of the above
526	9	Out of these, which one is NOT true about a 2-3 tree?	D	1	it is perfectly balanced	the leaves are always at the same level	it refers to a B-tree of the order 3	postorder traversal would yield the elements in a sorted order
527	9	In a B+ tree, Statement 1: When a node is split during insertion, the middle key is promoted to the parent as well as retained in right half-node. Statement 2: When a key is deleted from the leaf, it is also deleted from the non-leaf nodes of the tree.	A	1	Statement 1 is true but statement 2 is false	Statement 2 is true but statement 1 is false	Both the statements are true	Both the statements are false
528	9	To restore the AVL property after inserting a element, we start at the insertion point and move towards root of that tree. is this statement true? a) true b) false	A	1	true	false	Both depending on conditions	None of the above
529	9	Which of the following is false?	A	1	2-3 tree requires less storage than the BST	lookup in 2-3 tree is more efficient than in BST	2-3 tree is shallower than BST	2-3 tree is a balanced tree
530	9	The number of rotations required to insert a sequence of elements 28, 73, 89, 75, 74, 13 into an empty AVL tree is?	C	1	1	5	2	3
531	9	Consider a binary search tree T with distinct keys. The right sub tree of a node x in T is empty and the node x has an inorder successor y, then minimum no. of ancestors node x is having is_____? (every node is considered to be its own ancestor)	D	1	4	5	6	2
532	9	The number 1,2…..n are inserted in a binary search tree in some order, in the resulting tree, the right subtree of the root contains P nodes. the first number to be inserted in the tree must be	C	1	P	P+1	N-P	P=1

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
533	9	While inserting the elements 72, 65, 86, 69, 66, 81,23,7,89 in an empty binary search tree (BST) in the sequence shown, the elements in the left subtree and the elements in the right subtree are_____	B	1	3 and 5	5 and 3	5 and 4	4 and 5
534	9	Consider a B-tree with key size 10 bytes, block size 512 bytes, data pointer is of size 8 bytes and block pointer is 5 bytes. Find the order of B-tree.		3				
535	9	2-3 tree is a specific form of _____	A	0.5	Height balanced tree	B+ tree	B tree	Threaded binary tree
536	9	A binary search tree is constructed by inserting the following numbers in order : 60, 25, 72, 15, 30, 68, 101, 13, 18, 47, 70, 34 The number of nodes in the left sub tree is :	A	0.5	7	2	3	4
537	9	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?	A	1	0 1 2 3 4 5 6 7 8 9	7 5 1 0 3 2 4 6 8 9	0 2 4 3 1 6 5 9 8 7	9 8 6 4 2 3 0 1 5 7
538	9	Let T be a binary search tree with 63 nodes. The minimum and maximum possible heights of T are:	C	1	3 and 62	4 and 62	5 and 62	6 and 62
539	9	How many rotations are required during construction of an AVL tree if the following elements are added in order given? 35, 50, 40, 25, 30, 60, 78, 20, 28	B	1	2 left, 3 right rotations	3 left, 2 right rotations	2 left, 2 right rotations	3 left, 3 right rotations
540	9	Construct a height balanced binary tree (AVL tree) for the following data and show all steps with rotations 42,06,54,62,88,50,22,32,12,33		5				
541	9	Obtain the AVL tree by inserting one integer at a time in the following sequence. 45, 50, 55, 10, 5, 35, 15, 40, 25, 42, 65, 75. Show all the steps.		5				
542	9	Elements 1,2,3,4,5,6,7,8,9,10 are inserted into 2-3 Trees in the same order. What is the maximum number of splits occurring after inserting all these keys into the tree?		1	1	2	3	4
543	9	The postorder traversal of a binary search tree is 25,33,30,35,42,48,40,60,58,50. The inorder traversal of the same tree is 25,30,33,35,40,42,48,50,58,60. What is the length of the longest path from one leaf to another leaf. (Note: Length of longest path means total number of nodes present in that path). Note: Show the Tree as well		1				
544	9	Insert the following letters into an empty B-tree of order 5 and then show the final Tree after deleting the value K and S. C N G A H E K Q M F W L T Z D P R X Y S		2				
545	9	Obtain an AVL tree by inserting one integer at a time in the following sequence. 150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180. Show all the steps. Also show the total number of rotations needed of type 1) L-L 2) R-R 3) L-R and 4) R-L		5				
546	9	1. Construct an AVL Tree with the following elements and mention the actions taken along with all rotations (L, R, LR, RL) clearly drawn. H, I, J, B, A, E, C, F, D, G, K, L 2. Delete F, E in order from the above AVL tree.		4				
547	9	1. Create a BST with the following data -> 10, 1, 3, 5, 15, 12, 16 2. Delete the node 10 from the tree such that there should be no changes in the left subtree of 10 3. Insert a new node 7 and check whether the tree is balanced. If unbalanced take appropriate action to balance it. 4. Draw a Preorder Threaded Binary Tree Representation for the final BST Tree		3				
548	10	Consider a hash table of size 7, with hash function H(k)=k%7, and pseudo random i=(I +5)%7. We want to insert the following keys one by one from left to right. 15,11,25,16,9,8,12 What will be the position of the key 25, if we use random probing?	D	1	4	5	1	2

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Sr No	Unit Number	Question_Text	MCQ Answer	Marks	Option A	Option B	Option C	Option D
549	10	Consider a hash table with 9 slots. The hash function is h(k)= k mod 9. The collisions are resolved by chaining. The following 9 keys are interested in the order: 5,28,19,15,20,33,12,17,10. The maximum, minimum, and average chain lengths in hash table, respectively are,	A	1	3,0 and 1	3,3,and 3	4,0 and 1	3,0 and 2
550	10	What data organization method is used in hash tables?	C	1	Stack	Array	Linked list	Queue
551	10	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i. 9679, 1989, 4199 hash to the same value ii. 1471, 6171 hash to the same value iii. All elements hash to the same value iv. Each element hashes to a different value	C	1	i only	ii only	i and ii only	iii or iv
552	10	Which of the following techniques offer better cache performance?	B	1	Quadratic probing	Linear probing	Double hashing	Rehashing
553	10	What is the hash function used in the division method?	B	1	h(k) = k/m	h(k) = k mod m	h(k) = m/k	h(k) = m mod k
554	10	The integers given are to be inserted in a hash table with 5 locations using chaining to resolve collisions. Construct hash table and use simplest hash function. 1,2,3,4,5,10,21,22,33,34,15,32,31,48,49,50.		7				
555	10	The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table?		7				
556	10	Build a chained hash table of 10 memory locations. Insert the keys 131, 3, 4, 21, 61, 24, 7, 97, 8, 9 in hash table using chaining. Use h(k) = k mod m. (m=10)		4				
557	10	Consider the hash table of size 10. Using quadratic probing, insert the keys 72, 27, 36, 24, 63, 81, and 101 into hash table. Take c1=1 and c2=3.		7				
558	10	Insert the key values 26,37,59,76,65,86 in to a hash-table of size m=11 using linear probing.consider the primary hash function is h'(k) = k mod m.		4				
559	10	Consider inserting the keys 76,26,37,59,21,65 into a hash table of size m= 11 using double hashing.consider hash functions are $h_1(k)$ = kmod 11 and $h_2(k)$=k mod 9		2				
560	10	Let us consider the insertions of elements 5,28,19,15,20,33,12,17,10 into a chained-hash table. Let us suppose the hash table has 9 slots and the hash function be h(k)= k mod 9.		4				
561	10	Consider a hash table of size 11. We want to insert keys 20, 34, 45, 70, 56 in the hash table. Let's insert the keys into hash table using the following double hash functions: h1(k) = k mod 11 (first hash function) h2(k) = 8 - (k mod 8) (second hash function)		3				
562	10	Consider a hash function that distributes keys uniformly. The hash table size is 20. After hashing will the probability that any new key hashed collides with an existing one exceed 0.5	C	1	5	1	8	7
563	10	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, and 4199) and the hash function x mod 10, which of the following statements are true? i.9679, 1989, 4199 hash to the same value. ii. 1471, 6171 has to the same value. iii. All elements hash to the same value. iv. Each element hashes to a different value.	C	1	i only	ii only	i and ii only	iii or iv
564	10	Consider the hash table of size 11. Using quadratic probing, insert the key 126, 75, 37, 56, 29, 154, 10 and 99 into hash table.		2				
565	10	Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.	B	1	8, _, _, _, _, _, 10	1, 8, 10, _, _, _, 3	1, _, _, _, _, _,3	1, 10, 8, _, _, _, 3

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566	10	Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function x mod 10, which of the following statements are true? i.9679,1989,4199 hash to the same value. ii. 1471, 6171 has to the same value. iii. All elements hash to the same value. iv. Each element hashes to a different value.	C	1	I only	ii only	i and ii only	iii or iv
567	10	Consider a double hashing scheme in which the primary hash function is h1(k)=k mod 23 and the secondary hash function is h2(k)=1+(k mod 19). Assume that the table size is 23. then the address returned by probe 1 in the probe sequence(assume that the probe sequence begins at probe 0) for key value k=90 is____.		3				
568	10	which one of the following hash functions on integers will distribute keys most uniformly over 10 buckets numbered 0 to 9 for ii ranging from 0 to 2020?	B	1	h(i)=i^2(mod10)	h(i)=i^3(mod10)	h(i)=(11*i^2)mod10	h(i)=(12*i)mod10
569	10	If ' h ' is a hashing function and it is used to hash ' n ' keys into a table of size ' m ' where n <= m . What is the expected number of collisions involving a particular key ' x ' ?	A	1	less than 1.	less than n.	less than m.	less than n / 2.
570	10	What is the value of h(k) for the key 123456? where p=14, s=2654435769, w=32	D	1	123	456	70	67
571	10	What is direct addressing?	A	1	What is direct addressing?	Fewer array positions than keys	Fewer keys than array positions	Distinct array positions for keys based on priority
572	10	Using division method, in a given hash table of size 157, the key of value 172 be placed at position _____	C	1	19	72	15	17
573	10	Using division method, in a given hash table of size 156, the key of value 172 be placed at position_____.	C	1	15	11	16	2
574	10	Consider a double hashing scheme in which the primary hash function is h1(k) = k mod 23, and the secondary hash function is h2(k) = 1+(k mod 19). Assume that the table size is 23. Then the address returned by probe 1 in the probe sequence (assume that the probe sequence begins at probe 0) for key value k = 90 is _____ .	A	1	13	15	21	23
575	10	An advantage of chained hash table (external hashing) over the open addressing scheme is	C	1	Worst case complexity of search operations is less	Space used is less	Deletion is easier	None of the above
576	10	Consider a hash table with 100 slots. Collisions are resolved using chaining. Assuming simple uniform hashing, what is the probability that the first 3 slots are unfilled after the first 3 insertions?	A	1	97 × 97 × 97)/1003	(99 × 98 × 97)/1003	(97 × 96 × 95)/1003	(97 × 96 × 95)/(3! × 1003)
577	10	Which hashing technique is free from clustering?	B	1	Linear Probing	Double hashing	Quadratic hashing	Rehashing
578	10	If several elements are competing for the same bucket in the hash table, what is it called?	C	1	Diffusion	Replication	Collision	Duplication
579	10	A hash table contains 10 buckets and uses linear probing to resolve collisions. The key values are integers and the hash function used is key % 10. If the values 43, 165, 62, 123, 142 are inserted in the table, in what location would the key value 142 be inserted.	D	1	1	2	5	6
580	10	Consider a double hashing scheme in which the primary hash function is h1(k)=k mod 23 and the secondary hash function is h2(k)=1+(k mod 19). Assume that the table size is 23. Find the address returned by probe 1 and 2 in the probe sequence (assume that the probe sequence begins at probe 0) for key value k=90.		3				
581	10	Consider a hash table of size 11 with linear probing and a hash function h(K) = K mod N. The following keys are inserted in an empty hash table : 6, 17, 2, 63, 81, 40, 9, 28 Show the representation of hash table and give the list of empty indices after insertion.		2				
582	10	A hash table has space for 100 records. Then the probability of collision before the table is 10% full, is	D	1	0.45	0.5	0.3	0.34

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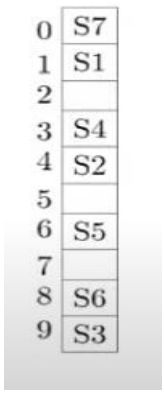
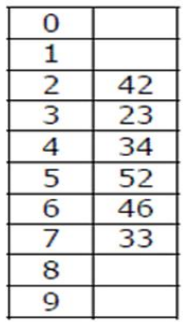
583	10	Consider a hash table with 9 slots. The hash function is h(k) = k mod 9. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. Find the maximum, minimum, and average chain lengths in the hash table, respectively.		1				
584	10	Consider the hash table with 50 slots. Collisions are resolved using chaining. Assuming simple uniform hashing, what is the probability that the first 4 slots are unfilled after the first 3 insertions? (Note – Steps are not needed. Only answer is enough)		1				
585	10	Insert the following keys in an array of size 17 using the modulo division method. Use double hashing to resolve collisions. Take h'(k)=(key%7)+1 as the second hash function: 94,37,29,40,84,88,102,63,67,120,122. What is the value present at location 7 ____		2				
586	10	If size of hash table is 200 and you need to enter the value 657845921, then the value will be inserted at which index according to Folded Key Methodology?		1				
587	10	A hash table with ten buckets with one slot per bucket is shown in the following figure. The symbols S1 to S7 initially entered using a hashing function with linear probing. The maximum number of comparisons needed in searching an item that is not present is  	A	1	5	4	3	7
588	10	A hash table of length 10 uses open addressing with hash function h(k)=k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.Which one of the following choices gives a possible order in which the key values could have been inserted in the table?  	C	1	46, 42, 34, 52, 23, 33	34, 42, 23, 52, 33, 46	46, 34, 42, 23, 52, 33	42, 46, 33, 23, 34, 52