# Data Structure and Algorithm

* What is Algorithm ?

*An Algorithm is any well-defined computational procedure that takes some value or set of values as input and produces some value or set of values as output.*

*An algorithm is thus a sequence of computational steps that transfer the input into the output.*

* *We can also view an algorithm as a toll for solving a well-defined computational problems.*
* *An algorithm is said to be correct if for every input instance it halts with the correct output. We say that a correct algorithm solves the given computational problem.*

**What kind of problems are solved by algorithms**

Sorting is by no means the only computational problems for which algorithm have been developed.

Practical application of algorithm are ubiquitous and include the following examples :-

*The Internel enables people all around the world to quickly access and reterived large amount of information. With the aid of clever algorithm sites on the ternet are able to manage and manipulate this large volume of data. Examples of problems that takes essential use of algorithm include finding good routes on which the data will travel (technique for solving such problems appears in and using a search engine to quickly find pages on which particular information resides.*

**Data Structures**

Data Structure is a way to store and generates data in order to facilitates access and modification. No Single data structure works well for all purpose, and so it is important to know the strengths and limitations of several of them.

Our first algorithm insertion sort solves sorting problem introduced in Chapter

**Input:** A Sequence of n number (a1,a2,a3,........,an)

**Output:** A permutation (reordering) {a1,a2,a3,....an} of the input sequence such that a1,<=a2,<=....<=an.

The number that we wish to sort also known as the keys.

**Insertion Sort** which is an efficient algorithm for sorting a small number of elements.

**Analysis of Insertion sort :-**

The time taken by INSERTION-SORT procedure depends on the inputs: sorting a thousands numbers takes longer than sorting three numbers. Moreover INSERTION-sort can take different amounts of time to sort two input sequences of the same size depending on how sorted they already are.

In general the time taken by an algorithm grows with the size of the input so it is traditional to describe the running time of a program as function of the size of its input.