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Quiz - Recursion, Recurrence Relations and Divide & Conquer

This is a preview of the draft version of the quiz

Instructions

This quiz will test your understanding of the material covered so far this week (MLOs).

This is an online quiz. There will be no time limit to the quiz. You can attempt the quiz twice and the best of the scores will be retained. This is open notes and open internet quiz but refrain from discussing with anybody during the exam.

Note that this test cannot be taken past the due date for any credit.

Quiz Type	Graded Quiz
Points	10
Assignment Group	Quizzes
Shuffle Answers	Yes
Time Limit	No Time Limit
Multiple Attempts	Yes
Score to Keep	Highest
Attempts	2
View Responses	Always
Show Correct Answers	After Apr 10 at 12am
One Question at a Time	No

Due	For	Available from	Until
Apr 9	Everyone	-	Apr 9 at 11:59pm

Preview

Score for this attempt: **0** out of 10
Submitted Apr 12 at 10:42am
This attempt took less than 1 minute.

Unanswered

Question 1

0 / 1 pts

Which of the following correctly defines what a 'recurrence relation' is?

- T(n)=T(n-1)+2n, T(0)=1
- An equation (or inequality) that represents n^{th} iteration of a sequence in terms of n. That includes an initial condition.
- T(n) = 2(1+n), T(0) = 2

Correct Answer

- An equation (or inequality) that relates the n^{th} element of a sequence to its predecessors (recursive case). This includes an initial condition (base case).

Unanswered

Question 2

0 / 1 pts

Given the following algorithm

```
foo(n)
   if n <= 1
       return 1
   else
       x = foo(n-1)
       for i = 1 to n
           x = x + i
       return x
```

Determine the asymptotic running time. Assume that addition can be done in constant time.

- $\Theta(n)$
- $\Theta(2^n)$
- $\Theta(n^2)$ **orrect Answer**
- O(n)

Unanswered

Question 3

0 / 1 pts

Solve the following recurrence by giving the tightest bound possible.

T(n) = 4T(n/4) + 4n

- $\Theta(n)$
- $\Theta(\log n)$
- $\Theta(n \log n)$ **orrect Answer**
- $\Theta(n^2)$

Unanswered

Question 4

0 / 1 pts

What is the solution of $T(n) = 2T(n/2) + n^2$ using the Master theorem?

- $\Theta(n\ lg\ n)$, Case 3

orrect Answer

- $\Theta\left(n^2\right)$, Case 3
- $\Theta(n\ lg\ n)$, Case 2
- $\Theta\left(n^2\right)$, Case 1

Unanswered

Question 5

0 / 1 pts

What is the solution of $T(n) = 2T(n/2) + n/logn$ using the Master theorem?

- $T(n) = \Theta(n^2)$, Case 1
- $T(n) = \Theta(nlog_2n)$, Case 2
- $T(n) = \Theta(nlog_2n)$, Case 1
- Master Method does not apply

orrect Answer

Unanswered

Question 6

0 / 1 pts

We can use Divide and Conquer technique to solve a problem in which of the following scenarios?

- The subproblems are overlapping so we don't have to solve them over and over again
- The complexity is exponential to solve the entire problem

orrect Answer

We can break the problem into several subproblems that are similar to the original problems but smaller in size

None of the options

Unanswered

Question 7

0 / 1 pts

What would be the time complexity of the following algorithm?

```
int sum = 0;
for (i = 0; i < n; i++) {
    for (j = 0; j < n; j++) {
        for (k = 0; k < n; k++) {
            if (i == j == k) {
                for (l = 0; l < n*n*n; l++) {
                    sum = i + j + k + l;
                }
            }
        }
    }
}
```

orrect Answer

$\Theta\left(n^4\right)$

$\Theta\left(n^4 \log n\right)$

$\Theta\left(n^3\right)$

$O\left(n^3\right)$

Unanswered

Question 8

0 / 1 pts

What would be the time complexity of the following algorithm?

```
reverse(a):
    for i = 1 to len(a)-1
        x = a[i]
        for j = i downto 1
            a[j] = a[j-1]
        a[0] = x
```

- O(n^3)
- O(n/2)
- O(n^2)
- O(n)

orrect Answer

Unanswered

Question 9

0 / 1 pts

Which of the following equations correctly represent the factorial function.

Factorial of a number n is given by:

$$Factorial\ of\ n\ =\ n * (n-1) * (n-2) \cdot \cdot \cdot \cdot \cdot \cdot 3 * 2 * 1$$

- f(n) = n f(n)
- f(n-1) = n f(n)
- f(n) = (n-1) f(n-1)
- f(n) = n f(n-1)

orrect Answer

Unanswered

Question 10

0 / 1 pts

Which of the following recurrence relations is correct representation of the towers of Hanoi problem that was discussed in the exploration?

- F(n) = 2F(n-1)

orrect Answer

- F(n) = 2F(n-1) + 1
- F(n) = nF(n-1) + 1
- F(n) = F(n-1) + 2

Quiz Score: **0** out of 10