

COMP 520 Compiler Design

Individual Assignment #2

The Rest of MiniLang! Your first compiler...

Due: Sunday, February 8

Overview:

The purpose of this assignment is to get everyone familiar with the remaining phases of the compiler, within the context of a simple project.

Question 1: *Type or declaration errors* (5 points)

Develop five small programs, where each program exhibits a different type or declaration error. We will collect these together, along with all of the other students' tests, into one big torture test suite which we will use for testing your compiler.

You should test your compiler on many more programs.

Question 2: *AST and pretty print MiniLang* (10 points)

Implement an AST and pretty printer of the AST for MiniLang. Given an input program of the name `foo.min`, your compiler should write the pretty print to file `foo.pretty.min`. This pretty-printed file should be parsable by your compiler, in particular, check the invariant we saw in class:

$$\text{pretty}(\text{parse}(\text{pretty}(\text{parse}(P)))) \equiv \text{pretty}(\text{parse}(P))$$

Question 3: *Symbol Table and Type Checking* (10 points)

Implement a simple symbol table and type checker for MiniLang, ensuring that you implement the semantics we decided in class. If there is a declaration or type error, then your compiler should emit an error message, and not proceed to generate code.

If the program being compiled is `foo.min`, then your compiler should print out your symbol table into file `foo.symbol.txt`. You should be able to print a symbol table, even if there is a declaration or type error in the program, although the symbol table information may be incomplete. This will help you in debugging.

Question 4: *Code Generation* (10 points)

If the input program successfully passes type checking, then your compiler should produce an output `.c` file. If the input file is `foo.min`, then the output file should be `foo.c`. This output file should be compilable by any standard C compiler, without needing any other files. Make sure you test your generated code.

What to hand in

Hand in a `tar.gz` file of the form `firstname_lastname.tar.gz`. The structure of the files inside that tar-ball should be:

```
firstname_lastname/  
  README    (Your name, student ID, what command to use to make your  
            scanner/parser (make, ant ..), any special directions)  
  programs/  
    invalidtype/ (your five programs with decl or type errors)  
  src/ (the source code and build files)  
  run (a script that when invoked as "run foo.min" will process the  
input file and will produce three outputs, foo.pretty.min,  
foo.symbol.txt and foo.c.)
```

The `.tar.gz` file should be handed in via MyCourses.