CSN 401, Compiler Design
Topic : Compiler for a Select Function Set of C Language

Submitted by:
Aanshi Bansal 16103055
Ishita Agarwal 16103056

Motivation:
The motivation for the project is to learn how all the phases of the compiler are implemented. We are learning the theory in our compiler course and want to apply that in practical scenario.

Objective:

1. The primary objective is to implement all the phases of the compiler for a subset of the C programming language. By subset, it is conveyed that the basics of C language will be implemented, but the complexities like struct, union will not be implemented.
2. Showing the output of each phase of the compiler.
3. The following phases will be implemented:
    a. Lexical analysis.
    b. Syntax analysis.
    c. Semantic analysis
    d. Intermediate code generation.
    e. Target Code Generation

Scope:
We will be implementing the following features of the C language -

It will follow the following rules -

1. **Identifier Rules**
    a. Same as in C
2. **Data Types:**

    Data types supported are:
    a. Primary Data Types (integer(int), floating point(float), character(char) and void).
    b. Derived Data Types (String and array)

3. **Expressions**
    1. Arithmetic Operators (+, -, *, /, %, ++, --)
    2. Relational Operators (== , != , > , < , >=, <=)
    3. Logical Operators (&&, ||, !)

4. Bitwise Operators (&, | , ^ , << , >>)

4. Statements

a. Declaration statement

E.g. int a;

b. Declaration and initialization

E.g. int a = 5;

c. Assignment Statement

E.g. a = b;

d. Conditional statement (Nesting not allowed)

i. Simple if (nesting not allowed)

```
if
    ….
Else
    ….
```

ii. Switch Statement (nesting not allowed)

```
Switch()
Cases
    Value 1:
Break;
.
.
.
    Value n:
break;
Endcase
```

iii. Repetition Statement (nesting not allowed)

a. While loop

b. For loop (start value, end value, inc/dec)

5. Functions

a. Return type

b. Function name following identifier rules

c. () containing input parameters

d. { Function body and return statement }