National Institute of Technology Calicut
Department of Computer Science and Engineering
Third Semester B. Tech.(CSE)
CS2092D Programming Laboratory
Modification Question for Assignment-6 (11.11.2021)

Instructions: For the two questions given below, write the design in the shared doc. Upload your design (of both questions, Q1& Q2) as a **single** .pdf file in the Eduserver on or before 3:00 pm in the link provided for *submitting the design of the Modification question.* After submitting the design, implement your design using *C Language* and show the output of your programs to the evaluator for the test cases given for the Modification question in Eduserver. In any case, you should submit your C Programs of both questions, Q1& Q2, as separate files on or before 03:45 PM in the corresponding links provided in Eduserver for *submitting the C Program for the Modification question.* In case of clarifications, your evaluator will help you.

Marks	Q1 (Design + Implementation)	$4 + 2$
	Q2 (Design + Implementation)	$1 + 1$
Submission Deadlines	Q1& Q2 Design	03:00 PM
	Q1 & Q2 Implementation	03:45 PM
Naming Conventions	For Design	<ROLLNO>_<FIRSTNAME>_ASSGN6_MOD.pdf
	For Implementation	<ROLLNO>_<FIRSTNAME>_ASSGN6_MOD_1.c <ROLLNO>_<FIRSTNAME>_ASSGN6_MOD_2.c

The marks for the implementation will be based on the results for the test cases. The evaluator will be conducting a viva for a maximum of 5-10 minutes.

QUESTIONS

1. Write a program that reads an assignment statement, `S`, of the form `variable = expression;` and constructs an expression tree for the statement. The program should then print the *postorder* traversal of the tree. The statement is terminated by a '`;`' but the symbol '`;`' do not appear in the tree. The tree should have a root node with data '`=`', a node representing the `variable` as left child of root and the tree for the `expression` as the right subtree. For simplicity, assume `S` contains only single letter variables $\in [a - z]$. The expression is of the form given in question 3 of Assignment 6 and $|S| \leq 10^3$.

   The program should contain a function CreateAssignmentTree(s) which creates a tree for the given assignment statement 's' using a linked list and returns a pointer to the root of the tree.

   Input format:

   - A single line containing the assignment statement.

   Output Format:

   - A single line containing the postorder traversal of the expression tree constructed for the given statement.

   Sample Input1:
   x=a+b*c;

   Sample Output1:
   xabc*+=

Sample Input2:
x=a;

Sample Output2:
xa=

Sample Input3:
y=y;

Sample Output3:
yy=

Sample Input4:
z=(x+y)*(a+b);

Sample Output4:
zxy+ab+*=

2. Modify the above program to read the statement, `S`, from a given file. The file may contain more than one assignment statement. The program should convert each statement into a tree and print its *preorder* traversal.

   Input format:

   - The input is the name of the `.txt` file. The file contains one or more lines. Each line represents exactly one assignment statement.

   Output Format:

   - Print the *preorder* traversal of the expression tree of each assignment statement in separate lines.

   Sample Input1:
   input1.txt

   `Contents in input1.txt`

   ```
   x=a+b*c;
   x=a;
   ```

   Sample Output1:
   =x+a*bc
   =xa

   Sample Input2:
   exp2.txt

   `Contents in exp2.txt`

   ```
   y=y;
   z=(x+y)*(a+b);
   ```

   Sample Output2:
   =yy
   =z*+xy+ab