# L1-Algorithms

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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<br>(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.