Semester Examination

Roll no - 20207005
Course - B.Sc. CSIT
Subject - Data Structure

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Semester - 1st
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Answer No. 1

inorder traversal → in inorder traversal we first traverse through left subtree → root → right subtree.

D H B E A F C I G J

preorder traversal → root → left subtree → right subtree

A B D H E C F G I J

post order traversal → left subtree → right subtree → root

H D E B F I G J C A

Answer No. 5

Bubble sort is the simplest sorting ~~swapping~~ algorithm that works by swapping the adjacent element repeatedly if they are at wrong place. , when the adjacent element is smaller, then swap.

example:→ (5, 1, 4, 2, 8)

first pass → (5, 1, 4, 2, 8) → (1, 5, 4, 2, 8)

(1, 5, 4, 2, 8) → (1, 4, 5, 2, 8)

(1, 4, 2, 5, 8) → (1, 4, 2, 5, 8)

Second pass →

(1, 4, 2, 5, 8) → (1, 2, 4, 5, 8)

(1, 2, 4, 5, 8) → (1, 2, 4, 5, 8)

(1, 2, 4, 5, 8) → (1, 2, 4, 5, 8) sorted

now array will do another pass without any swaps.

Answer No - 6

insertion sort →

20, 35, 40, 100, 3, 10, 15

sorted

3, 20, 35, 40, 100, 10, 15

3, 10, 20, 35, 40, 100, 15

3, 10, 15, 20, 35, 40, 100

sorted, in insertion sort the value from unsorted part are picked and placed at correct position of sorted part

Answer No - 7

selection sort is a simple sorting algorithm this sorting algorithm is an inplace comparism based in which list is divided into two parts, the sorted parts at the left end and unsorted part at the right end. initially sorted part is empty and unsorted part is whole list. The smallest element is selected from the unsorted array and swapped with the leftmost element, and that element become the part of sorted array. This process continues moving unsorted boundary by one element to the right.

(12), 45, 23, 51 → 12, (23), 45, 51

smallest — sorted — smallest — unsorted

→ 12, 23, 45, 51

now whole list is sorted.

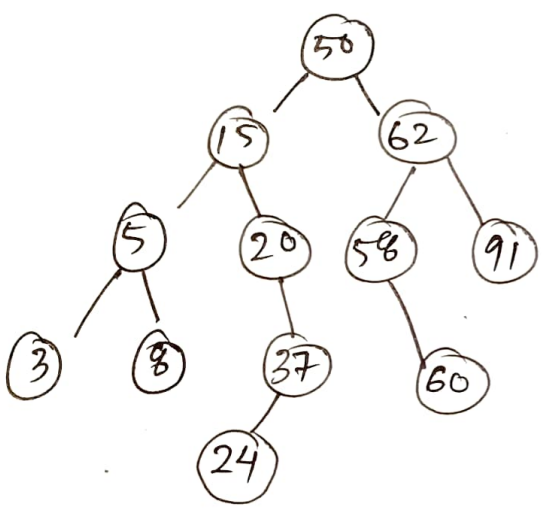
Answer No - 10

elements are → 43, 165, 62, 123, 142.

key % 10 → 43 % 10 = 3
165 % 10 = 5
62 % 10 = 2
123 % 10 = 3
142 % 10 = 2

bucket	
0	
1	
2	62
3	43
4	123
5	165
6	142
7	
8	
9	

Answer No - 11



Binary search tree for element: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24.

←

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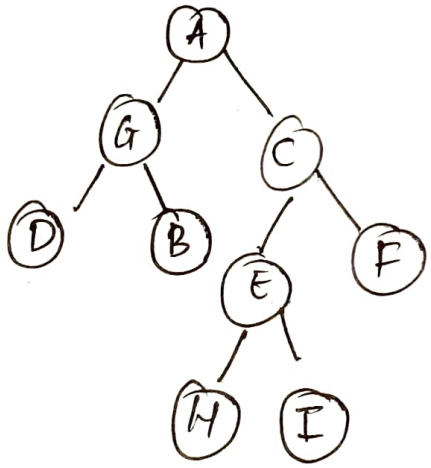
Ans No - 13

binary tree from given traversal is

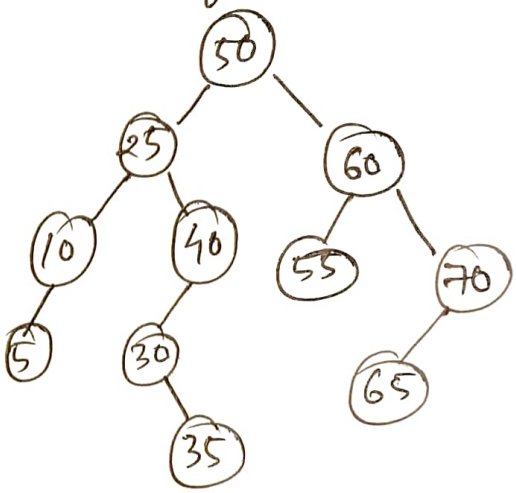
inorder → DG B A H E I C F

postorder → G D B H I E F C A



Ans No - 15

B.ST. of , 50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5



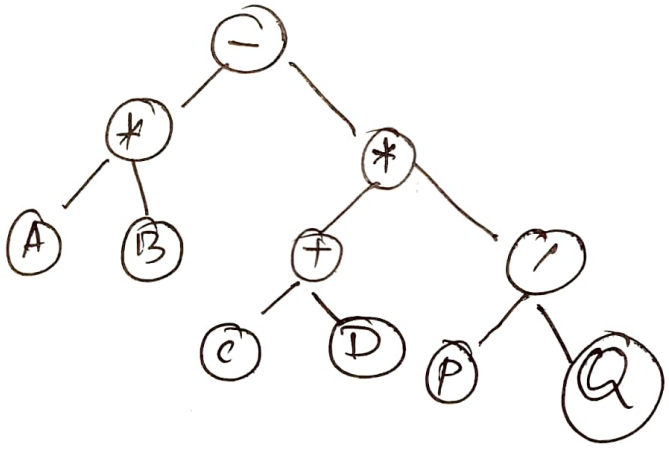
inorder → 5, 10, 25, 30, 35, 40, 50, 55, 60, 65, 70.

preorder → 50, 25, 10, 5, 40, 30, 25, 60, 55, 70, 65.

post order → 5, 10, 35, 30, 40, 25, 55, 65, 70, 60, 50.

Answer No - 2 → Draw a binary tree for.

(A * B - ((+D) * (P/Q)



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Answer No - 3

Change to post fix expression

$(A+B \wedge D) / (EF) + G = (AB+ \wedge D) / (EF) + G$

$= (AB+D \wedge) / (EF) + G$

$= (AB+D\wedge)(EF) / + G$

$= (AB+D\wedge)(EF) / G +$

$(AB+D\wedge)(EF)/G+$ is post fix expression.

Answer No - 4

equivalent postfix expression

$A * (B+D) / E - F * (G+H/K)$

$\rightarrow A * (BD+) / E - F * (G+HK/)$

$\rightarrow A * (BD+) E / - F * (GHK/+)$

$\rightarrow A(BD+)E/* - F(GHK/+)*$

$\rightarrow A(BD+)E/* F(GHK/+)*-$

this is the postfix expression.

Answer No - 8

convert to postfix expression,

$\rightarrow A + B * (C+D) / F + D * E$

$\rightarrow A + B * (CD+) / F + D * E$

$\rightarrow A + B * (CD+) F / + D * E$

$\rightarrow A + B (CD+) F / * + D * E$

$\rightarrow A + B (CD+) F / * + DE*$

$\rightarrow AB (CD+) F / * + + DE*$

$\rightarrow AB(CD+) F / * + DE * +$

this is the post fix expression.

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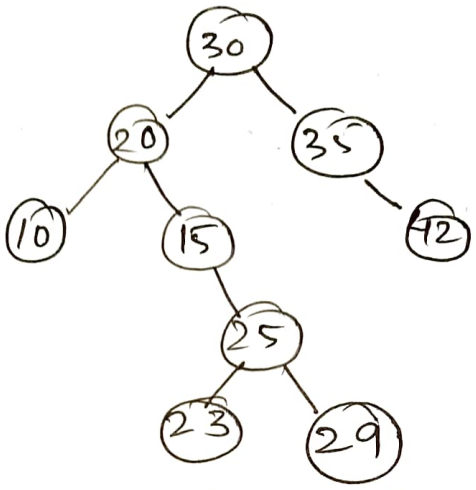
Answer No - 9

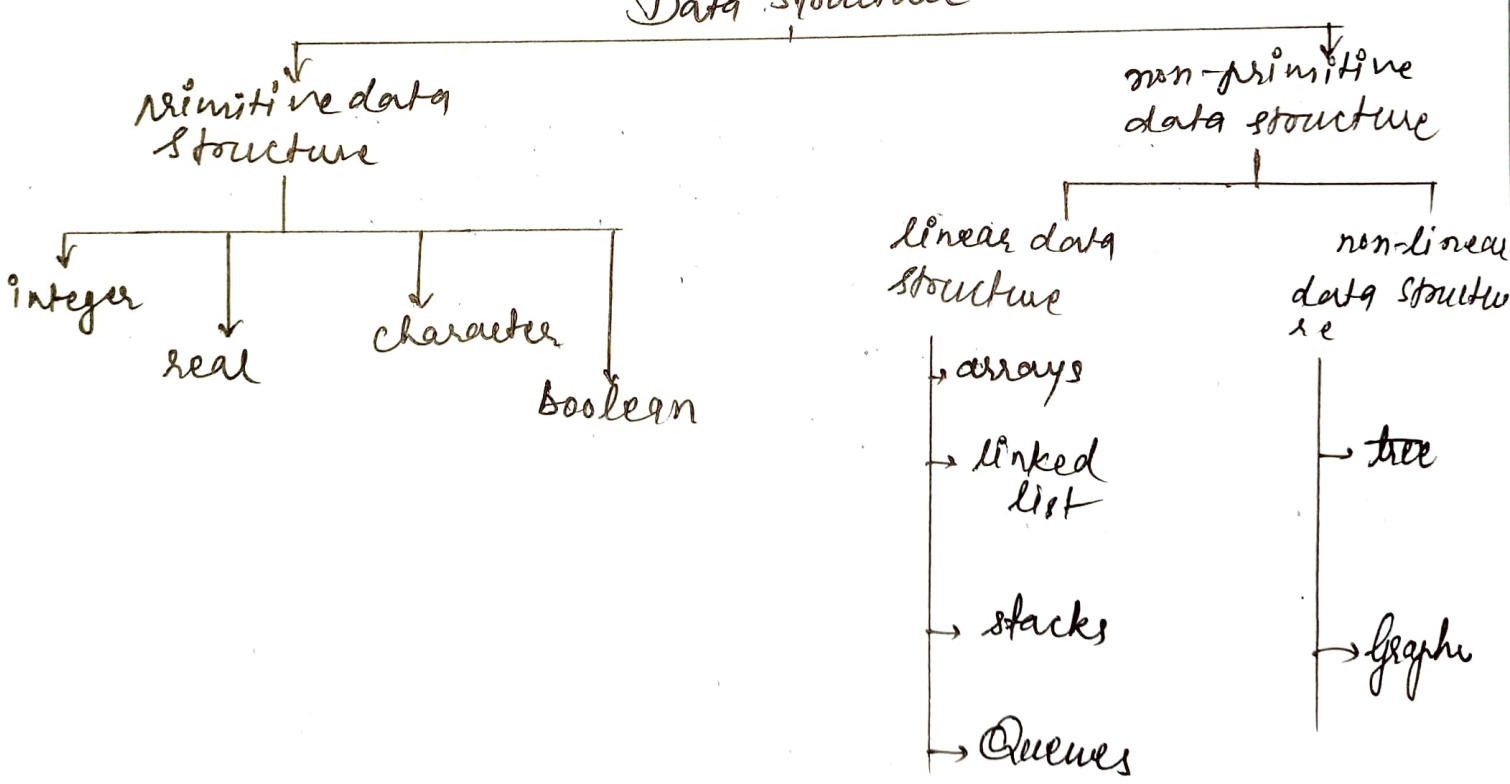
the pre order sequence of binary search tree is 30, 20, 10, 15, 25, 23, 39, 35, 42.

BST ⟶



post order sequence of this tree is 10, 23, 29, 25, 15, 20, 42, 35, 30.

Answer No - 12 Let us first see the flow chart.



P.T.O →

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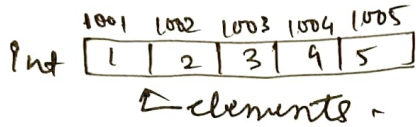
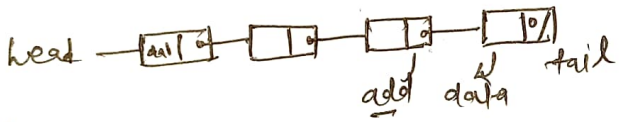
Data Structure →

Data structure is way of organising and storing data in a computer show that it can be accessed and modified efficiently. The main idea is to reduce the space and time complexity of different task.

array → array is a data structure used to store homogenus elements at contagious location size of array must be provided before storing data.



linked list → it is a linear data structure where each element is a seperate object. each node of list comprising of two items, the data and a refrence to next node.



stacks:

a stack (LIFO) is an abstract data type that serves as a collection of elements, with two principle operation: push: which adds element to collection and pop: which removes the last element that was added. in stack both the operation of push and pop takes place at the same end that is top of stack.

Queue:

a Queue (FIFO) is an abstract data type that serves as an elements collection. with two principle operation enqueue: the process of adding an element to collection (element added from rear side)

dequeue: the process of removing first element that was added (elements can be removed from front side).

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tree →

a tree is a data structure can be defined recursively as a collection of nodes where each node is a data structure containing of value, together with a list of reference to nodes (child or subtree), with constraints that no reference is duplicate, and none point to the root.

Graph →

graph is a non linear data structure consisting of nodes and edge. the nodes are some time refers, vertices and the edges are lines or are. that connect any nodes in graph,

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