Quiz 4 EECE4040 Fall 2022

Due Feb 7 at 11:59pm   **Points** 10   **Questions** 10

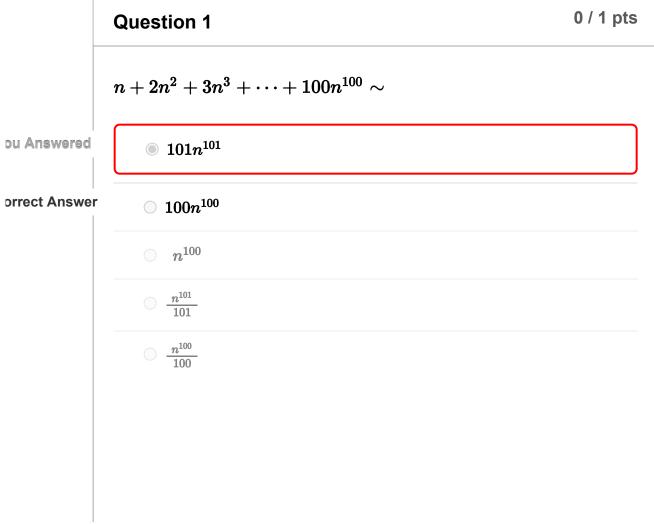**Available** Feb 7 at 10am - Feb 7 at 11:59pm about 14 hours   **Time Limit** 15 Minutes

This quiz was locked Feb 7 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	**Attempt 1**	13 minutes	7 out of 10

Score for this quiz: **7** out of 10

Submitted Feb 7 at 10:58pm

This attempt took 13 minutes.

Question 1   0 / 1 pts

$$n + 2n^2 + 3n^3 + \cdots + 100n^{100} \sim$$

ou Answered

⊙ $101n^{101}$

orrect Answer

○ $100n^{100}$

○ n^{100}

○ $\dfrac{n^{101}}{101}$

○ $\dfrac{n^{100}}{100}$

$n + 2n^2 + 3n^3 + \cdots + 100n^{100}$ is a polynomial of degree n
with highest degree term $100n^{100}$

Therefore correct answer is $\sim 100n^{100}$

Question 2   1 / 1 pts

$1^{100} + 2^{100} + 3^{100} + \cdots + n^{100} \sim$

- ○ $101n^{101}$

- ○ $\frac{n^{100}}{100}$

- ○ $100n^{100}$

- ○ n^{100}

Correct!

- ◉ $\frac{n^{101}}{101}$

$1^k + 2^k + 3^k + \cdots + n^k \sim \frac{n^{k+1}}{k+1}$

substituting *k* = 100 we obtain

$1^{100} + 2^{100} + 3^{100} + \cdots + n^{100} \sim \frac{n^{101}}{101}$

Question 3   1 / 1 pts

$\log n!$ has order

Correct!

◉ $n \log n$

○ $\log n$

○ $n^2 \log n$

○ $n(\log n)^2$

○ $(\log n)^2$

Question 4   1 / 1 pts

$$1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n} + \cdots + \frac{1}{n^2-1} + \frac{1}{n^2}$$

Correct!

◉ $\sim 2 \ln n$

○ $\sim \ln n$

○ $\sim 4 \ln n$

○ $\sim n \ln n$

○ $\sim \log_2 n$

$$1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n} + \cdots + \frac{1}{n^2-1} + \frac{1}{n^2} \sim \ln n^2 \sim 2 \ln n$$

Question 5   1 / 1 pts

An algorithm has polynomial time means

Correct!

◉ $W(n) \in O(n^k)$ for some constant k

○ $B(n) \in O(n^k)$ for some constant k

○ $A(n) \in \Theta(n^k)$ for some constant k

○ $W(n)$ is a polynomial

○ $W(n) \in \Theta(n^k)$ for some constant k

Question 6   1 / 1 pts

Which algorithm is not in-place?

Correct!

◉ Mergesort

○ Insertion Sort

○ Bubble Sort

○ Selection Sort

○ Quicksort

Question 7   1 / 1 pts

The recurrence relation for the worst-case complexity of Mergesort, assuming n is a power of 2, is given by

○ $W(n) = W\left(\frac{n}{2}\right) + 1, \quad W(1) = 0$

○ $W(n) = 2W(n-1) + 1, \quad W(1) = 0$

○ $W(n) = W\left(\frac{n}{2}\right) + n - 1, \quad W(1) = 0$

○ $W(n) = 2W\left(\frac{n}{2}\right) + \log_2 n, \quad W(1) = 0$

Correct!

◉ $W(n) = 2W\left(\frac{n}{2}\right) + n - 1, \quad W(1) = 0$

Question 8   1 / 1 pts

The worst-case complexity of Quicksort has order

○ $n \log n$

○ $n^2 \log n$

○ $\log n$

○ $(\log n)^2$

Correct!

◉ n^2

Question 9   0 / 1 pts

A node in a complete binary tree implemented using an array has index 100. The indices of the parent, left child, right child are respectively

orrect Answer

○ 49, 201, 202

○ 101, 102, 103

○ 49, 200, 201

ou Answered

◉ 101, 201, 202

○ 50, 201, 202

For index *I* the indices of the parent, left-child, right-child are given by $\lfloor \frac{(I-1)}{2} \rfloor, 2I+1, 2I+2$

Substituting *I* = 100 we obtain

$\lfloor \frac{(100-1)}{2} \rfloor = 49, 2 \times 100 + 1 = 201, 2 \times 100 + 2 = 202$

Question 10   0 / 1 pts

The copy constructor and destructor in C++ can be implement using the respective traversals

○ Inorder and Preorder

○ Preorder and Inorder

○ Postorder and Preorder

ou Answered

◉ Inorder and Postorder

orrect Answer

○ Preorder and Postorder

Quiz Score: **7** out of 10