

ASSIGNMENT-3

Spring 2022

Create a menu with items Left Recursion, Left Factoring, Prefix Evaluation, Postfix Evaluation, and Three Address Repression. Use string input instead of a number to select menu items. For example, the user should write **LR** to select Left Recursion, **LF** to select Left Factoring, **PRE** to select Prefix Evaluation, **POST** to select Postfix Evaluation, **TAR** to select Three Address Repression.

For LR Input:

Take an expression input from the console and convert the expression into Left Recursion.

Formula: For expression $A \rightarrow Aa \mid b$,

the Left Recursion will be $A \rightarrow bA'$

$$A' \rightarrow aA' \mid \varepsilon$$

For example, for expression $E \rightarrow abAb \mid bEa \mid Eab \mid EAb \mid ab$

the Left Recursion will be $E \rightarrow abAbE' \mid bEaE' \mid abE'$

$$E' \rightarrow abE' \mid AbE' \mid \varepsilon$$

For LF Input:

Take an expression input from the console and convert the expression into Left Factoring.

Formula: For expression $A \rightarrow ab \mid ac$

the Left Factoring will be $A \rightarrow aA'$

$$A' \rightarrow b \mid c$$

For example, for expression $E \rightarrow abc \mid ab \mid bd \mid bde \mid x$

the Left Factoring will be $E \rightarrow abE' \mid bdF' \mid x$

$$E' \rightarrow c \mid \varepsilon$$

$$F' \rightarrow \varepsilon \mid e$$

For PRE Input:

Take a prefix expression input from the console and evaluate the expression to a number result.

For example, for expression $-/-^42*37/^3/34-3/7/4/4/7*223$

the prefix evaluation result will be -0.807

For POST Input:

Take a postfix expression input from the console and evaluate the expression to a number result.

For example, for expression $231-2^222^52/3/4^*+2+^4/2^*+$

the postfix evaluation result will be 2.002

For TAR Input:

Take an expression input from the console and show all three address representations.

For example, for expression $(x/y)*((y/z)+(x^y-(z^z)))/(y/(z-y^w*v)-x))/h$

the three address representations will be:

1. $t_1 = x/y;$
2. $t_2 = y/z;$
3. $t_3 = z^z;$
4. $t_4 = x^y;$
5. $t_5 = t_4 - t_3;$
6. $t_6 = y^w;$
7. $t_7 = t_6 * v;$
8. $t_8 = z - t_7;$
9. $t_9 = y/t_8;$
10. $t_{10} = t_9 - x;$
11. $t_{11} = t_5/t_{10};$
12. $t_{12} = t_2 + t_{11};$
13. $t_{13} = t_1 * t_{12};$
14. $t_{14} = t_{13}/h;$