AMERICAN INTERNATIONAL UNIVERSITY, BANGLADESH

DEPARTMENT OF COMPUTER SCIENCE

COURSE: DATA STRUCTURES LAB

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
Remember	Understand	Application	Analysis	Evaluation	Create

Instructions: (a) Answer any two sets and 4 questions.
(b) Use separate pages for each section.
(c) All questions are of equal value.
(d) Figures in the right margin indicate full marks.

1 (a) The following is an infix expression. Change the infix expression into a prefix expression and evaluate the result of your output prefix expression by finding its value. 5

Sample Expression: (34*2)- [{40/ (4-2)}+2]

(b) Create a queue using linked list and reverse its elements. Print the elements in two directions: 5
(i) Front to rear (ii) Rear to front

2 (a) Change an infix expression to a postfix expression with the help of stack using linked list.
Sample input: ((A+B)-C*(D/E)) +F
Sample Output: AB+CDE/*-F+

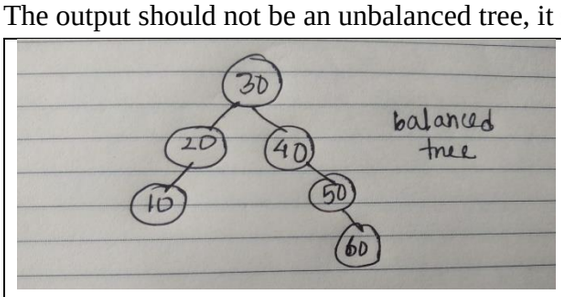
(b) Create a binary search tree using an iterative approach for insertion function and deletion function. Print out the nodes of your constructed BST using any traversal mechanism. Now determine the height of the BST of the root node.
Formula to find height: |Left subtree| – |Right subtree| or |Right subtree| –|Left subtree|

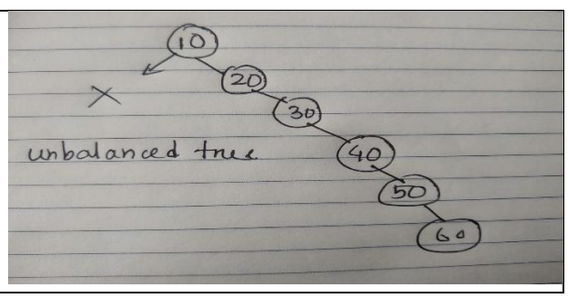
3 (a) **Post Order Sequence of a BST is this:** A B D GK H L M C E 5
Pre Order Sequence of a BST is this: K G L M H D B E C A
Construct the binary search tree using this information where these two sequences are input, and the output should be printed in the In Order Sequence.
In Order Output: K G D L H M B A E C

(b) Create a balanced binary tree using these necessary conditions with the help of the linked list: 5

- The height difference should not be more than 1.
- The Left sub-tree should be balanced, and the right sub-tree should be balanced.

The height difference of a tree is calculated using this formula:
|Left subtree| – |Right subtree|. The difference should not be more than 1.
The input of each node is given as below: *10,20,30,40,50,60*
The output should not be an unbalanced tree, it should look like the left column





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Course Teacher's Signature: