

CS 108 Introduction to Computation with Python
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Sample Examination 2

This is a closed-book examination. Write your solutions in the spaces provided.

1. Consider the following Python program.

```
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()
```

Describe what happens in this interactive program.

2. Consider the following program.

```
def foo(s):
    f = open(s, "r")
    c = 0
    while f.readline():
        c = c + 1
    return c

print foo("file.txt")
```

a. [10] What does the program print?

b. [10] Explain why a for-loop is not used in the definition of foo()

3. Consider the following definition for function foo():

```
def foo(a,b):  
    try:  
        if a > b:  
            c = a/b  
            print "Option 1"  
        elif b > a:  
            c = b/a  
            print "Option 2"  
        else:  
            print "Option 3"  
    except:  
        print "Option 4"
```

a. [2] Under what condition will Option 1 be printed?

a > b, b ≠ 0

b. [2] Under what condition will Option 2 be printed?

b > a, a ≠ 0

c. [2] Under what condition will Option 3 be printed?

a = b

d. [4] Under what condition will Option 4 be printed?

a > b, b = 0

b > a, a = 0

4. Write an expression using either random or randrange to calculate the following:

a. [2] A random integer in the range 0 - 10 inclusively.

randrange(0,11) or randrange(11)

b. [2] A random float in the range - 0.5 to 0.5.

random - 0.5

c. [2] A random number representing the roll of a six-sided die.

randrange(1,7)

d. [4] A random number representing the sum resulting from rolling two six-sided dice.

randrange(1,7) + randrange(1,7)

5. Consider the following class definition.

```
from random import randrange
class MSDie:
    def __init__(self, sides):
        self.sides = sides
        self.value = 1

    def roll(self):
        self.value = randrange(1, self.sides+1)

    def getValue(self):
        return self.value

    def setValue(self, value):
        self.value = value
```

- a. What self refer to?

- b. Define another class Dice, which describes objects containing two six-sided dies (ie two six-sided MSDie objects). It should support a constructor, such that `d = Dice()` constructs one of these Dice objects, a method `roll()` such that `d.roll()` randomly rolls the two dies, and the methods `getValue1()` and `getValue2()` for obtaining the values (ie `d.getValue1()`) of each of the dies.

- c. Write a simple `main()` program that demonstrates all of the methods for Dice, by rolling and printing the values for the dice ten times.