

Carnegie Mellon University in Qatar  
Principles of Computing  
15-110 - Fall 2018  
Mock Quiz 1

Name: \_\_\_\_\_ **SOLUTION** \_\_\_\_\_

Andrew ID: \_\_\_\_\_

**Total time: 50 minutes**

**Instructions:**

- Write your answers in the spaces provided below the problems. If you make a mess, clearly indicate your final answers.
- This Quiz has 4 problems over 7 pages, for a total of 30 points.
- Keep up with time. All the best!

Problem	Points	Score
True/False Questions	4	
Multiple Choice Questions	3	
Short Answer Questions	10	
Programming Questions	13	

### **Problem I: True/False Questions (4 Points)**

- 1) RAM is a non-volatile memory (**True/False**)
- 2) Variables defined in a function are local to that function, unless bound by the global keyword (**True/False**)
- 3) There is usually only one correct solution to a problem involving decision structures (**True/False**)
- 4) The condition  $x \leq y \leq z$  is allowed in Python (**True/False**)
- 5) A Python *while* can implement a definite loop (**True/False**)
- 6)  $a \text{ and } (b \text{ or } c) == (a \text{ and } b) \text{ or } (a \text{ and } c)$  (**True/False**)
- 7) An int can be converted to a string while a string cannot be converted to an int (**True/False**)
- 8) The if statement can only accept a Boolean expression as a condition (**True/False**)

### **Problem II: Multiple Choice Questions (3 Points)**

- 1) Which of the following is/are NOT (a) legal identifier(s)?
  - a) Spam
  - b) spAm
  - c) **2spam**
  - d) **Spam!**
  - e) If
- 2) Which of the following is NOT a python data type?
  - a) int
  - b) float
  - c) **rational**
  - d) string
  - e) bool
- 3) Which of the following is NOT a built-in operation in Python?
  - a) +
  - b) %
  - c) abs()
  - d) **sqrt()**
- 4) In a mixed-type expression involving ints and floats, Python will convert:
  - a) floats to ints
  - b) ints to strings
  - c) floats and ints to strings
  - d) **ints to floats**
- 5) The best structure for implementing a multi-way decision in Python is:
  - a) if
  - b) if-else
  - c) **if-elif-else**
  - d) try
- 6) What statement can be executed in the body of a loop to cause it to terminate?
  - a) if
  - b) exit
  - c) continue
  - d) **break**

### **Problem III: Short Answer Questions (10 Points)**

- 1) **(1.5 Points)** List the five major components of a computer.

**CPU, RAM, Disk, Input Devices, and Output Devices**

- 2) **(1.5 Point)** Show the result of evaluating each expression. Be sure that the value is in the proper form to indicate its type (int or float). If the expression is illegal, explain why.

- a)  $4/10 + 3 * 2$
- b)  $4 \% 10 + 6 // 5$
- c)  $\text{abs}(4-20//3) ** 3$
- d)  $\text{sqrt}(4.5 - 5.0) + 7 * 3$

- a) 6.4**
- b) 5**
- c) 8**
- d) Error; cannot apply sqrt on a negative number.**

- 3) **(2 Points)** Consider this very simple function:

```
def cube(x):  
    answer = x * x * x  
    return answer
```

Here is a fragment of a program that uses this function:

```
answer = 4  
result = cube(3)  
print(answer, result)
```

The output from this fragment is 4 27. Explain why the output is NOT 27 27, even though the cube function seems to change the value of the variable *answer* to 27.

Because the variable *answer* defined in the function *cube* is local to this function and, accordingly, is distinct from the variable *answer* defined outside *cube*.

- 4) **(2 Points)** The following fragment of code is written using a for loop. Re-write it using a while loop.

```
sum = 0
for k in range(1, 22, 3):
    sum = sum + k
print(sum)
```

```
sum = 0
k = 1
while k < 22:
    sum = sum + k
    k = k + 3
print(sum)
```

- 5) **(3 Points)** Show the output from the following fragments:

a) for i in range(-10):  
    print(i \* i)

There will be no output from this fragment of code!

b) `for i in range(1, 11, 12):`  
    `print(i*i)`

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c) `x = 2`  
    `y = 10`  
    `for j in range(0, y, x):`  
        `if j % 2 == 0:`  
            `continue`  
        `print("iteration", j)`

There will be no output from this fragment of code!

**Problem IV: Programing Questions (13 Points)**

- 1) **(4 Points)** Write a program that accepts integer inputs from a user as long as the word *stop* is not input. Compute and print the minimum of these integers.

```

val = eval(input("Enter an integer number (or the word stop to stop) >> "))
minimum = val

if val != "stop" and type(val) is int:
    while True:
        val = eval(input("Enter an integer number (or the word stop to stop) >> "))
        if val != "stop" and type(val) is int:
            if val <= minimum:
                minimum = val
            else:
                if val == "stop":
                    print("Minimum =", minimum)
                    break
                else:
                    print("Opps; You entered an invalid input. Try again!")
        else:
            if val == "stop":
                print("No minimum to report!")
            else:
                print("You did not enter an integer value.")

```

- 2) **(9 Points)** Write a program that approximates the value of  $\pi$  by summing the terms of this series:

$$4/1 - 4/3 + 4/5 - 4/7 + 4/9 - 4/11 + \dots$$

The program should prompt the user for  $n$ , the number of terms to sum, and then output the sum of the first  $n$  terms of the above series.

```
n = eval(input("Enter a positive integer n: "))
if type(n) is int and n > 0:
    toggle = True
    sum = 0.0
    for i in range(1, n+1, 2):
        if toggle:
            sum = sum + 4/i
            toggle = False
        else:
            sum = sum - 4/i
            toggle = True

    print("Sum =", sum)
else:
    print("You entered an invalid number.")
```