# Final Practice Supplement

COMP 110: Introduction to Programming Spring 2024

Wednesday May 1, 2024

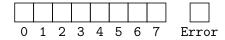
Question 1: Loops In this series of questions, you will trace code that modifies a boolean list a. You will respond beneath each code listing by completely shading in the squares of items whose value is assigned True. If an error occurs during the evaluation of the loop, fill in the Error box and stop evaluating. If any item's value was assigned True prior to the error, keep its value shaded in.

You can assume a is initialized with 8 False elements, as shown below, and that each question is independent of the next.

```
1 f: bool = False
2 a: list[bool] = [f, f, f, f, f, f]
```

#### 1.1. Loop 1

```
1  i: int = 0
2  while i < len(a):
3   if i % 2 == 1 and i >= 3:
4    a[i] = True
5   i += 1
```



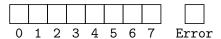
## 1.2. Loop 2

```
1    i: int = 1
2    while i < len(a):
3     a[i] = True
4     if i % 2 == 1:
5         i -= 1
6     else:
7     i += 2</pre>
```



# 1.3. Loop 3

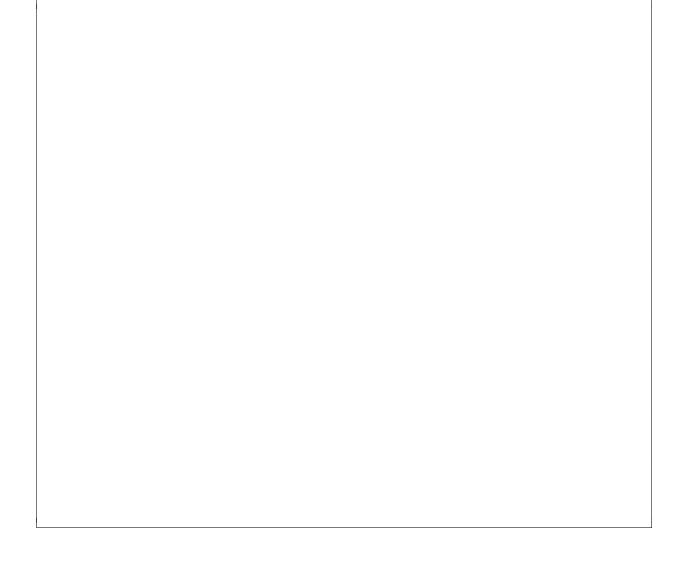
```
1   i: int = len(a)
2   while i > 0:
3    a[i] = True
4   i -= 1
```



Question 2: Method Writing Complete the implementation of the find method. It should return the (row, column) of the needle parameter in the data attribute. If the needle cannot be found, return (-1, -1).

```
1
   class Table:
2
     width: int
3
     height: int
4
     data: list[list[int]]
5
6
     def __init__(self, width: int, height: int):
7
       self.width = width
8
       self.height = height
9
       self.data = []
10
       for _y in range(height):
         row: list[int] = []
11
12
         for _x in range(width):
13
           row.append(0)
14
         self.data.append(row)
15
16
     def find(self, needle: int) -> tuple[int, int]:
17
       # TODO
```

2.1. Write your function definition for find here.



### Question 3: Identifying Elements of a Python Class Consider the following class definition.

<pre>2    name: str 3    age: int # in years 4 4    definit(self, name: str, age: int): 5    self.name = name 6    self.age = age 8    def greet(self) -&gt; str: 6        return f"{self.name} says hello" 11    def ages(self, n: int) -&gt; None: 12    """Increase the pet's age by n years.""" 14    self.age += n  3.1. On what line(s) is a return type declared? Write None if none.  3.2. List the names of the methods defined in class Pet. Write None if none.  3.5. On what line(s) are comments found? Write None if none.  4</pre>	Ī		on 3: Identifying Elements of a Python		Consider the following class definition.						
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4.3. Continuing from the previous sub-question, write one line of code to declare an explicitly typed

variable named x. Initialize x to the result of calling greet on pup.

# Question 5: Identifying Elements of a Python Program Consider the following code listing:

$\begin{array}{c c} 1 \\ 2 \end{array}$		main() -> None: ""Entrypoint of program."""								
3		tart: int = int(input("Start: "))								
4 5		<pre>nd: int = int(input("End: ")) esult: int = mystery(start, end)</pre>								
6		rint(f"Result: {result}")								
7										
8 9	def	<pre>mystery(i: int, n: int, x: int = 0</pre>	) _> i	nt·						
0		f $i \geq n$ :	, -, 1	110.						
1		return x + i								
12 13	e.	lse: return mystery(i + 1, n, x + i)								
4		return mystery(1 + 1, n, x + 1)								
15		name == "main":								
6	m	ain()								
			Ē							
	5.1.	On what line(s) is a base case declared?	5.3.	Ignoring function calls to built-in func-						
		Write <i>None</i> if none.		tions, what 2 line(s) contain function calls with arguments?						
				with arguments:						
	5.2.	On what line(s) is a recursive case de-	5.4.	On what line(s) are default parameter(s)						
		clared? Write <i>None</i> if none.		found? Write <i>None</i> if none.						
			•							
Qι	ıesti	on 6: Evaluating Functions These question	ons conti	inue from the code listing above.						
		What value returns from mystery(6, 6, 9)?								
	0.1.	, had rate recards non-my2002 y (e, e, e,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
	6.2.	What value returns from mystery(5, 6, 4)?	Write 1	Error if an error occurs.						
	0.0									
	6.3.	What value returns from mystery(4, 6)? Write Error if an error occurs.								
6.4. What value returns from mystery(1, 3)? Write Error if an error occurs.										
		, ,								

**Question 7: Memory Diagram** Trace a memory diagram of the following code listing. For the purposes of diagramming, you can ignore the imports, and use short-hand frames for <sub>init</sub>.

```
1
   from typing import Self
2
3
   class Vec2D:
4
     x: float
5
     y: float
6
7
     def __init__(self, x: float, y: float):
       self.x = x
8
       self.y = y
9
10
11
     def scale(self, factor: float) -> None:
12
       self.x *= factor
13
       self.y *= factor
14
15
     def add(self, other: Self) -> Self:
16
       return Vec2D(self.x + other.x, self.y + other.y)
17
   a: Vec2D = Vec2D(1.0, 2.0)
18
19
   b: Vec2D = a.add(a)
20 | a.scale(3.0)
  print(f"a:({a.x}, {a.y}) - b:({b.x}, {b.y})")
```

Stack	Heap	