Use the code below to answer the following questions.

```
for i from 0 to n-1
    "Line 2"
    for j from 0 to n*n
        "Line 4"
        for k from 0 to i
            "Line 6"
```

1) If “Line 2” is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

\[ O(n) \]

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

\[ O(n \cdot n^2) = O(n^3) \]

Notice that the second loop has \( n^2 \) iterations!!

3) If “Line 6” is the line of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

\[ O(n^4) \]

At first glance maybe it’s actually faster than this. If we the innermost loop actually ran \( n \) times we would get \( \Theta(n^4) \) for sure. As is it requires a more in depth analysis, but indeed our intuition is accurate that actually is \( \Theta(n^4) \)

4) If “Line 2” and “Line 4” are the lines of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

\[ O(n + n^3) = O(n^3) \]

5) If “Line 4” and “Line 6” are the lines of interest and everything else is trivial, what is the asymptotic growth rate of this algorithm?

\[ O(n^3 + n^4) = O(n^4) \]