EECS 3101M: Design and Analysis of Algorithms
Winter 2019
Tutorial 3 (January 25, 2019)

1. Prove that the following algorithm that computes the $n^{th}$ Fibonacci number is correct.

```
FIB(n)
 1  if n = 0
 2     then return 0
 3     else last ← 0
 4          current ← 1
 5          for j ← 2 to n
 6          do temp ← last + current
 7             last ← current
 8             current ← temp
 9  return current
```

2. Suppose $T(n)$ is a constant for $n \leq 2$. Solve for $T(n)$ asymptotically and justify your answer.

$$T(n) = 7T(n/3) + n^2.$$

3. Solve the following recurrence assuming that $T(n)$ is constant for sufficiently small $n$. Justify your answer.

$$T(n) = T(n-2) + 2\lg n.$$