

Hands-On-3

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Q-3 Find Polynomials that are upper and lower bounds on your Curve from #2. From this specify a big-O, a big-omega, and what big-theta is

Ans:

- ⇒ The obtained fitted curve is a quadratic function of the form $y = ax^2 + bx + c$.
- Big-O : This deduce that the runtime is bounded above by constant multiple of n^2 for sufficiently large n .
- Big-Omega : $\Omega(n^2)$:- This means that the runtime is bounded below by a constant multiple of n^2 for sufficiently large n .
- Big-Theta :- $\Theta(n^2)$:- This concludes that the runtime is asymptotically equivalent to n^2 .

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Hands-on:

→ If I modified the function to be:

```

X = f(n)
X = 1;
Y = 1;
for i = 1:n
    for j = 1:n
        X = X + 1;
        Y = i + j
    
```

Q-4 Will this increase how long it takes the algorithm to run (e.g.: you are timing the function like in #2)?

Ans:- Newly add operation addition operation ($Y = i + j$) in inner loop has constant time complexity of $O(1)$. So, it will not have significant impact on runtime of function.

Q-5 Will it effect your results from #1?

Ans:- The changes will not affect the overall runtime complexity of the function. It remains $O(n^2)$, Big-omega n^2 , and Big-theta (n^2) .