

## CSE 332: Data Structures and Parallelism

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### Exercises (Recurrences)

Directions: *Submit your solutions on Canvas. You must use a pdf file.*

#### EX08. Exactly Exactly Exactly Exactly. . . (20 points)

Consider the following recurrence:

$$T(n) = \begin{cases} 6 & \text{if } n = 1 \\ 1 + 2T(\lfloor \frac{n}{2} \rfloor) & \text{if } n > 1 \end{cases}$$

Note that  $\lfloor n \rfloor$  is the floor function which rounds  $n$  down to the nearest integer.

- (a) [5 Points] Determine  $T(n)$  for  $n = 1, 2, 3, 4, 5, \dots, 8$
- (b) [15 Points] Find an *exact* closed form for the recurrence. You do not have to prove that your answer is correct, but we expect you to show how you got it and justify why it is correct. Note that in this exercise we have not given you a piece of code, but rather you should treat this as a mathematical function and give us the closed form of this function.