

ENGI1020 – Spring 2020 – Lori Hogan

Midterm 2.1 – July 24, 2020, 11 – 11:50am

Please read all questions carefully and respond via the provided options (Multiple Choice, Short Answer, Written Answer).

The test will be marked out of 50, and you have 50 minutes to complete it - use this as guidance in terms of how much time you should spend on each question.

This is a CLOSED BOOK test. You may NOT use any notes, books, or any other form of assistance. Until such time that you submit your scanned answer sheet electronically, you may NOT use any electronic devices outside of the device on which you are viewing the test and WebEx Remote Conferencing for invigilation purposes, and the device with which you will scan your answer sheet. You will ONLY use these devices for the approved purposes.

You MUST answer questions on the provided answer sheet; once you are finished or the test is over (whichever comes first) you will have 15 minutes in which to scan and upload your answers to Gradescope.

Similar to an in-person exam, please position your answer sheet as well as your cell phone/mobile device such that your invigilator may see them in your video.

Part I - Remember and Understand - Multiple Choice (1 pt each, 10 pts total)

For each question or statement, choose the BEST answer. Mark an 'X' in the appropriate choice for that question *on your answer sheet*.

1. What will be the value of x after the given code executes?

```
a = '3'  
b = '2.5'  
x = b + a
```

- a. b. c. d.

2. These are this list of values *actually* passed in when a function is called.

- a. b. c. d.

3. Which programming construct is best to use when we want to execute a sequence of statements an undetermined number of times?

- a. b. c. d.

4. What Python data type is represented in the statement below?

```
this = ['E', 'N', 'G', 'I', 1, 0, 2, 0]
```

- a. b. c. d.

5. What will be the value of x after the below statements execute?

```
mystery = [1, 2, 4, 8, 16, 32, 64]  
x = mystery[-3]
```

- a. b. c. d.

6. The scope of a variable defined in a Python script is generally

- a. b. c. d.

7. These are the conditions that must be met by the user of a function, as per the specification, to ensure the function works as promised.

- a. b. c. d.

8. Which one of these is *not* a valid function name?

- a. b. c. d.

9. What will be printed to console after the statements below execute?

```
print(3* 'Hip' + 'Hooray!')
```

- | | | | |
|----|--|----|---|
| a. | <input type="text" value="3*Hip+Hooray!"/> | b. | <input type="text" value="HipHoorayHipHoorayHipHooray!"/> |
| c. | <input type="text" value="HipHooray!"/> | d. | <input type="text" value="HipHipHipHooray!"/> |

10. In a flowchart, what is represented by a *diamond*?

- a. b. c. d.

11. Part II - Analyze and Apply - Interpret Code

For each excerpt of code, use the indicated spot (Blank #x) to identify what will be printed to the console or answer the question posed. Use the workings section for any calculations.

There may be more blanks on the answer sheet than needed. **Leave these empty.**

Question 16 – 3 pts total (Blank1 – 1 pt; Blank2 – 2 pts)

```
x = [0, 1, 1, 2, 3, 5, 8, 13]
count = 0

for i in range(len(x)):
    if i < x[i]:
        count += 1
        print(i, ' ', x[i])

#Blank1 - How many times does loop execute?
print(count) #Blank 2 - What is the value of count?
```

Question 17 – 6 pts total (Blank1 – 1 pts; Blank2 – 2 pts; Blank3 – 3pts)

```
surname = input('Please enter your last name: ')
firstname = input('Please enter your first name: ')

#Blank1
print(surname + ',' + firstname + ' ' + surname)

#Blank2
print(2*firstname, 2*surname)

#Blank3
print(firstname[0]+'.'+surname[0:min(len(surname), 3)])
```

Question 18 – 7pts total (Blank1 – 2 pts; Blank2 – 2 pts; Blank3 – 3pts)

```
def foo(q):
    r = 0
    s = 0
    t = 1
    while q > 0:
        s = r + t
        r = t
        t = s
        q -= 1

    print(q) #Blank 1
    return s

q = 4
r = foo(q)
print(q) #Blank2
print(r) #Blank3
```

Question 19 – 7pts total (Blank1 – 2 pts; Blank2 – 4 pts; Blank3 – 1pts)

```
a = 4
b = 3
c = 0

def bar(a, b):
    print(a+b*c)

for i in range(1, 4):
    bar(i, b)
    c += 1

#Blank1 - How many lines will get printed?
#Blank2 - What will be the LAST line printed?
#Blank3 - What is the value of the variable a
#          when the code above is done executing?
```

Part III - Evaluate & Create - Function Specification & Code Implementation

In this section, you will design a function specification and implement Python code based on the given problem statement and information.

*You have been hired to be part of a programming team that is implementing cryptographical algorithms - altering data from a readable form (also known as plaintext) to a protected form (also known as ciphertext) - for an unnamed government organization. To get you used to this work, you are assigned tasks related to a relatively simple cipher known as **Caesar Cipher**. From Wikipedia, you learn that this “is a type of substitution cipher in which each letter in the plaintext is replaced by a letter some fixed number of positions down the alphabet. For example, with a left shift of 3, D would be replaced by A, E would become B, and so on. The method is named after Julius Caesar, who used it in his private correspondence.”*

Question 20 – 7 pts total - Write an accurate function specification for the function described below.

One of the functions you will have to write (called `caesarString()`) should take in a string containing alphabet characters ('a'-'z' and 'A'-'Z'), and a positive integer corresponding to how many places to the left each letter should be shifted. This function will return a string containing the encoded version of the string.

For example, `caesarString ('Hello', 3)` would return `'Khoor'`. Another example, `caesarString ('Goodbye', 10)` would return `'Qyynllo'`.

Remember to include in your specification:

- Succinct description of function purpose
- Parameter(s) and restrictions/assumptions on them, and
- Return value(s) type and meaning

Note that you do NOT have to implement (define) this function. You just need to write the specification.

Question 21 – 10 pts total - Write a function definition for the function described below.

Given the following specification and *assuming that caesarString() described in the last question has already been implemented and imported into your Python environment*, you are asked to implement the function `encodeWordList()`. It will take a Python list of strings and a positive integer corresponding to how many places to the left each letter in each string should be shifted. This function will return a string containing the concatenation of encoded words, put together in the same order as the plaintext words in the list.

```
def encodeWordList(wordList, keyValue):  
    """  
    Encodes a list of words given Caesar key value and  
    concatenates encoded words together in one string  
  
    Parameters  
    -----  
    wordList : List of strings  
        Plain-text words to be encoded with Caesar cipher  
    keyValue: int, 0 <= keyValue <= 25  
        Caesar key value for encoding word  
  
    Returns  
    -----  
    string - Concatenation of all encoded words  
    """
```