

Unit 4: Recursion.

Recursion is a fundamental algorithmic strategy for solving many problems. The basic idea is to decompose the problem into other smaller subproblems, and to compose the solution to the initial problem from the smaller subproblem solutions.

Many students have problems when acquiring the concept of recursion because it is perhaps the first time they face it. To overcome these difficulties, this lesson deals with the concept of recursion by the realization of number examples, whose degree of complexity is progressively increasing. The lesson describes the structure of a recursive algorithm, which must always have at least one base case where the solution is immediate, and one or more general cases where the problem is broken down into simpler ones, and are solved by applying the algorithm recursively on the subproblems.

The example of the factorial function also shows how recursive calls are stored in the memory stack, which will allow us to build the solution for the initial problem from the partial solutions that are stored in the stack.

The lesson ends by comparing the mechanisms of iteration and recursion, and emphasizing the pros and cons of recursion.

At the end of the lesson, students should be able to:

- Describe the concept of recursion and give examples of its use.
- Identify the base case and the general case of a recursive function.
- Write recursive functions for solving problems.
- Compare iterative and recursive solutions for elementary problems