Project #6
CpSc 8270: Language Translation
Computer Science Division, Clemson University
Final Project: Python Functions & Scope
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Due Date:

In order to receive credit for this assignment, your submission must be submitted, using the `web handin` command, by 8 AM, Monday, December 5^{th} of 2016. 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 handle integer and float values and variables, print, assignment, and the same expressions as the previous project, including {x + y, x − y, x ∗ y, x/y, x//y, x%y, x∗∗e, (x), −x, +x}; and, { x+ = y, x− = y, x∗ = y, x/ = y, x// = y, x% = y }.
2. In addition, your solution should handle Python functions, illustrated in Figure 1. In particular, Figure 1a will earn 90%, Figures 1b, 1c, and 1d, will earn an additional 10% each, for a total of 120%.
3. In all cases, the oracle for correctness is a Python 2.7.n interpreter; that is, your expressions should evaluate, sans extended precision, to the same result that a Python 2.7.n interpreter would produce.
4. In the directory that contains your working interpreter, place a new directory titled cases that contains test cases that adequately test your interpreter.
5. Write a test harness, test.py, and place it in your project folder so that it runs the test cases in cases.
6. Your code should be well organized, formatted, readable, free of memory leaks, and exploit proper object orientation.

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

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

(a) Basic Scope

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

(b) Nested Functions

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

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

(c) Return Statement

```
x = 9
def f():
  x = 17
  print x
  global x
  x += 1
f()
print x
```

(d) Global Statement

Figure 1: Examples of the Levels of Interpreter and Function Implementation.