1) If “Line 4” is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

```plaintext
for i from 0 to n
  “Line 2”
  for j from 0 to n
    “Line 4”
    for k from 0 to n
      “Line 6”
```

$$O(n_1 \cdot n_2)$$

Remember the loops are nested, so Line 4 occurs for every one of the $$n_1$$ instances of Line 2.

However, the third loop is irrelevant because it does not include any Line 4’s.

2) Assuming all arithmetic can be done in hardware, find an asymptotic upper bound on the runtime of this algorithm. Give a one-sentence explanation for your upper bound.

```plaintext
myFunc(n):
  if n == 0 return 1
  for i from 0 to n-1
    “Line 4”
  return myFunc(n-1)+ myFunc(n-2)
```

The recursive part tells us that we have $$O(2^n)$$ function calls. However, the runtime is actually longer than that, because the loop causes each function call to have $$O(n)$$ time. Hence the total runtime is:

$$O(n \cdot 2^n)$$