

Teacher's Guide:

Dear teachers,

Peace, mercy and blessings of God

This lesson aims to give an overview of the some problems facing programmers and how algorithms can resolve those problems taking into consideration that different algorithms can be used for the same problem.

In this lesson, we introduce different types of sorting algorithms and we apply them to a list of numbers and compare them to tell which algorithm is the best to use

During this lesson, students learn skills of logical thinking, recursive approaches and ideas to certain steps that can be implemented by computer.

At the end of the lesson, a software program that implements the algorithms simultaneously and visibly is presented to help in understanding the sorting process further, and compare the speed and efficiency of the different algorithms.

Prior Knowledge:

The student need not be familiar to a certain topic before watching this lesson, but it would be preferable to be familiar to one of the programming languages .

Guidelines for the teacher:

In the first activity, the teacher should acknowledge that the sorting methods students will try to find should not use a large number of places.

Preferably, the comparisons and movements for elements among each other should be kept to minimum to speed up the procedure.

In the second activity, the teacher shows that the sorting in this way starts with the largest element first and draws attention of the students that there are many movements and the sorting is time-consuming.

In the third activity, it should be noted that this way starts with the smallest elements first and the number of movements is much less than the previous algorithm although there are also many comparisons.

In the fourth activity, the teacher comments on the intelligence of algorithms. It is very necessary to cooperate more closely with the students in sorting the elements, and draw their attention to sort the pivot first and then sort the elements on both sides of list.

Finally, there are a number of points that can be assigned to the gifted students as additional activities, such as:

1. Exploring other sorting algorithms and apply them.
2. Trying to write algorithms in one of the programming languages.
3. Making the sorting algorithms work in a descending order instead of ascending order.
4. Finding new ways to sort lists whose elements exceed the size of the computer memory, for example!

I thank everyone who has contributed to the success of this lesson and I hope it is a useful enrichment to the scientific library.

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