



# ARUNAI ENGINEERING COLLEGE

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## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CS8501 – THEORY OF COMPUTATION

### MIND MAP



Any computer program is always a form of an algorithm.

If a function is computable, then there is an algorithm for its computation.

A definition of an algorithm does not exist. There is only the Turing's thesis which has not been disproved yet.

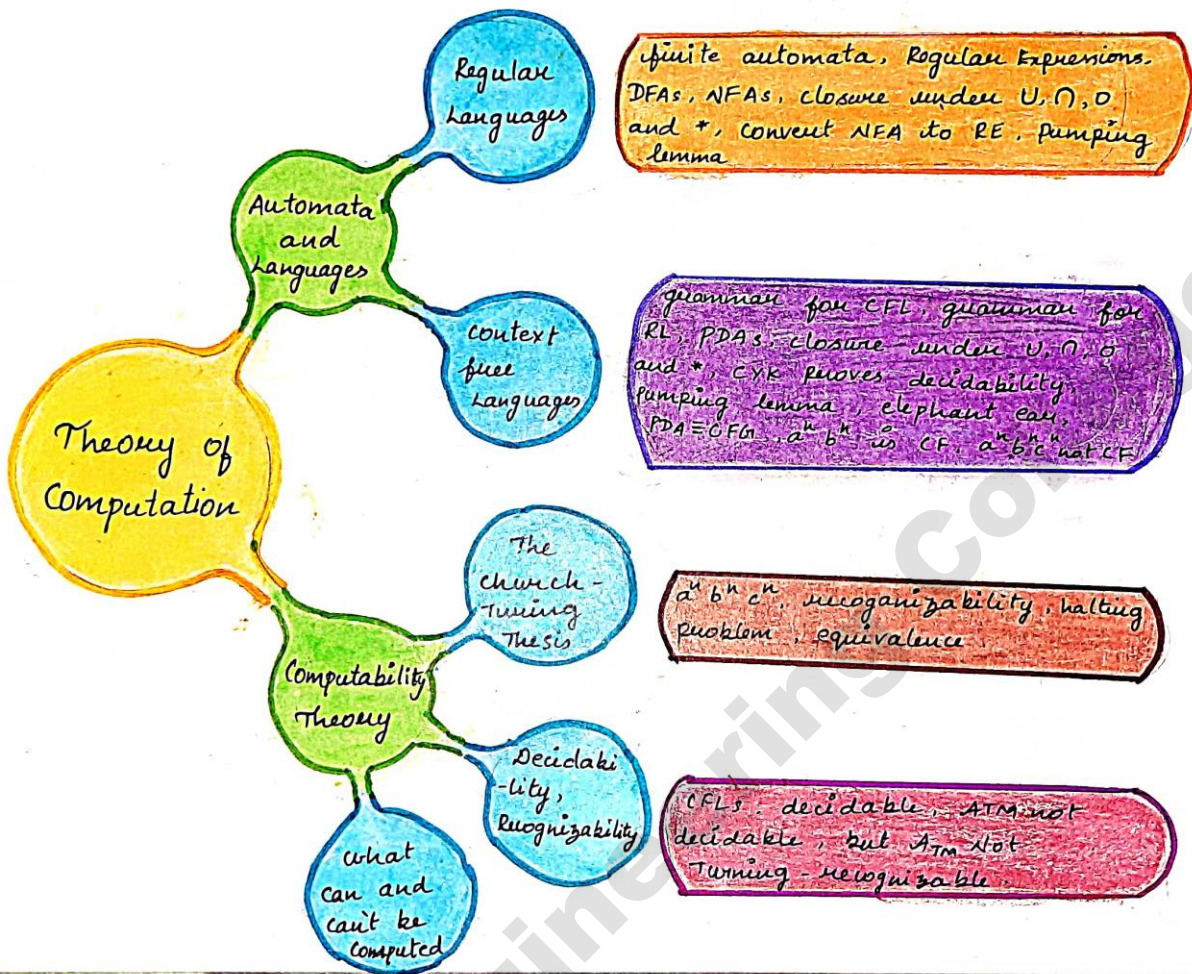
Turing's Thesis

Formalizes Logic

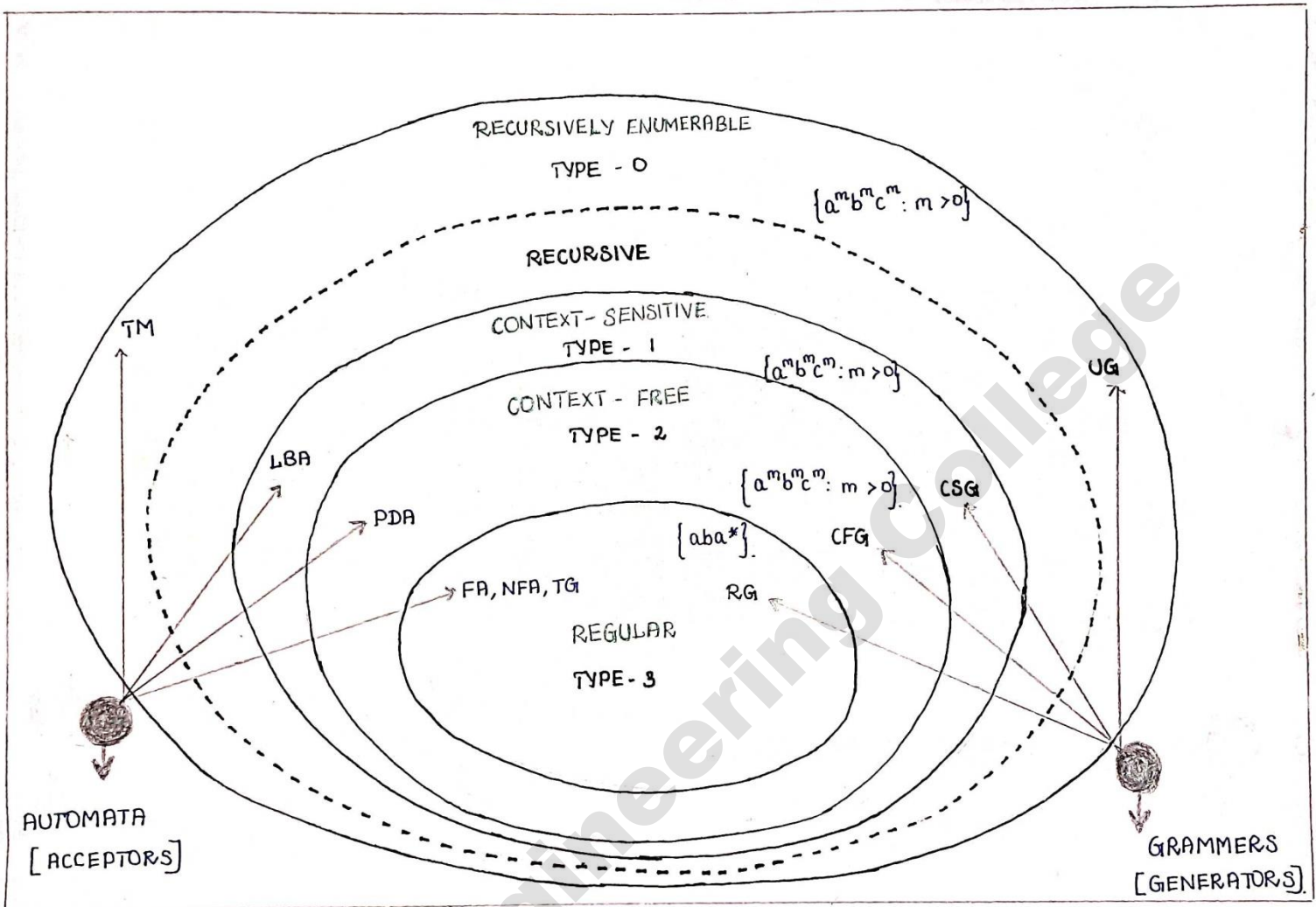
If there exists a reasonable understanding of an algorithm, then any algorithm corresponded to such understanding, can be implemented in the form of a program for the Turing Machine.

There are other formal systems, Eg.  $\lambda$ -calculus (Church's thesis), Markov algorithms.

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Theory of Computation

Types of Grammar

on the basis of type of production rules

- Type 0 → Unrestricted Grammar — Turing machine
- Type 1 → Context Sensitive Grammar — Linear Bound automata
- Type 2 → Context free Grammar — Push down automata
- Type 3 → Regular Grammar — Finite automata

on the basis of number of derivation trees

- Ambiguous Grammar — have more than one leftmost derivations
- Unambiguous Grammar — have unique leftmost derivation

on the basis of number of strings

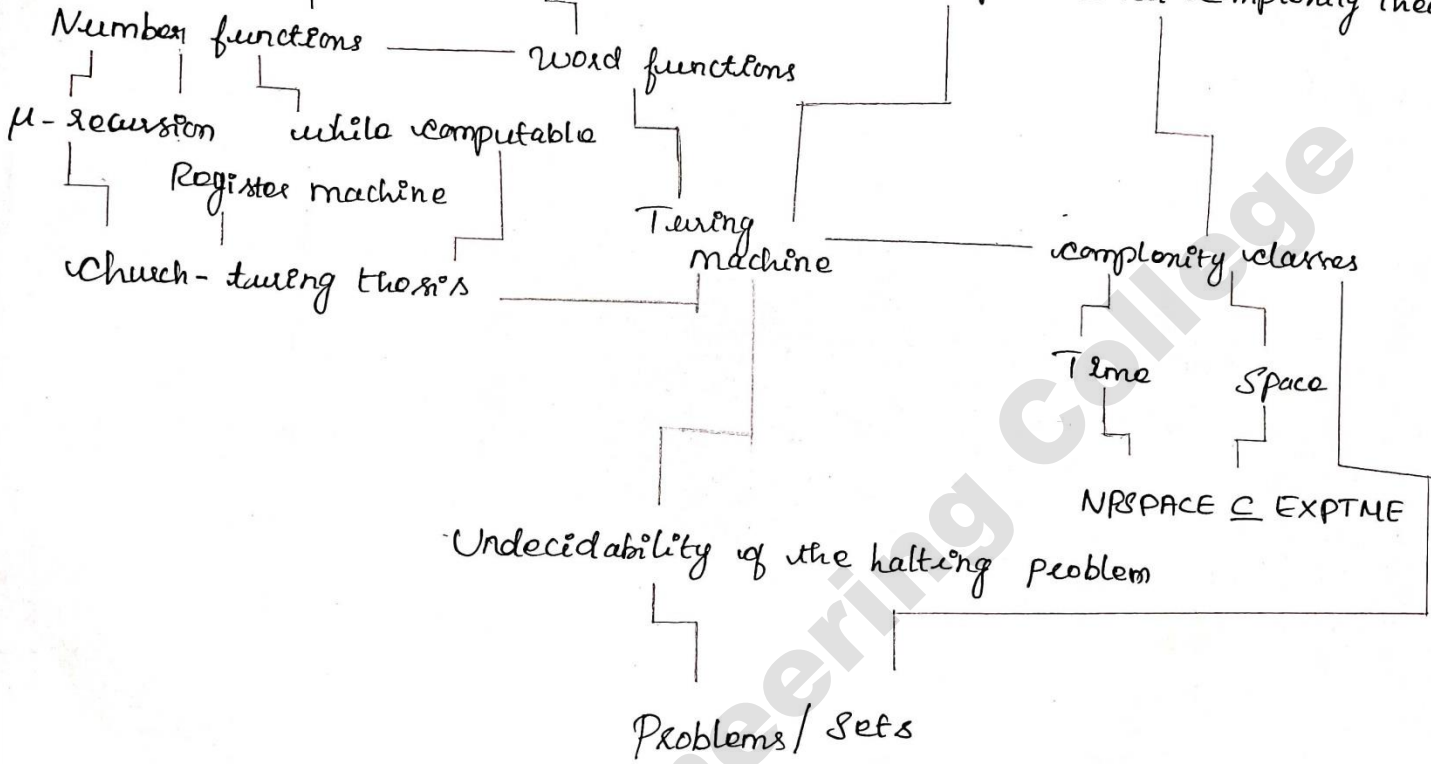
- Recursive Grammar — Left recursive grammar, Right recursive grammar
- Non-recursive grammar

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# Theory of computation

## Recursion theory

## Computational complexity theory



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