SENG 1000 - Software Engineering Foundations and Practice

Spring 2020 Midterm Exam

March 3, 2020, 3:30 PM to 5:00 PM, Duration: 90 minutes

(9 Pages, 7 Questions, 100 Marks)

Instructor: Sumati Kulkarni

Student Name: _____

- This exam covers from Lecture 1 to Lecture 7(Data Structures List & Tuples), posted examples and Assignments.
- This exam is closed book, closed notes.
- You can use simple calculator that does arithmetic operations. No scientific calculators allowed.
- There are 7 questions worth 100 points

Questions

1. **(10 Points)** Answer the following
    a. **(5 Points)** What are the major components of computer? Describe each one of them in one line

    b. **(5 Points)** What is a Program? Write three steps on how program works?

2. **(15 Points)** Answer the following
    a. **(2 Points)** What is difference between Compilers and Interpreters?

b. **(2 Points)** What are the four basic built-in datatypes of python?

c. **(4 Points)** Identify the following valid variable names? (Write True in front of valid variables. False in front of invalid variables)

Variable name	True/ False
a	
a1	
1a	
*_a	
_2_bob_	
A_good_grade_is_A+	
Student-1	
_1	

d. **(2 Points)** Write any 2 Python's reserved words.

e. **(3 Points)** Given the following expression

```
A=(2+4*5)-12/6+((2**3)+8+True)+False
```

- What is the result of A? What is the datatype of A? What built-in function is used to find the datatype of A?

f. **(2 Points)** What is the output of the following code?

```
x, y = 2, 3
x, y = y, x
print("x = ", x)
print("y = ", y)
```

3. **(20 Points)** Answer the following
    a. **(4 Points)** Write a Python script to print the following pattern

```
*
* *
* * *
* * * *
* * * * *
```

    b. **(2 Points)** For what values of x will this program print "True"?

```
if x > 1 or x <= 8:
    print("True")
```

    c. **(4 Points)** What is this code doing? [Hint: Look for break and continue]

```
while (True):
    num = int(input("Enter an integer: "))
    if num == 99:
        break
    if num % 2:
        continue
    print(num)
```

d. **(10 Points)** This is a program which prompts the user for 10 floating-point numbers (in a loop) and calculates their sum, product and average. Fill in appropriate code.

```
total     = _______
product   = _______

for ____ in range(1, ______):
    num = ______(input("Please enter number " + str(i) + " : "))
    total      = ___________________
    product    = ___________________

average _____________

print("Sum: ", _______)
print("Product: ",_______)
print("Average: ",_______)
```

4. **(15 Points)** Answer the following
   a. **(3 Points)** What are the benefits of code modularization using functions?

   b. **(2 Points)** What is the difference between `import math` and `from math import *`

c. **(10 Points)** Write a function factorial(n). Write only function definition. Handle all cases of factorial. [Note: 0! = 1, 1! = 1, 5! = 120]

5. **(15 Points)** Answer the following
   a. **(5 Points)** Write the output of the following given `s = "ABRACADABRA"`
      - `s1[-1:-4:-1])`
      - `s1[4:1])`
      - `s1[-4:-1])`
      - `len(s1[-1:0:-2]))`
      - `s1[1:4:2]`

b. **(5 Points)** Consider the following string

```
greeting = "Hello World from Another World"
```

- How do you check if "world" exists in greeting, using case-insensitive comparison?

- What does `greeting.lower().find('world')` return?

- What is the result of `greeting.split()`?

c. **(5 Points)** Print the output of the following

```
s1 = "ABCDEFGHIJKLMNOPKRSTUVWXYZ"
i = -1
j = -1 * len(s1)
while i >= j:
     print(s1[i:0:-2])
     i -= 1
```

6. **(15 Points)** Answer the following
    a. **(5 Points)** What will the following program print?

```
months = ("January", "February", "March", "April", "May",
          "June", "July", "August", "September", "October",
          "November", "December")

num_days = (31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31)

month_dict = {}

for month, days in zip(months, num_days):
    month_dict[month] = days

print(month_dict)
```

b. **(5 Points)** What is the main difference between Lists and Tuples? What is the purpose it serves?

c. **(5 Points)** Write the output of the following

- ```
  t = ()
  t = 10, 20, 30, 10, 50
  print(t)
  print(type(t))
  print(len(t))
  ```

- ```
  L = [1,2,3,4,5, 1,2,3,4, t]
  print(L)
  print(type(L))
  print(len(L))
  ```

7. **(10 Points)** Write a python script to accept two integer numbers from the user using a prompt and print the result of all operations like shown below.

```
Enter first number: 6
Enter second number: 2

Addition: 6 + 2 = 8
Subtraction: 6 – 2 = 4
Multiplication: 6 * 2 = 12
Division: 6 / 2 = 3.0
Integer Division: 6 // 2 = 3
Modulus: 6 % 2 = 0
Exponent: 6 ** 2 = 36
```