

Problems. Algorithms and Programs

Problems can be viewed as functions in the mathematical sense. A function is a matching between inputs (the domain) and outputs (the range). An input to a function might be a single value or a collection of information. The values making up an input are called the parameters of the function. A specific selection of values for the parameters is called an instance of the problem. For example, the input parameter to a sorting function might be an array of integers

Algorithms:

An algorithm is a step-by-step procedure for performing some task in a finite amount of time. Typically, an algorithm takes input data and produces an output based upon it.

INPUT -----> [ALGORITHM] -----> OUTPUT

An algorithm is a method or a process followed to solve a problem. If the problem is viewed as a function, then an algorithm is an implementation for the function that transforms an input to the corresponding output. A problem can be solved by many different algorithms. A given algorithm solves only one problem (i.e., computes a particular function).

A data structure is a systematic way of organizing and accessing data.

An algorithm possess several properties :

1. It must be correct.
2. It is composed of a series of concrete steps.
3. There can be no ambiguity as to which step will be performed next.
4. It must be composed of a finite number of steps.
5. It must terminate. In other words, it may not go into an infinite loop

Pseudo-code

- High-level description of an algorithm
- More structured than English prose
- Less detailed than a program
- Preferred notation for describing algorithms
- Hides program design issues