

INFO2000 Mid-term exam, 10/9/2023

Total: 40 points, time: 50 minutes

Instructions: Answer all the questions provided below. If you are not sure about something, do your best to explain the thinking behind your answer. When prompted for the output of a statement, write ERROR if you think that the statement results in an error being thrown.

Good Luck!

1. What is the output of the following snippet of code? (7 pts):

```
for i in range(2):
    for j in range(2):
        if i == 1 and j == 1:
            break
        print(i*10,j*10)
    print(i,j)
```

0	0	-> i=0, j=0
0	10	-> i=0, j=1
0	1	-> i=0, j=1
10	0	-> i=1, j=0
1	1	-> i=1, j=1

2. What is the output of the following block of code? (5 pts):

```
for i in range(1, 5):
    for j in range(1, i+1):
        print(j,end = "")
    print()
```

1
12
123
1234

3. What is the output of the following snippet of code? (1 pt)

```
def multiply_numbers(a, b=2):  
    return a*b  
print(multiply_numbers(3))
```

The answer is **6**. Since b isn't provided, we use the default argument 2.

4. Write a function called `in_range` (`testNum`, `floor`, `ceiling`) that tests whether a given number falls within a specified range. The function takes three parameters:

- `testNum`: the number we are testing
- `floor`: lower bound
- `ceiling`: upper bound

The function `in_range()` should return **True** if `testNum` is greater than or equal to `floor` and less than or equal to `ceiling` otherwise it should return **False**. See sample output of the function below: **(8 pts)**

```
print(in_range(4,1,7))  
print(in_range (2,10,20))
```

✓ 0.0s

True
False

```
def in_range(testNum, floor, ceiling):
```

```
    if testNum >= floor and testNum <= ceiling:
```

```
        return True
```

```
    else:
```

```
        return False
```

5. What is the purpose of the break keyword in python? (2 pts)

It allows the program to stop the execution of the current loop (could be a while loop or for loop) and exit the loop.

6. Consider the following python function where num1 and num2 are assumed to be positive integers.

```
def mystery(num1, num2):  
    phase = 0  
    angle = 0  
    while angle < num2:  
        phase = phase + num1  
        angle = angle + 1  
    return phase
```

Trace phase and angle in this function when it is called with the inputs , num1=5 and num2 = 4. In other words show the values of phase and angle in each iteration of the while loop when **mystery(5,4)** is called. The first two iterations are done for you: (6 pts)

phase	angle
0	0
5	1
10	2
15	3
20	4

7. For each of the following python expressions, write down the value that is output when the expression is evaluated using a python interpreter: **(4 pts)**

a. `15%3`

0

b. `8*5+5 == 80`

False (evaluates to `45 == 80`)

c. `"INFO" + "2000"`

INFO2000

d. `"ELLEE" + 2045`

Error

8. Let **new_grades** and **old_grades** be two non-empty lists. Write a Python command or commands that will append the last element of **new_grades** to the end of **old_grades** **(2 pts)**

`old_grades.append(new_grades[-1])`

9. What is the purpose of using the **.copy()** method of a list object? **(2 pts)**

We use the `copy()` method to copy the contents of a list to a new list while ensuring that modifications to the new list do not alter the original list.

10. What is the difference between a class and a function in python? **(2 pts)**

A class is a blueprint that allows you to create objects that may contain behaviors (methods/functions) as well as attributes (variables), while a function is a block of code that performs a specific task.

11. If you do not provide a return statement in your function, what does your function return when called? **(1 pt)**

None. Which is a `NoneType`