CPSC 320: Tutorial 3

1. Express, as a recurrence relation, the running time of the recursive algorithm that calculates the nth Fibonacci number using the definition $F(n) = F(n-1) + F(n-2)$, $F(0) = 0$, $F(1) = 1$. Find upper and lower bounds on this running time.

   What is the exact number of times the plus operation, '+', is performed in calculating the nth Fibonacci number in this way, as a function of n? (You may express this function using the Fibonacci function.)

2. Using a method of your choice, give both lower and upper bounds on the solution to the following recurrence relation:

$$T(n) = T(4n/5) + 2T(2n/5) + T(n/5) + n^2$$
$$T(1) = T(2) = T(3) = T(4) = 1.$$