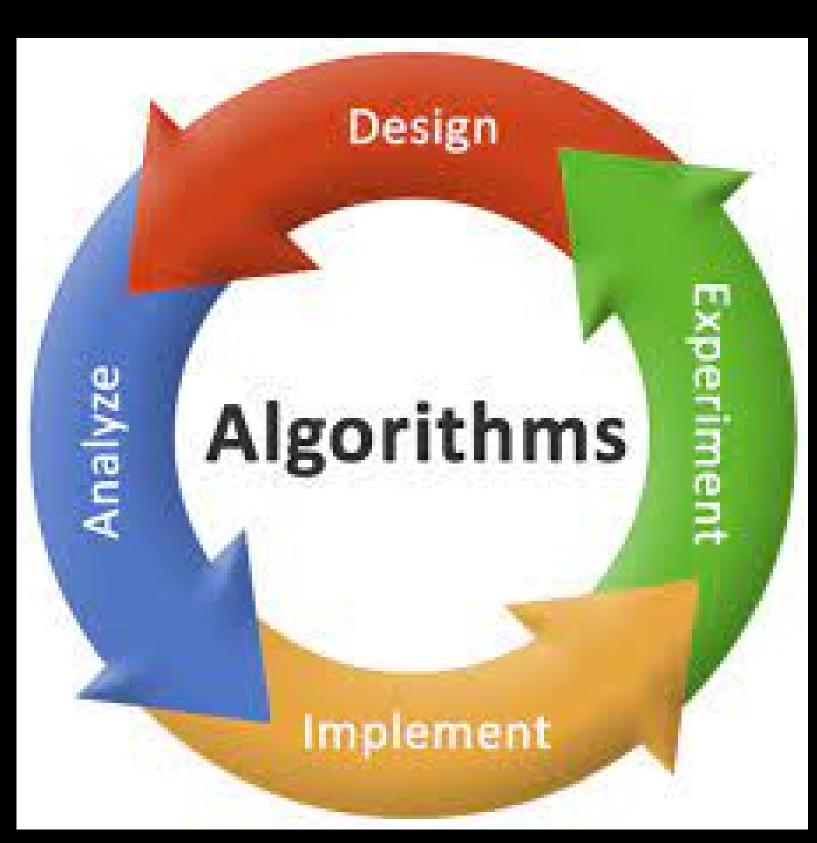
# 

## Algorithms



## What is an algorithm?

# It is a finite sequence of steps to achieve a task by computer.

### Real world example

#### making a cup of tea

- 1. Put the teabag in a cup.
- 2. Fill the kettle with water.
- 3. Boil the water in the kettle.
- 4. Pour some of the boiled water into the cup.
- 5. Add milk to the cup.
- 6. Add sugar to the cup.
- 7. Stir the tea.
- 8. Drink the tea.

#### ALGORITHM IN CODING

Similar to this, we also need to write many instructions (statements) to get the task done

# A simple linear search algorithm

Used to check if a particular item exists or not

### Demo Example

#### algorithmHungarian Heavy Paragrament Assignment Chine seR emainderTheorem Superior Hungarian Segmented Articulation Dijkstra /ertex 5 Eulers Mathematical intersection Randomized Graham Partition genera Floyd 岩山 weighted Common Knapsack Froblem Matrix Istar 0 main. norea Calipers Ways Ford Stoer Ces nce separa Successive Assembly polygon Ottmann Online Kuhn Topologica Strategy adth a btient nimalit GomonyHu RIPS 84 AreaPerimeter Branch construction Depth Bound Basic Kruskal Triangulation mincut 8 Subset Light Shortest iati( sequenc e Binary Jaubem ChinesePostman Bridges Delaunay Marriage Sieve Maxflow Trees Johnsons Warshall Munkres Technique HopcroftKarp multiplicative Cycle Decomposition

# Characteristics ofan Algorithm

- 1.Input specified
- 2.Output specified
- 3.Definiteness
- 4. Effectiveness
- 5. Finiteness
- 6.Independent

#### Analysis of Algorithms:

#### priori

without actually running
the program, and
measuring
theoretically

#### posterior

By actually running the program and measuring using time

#### Types of analysis:

- Efficiency of an algorithm can be analyzed at two different stages, before implementation and after implementation. They are the following -
- A Priori Analysis This is a theoretical analysis of an algorithm. Efficiency of an algorithm is measured by assuming that all other factors, for example, processor speed, are constant and have no effect on the implementation.
- A Posterior Analysis This is an empirical analysis of an algorithm. The selected algorithm is implemented using programming language. This is then executed on target computer machine. In this analysis, actual statistics like running time and space required, are collected.

# Algorithm Complexity

#### We measure running time of an algorithm

Time (CPU Time)
Space (RAM Memory)

CPU and Memory are two important resources of the computer system

Suppose X is an algorithm and n is the size of input data, the time and space used by the algorithm X are the two main factors, which decide the efficiency of X.

Time Factor – Time is measured by counting the number of key operations such as comparisons in the sorting algorithm.

Space Factor - Space is measured by counting the maximum memory space required by the algorithm.

#### Demo Example

# Square Root Approximation Algorithm (by Heron of Alexendria of ancient Greece)

#### Demo Example

# Fast Prime Check Algorithm

#### THANK keep calm YOU wear maska and study.