Text Book:
Introduction to the Design and Analysis of Algorithms
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2nd Edition

What is an algorithm?

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
Important Points about Algorithms

Characteristics of Algorithm

➢ Input: Zero or more quantities are externally supplied
➢ Definiteness: Each instruction is clear and unambiguous
➢ Finiteness: The algorithm terminates in a finite number of steps.
➢ Effectiveness: Each instruction must be primitive and feasible
➢ Output: At least one quantity is produced

Why do we need Algorithms?

➢ It is a tool for solving well-specified Computational Problem.
➢ Problem statement specifies in general terms relation between input and output
➢ Algorithm describes computational procedure for achieving input/output relationship This Procedure is irrespective of implementation details

Why do we need to study algorithms?

Exposure to different algorithms for solving various problems helps develop skills to design algorithms for the problems for which there are no published algorithms to solve it

Two descriptions of Euclid's algorithm

Natural Language

Euclid's algorithm for computing gcd(m,n)

Step 1 If n = 0, return m and stop; otherwise go to Step 2

Step 2 Divide m by n and assign the value of the remainder to r

Step 3 Assign the value of n to m and the value of r to n. Go to step 1.

Pseudo Code

ALGORITHM Euclid(m,n)

//computes gcd(m,n) by Euclid's method

//Input: Two nonnegative,not both zero integers

//Output:Greatest common divisor of m and n

while n ≠ 0 do

    r ← m mod n

   m← n

   n ← r

return m