**Data structures with problem solving**

**What’s data structures?**

It is a way of organizing data so that it can be used effectively, you can always create a program without using data structures, but the program will be inefficient.

In this lecture we will learn how to use data structures with problem solving to make efficient solutions and learn some built in functions.

**Prerequisite:** knowledge about basics of OOP like classes, structs, objects, templates.

This resource will be helpful: <https://www.geeksforgeeks.org/object-oriented-programming-in-cpp/>

At some contests like Google Hash Code the most important thing is to use data structures because the problem is complicated.

When a problem has a lot of information like a library that has number of books and these books have names and locations of and so on, you must think about data structures.

**Problem 1:**

I’ll give you an integer **N**that representsthe number of students

Each line contains **A** that representsthe name of a student and **B** that representshow tall the student is

And I’ll ask you to sort the data depending on their height.

**\*This question is solved in video below.**

**\*In this question you will learn sorting functions and comparator function or comparable function.**

**Problem 2:**

<https://www.hackerrank.com/challenges/polar-angles/problem>

**\*This question is solved in the video below.**

**\*In this question you will learn some math.**

**Resources:**

**Video tutorial for this lecture:**

**Sort function in C++ tutorial:** <https://www.geeksforgeeks.org/sort-c-stl/?ref=lbp>

**This is the video:** <https://youtu.be/3aKfr0R9u88>

**Additional problems:**

<https://codeforces.com/problemset/problem/1213/B>

<https://onlinejudge.org/index.php?option=com_onlinejudge&Itemid=8&page=show_problem&problem=330>

<https://codeforces.com/problemset/problem/797/C>

<https://codeforces.com/contest/1352/problem/E>

<https://codeforces.com/contest/1107/problem/C>

<https://codeforces.com/contest/1238/problem/B>

<https://codeforces.com/contest/1296/problem/C>

study these video:

bit manipulation: <https://www.youtube.com/watch?v=xXKL9YBWgCY>

Bitset data structure: <https://www.youtube.com/watch?v=jqJ5s077OKo>