Computer Science & IT

Discrete Mathematics

Set Theory & Algebra

Lecture No. 01

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Topics to be Covered

Topic — Introduction

Weightage −7−9

Zero to Hero

I'll discuss as & when needed ✓

Pre-requisite

① Permutation
② Combination
③ Binomial Expansion

① * Set Theory & Algebra → Sets, Relations, Functions, Group Theory

② Graph Theory

③ Mathematical Logic → Propositional logic, Predicate logic

④ Recurrence Relation & Generating Function

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repeation is not allowed

Set:- A well defined unordered Collection

of {distinct} elements is called set

eg:- $A = \{1, 2, 3\} = \{2, 1, 3\}$

$B = \{1, 2, a, b, Jan, Feb\}$ $\left\{\begin{array}{l}\text{elements of the} \\ \text{set need not be of} \\ \text{similar type}\end{array}\right\}$

$C = \{1, 2, \{1,2,3\}, \{1,2\}, \{3\}\}$

Five elements in set C

Cardinality of the Set :-

Cardinality of set A is defined as number of elements in set A. Cardinality of set A is denoted by $|A|$.

eg. ① $A = \{1, 2, 3\}$, $\therefore |A| = 3$

② $B = \{1, \{1\}, \{1, 2\}, \{1, 2, 3\}, 3\}$ $\therefore |B| = 5$

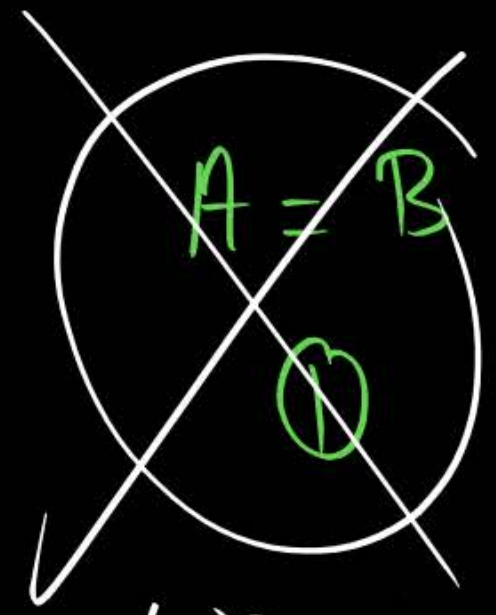③ $C = \{\}$ $\therefore |C| = 0$] C is an empty set - $|C| = 0$

$C = \{\} = \emptyset$

$A = \{ \{ \} \}$ Empty set $\{$ A is a set containing an element and that element is an empty set $\therefore |A| = 1$

$B = \{ \ \}$ here $|B| = 0$

$A = B$ or $A \neq B$

① ②

Wrong

ey: $A = \{ \{ \{ \{ \} \} \} \} \}$

$$\boxed{|A| = 1}$$

Set containing a set which contain an empty set is an element of set A

A is an empty set

eg: $A = \{ \{ \{ \{ 1, 2 \} \} \} \}$

A is set containing a set that contains another set containing one more set that contains elements $\underline{1 \& 2}$

$\underline{|A| = 1}$

eg: $A = \{ \underbrace{\{1, 2\}}, \underbrace{\{2, 1\}} \}$

$$\{1, 2\} \equiv \{2, 1\}$$

& duplicate elements are not allowed

∴ A is not a set.

2 mins Summary

Topic Introduction

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