

## CIIC 4030/ICOM 3046 Programming Languages

### Assignment #3

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This assignment will expand the PLY-based parser to interpret expressions and execute statements. You will add semantic actions to evaluate expressions and handle control flow, making the parser behave as an interpreter.

Add the following semantics specifications to the parsing code in assignment #2:

1. Setup Semantic Rules for Expressions and Statements
  - Add support for basic operations (e.g., addition, subtraction, multiplication, division) by interpreting the result of each expression.
  - Implement handling for comparison operators (`==`, `!=`, `<=`, `>=`, `<`, `>`) to evaluate to True or False.
  - Extend support for boolean constants (`true`, `false`).
2. Implement Variable Storage and Lookup
  - Create a dictionary to store variable values during runtime.
  - Extend the parser's assignment functionality to update this dictionary.
3. Add Control Flow
  - Implement handling for if-else statements to control code execution based on conditions.
  - For while loops, evaluate the loop condition and execute the loop body until the condition is False.
4. Add Function Definitions and Calls
  - Define a structure to store function definitions (e.g., a dictionary).
  - Implement function calls, parameter handling, and return statements.
5. Implement error exceptions for the grammar rules
  - Run specific tests for each of the error exceptions and get screenshots of the outputs for each test. Create a PDF file named `Results.pdf` with all the screenshots.

Submit all files required to run the parser and the `Results.pdf` file.