

# L1-Algorithms

Monday, August 10, 2020 9:28 AM

The word Algorithm is derived from the name of Muslim Mathematician Al-Khawarizmi .

What's an Algorithm:

- A sequence of well-defined steps that produce an output on an input.
- A computational procedure for solving a problem

Input =====> Algorithm (Computational Procedure) =====> output

Adding two numbers is a **problem**-----

Adding 3 & 4 is not a problem!!!!----- **Instance of a Problem**

Sort a list of **n** numbers: **a1,a2,a3,..., an**-----is a **problem**

Sort the given list: 2,-1,4,6,18,8-----**Instance of problem**

**Solution of a problem(by an Algorithm)** means ALL INSTANCES OF THE PROBLEM ARE SOLVED CORRECTLY.

Program	<====>	Algorithm
Programming Languages	<====>	Pseudo-Code (Well structured English/or any other language)
Computer	<====>	Computational Model

Computational Model:

1. RAM (**Random Access Machine**)
  - a. Large amount of memory arranged in sequence consisting of words
  - b. Fixed number of registers
  - c. All operations cost the same (Unit Cost)**
2. Pointer Machine
  - a. Object
  - b. Fixed number of fields and pointers to objects

### Class Activity1:

Find two elements in the list of n numbers that sum up to a given value (**val**).  
The list is not sorted.

The function shall return indices of the two elements that sum up to the given value or return -1,-1 in case of failure.

### Class Activity2:

Find two elements in the list of n numbers that sum up to a given value (**val**).  
**The list is sorted.**

The function shall return indices of the two elements that sum up to the given value or return -1,-1 in case of failure.