Assignment-6

Due : 29th March, 2022

In the last assignment, you had a context-free grammar for accepting common programming language statements. Now, you have to incorporate a symbol table which keeps track of all the variables and function names that are declared. It will have two fields per variable, name and type, and these fields will be populated when any declaration statement is encountered. For function names, it will have two fields, name and return type. For now, you can assume that it is an array, not a hash table. Next, whenever a variable is encountered, you have to find its type using a lookup operation in the symbol table.

Now, you have to add type-checking code for assignment statements. You have to derive type of an expression (denoted by non-terminal exp). If an integer variable/constant and a floating-point variable/constant are added, the type of the corresponding expression will be FLOAT. You have to check whether the variables are declared before using in the assignment statements.

The following program fragment should raise a warning as a floating-point number is assigned to the variable a, which is an integer. Also, it should raise an error as the variable d is used without being declared.

```
int main()
  {
      int a;
      float b, c;
      a = b + c;
      if(a>b){ a = b + c;}else{ a = b - c; }
      while(a<b){ a = a+c+d;}
  }
```