Project #5
CpSc 8270: Language Translation
Computer Science Division, Clemson University
Python Functions, Scope & Decision
Brian Malloy, PhD
November 14, 2017

Due Date:

In order to receive credit for this assignment, your project must be submitted, using the `web handin` command, by 8 AM, Friday, December 1st of 2017. If you are unable to complete the project by the first due date, you may submit the project within three days after the due date with a ten point deduction.

Project Specification:

1. Your solution should be able to translate those constructs from the previous project, including integer and float values, variables, print, assignment, and the expressions specified in the previous project.
2. For this project, your solution should be able to translate Python functions, including scope resolution and return value propogatoin, illustrated in Figure 1.
3. In addition, your solution should translate if/else. You are not required to translate elif.
4. In all cases, the oracle for correctness is a Python 2.7 interpreter; that is, your expressions should evaluate, sans extended precision, to the same result that a Python 2.7 interpreter would produce.
5. In the directory that contains your working interpreter, place a new directory titled cases that contains test cases that adequately test your interpreter.
6. Write a test harness, test.py, and place it in your project folder so that it runs the test cases in cases.
7. Your code should be well organized, formatted, readable, free of memory leaks, and exploit proper object orientation.

Light at the end of the tunnel:

In the final project, Project #6, we will translate actual and formal parameters and recursion.

```
x = 7
def f():
  x = 99
  x += 1
  print x

print x
int> 7
f()
int> 100
```

(a) Basic Scope

```
x = 7
def f():
  x = 99
  def g():
    x += 1
    print x
  g()
f()
int> 100
print x
int> 7
```

(b) Nested Functions

```
x = 7
def foo():
  x = 99
  x += 1
  return x

print foo()
int> 100
print x
int> 7
```

(c) Return Statement

Figure 1: Examples of Python Function Translation.