SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF INFORMATION TECHNOLOGY

19ITB201 – DESIGN AND ANALYSIS OF ALGORITHMS

II YEAR IV SEM

UNIT-I-Introduction

TOPIC: Introduction-Notion of an Algorithm

Prepared by
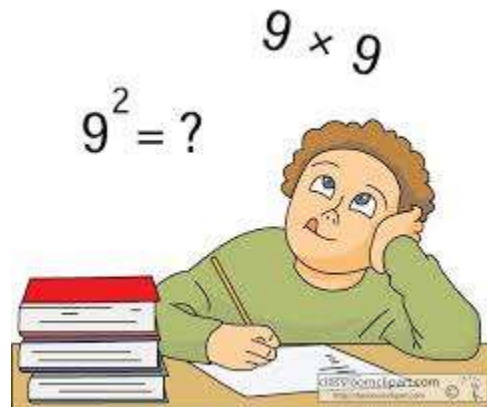C.PARKAVI,AP/AIML

INTRODUCTION-NOTION OF ALGORITHM

Subject :Design and Analysis of Algorithm
Unit : I

What you identified from the picture?

Answer : Solving Problem

How to solve the problem?
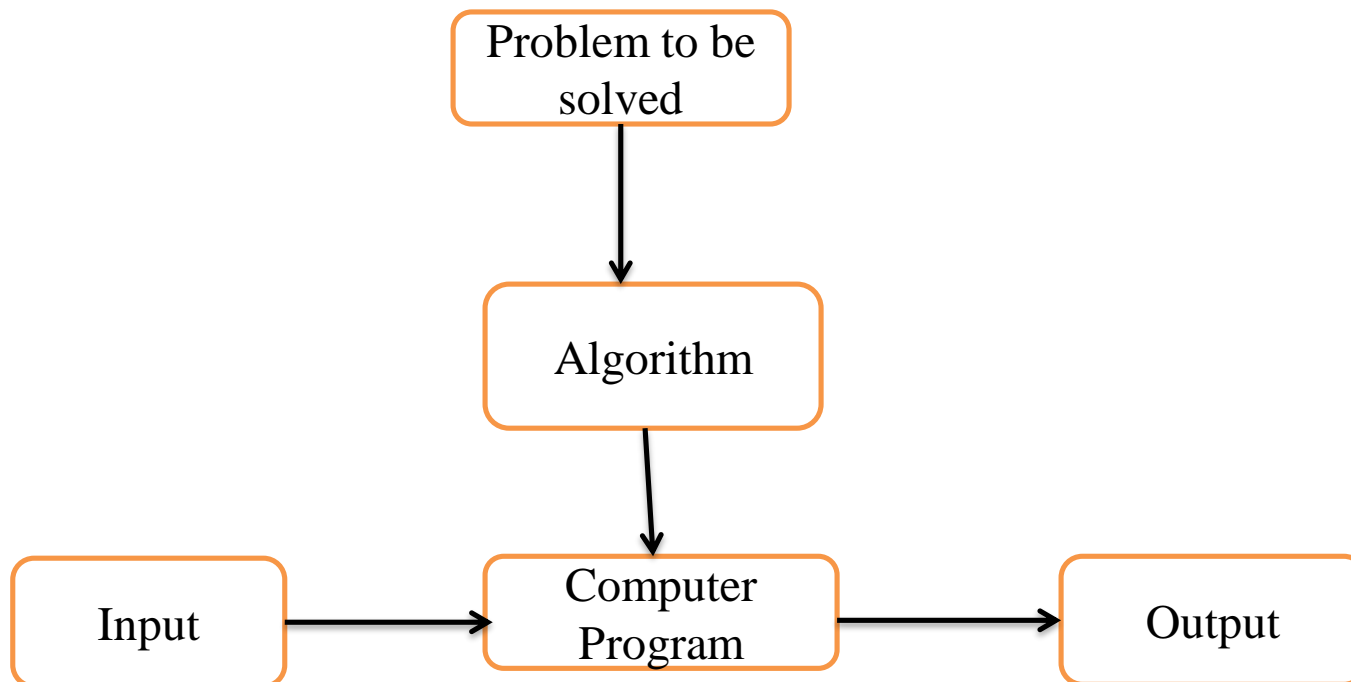
Answer: Problem solving methods

Definition

An *algorithm* is a sequence of **unambiguous instructions**

for **solving a problem,** i.e., for obtaining a required output

for any legitimate input in a finite amount of time.

Notion of an Algorithm

Problem to be solved

↓

Algorithm

↓

Input → Computer Program → Output

Properties of an Algorithm

➢ The **non ambiguity** requirement

  for each step of an algorithm

  cannot be com- promised.

➢ The **range of inputs** for which

  an algorithm works has to be

  specified carefully.

Properties of an Algorithm

➢ The same algorithm can be represented in **Several different ways**.

➢ There may exist **several algorithms** for solving the same problem

➢ Algorithms for the same problem can be based on very **different ideas and can solve the problem** with dramatically different speeds

Characteristics of an algorithm

- **Input:** Zero / more quantities are externally supplied.
- **Output:** At least one quantity is produced.
- **Definiteness:** Each instruction is clear and unambiguous.
- **Finiteness:** If the instructions of an algorithm is traced then for all cases the algorithm must terminates after a finite number of steps.
- **Efficiency:** Every instruction must be very basic and runs in short time.
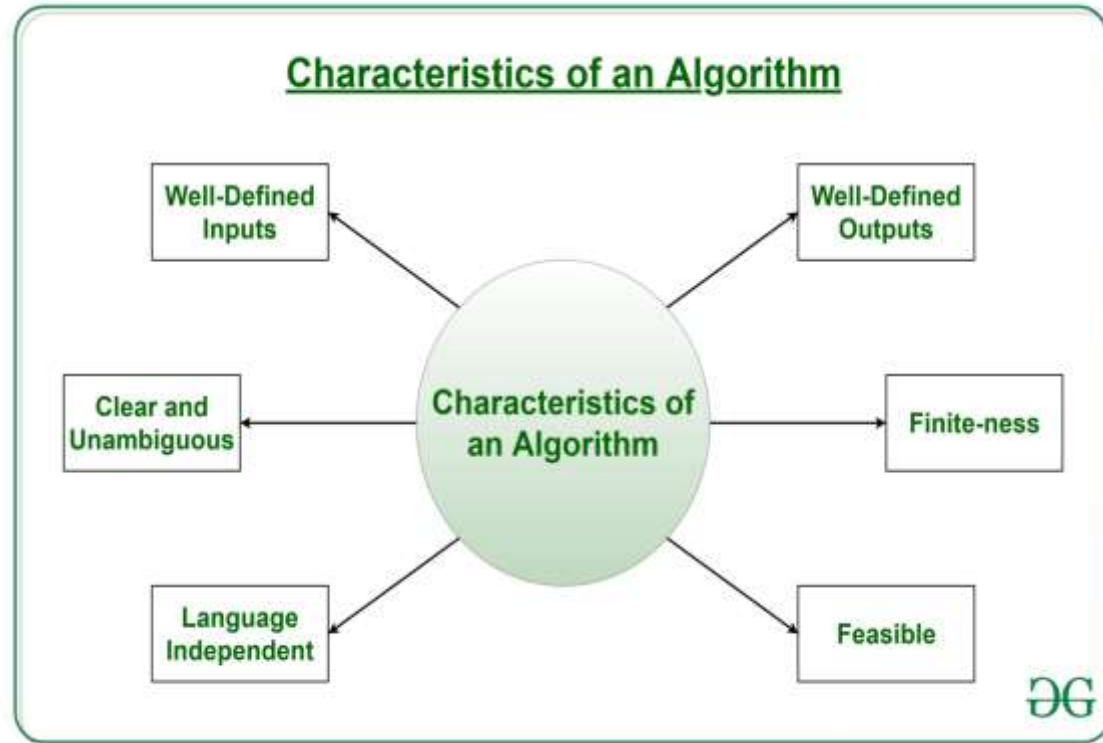
Characteristics of an algorithm

Characteristics of an Algorithm

- Well-Defined Inputs
- Well-Defined Outputs
- Clear and Unambiguous
- Finite-ness
- Language Independent
- Feasible

Characteristics of an Algorithm

Image Source :https://www.geeksforgeeks.org/introduction-to-algorithms/

Steps for writing an algorithm

❑ An algorithm is a procedure. It has two parts; the first part is **head** and the second part is **body**.

❑ The Head section consists of keyword **Algorithm** and Name of the algorithm with parameter list. E. g. Algorithm name1(p1, p2,…,p3). The head section also has the following:

//Problem Description

//Input:

//Output:

❑ In the body of an algorithm various programming constructs like **if, for, while** and some statements like assignments are used.

❑ The compound statements may be enclosed with **{** and **}** brackets. **if**, **for**, **while** can be closed by **en dif**, **endfor**, **endwhile** respectively. Proper indention is must for block.

❑ The **identifier** should begin by a letter and not by digit. It contains alpha numeric letters after first letter. No need to mention data types.

❑ Input and Output can be done using **read** and **write**.

Assessment

1.Which one is not a characteristics of an Algorithm?

a)Ambiguity
b)Definiteness
c)Finiteness
d)Efficiency

2.Write the two parts in writing an Algorithm

i)-------------------------------
ii)-------------------------------