

LeMoyne-Owen College
Division of Computer Science

COSI240
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Thursday
November 2, 2023

Quiz 3

Name: _____

I. Which theta notation applies to each of the following expressions? (20%)

$\theta(c)$, $\theta(n)$, $\theta(n^2)$, $\theta(n^3)$, or $\theta(n^4)$

1. $3n^4 + 4n^3 + 5n + 4$

2. $5n \log n - 2n^2$

3. $5 + 10 + 15 + 20 + \cdots + 5n$

4. $37 - 8$

II. Solve the recurrence relation (20%)

$$\begin{cases} T(n) = T(n-1) + n \\ T(0) = 1 \end{cases}$$

III. For the following program, **draw a stack** to find the **output**. (30%)

```
def ST(n):
    if n == 1:
        return 2
    return 2*n + ST(n-1)
```

```
print(ST(5))
```

Output: _____

Stack:

ST (____)	Function Value		
	Parameter		n
ST (____)	Function Value		
	Parameter		n
ST (____)	Function Value		
	Parameter		n
ST (____)	Function Value		
	Parameter		n
ST (5)	Function Value		
	Parameter	5	n

IV. **Write the recursive equation ($T(n)$)** for the run time of the ST function in part III and **solve the equation in terms of n** . (30%)