Algorithm Analysis Notes

Class 10

Big-Theta vs Big-Oh and Big-Omega

- an analysis depends only on arbitrary cases
- a special case is not a best case

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- recursion's base case: reached the end of recursing, a constant number of basic operations
- these are not best cases, these are special cases

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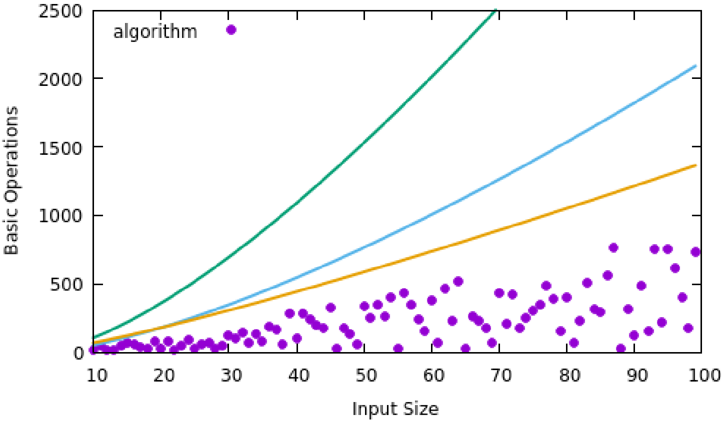
- for an input of arbitrary size, does the algorithm execute different numbers of operations depending on different inputs of the same size?

Big-Oh is Not Unique



does the green line appear to be an upper bound of the algorithm?

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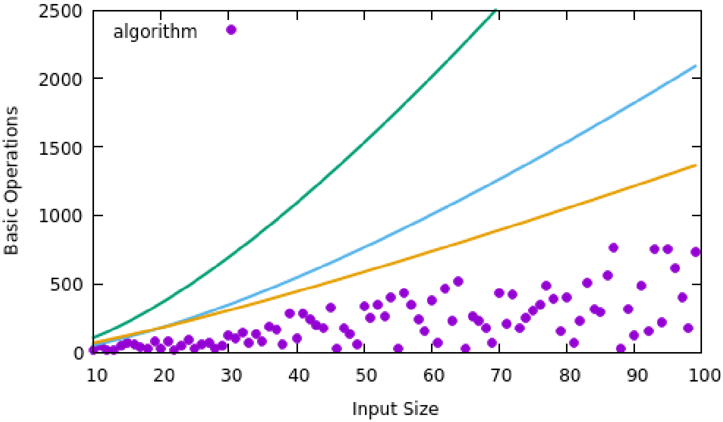

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does the blue line appear to be an upper bound of the algorithm?

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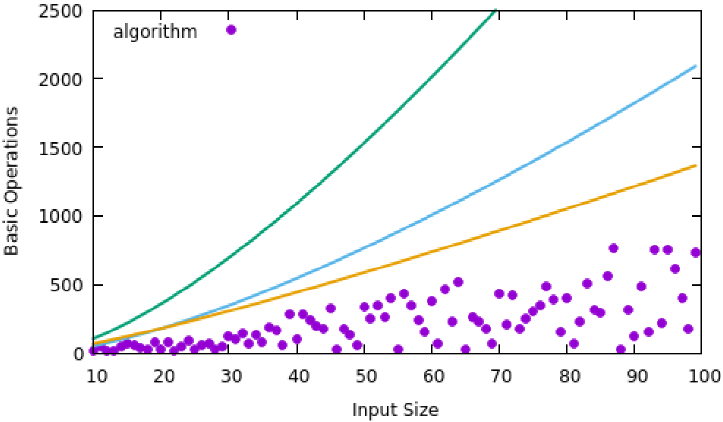

does the green line appear to be an upper bound of the algorithm?
does the blue line appear to be an upper bound of the algorithm?
the yellow line?

Big-Oh is Not Unique

are these true statements?

$$
\begin{aligned}
2n^2 - 3n + 4 &\in O(n^4) \\
&\in \Omega(1)
\end{aligned}
$$

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and this gives the most useful information of all:

$$\begin{aligned} 2n^2 - 3n + 4 &\in O(n^2) \\ &\in \Omega(n^2) \\ &\in \Theta(n^2) \end{aligned}$$