Assignment-6

Due : 1^{st} March, 2023

Part 1

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 arguments 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. You can assume that to be an array or 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 boolean variable/constant and a integer-point variable/constant are added, the type of the corresponding expression will be integer. 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 integer number is assigned to the variable a, which is a boolean variable. Also, it should raise an error as the variable d is used without being declared.

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

Part 2

The following program fragment should show warning for the if-block only.

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