

Simple Interpreter

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Data Structures I

Interpreter

Interpreter is a computer program that directly executes instructions written in a programming or scripting language, without requiring them previously to have been compiled into a machine language program.

User Manual

First, the program reads from a text file and displays the expressions.

Second, the program displays the results after evaluating the expressions

```

Welcome to The Simple Interpreter

Loaded Successfully

X = 12.5
Y = X * 4 / 5
Z = X * Y / 5
M = Z * -2
K = 10.5 + ( Z - 2.5 ) / ( X + Y ) * 1

X = 12.5
Y = 10.
Z = 25.
M = -50.
K = 11.5
Enter an expression you want to evaluate or Ctrl+Z to exit:
```

Third, the program asks you to Enter Expressions (if you want) to evaluate.

```

Welcome to The Simple Interpreter

Loaded Successfully

X = 12.5
Y = X * 4 / 5
Z = X * Y / 5
M = Z * -2
K = 10.5 + ( Z - 2.5 ) / ( X + Y ) * 1

X = 12.5
Y = 10.
Z = 25.
M = -50.
K = 11.5
Enter an expression you want to evaluate or Ctrl+Z to exit: N = X + 2 * 6
Enter an expression you want to evaluate or Ctrl+Z to exit: X = Y + 20 - 2 * -2
Enter an expression you want to evaluate or Ctrl+Z to exit: ^Z
```

Fourth, the program displays the variables and their result, after evaluating them.

Fifth, the program sorts the variables (By Name and By Value)

```
Variables Before Sorting:
X = 34.
Y = 10.
Z = 25.
M = -50.
K = 11.5
N = 24.5
*****
Sorting By Key
K = 11.500000
M = -50.000000
N = 24.500000
X = 34.000000
Y = 10.000000
Z = 25.000000
*****
Sorting By Value
M = -50.
Y = 10.
K = 11.5
N = 24.5
Z = 25.
X = 34.
```

Handling errors

1- Not Founding the Variable

```
Enter an expression you want to evaluate or Ctrl+Z to exit: t = f + 2
Error!! f not Found
```

2- Left-Hand-side should only have one variable

```
Enter an expression you want to evaluate or Ctrl+Z to exit: X + Y = 2
Error!! Missing equal or left hand side has more than one variable
```

3- Invalid Variable Name

```
Enter an expression you want to evaluate or Ctrl+Z to exit: 2l = 5 + 3
Error!! Invalid Variable Name
```

4- Invalid Expression

```
Enter an expression you want to evaluate or Ctrl+Z to exit: X + 3 - 2
Error!! Missing equal or left hand side has more than one variable
```

```
Enter an expression you want to evaluate or Ctrl+Z to exit: g = 2 * ( X + 5
Error!! Invalid expression unclosed bracket or closed bracket found without open bracket
```


System Description

The program reads the text file. It saves the data from the text file in an array of strings, then prints the data, then evaluates the variable (if there is no error). If there is an error, the program exits. The program evaluates the variables by using a stack, changing infix to postfix then evaluating the postfix. If there is a variable in the right-side of the expression, the program replaces the variables by searching. If the program didn't find the variable in the array, the program will exit. Then, the program asks the user to enter an expression (if he wants). Then the program passes the variables to store them in a Binary Search Tree. The binary search tree sorts the variables by the key of each variable (variable name). The program after that sorts the nodes by using a heap algorithm (sorting the variables by value from least to greatest).