

Complete

Revision

TOC LAST MINUTE NOTES

Notes
||
||
||

✓



Syllabus
P48
Mock

CombineCS
The Extra Step

||

Computer ss. - paper

<https://t.me/RashmiCCS>

My class @
3:30pm daily
on YouTube

18 Aug.
= 1-1
2,3

UGCNET PAPER - 2
COMPUTER SCIENCE
REVISION COURSE - 45 DAYS
 **15TH AUGUST 2021**

Test Topic
1 Sep.

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NET 2021

MHSET- 26 SEP 2021

1 month → Net

The **schedule of UGC-NET June 2021** is as follows:

Fill

2021

Online registration and submission of Application Form (complete in all respect) through NTA Website: https://ugcnet.nta.nic.in	10 August to 05 September, 2021 (upto 11:50 pm)
Last date for successful transaction of Examination fee	06 September, 2021 (upto 11:50 pm)
Correction in the Particulars in the Application Form (online only)	07 September to 12 September, 2021
Downloading of Admit Card from NTA Website	To be announced later on website
Dates of Examination	06 October to 11 October 2021
Timing of Examination	First Shift: 09.00 am to 12.00 pm
	Second Shift: 03.00 pm to 06.00 pm
Website	ugcnet.nta.nic.in , www.nta.ac.in

Finite Automata: It is the most restricted type of automata which can accept only regular languages. 2 P48

Deterministic FA and Non-Deterministic FA: In deterministic FA, there is only one move from every state on every input symbol but in Non-Deterministic FA, there can be zero or more than one move from one state for an input symbol.

Note: 148-5 Properties

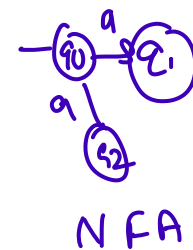
- Language accepted by NFA and DFA are same.
- Power of NFA and DFA is same.
- No. of states in NFA is less than or equal to no. of states in equivalent DFA. (+) dead state
- For NFA with n-states, in worst case, the maximum states possible in DFA is 2ⁿ
- Every NFA can be converted to corresponding DFA.

Moore Machine: Moore machines are finite state machines with output value and its output depends only on present state.

Mealy Machine: Mealy machines are also finite state machines with output value and its output depends on present state and current input symbol.

LMN-1
Identities of Regular Expression :

union highest 2019
 $\Phi + R = R + \Phi = R$
 $\Phi * R = R * \Phi = \Phi$ Intersection - lowest 2020
 $\epsilon * R = R * \epsilon = R$
 $\epsilon^* = \epsilon$ Gate P48 (2)
 $\Phi^* = \epsilon$
 $\epsilon + RR^* = R^*R + \epsilon = R^*$
 $(a+b)^* = (a^* + b^*)^* = (a^* b^*)^* = (a^* + b)^*$
 $= (a + b^*)^* = a^*(ba^*)^* = b^*(ab^*)^*$ 2 P48



NFA

a, b

Paid course - LMN

3:30pm

(1212) P48

P48

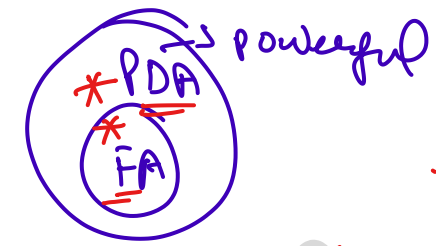
Push Down Automata: Pushdown Automata has extra memory called stack which gives more power than Finite automata. It is used to recognize context free languages. 2048

Deterministic and Non-Deterministic PDA: In deterministic PDA, there is only one move from every state on every input symbol but in Non-Deterministic PDA, there can be more than one move from one state for an input symbol.

Note:

- Power of NPDA is more than DPDA. 3-48
- It is not possible to convert every NPDA to corresponding DPDA.
- Language accepted by DPDA is subset of language accepted by NPDA.
- The languages accepted by DPDA are called DCFL (Deterministic Context Free Languages) which are subset of NCFL (Non Deterministic CFL) accepted by NPDA. 10-48

Push operation - Stack DS
CFL



→ All CFL is Regular
Yes/No.

Q1 every FA is CFL Q2
PDA = FA + Stack

Regular. Q3 DFA = NFA same
DPDA < NPDA
= Powerful

10-48 FA, PDA → session

Linear Bound Automata: Linear Bound Automata has finite amount of memory called tape which can be used to recognize Context Sensitive Languages.

- LBA is more powerful than Push down automata.

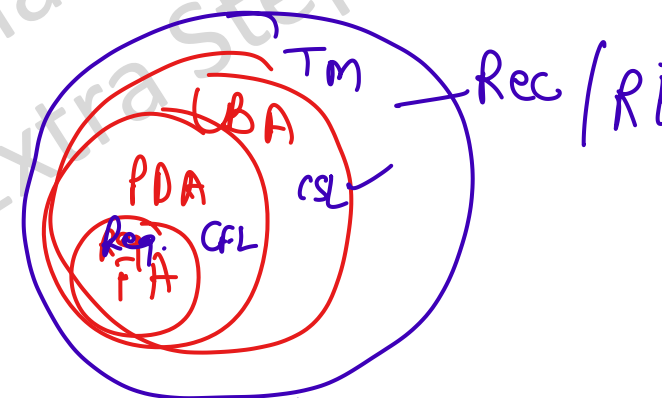
- Turing Machine Turing machine has infinite size tape and it is used to accept Recursive Enumerable Languages.

- Turing Machine can move in both directions. Also, it doesn't accept ϵ .

non-deterministic

Deterministic and Non-Deterministic Turing Machines: In

deterministic Turing machine, there is only one move from every state on every input symbol but in Non-Deterministic Turing machine, there can be more than one move from one state for an input symbol.



Note: **

- Language accepted by NTM, multi-tape TM and DTM are same.

- Power of NTM, Multi-Tape TM and DTM is same.

- Every NTM can be converted to corresponding DTM.

P48 Gate / skh / net

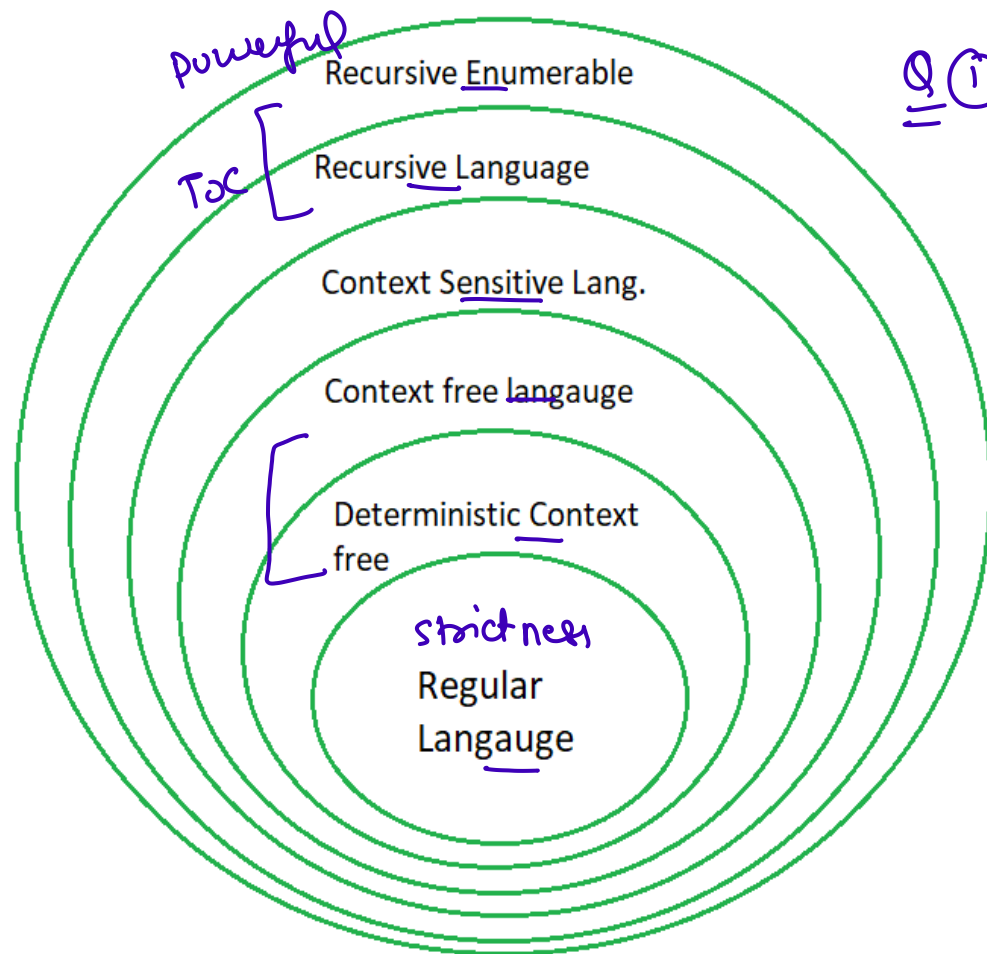
TRICK

powerful



TM
LBA
FA

powerful & same



2.29

Arrange on the basis of powerful

$$RL < CFL < RE < Rec. \rightsquigarrow$$

$$Rec < RE$$

Strictness

Lang. \rightarrow string parse

word Token

Img source:GG

Most powerful

FA < PDA < LBA < TM

Reg. DyFL CFL CSL Rec RE

(Machine)
language

Chomsky Classification of Languages or How to identify Language

Single video

→ support



Comment free learned

June 2019

Type-0
(Recursive Enumerable)

$\alpha \rightarrow \beta$ where $\alpha, \beta \in (T \cup N)^*$ and α contains at least 1 non-terminal

Recursive Enumerable

Turing Machine

Union, Intersection, Concatenation, Kleene Closure

$A \rightarrow \epsilon$

Type-1
(Context Sensitive Grammar)

$\alpha \rightarrow \beta$ where $\alpha, \beta \in (T \cup N)^*$ and $\text{len}(\alpha) \leq \text{len}(\beta)$ and α should contain at least 1 non terminal.

Context Sensitive

Linear Bound Automata

Union, Intersection, Complementation, Concatenation, Kleene Closure

$AB \rightarrow \alpha$
 $\alpha = \beta$

Step

Type 0 > Type 1 > Type 2 > Type 3

RE
TM

CSL
LBA

CF
PDA

FF Reg.

Type-2
(Context Free Grammar)

$A \rightarrow \rho$ where $A \in N$ and $\rho \in (T \cup N^*)^*$

Context Free

Push Down Automata

Union, Concatenation, Kleene Closure

Terminal - small

Non-term -

a, b, c, d
 A, B, C

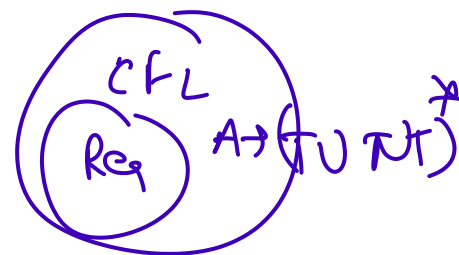
Type-3
(Regular Grammar)

$A \rightarrow a$ or $A \rightarrow aB$ where $A, B \in N$ (non terminal) and $a \in T$ (Terminal)

Regular

Finite Automata
Union, Intersection, Complementation, Concatenation, Kleene Closure

T
 $T \cup N$



Type 2 : Identity →



Decidable and Undecidable Problems:

1 PVA

D → Recur (100%) Gate 2018

A language is Decidable or Recursive if a Turing machine can be constructed which accepts the strings which are part of language and rejects others.

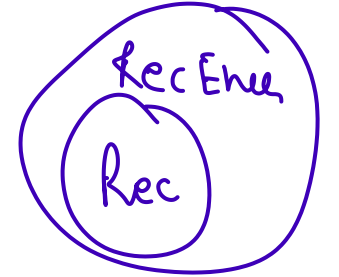
e.g.; A number is prime or not is a decidable problem.

even/odd, palindrome

halt

Q2

A language is Semi-Decidable or Recursive Enumerable if a Turing machine can be constructed which accepts the strings which are part of language and it may loop forever for strings which are not part of language.



A problem is undecidable if we can't construct an algorithms and Turing machine which can give yes or no answer.

e.g.; Whether a CFG is ambiguous or not is undecidable.

Q4Q

algv. p

halt p

Rashmi Prabhakar
CombineCS The Extra Step

Decidability Table						
Problem	<u>RL</u>	<u>DCFL</u>	<u>CFL</u>	<u>CSL</u>	<u>RL</u>	<u>REL</u>
Membership Problem	D	D	D	D	D	UD
Emptiness Problem	D	D	D	UD	UD	UD
Completeness Problem	D	UD	UD	UD	UD	UD
Equality Problem	D	D	UD	UD	UD	UD
Subset Problem	D	UD	UD	UD	UD	UD
$L1 \cap L2 = \phi$	D	UD	UD	UD	UD	UD
Finiteness	D	D	D	UD	UD	UD
Complement is of same type	D	D	UD	D	D	UD
Intersection is of same type	D	UD	UD	UD	UD	UD
Is L regular	D	D	UD	UD	UD	UD

TRICK TOC / compiler
 \Rightarrow decidable

2) closure \sim Maxle test
TRICK \rightarrow Solve

2. x \rightarrow 10, 15, 20, 25

Img source:GG

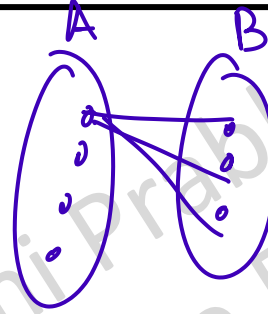
Combi

Countability

course

- Set of all strings over any finite alphabet are countable.
- Every subset of countable set is either finite or countable.
- Set of all Turing Machines are countable.
- The set of all languages that are not recursive enumerable is Uncountable.

Count → 1:1 mapping



Rashmi Prabha
CombineCS The Extra Step

Quick
Revise

Guidance

TOC ✓
compiler ✓

closure →

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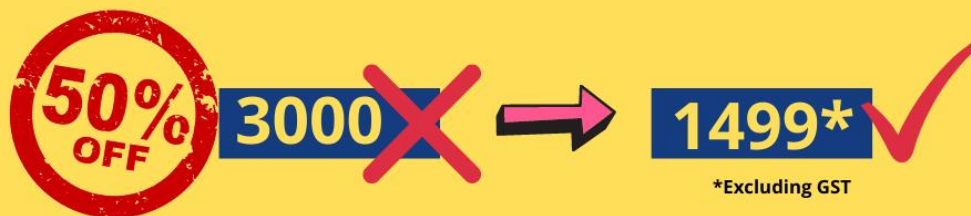
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~~5000~~



2999*

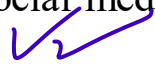
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