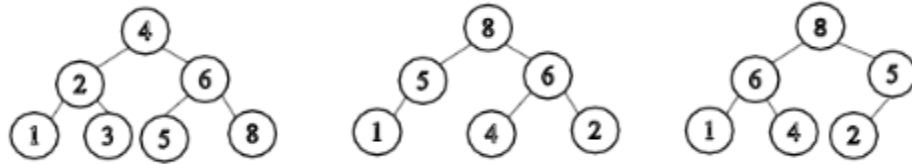# Tutorial Session 10

1. Consider the following trees

i.   For each of the above binary trees, why it is or is not a heap tree?

ii.   Represent the third tree above as an array.

iii.   If the index of a node is 11, what is the index of its left child?

iv.   If the index of a node is 11, what is the index of its right child?

v.   If the index of a node is 11, what is the index of its parent node?

vi.   Draw the third tree above after a heap remove operation.

vii.   Draw the third tree above after a heap insert (item=7) operation.

2. Construct a Binary Heap using the following sequence of numbers as input. It is up to you to decide whether to construct a Max heap or Min heap.
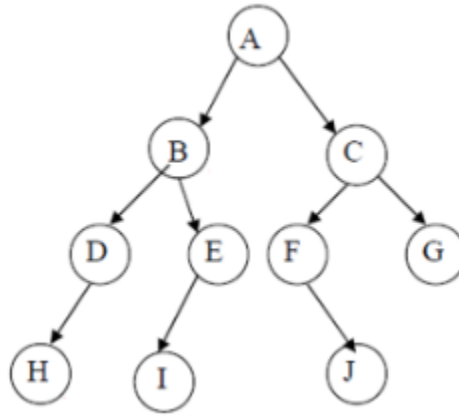
28 12 17 5 7 22 13 12 4 11 16

3. Insert the number 77 into the following AVL tree. After the insert, at which node does is the tree out of balanced and what type of rotation is needed to re-balance.
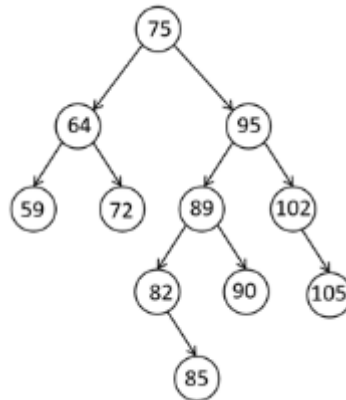
4. What is the minimum and maximum number of nodes in an AVL tree of height 6?

a. Minimum = a

 Maximum = b.

b. Give traversals of the tree shown on the above

 i. Pre-Order:

ii. Post-Order:

iii In-Order

c. What is the depth of node F:

 Is it AVL balanced?

5. Build the Huffman coding tree and determine the codes for the following set of letters and weights Letter Frequency –

Letter	A	B	C	D	E	F	G	H	I	J	K	L
Frequency	2	3	5	7	11	13	17	19	23	31	37	41

i.   What is the expected length in bits of a message containing n characters for this frequency distribution?

ii.   Encode message "Deed" by using this Huffman code

iii.   Decode the following Huffman code 0100111101010