

Name: \_\_\_\_\_ Section: \_\_\_\_ Andrew Id: \_\_\_\_\_

### 15-112 Spring 2014 Quiz 1

\* 17.5 minutes. No calculators, no notes, no books, no computers.

\* You may not discuss any portion of this quiz with anyone until after 5pm today.

\* No loops or conditionals or recursion! \* SHOW YOUR WORK, CIRCLE YOUR ANSWERS.

1. **Short Answer** [20 pts; 10 pts each]

a. In 5 words or less, why can't a program with a syntax error also have a runtime error?

b. The following is an incorrect attempt at `almostEqual`. Provide one example of inputs on which the function clearly fails (that is, returns the wrong answer), and then describe in 5 words or less what the bug is.

```
def almostEqual(d1, d2):
    epsilon = 10**-10
    return (d2 - d1) < epsilon
```

2. **Code Tracing** [30 pts]: Indicate what this will print:

```
def f(x): return 2*x
def g(x): return 3+f(x+3)
def h(x, y): return (x < y/2)
def ct1(x, y):
    print "A", x**2 + y/5
    print "B", f(y-x) + g(y%9)
    print "C", y/10
    print "D", 1.0*y/10
    print "E", 1.0*(y/10)
    print "F", x%y
    print "G", y%x
    print "H", -y%x
    b1 = h(x,y)
    b2 = h(y,x)
    print "I", b1
    print "J", b2
    print "K", b1+b2
    print "L", (b1 and f(3)) or (b2 and f(4))
    z = round(y/10.0)
    print "M", z
    print "N", type(z)
result = ct1(3, 16)
print "O", result
```

3. **Reasoning Over Code** [15 pts]

Find arguments for the following function that make it return True. You only need one set of arguments for the function, even if there are multiple correct answers.

```
def f(x):  
    return ((type(x) == int) and  
            (int(round(x**0.5))**2 == x) and  
            (x/10 == x%10 + 2))
```

4. **Free Response: roundToInt(f)** [35 pts]

Without using the builtin round function, write the function roundToInt(f) that takes a float f and returns the nearest int value to f. For example, roundToInt(1.4) returns 1 and roundToInt(1.5) returns 2. Remember not to use conditionals (if's), and don't forget about negative values of f.

5. **Bonus/Optional:** [2.5 pts] What will this print? For credit, be sure to show your work!

```
def f(g, h, x): return g(h(x))  
def g(x): return (x+3) % 17  
def h(x): return g(g(x))  
print f(g, h, f(h, g, 42))
```