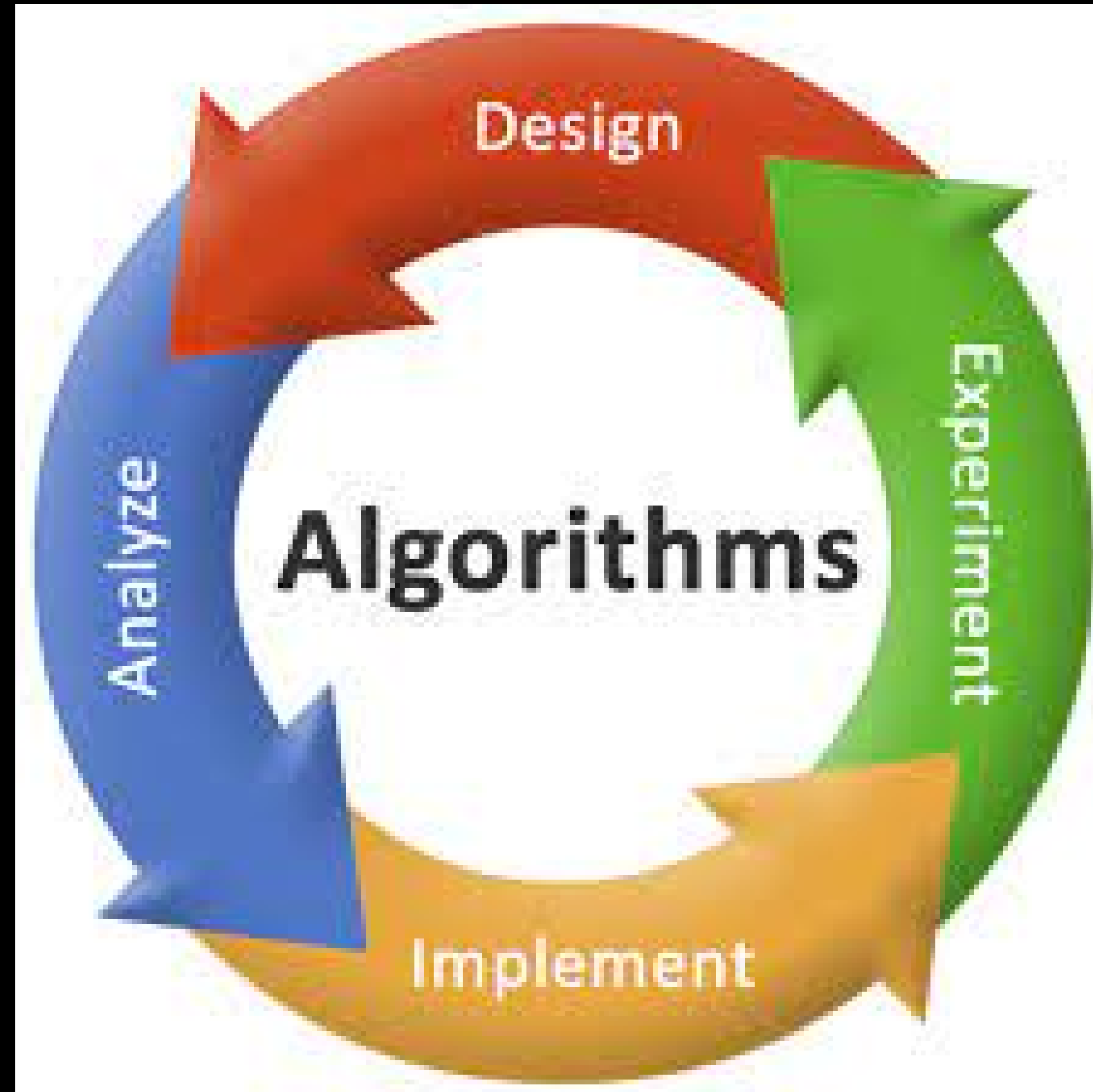


**13TH
DAY**

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.

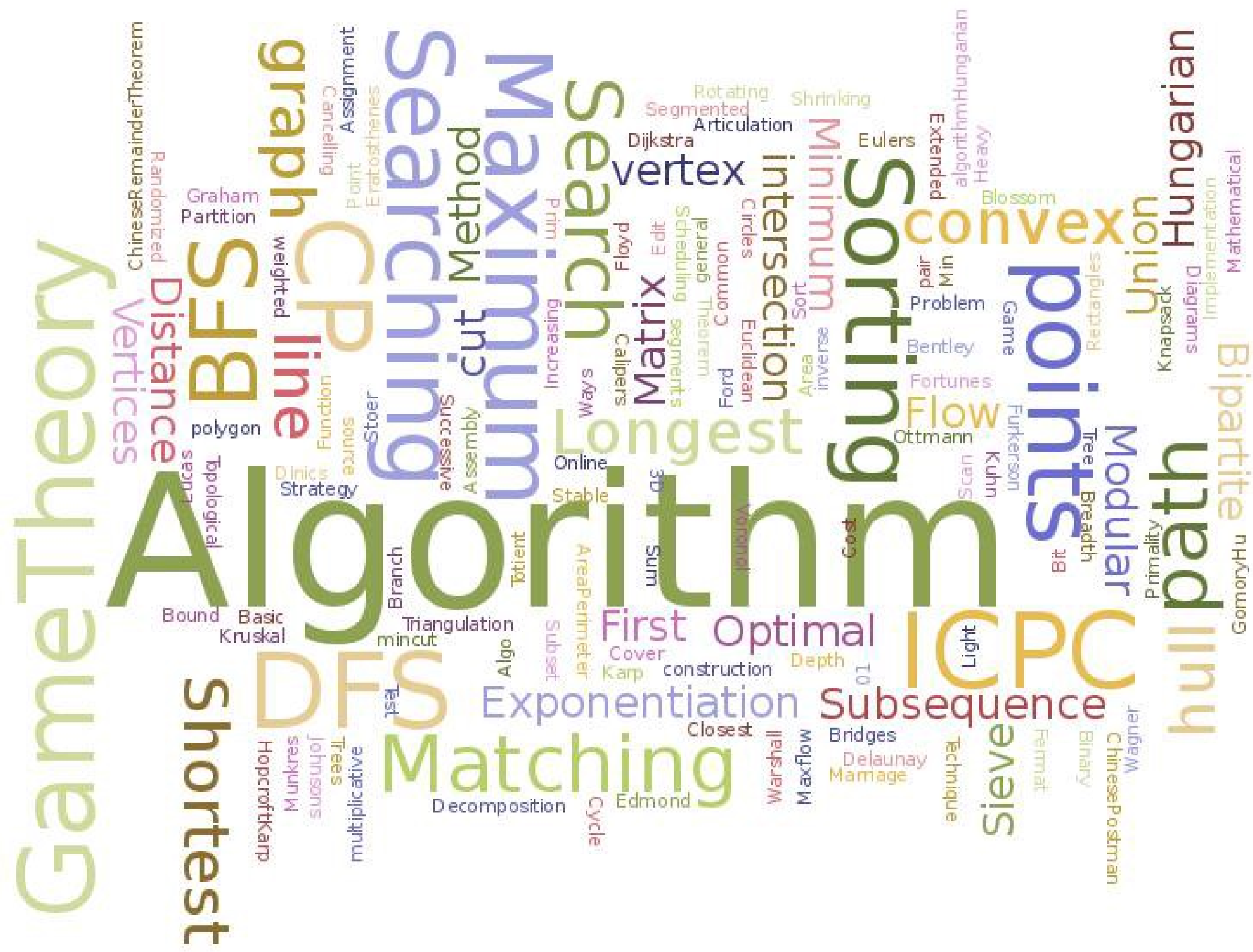
ALGORITHM IN CODING

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



Characteristics of an 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 Alexandria
of ancient Greece)

Demo Example

Fast Prime Check
Algorithm

keep calm
wear mask &
and study.

THANK
YOU

ISSUED IN PUBLIC INTEREST