

**Training Problems #3**

1.

Show that the solution of  $T(n) = T(\lceil n/2 \rceil) + 1$  is  $O(\lg n)$ .

2. Using substitution, find the Big-O time complexity of the below function:

$$T(n) = \begin{cases} 3T(n-1), & \text{if } n > 0 \\ 1, & \text{otherwise} \end{cases}$$

3.

Use a recursion tree to determine a good asymptotic upper bound on the recurrence  $T(n) = 3T(\lfloor n/2 \rfloor) + n$ . Use the substitution method to verify your answer.

4.

Use a recursion tree to determine a good asymptotic upper bound on the recurrence  $T(n) = T(n/2) + n^2$ . Use the substitution method to verify your answer.