CS 173, Fall 18 Examlet 11, Part B

Name:_____

NetID:_____ **Lecture: B**

Discussion: Friday 11 12 1 2 3 4

(15 points) Check the (single) box that best characterizes each item.

$T(1) = d$
$T(n) = T(n/2) + d$

☐ $\Theta(\log n)$ ☐ $\Theta(\sqrt{n})$ ☐ $\Theta(n)$ ☐ $\Theta(n \log n)$
☐ $\Theta(n^2)$ ☐ $\Theta(n^3)$ ☐ $\Theta(2^n)$ ☐ $\Theta(3^n)$

$T(1) = d$
$T(n) = 2T(n/4) + c$

☐ $\Theta(\log n)$ ☐ $\Theta(\sqrt{n})$ ☐ $\Theta(n)$ ☐ $\Theta(n \log n)$
☐ $\Theta(n^2)$ ☐ $\Theta(n^3)$ ☐ $\Theta(2^n)$ ☐ $\Theta(3^n)$

Finding a value in a sorted array is $\Theta(2^n)$.

true ☐ false ☐

Problems in class P (as in P vs. NP) require exponential time

true ☐ false ☐ not known ☐

The Travelling Salesman problem can be solved in polynomial time.

true ☐ false ☐ not known ☐

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Discussion: Friday 11 12 1 2 3 4

(15 points) Check the (single) box that best characterizes each item.

$T(1) = d$
$T(n) = 3T(n/3) + c$

$\Theta(n)$ ☐ $\Theta(n \log n)$ ☐ $\Theta(n^2)$ ☐ $\Theta(n^3)$ ☐
$\Theta(n^{\log_3 2})$ ☐ $\Theta(n^{\log_2 3})$ ☐ $\Theta(2^n)$ ☐ $\Theta(3^n)$ ☐

$T(1) = d$
$T(n) = T(n/2) + n$

$\Theta(\log n)$ ☐ $\Theta(\sqrt{n})$ ☐ $\Theta(n)$ ☐ $\Theta(n \log n)$ ☐
$\Theta(n^2)$ ☐ $\Theta(n^3)$ ☐ $\Theta(2^n)$ ☐ $\Theta(3^n)$ ☐

Algorithm A takes 2^n time. On one input, A takes x time. How long will it take if I double the input size?

$x + 2$ ☐ $2x$ ☐ 2^x ☐ x^2 ☐

Problems in class NP require exponential time

true ☐ false ☐ not known ☐

Circuit satisfiability can be solved in polynomial time.

true ☐ false ☐ not known ☐