CSE-354 (SET-A)
Compiler LAB Final Exam

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Q1. Write a program which can classify strings as valid or invalid according to a Regular Expression.

The following table contains a list of Regular Expressions (RE) and some valid and invalid examples. You can consider **Any Two Patterns from the following set of** RE:

Description	RE	Valid	Invalid
Zero or more	X(Y)*Z Here, X = "a" Y = "bc" Z = "de"	ade abcbcde	abde abcbde
Negation of character classes	[^W] Here, W="aeiou"	b c	a e
Exactly N times	[^W]{N} Here, W="aeiou" N = 6	rhythm syzygy	rhythms allowed

Your job is to input RE and sample string from user. Then print **'VALID'**, if the text string is valid according to User given regular expression, otherwise print '**INVALID'**.

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Q2. Build a simple lexical analyzer that will identify all the numerical values, identifiers, keywords, math operators, logical operators and others [distinct]. You will need to read a file named "**input.c**" to collect all chars. For simplicity, input file will be a C program without headers and methods.

Input:

```
int a, b, c;
float d, e;
a = b = 5;
c = 6;
if ( a > b)
{
        c = a - b;
        e = d - 2.0;
}
else
{
        d = e + 6.0;
        b = a + c;
}
```

Output:
Keywords: int, float, if, else
Identifiers: a, b, c, d, e
Math Operators: +, -, =
Logical Operators: >
Numerical Values: 5, 6, 2.0, 6.0
Others: , ; ( ) { }

Q3. Construct a simple Calculator using **Flex and Yacc.** **5**

i) Write a LEX program which will identify the tokens.

ii) Write a YACC program which will check the syntax according to the grammar given.

a) If there is any Syntax Error, then output 'Syntax Error'.

b) If there is no Syntax Error, then evaluate the expressions and display the results.

Consider the following grammar for YACC for the evaluation of arithmetic expressions:

(1) Expr → Expr + Term | Expr **-** Term | Term

(2) Term → Term * Factor | Term / Factor | Factor

(3) Factor → **(** Expr **)** | **number**

For reference, The terminal symbols are: + - * / **number ( )**
The nonterminal symbols are: Expr Term Factor

The following illustrates sample calculator input and output:

Input: 3*(4+5)
Output: 27
Input: *7+- 4
Output: Syntax Error
Input: 1+2*5
Output: 11