Quiz 2

Answer all questions. Do not use AI.

Submit by 10:25 AM.

1. Write a recursive function fibonacci(n:int) –> int (returns) to compute the n^{th} Fibonacci number, where the sequence is defined as
$F(0)=0; F(1)=1; \text{for } n>=2 \quad F(n)=F(n-1)+F(n-2)$
Write another program without using recursion.

2. Write a function second_largest(numbers: list)–>int that returns the second largest number in a list.
If the list has fewer than two unique numbers, return *None*.
Example:

```
print(second_largest([3, 1, 4, 1, 5, 9, 2])) # 5
print(second_largest([1, 1, 1]))  # None
```

3. Explain the behavior of this code and correct the issue

```
def foo(x, items=[]):
    items.append(x)
    return items

print(foo(1))  # [1]
print(foo(2))  # [1, 2]
print(foo(3, []))  # [3]
print(foo(4))  # [1, 2, 4]
```

4. Write a function $y = \text{my\_cumsum}(x)$ where the function computes the sum $y_k = \sum_{i=1}^{k} x_i$ where $x_i \in [0,1)$ is a random array of floating point values. Use different values of k tand compare the values. Note that different values of k implies a variable length of x_i array.