San José State University
Department of Computer Science

CS 153
Concepts of Compiler Design

Fall 2023
Instructor: Ron Mak

Assignment #6

Assigned: Monday, October 23
Due: Monday, November 6 at 4:00 PM
Team assignment, 120 points max

Pascal Compiler

The purpose of this assignment is to give you practice with ANTLR by completing a Pascal compiler.

Unzip file Asgn06.zip which contains a Pascal interpreter (visit methods in class **backend.interpreter.Executor**) , a Pascal converter (visit methods in class **backend.converter.Converter**), and an incomplete Pascal compiler (visit methods in class **backend.compiler.Compiler** and other classes in the same package).

Invoke the compiler with the **-compile** command-line option. The compiler should compile a Pascal program such as **Foo.pas** to a Jasmin assembly program **Foo.j**.

Complete the compiler

The incomplete compiler can compile Pascal assignment statements, **REPEAT** statements, expressions, and **WRITE** and **WRITELN** statements. It can compile the Pascal program **TestRepeat.pas** to **TestRepeat.j**, which you can assemble and run.

Complete the emit methods in class **backend.compiler.StatementGenerator** which are called by the corresponding visit methods in class **backend.compiler.Compiler** to compile

- **WHILE** statements
- **FOR** statements
- **IF** statements
- **CASE** statements
- procedure calls
- function calls

Test Pascal programs
Test your compiler on the following test Pascal programs to generate the equivalent Jasmin programs:

- **`TestWhile.pas`**
- **`TestFor.pas`**
- **`TestIf.pas`**
- **`TestCase.pas`**
- **`TestProcedure.pas`**
- **`Newton3.pas`**

You should get the same runtime output when you run the Pascal program with the interpreter as when you run the generated Jasmin programs after you've assembled them with the Jasmin assembler.

This assignment is a prototype of your final compiler project!

What to submit to Canvas
A zip file that contains:

- All of your Java <u>source files</u> and your grammar file.

- For each of the test Pascal programs, the <u>runtime output</u> from running the program under the interpreter, the generated <u>Jasmin program</u>, and the <u>runtime output</u> from running the assembled Jasmin program.

Submit to **Assignment #6: Pascal Compiler**

Rubric

Your submission will be graded according to these criteria:

Criteria	Max points
`TestWhile.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10
`TestFOR.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10
`TestIF.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10
`TestCASE.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10
`TestProcedure.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10
`Newton3.pas:`	**20**
• Generated Jasmin program.	• 10
• Runtime output from Jasmin program.	• 10