

# THEORY OF COMPUTATION



## 1. Introduction to Theory of Computation

- Introduction to Theory of Computation
- Understanding Basic Terminologies
- Chomsky Hierarchy and Classification of FA

## 2. Regular Language and Finite Automata

- Introduction to DFA with examples
- More Examples on DFA Part 1
- More Examples on DFA Part 2
- Complementation of DFA and Examples of DFA
- Different Operations on DFA Part 1
- Different Operations on DFA Part 2
- Introduction to NFA
- Minimization of DFA
- Introduction to Moore and Mealy Machine
- Conversion between Moore and Mealy Machine
- Epsilon NFA
- Regular Language and Regular Expression
- Examples on Regular Expressions
- Regular Expression to Finite Automata
- Examples on Regular Language Part 1
- Examples on Regular Language Part 2
- Pumping Lemma for Regular Language

## 3. Context Free Grammars

- Introduction to Context Free Grammars
- Examples on Context Free Grammars
- Chomsky Classification of Grammars
- Eliminating NULL Production from CFG
- Eliminating Unit Production from CFG
- Eliminating Useless Symbols from CFG
- Introduction to CNF and GNF
- Introduction to CYK Algorithm
- Introduction to Push Down Automata
- Conversion to PDA from CFG
- Examples on Context Free Language Part 1
- Examples on Context Free Language Part 2
- Pumping Lemma for Context Free Language

## 4. Turing Machine and Unrestricted Grammars

- Introduction to Turing Machines with Examples
- Representation of Turing Machine
- Turing Thesis (Optional)
- Different Types of Turing Machines
- Universal Turing Machine
- Introduction to REL and RL
- Understanding CSL

## 5. Theory of Computation - Miscellaneous

- Introduction to Countability
- Examples of Countability
- Different Properties on Countability
- Difference Between Computability and Decidability
- Turing Machine Halting Problem
- Post Correspondence Problem and Complexity Classes
- Properties of CFL and PDA
- Properties of RL and FA
- Decidability Chart
- Closure Property Chart