

CS2223 D Term 2020 Quiz 2

(1 point) Question 1:

I pledge that I am taking this quiz on my own, with help from no one else and no notes:
“My brain is open...”

(3 points) Question 2: Initial Conditions

An **initial condition** of a recurrence relation for an arbitrary function $F(n)$ is:

- A.) $F(n) = 1$
- B.) $F(n) = F(n - 1) + n$
- C.) A convenience for getting started, but ultimately unnecessary
- D.) Essentially the equivalent of the base case for a recursive algorithm
- E.) An affliction suffered by the poets T.S. Eliot and E.E. Cummings

(3 points) Question 3: Uses of Recurrence Relations

A recurrence relation might be most useful in analyzing what type of problems?

- A.) Decision Problems, i.e. problems with Boolean outputs
- B.) Optimization Problems
- C.) Problems with the same solution for all sizes of input
- D.) Problems whose individual instances have multiple solutions
- E.) Problems whose solutions can be developed from solutions of smaller subproblems

(3 points) Question 4: Solution of a Recurrence Relation

The recurrence relation:

$$T(n) = T(n - 1) + 2n, \quad n > 1; \quad T(1) = 1$$

has solution:

- A.) $T(n) = 1$
- B.) $T(n) = n$
- C.) $T(n) = n^2$
- D.) $T(n) = n^2 + n - 1$
- E.) $T(n) = 2^n - 1$

(1 point) Bonus Question: ‘abacaba’ is shorthand for a recursive fractal pattern arising...

- A.) ...in the most-significant changed bit when counting in Base Two.
- B.) ...in the differing lengths of the markings on a ruler or tape measure.
- C.) ...in the depths of nodes visited on an in-order traversal of a (perfect) binary tree.
- D.) ...in the sequence of sizes of the discs moved in solving the Tower of Hanoi puzzle.
- E.) All of the Above