CSL302: Compiler Design

Lab Exam-2 (2025-26-M Semester)

Max. Points: 100 **Duration:** 1 hour 30 minutes

October 16, 2025

Instructions

- The question paper contains 1 question. Prepare a folder and name it as <Q1>.
- The folder should also contain a ReadMe file, which should list the instructions to execute your program.
- Prepare a zip file for your solutions. The zip file should be named as RollNo_Name.zip
- The submission details will be announced at the end of the exam.

Question-1

Design a syntax analyzer for the following programming language.

Notes:

- You are required to write the corresponding lexical analyzer as well for the working solution.
- Partial marks will be awarded based on the supported features.

Lexical Rules

1. **Identifiers:** A string containing one or more lower alphabets. For example: a, bc, xyz
2. **Temporary variables:** Start with a letter t followed one or more digits. For example, $t1, t2, t150$.
3. **Constants:** Integer values.
4. **Operators:** $+, -, *, /, <, >, =, !$
5. **Special Characters:** [,], ;, :
6. **Keywords:** goto, if
7. **Labels:** Start with letter L followed one or more digits. For example, $L1, L12$.

Syntax Rules

1. A statement can be arithmetic statement or conditional statement.
2. Arithmetic statement supports the following
   - x = y, where x and y can be identifiers or can be temporary variables
   - x = y op z, where x, y, z can be identifiers or temporary variables and op can be $+, -, *, /$
   - x = op y, where x and y are identifiers or temporary variables and op can be $-, !$
   - x = y[i], x, y, i are identifiers or temporary variables.
   - x = *y, where x and y can be identifiers or can be temporary variables
3. A conditional statement supports the following
   - if x relop y goto Label
     where x and y can be identifiers or temporary variables, relop can be $>, <, <=, >=, ==, != .$
   - goto Label
4. Each arithmetic and conditional statement can be prefixed with optional **Label:**

Example Input

```
if a < b goto L1
goto L2
L1: t1 = a + b
c = t1
goto L3
L2: t2 = a - b
c = t2
```

Expected Output

```
The program is syntactically correct.
```

[100 Points]