

CMSC 22620/32620  
Spring 2015

Implementation of  
Computer Languages II

Project 1  
April 1, 2015

## Extending the Flang Front End

Due: April 15, 2015

### 1 Introduction

Your first assignment is to extend an existing implementation of a front end for Flang. The front end consists of a scanner, parser, and type checker, and you will have to make modifications to all three of these phases.

### 2 Extensions

This section summarizes the extensions that you are responsible for implementing. You should refer to the supporting documentation about **Flang** for the details of the syntax and typing rules for these extensions.

- extend the implementation to support mutually recursive datatypes
- extend the implementation to support mutually recursive functions
- extend the implementation to support the or-else (`| |`) and and-also (`&&`) conditional operators
- extend the implementation to support the **try-catch** and **throw** expression forms.

### 3 Modifications

You will be provided with an implementation of a front-end for the version of **Flang** used in CMSC 22610 last quarter (the provided code is essentially a solution to Project 3). To implement these extensions, you will have to modify the following components of the provided code:

- modify the lexer to recognize new tokens (`parser/flang.lex`)
- modify the parse-tree representation to represent the new syntactic forms (`parser/parse-tree.sml`)
- modify the parser to recognize new syntactic forms and to build the corresponding parse-tree representation (`parser/flang.grm`)
- modify the parse-tree printer to print the new parse-tree representations (`parser/print-parse-tree.sml`)

- modify the type checker to handle the new constructs (`typechecker/typechecker.sml`)

The seed code will include modifications to the AST representation of programs (`typechecker/ast.sml` and `typechecker/print-ast.sml`).

## 4 Submission

This project is due at 10pm on Wednesday, April 15. You should submit your code by committing it to your phoenixforge **svn** repository. Please put your code into a directory called “proj-1.”

**Note:** It is important that your code compile. Code that does not compile (*i.e.*, has syntax or type errors) will get **0** points for correctness.

## 5 Document history

**April 1, 2015** Original version.