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CS4215 Programming Language Implementation

Semester Project Objectives, Scope, Plan

AY2021/22, Semester 2

Objectives

We aim to implement a subset of F# programming language which is named FLite#. In the final product, the user will be able to run a FLite# program from the command line by using our interpreter.

We will create a parser for FLite# using ANTLR parser generator and a custom grammar and implement a FLite# interpreter in the Java programming language.

Scope

FLite# will be a statically typed programming language where the types must always be explicitly specified in the code. The implemented interpreter will provide type checking for the language. The main features covered by the language will be the following:

Goals

- Parser for FLite#
- Types: int, double, bool
- Collections: lists, tuples
- Operators: +, -, *, /, =, <>, <, >, <=, >=, &&, ||, not, ::, @
- Conditional expressions
- Immutable variables
- Functions, recursive functions, lambda expressions
- Pattern matching
- Units of measure

Deployment and documentation

The code of our implementation will be deployed onto a GitHub repository. The repository will also contain an already built jar executable which can be used to interpret FLite# programs.

The documentation of our project will include a grammar describing the syntax, evaluation rules for most relevant features of the language and type rules used for type checking. The technical documentation of the code could be automatically generated from the source code using JavaDoc.

Schedule

Week	Task
5	Set up a working environment and repository Syntax and semantics
6	Syntax and semantics Parser Calculator language interpreter
Recess Week	Variable binding Conditional expressions Lists, tuples Lambda expressions and closure

7 (Milestone 1: Interpreter for basic language)	Functions Type-checker
8	Type-checker
9	Type-checker Separate topics: Simone: units of measure Xiaoteng: pattern matching
10	Separate topics: Simone: units of measure Xiaoteng: pattern matching
11 (Milestone 2: Type-checking and units of measure)	Separate topics: Simone: units of measure Xiaoteng: pattern matching
12	Pattern matching Testing
13	Pattern matching Documentation