ECS 122A – Algorithm & Analysis
Homework 03

Due: Sunday, October 17, 2021, 11:59pm PT

Note:

- Identify the corresponding pages for each question according to the outline on Gradescope.
- If you handwrite your solutions, make sure they are clear and readable.

Question 1 (10 points each)

For the following recurrences, use recursion tree to find the tightest possible Big-O. (Hint: Check the Big-O guesses for the recurrences in Homeowrk 2.)

1. $T(n) = T(n-1) + n$
2. $T(n) = T(n/2) + 1$
3. $T(n) = T(n/2) + n^2$
4. $T(n) = 3T(\frac{n}{2}) + n$
5. $T(n) = T(n-1) + T(\frac{n}{2}) + n$

Question 2 (10 points each)

For the following recurrences, use the master method to find the Big-Θ if possible. If not, explain why. Assume that $T(n)$ is constant for sufficiently small n.

1. $T(n) = 2T(n/4) + 1$
2. $T(n) = 2T(n/4) + \sqrt{n}$
3. $T(n) = 2T(n/4) + n$
4. $T(n) = 2T(n/4) + n^2$