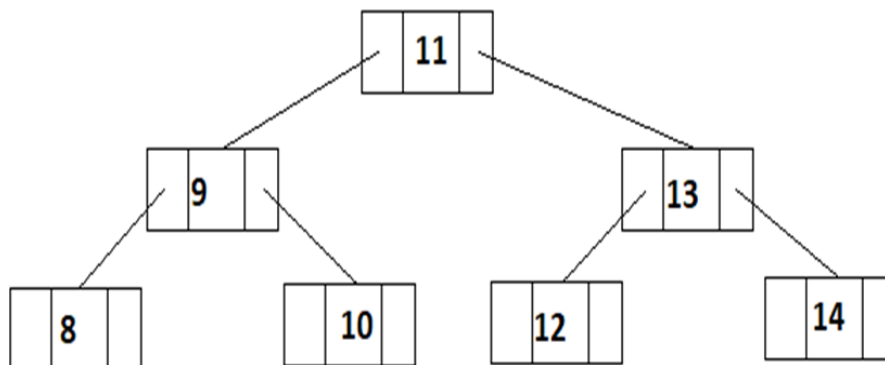


First Semester 2023-24
Data Structures and Algorithms Design (Merged-SEZG519/SSZG519)
Exercises (Non-linear Data Structures)

1. Draw stack execution steps in non-recursive preorder, inorder, and postorder traversals of the following tree.



Preorder:

			8					
		9	10	10		12		
	11	13	13	13	13	14	14	
Steps	1	2	3	4	5	6	7	8

O/P:

Step 2: **11** Step 3: **9** Step 4: **8** Step 5: **10** Step 6: **13** Step 7: **12**

Step 8: **14**

Inorder:

			8						
		9	9	9	10			12	
	11	11	11	11	11	11	13	13	14
Steps	1	2	3	4	5	6	7	8	9

O/P:

Step 2: – Step 3: – Step 4: **8** Step 5: **9** Step 6: **10** Step 7: **11**

Step 8: – Step 9: **12** Step 10: **13** Step 11: **13** Step 12: **14**

Postorder:

			8									
		9	9	9				12				
		10	10	10	9		13	13	13			
	11	11	11	11	11	11	14	14	14	13		
	13	13	13	13	13	13	11	11	11	11	11	
Steps	1	2	3	4	5	6	7	8	9	10	11	12

O/P:

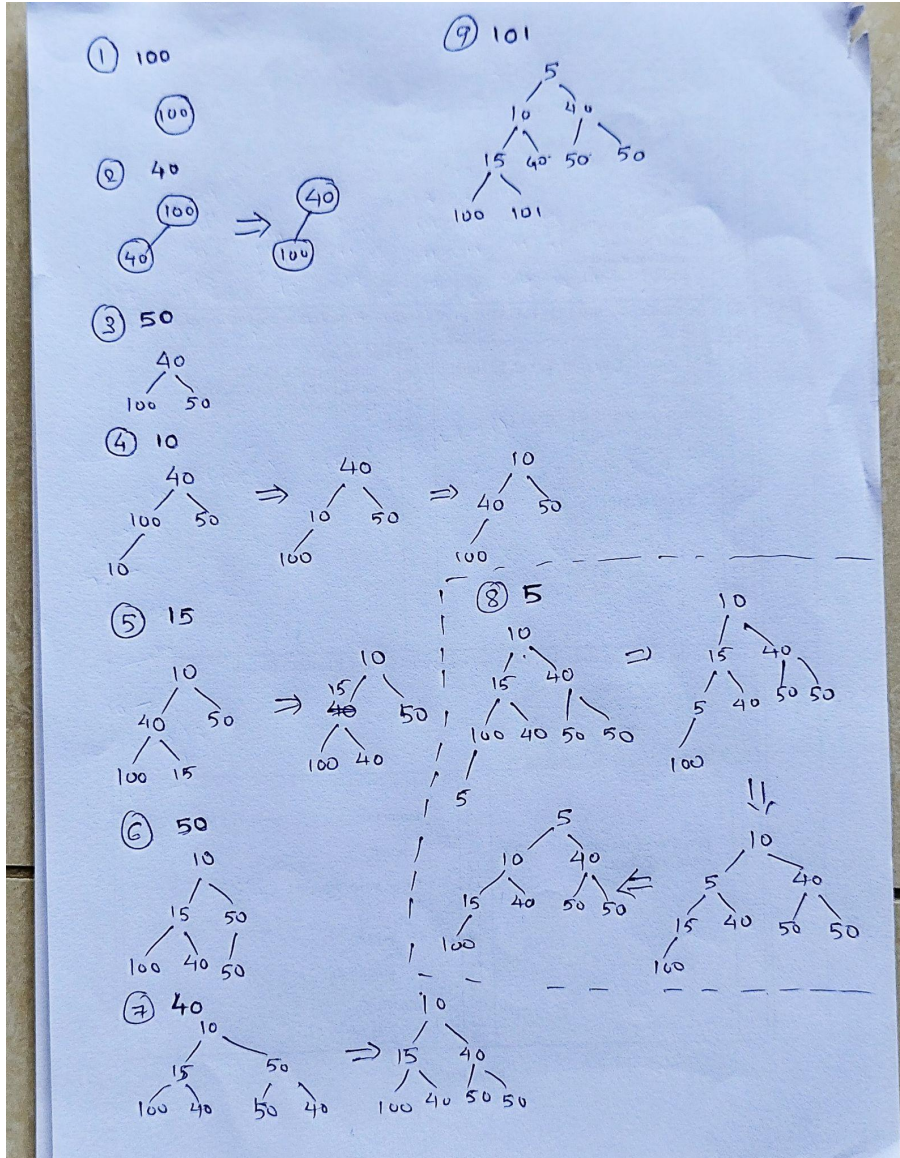
Step 2: – Step 3: – Step 4: **8** Step 5: **10** Step 6: **9** Step 7: –

Step 8: – Step 9: **12** Step 10: **14** Step 11: **13** Step 12: **11**

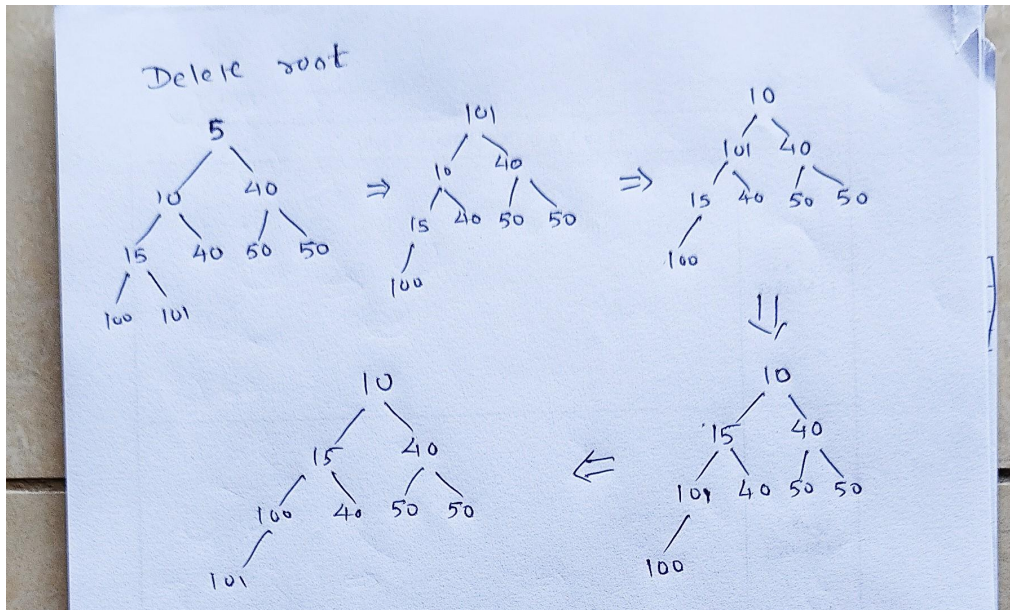
Ref: <https://www.geeksforgeeks.org/iterative-postorder-traversal-using-stack/>

2. (A) Insert the following data in a MIN heap tree. Tree is initially empty. Depict the tree and corresponding array for each insertion.

100, 40, 50, 10, 15, 50, 40, 5, 101 (maintain the order while insertion)



- (B) Depict the tree and corresponding array for deletion of root node.



3. Determine the sequence of data while insertion for Q-2 to make insert operation efficient. (Hint: Insert operation will be efficient if reheaping is not required).

5-10-40-15-40-50-50-100-101