CS300-Advanced Programming

Programming Assignment 1 Part-III Spring 2021-22 Total Marks: TBA

Due : Friday, February 18, 2021 11:55 pm

- You are going to build a C++ code scanner written in Haskell Language. A scanner is a program that takes a sequence of characters (the source file of the program) and produces a sequence of tokens.
- **Late submissions will not be considered for any reason.** There will be no marks for empty submissions. Don't submit zip files.
- **Please submit only one Haskell(in hs format) and rename it RollNumber_1_3.hs**. You are not required to submit any input/output txt files.
- **Your code must read C++ code from a file.The name of the file will be taken as input from the user.**
- **We will be only passing the name of the txt file(where C++ code is written) as the argument to scanner function and the function will generate that output file.**
- **The output must be a txt file showing tokens and lexemes as** $< token, lexeme >$ **pair format**. For example if you have code
  `int xY;`
  `xY=43;`
  then the output file will contain the data like
  $< keyword, int >, < identifier, xY >, < operator, ; >$
  $< identifier, xY >, < operator, => , < intContsant, 43 >$
- The name of the output file will be your RollNumber.txt
- In case of any queries, feel free to write us an email instead of doing plagiarism.

Specification(s):

The specifications for an Ad-hoc Scanner are given below and you are required to generate it.

1. All numbers (int, float & double) are heptal **(base 7)**. Rest of other numbers should be interpreted as errors.
2. Identifiers are at least 2 characters long with at least one capital letter in them but will not start with digits.

3. Operators will include + - * / % < ≤ > ≥ = == != && || [ ] ( ) −− { } ++ << >>

   - Operators can be written with or without white spaces with the operands or expressions. (i.e. “a+b” or “a + b” or “ a + b ” all are allowed).

4. The delimiters will include , ; :

5. Keywords of the scanner will be (int, float, double, void, while, for, if, else, char, array, struct, class, break, case, return, cout, cin, true, false, endl).

6. Strings will be the text written in inverted commas.

7. Comments can be single-line and multi-line. Single-line comments start with // and automatically finishes at the end-of-line character. Multi-line comments starts from /* and finishes at /*.

You can use this code to read data from a file in Haskell:

```
import System.IO
import Control.Monad

main = do
        let list = []
        handle <- openFile "test.txt" ReadMode
        contents <- hGetContents handle
        let singlewords = words contents
            list = f singlewords
        print list
        hClose handle

f :: [String] -> [Int]
f = map read
```

We will test your scanner on the (similar) C++ code given below:

```
int str;

//correct input
/* Function ABC*/
bool ABC(int a , string b, string str)
{
        int c;
        a = 5;
        c = 10.4;
        b = "Ali";
        str = "Sana";

        while ((c<1))
        {
                while (false)
                {
                   c= c+a;
                   if(a <= 10)
                   {
                     // "Welcome to CS300"
                        return true;
```

```
                    }
                    else
                        return false;
                }
        }
        while (true)
        {
            b = ADD(a,c);
            cout << "Programming" << endl;
            b = b*c;
        }
        /*d = d+ (b+((c+ 2)* a));
        if(a = b)
            str2 = "Badar";     */

        return b;
}
```