

CS 108 Python Programming  
Spring 2014  
Examination 1

This is a closed-book examination. Write your solutions in the spaces below. There are six problems.

1. [20] What is the value for each of the following expressions?

- a.  $3 * 3 + 4 * 4$  25
- b.  $5 / 2$  2.5
- c.  $5 // 2$  2
- d.  $5 \% 2$  1
- e. `"1" + "1"` "11"
- f. `"two" * 3` "twotwotwo"
- g. `"catdog"[3]` "d"
- h. `"catdog"[3:]` "dog"
- i. `"catdog"[:3]` "cat"
- j. `[1,2,3,[4,5]][2:4]` [3, [4,5]]

2. [15] What do each of the following print statements produce as output?

a. `print("cat", "dog", "bird")`

cat dog bird

b. `print("cat", "dog", "bird", sep = " + ")`

cat + dog + bird

c. `print("apple" * 3)`

appleappleapple

d. `for i in range(0,16,5):`  
`print(i, end = " ")`

0 5 10 15

e. `print("abcdefg"[:])`

abcdefg

3. [15] Write a definition of the function `foo` such that `foo(n)` returns the sum of the numbers from 0 to `n` inclusively. For example, `foo(0)` is 0, `foo(4)` is 10, `foo(5)` is 15.

```
def foo(n):  
    result = 0  
    for i in range(n+1):  
        result = result + i  
    return result
```

4. [20] Consider the following definition for f.

```
def f(n):  
    m = 1  
    for i in range(1, n+1):  
        m = m * i  
    return m
```

a. [5] What is the value of f(4)? 24

b. [5] What is the value of f(5)? 120

c. [5] What is the value of f(0)? 1

d. [5] What mathematical function does f(n) compute? *factorial*

5. [15] Describe what happens when the following interactive graphics program runs:

```
from graphics import *  
def main():  
    win = GraphWin()  
    shape = Circle(point(50,50), 20)  
    shape.setOutline("red")  
    shape.setFill("red")  
    shape.draw(win)  
    for i in range(10):  
        p = win.getMouse()  
        c = shape.getCenter()  
        dx = p.getX() - c.getX()  
        dy = p.getY() - c.getY()  
        shape.move(dx, dy)  
    win.close()  
main()
```

- (1) Draws a 200 x 200 pixel window
- (2) Draws a solid red circle at (50,50) with radius 20.
- (3) The circle follows the next 10 clicks, centered on each click.
- (4) After 10 clicks, the window closes

6. [15] Draw the graphics window that you would see after the following program runs.

```
from graphics import *
```

```
def main():
```

```
    w = GraphWin()
```

```
    w.setCoords(0.0, 0.0, 4.0, 4.0)
```

```
    Circle(point(2.0,2.0), 2.0).draw(win)
```

```
    Line(Point(0,0), Point(4,4)).draw(win)
```

```
    Line(Point(0,4), Point(4,0)).draw(win)
```

```
main()
```

