CSL 356
Algorithm Design & Analysis

→ www.cse.iitd.ernet.in/~ssen

Sandeep Sen off. 428

CSL 201 : Data Structure

Discrete Stk — Recurrence relns & order

elementary Discrete Probability

Lecture Notes

(Reference books)

→ ① Dasgupta, Papadimitriou & Vazirani

→ ② Corman, Leiserson, Rivest, S

→ ③ Aho Hopcroft & Ullman

→ ④ ___ & Tardos

2 Minor	Major	Assignments	Quizes
20% each	40%	6	3
		20%	

Tutorial 1 - 1:50

Venue II A 201

Question

1. Can we design an *algorithm for any "problem"? (computational)

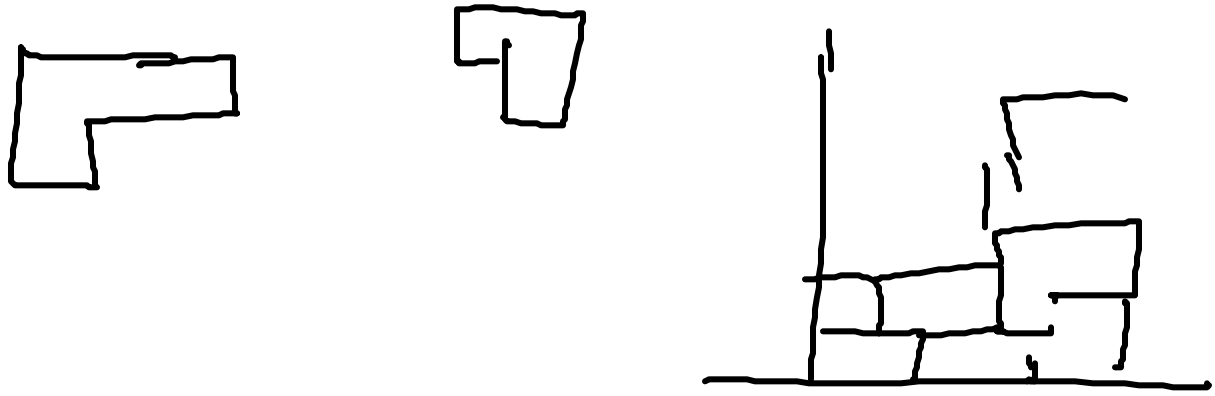
* Properties ① must be correct for all inputs

② must terminate

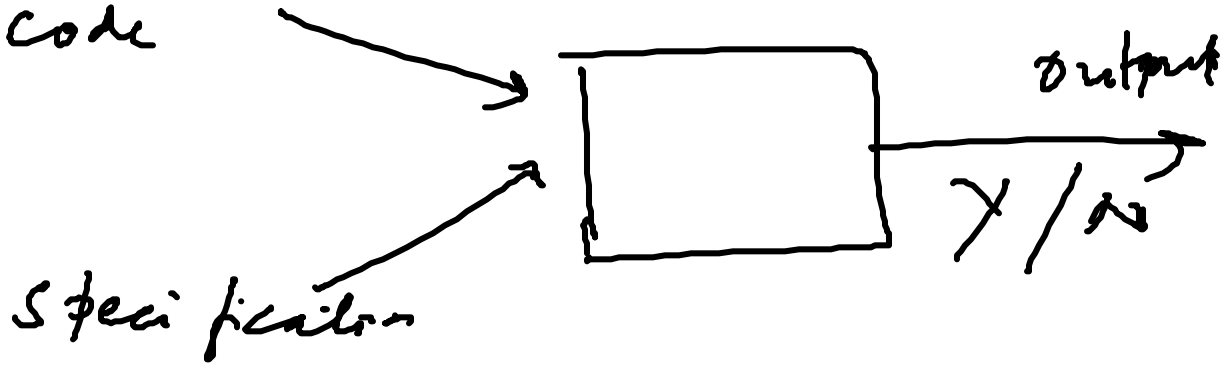
Answer is "No"

→ Goedel Incompleteness Thm

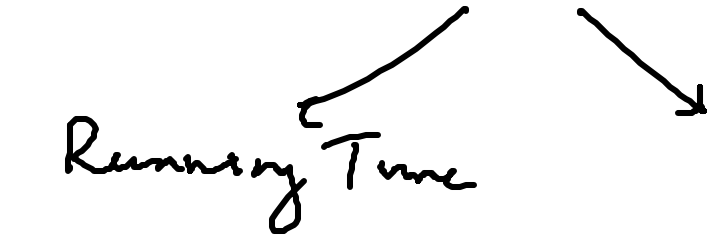
Tiling Problems



Proving Correctness of Programs (using programs)



Designing & "Efficient" algorithms



Time Complexity Space Complexity

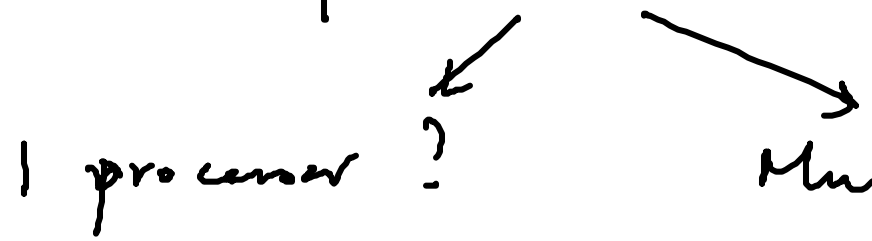
Measure / Estimate of time / space
- the program takes
and often expressed as (asymptotic behaviour) functions of input-size
using 'O' - Big Oh notation

$O(n^2)$ $O(n^3 \log^3 n)$ ...

$O(n^2 + n \log n) \sim O(n^2)$

Design and then analyse

Computational Model



1 processor ?

Multiple processors

$O(n^2)$

$O\left(\frac{n^2}{p}\right)$

p ← # processors

→ what are capabilities of a processors { basic instruction set

→ clock speed

Computing the n^{th} Fibonacci No

→ $F_0 = 0 \quad F_1 = 1 \quad F_i = F_{i-1} + F_{i-2}$