Why Data Structures and Algorithms Are Important to Learn?

Array, Linked List, Stack, Queues, Searching, Sorting, Tree, Graph…

Do you have questions about why I should study all the above-complicated stuff if it has absolutely no use in real life?? Why do companies ask questions related to data structures and algorithms if it's not useful in a daily job??
A lot of beginners and experienced programmers avoid learning Data Structures and Algorithms because it's complicated and they think that there is no use of all the above stuff in real life. So before we discuss the topic we are going to throw a simple problem at you and you need to find the solution for that. If you need to search your roll number in 20000 pages of a PDF document (roll numbers are arranged in increasing order) how would you do that?

- If you will try to search it randomly or in a sequential manner it will take too much time. You might get frustrated after some time.
- You can try another solution which is given below…
  1. Go to page no. 10000
  2. If your roll no. is not there, but all other roll no. in that page are lesser than your than
  3. Go to page no. 15000
  4. Still if your roll no. is not there. But this time all other roll no. is greater than yours.
  5. Go to the page no. 12500

Continue the same process and within 30-40 seconds you will find your roll number. **Congratulations… you just have used Binary Search algorithm unintentionally.**

This was just a simple example and you might have understood a little bit that's why learning data structure and algorithms is important in real life. There are plenty of examples you can find in your daily life. So if you think that this skill is only important to crack the interviews of product-based companies then you are totally wrong.

Any developer or CS student must have to write code which provides a required output. Algorithms are methods to implement certain tasks. Algorithm is a general word which suggests a process to perform tasks in a sequential manner. Algorithms are developed to perform tasks more efficiently. If you write code as per your perception and judgement without applying any predefined algorithm, your code will be botched up after a certain time. It is because you haven't applied any predefined approach or methodology.

Same thing happens with data structures. Data structures are like hands for algorithms to make recipes. Using a combination of data structure and algorithms, we can improve the performance of a program drastically. For example, you are using any searching algorithm like binary search, then set data structure would be perfect rather than array. The reason is, sets are much better for checking whether an element is present in a specified place or not. This is actually not a quite good example but it can tell you the actual need of data structure in algorithms.