

Data Science & AI



Artificial Intelligence

Logics

Lecture 01



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Recap of Previous Lecture



Topic

Topic

Topic

Topic

Topic

Topics to be Covered



Topic

Propositional Logic

Topic

predicate logic

Topic

Topic

Topic

logic

① Propositional logic

② Predicate logic

Proposition logic

① Atomic logic → A single statement which can be represented in a form of True or False.

② Compound logic → Multiple statements combiningly giving us true or False is called as compound logic

$\begin{matrix} T, F \\ \text{if we are attending} \end{matrix}$ $\begin{matrix} \text{all the} \\ \text{classes} \end{matrix}$ $\begin{matrix} F, T \\ \text{then we can clear} \end{matrix}$ GATE DA Exam $\Rightarrow \underline{T, F}$

$T \rightarrow$ tautology

$F \rightarrow$ Contradiction.

Logical Connective

① AND $\rightarrow \wedge \rightarrow$ Conjunction \rightarrow

A	B	O
T	T	T
T	F	F
F	T	F
F	F	F

Akash is preparing For GATE AND Job

A \rightarrow Akash is preparing For GATE \rightarrow T, F

B \rightarrow Akash is preparing For Job \rightarrow T, F

$$(A \wedge B) \Rightarrow F$$

② OR $\rightarrow \vee \rightarrow$ Disjunction \rightarrow

A	B	O
T	T	T
T	F	T
F	T	T
F	F	F

① Akash is preparing For GATE or Job.

① Akash is preparing For GATE \rightarrow T/F

② Akash is preparing For Job \rightarrow T/F

$$(\text{Akash is preparing For GATE or Job}) \Rightarrow T$$

③ Negation $\rightarrow \sim \rightarrow \neg \rightarrow$ ① Akash is preparing for job $\Rightarrow A$

\neg Akash is not preparing for job

A	O
T	F
F	T

(2!) = 2

($\sim A \mid \neg A$)

④ Implication $\rightarrow (\overset{\sim}{\rightarrow}) \rightarrow$ if you are ^{$A \Rightarrow T, F$} preparing for GATE Then ^{$B \Rightarrow T \mid F$} you will be able to crack
 $A \rightarrow B$

⑤ Biconditional — you will able to get IIT if and only if you will score more than
^A 50%. ^B

($A \overset{\sim}{\iff} B$)

First order logic \rightarrow Predicate logic.

① Atomic \rightarrow

All of us are preparing for Gate. \rightarrow (A)

② Compound or complex \rightarrow

Student(x) \rightarrow Gate(x)

($\forall A$) Gate(A)

$\forall \rightarrow (\Rightarrow)$

Some of us will be able to crack \rightarrow

($\exists A$) \Rightarrow

Student(x) \wedge Crack(x)

$\exists \rightarrow \wedge$

Compound Sentence Example

All of us are (A) preparing for GATE but (B) Some of us will be able to crack

($\forall A$)

($\exists B$)

Given 3 literals A , B , and C , how many models are there for the sentence $A \vee \neg B \vee C$?

$\Rightarrow 7$

A	B	$\neg B$	C
T	T	F	T
T	T	F	F
T	T	F	T
T	T	F	F
T	F	T	T
T	F	T	F
T	F	T	T
T	F	T	F
F	T	F	T
F	T	F	F
F	T	F	T
F	T	F	F
F	F	T	T
F	F	T	F
F	F	T	T
F	F	T	F

$2^3 = 8$

$\Rightarrow 8$

$2^3 = 8$

$(A \vee \neg B \vee C)$

$\Rightarrow 7$



2 mins Summary



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THANK - YOU