CS F363 Compiler Construction
Assignment-2

Due date: 29 April 2023 11:59 PM   **Marks : 30**

Consider a programming language, (**Mini-C**) with the following features:

1. **Type:** int, float, char

2. **Basic statements**: expression statement, assignment statements, and compound statements, declaration statement.

3. **Control and looping statements:** if statement, for statement, while statement, and switch statement. (note that nesting of these statements is also possible.)

4. **System functions**: printf and scanf statements.

5. **Other:** Variables, arrays, and function

The syntax for the above is same as in C language. The structure of the input program is also same as a C program.

Tasks:

1. **Lexical Analysis** *[5 marks]* - For this phase, write a LEX program that broked down the input program into tokens (identifiers, operators, numbers, keywords, punctuators). A symbol table is created with the list of tokens obtained from the input. Also, report if any invalid printf and scanf statements are in the given program.

2. **Syntax Analysis** *[8 marks]*- For this phase, write a YACC program that takes tokens generated after lexical analysis and construct syntactically correct sentences and the syntax errors present are printed out (missing parenthesis, semicolon).

3. **Semantic Analysis** *[6 marks]*- Extend your YACC program written in the last phase to examine semantic errors and the abstract syntax tree is printed.

   Semantic errors like type checking, undeclared variables, multiple declarations of variables are verified.

4. **Code Generation** *[6 marks]* - Extend your YACC program in the last phase to generate the intermediate code in three address code format.

5. **Final stage:** *[5 marks]* Fianlly, extend your YACC proram to print the output of the given input program.

Instructions

1. Do the assignment in groups of size maximum of 6.

2. Deadline is 29 April 2023 11:59 PM. No extension is possible.

3. Late submissions will be allowed upto maximum 24 hrs after the deadline with peanlty of 2% per each hour.

4. The input/output format and submission guidlines will be upadted in a week.

All the best.