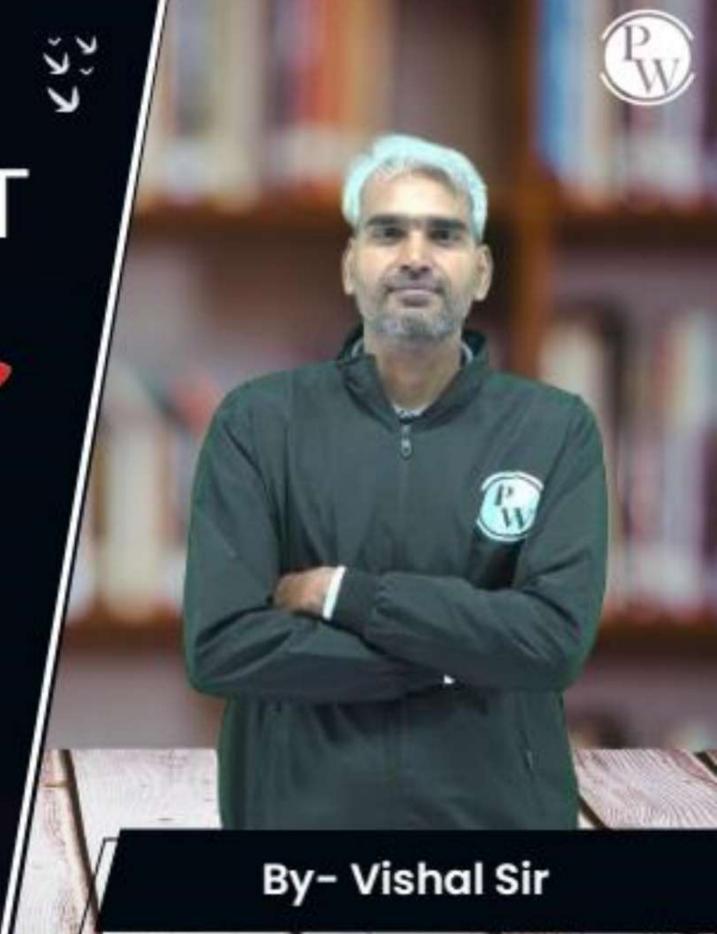
Computer Science & IT

Database Management
System

Relational Model & Normal Forms

Lecture No. 02

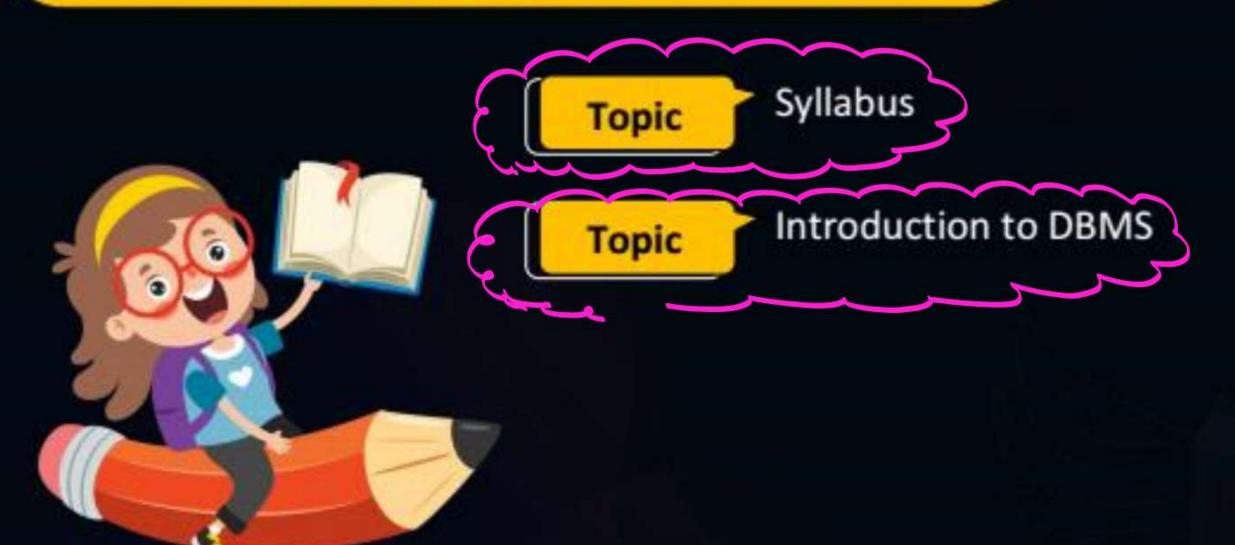




## **Recap of Previous Lecture**





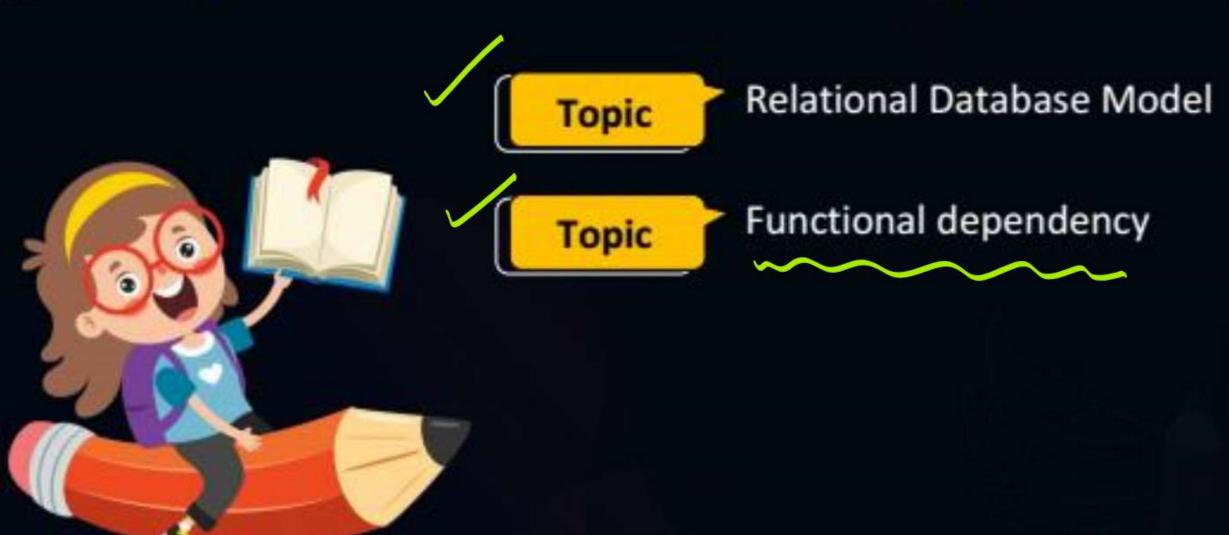


# **Topics to be Covered**













In relational database model, information is Stored in the form of table.

Table is a collection of rows of Columns.







7,	the	example	( )+	is	a	•
In	14.00	example,	1,0	rela	tion	V

Number of tuples in given example = 4

0	1. 1
	Tudent



Relational Schema:

Student (Roll-No, Sname, Cont-No)

tuples / records



i.e., No af Columns



Pegace/Arity: - No. af attributes/field in a relation is defined as degree/arity of that relation

tuple/record:-

Each row of the relational table is called is called a tuple/record

Cardinality:-

Cardinality of a relational table is delined as number of tuples/secords in the relation.





Relational Schema: It is used to provide the abstract detail of the relation in the database

Relational Achema for the relational table in the above example

Student (Roll-no, Sname, Cont-No.





Relational Instance: If data exists in the relation at a given time, then that set of datastype is called relational instance of that time.

+ Current

Relational instance

W. o.t. above example =  $\{(S_1, A, 123), (S_2, B, 456), (S_3, A, 789), (S_4, C, 123)\}$ 

Note:- Relational instance may change with time because of insert, delete or update operations.





Let R be the relation and X47 one set of attributes from relation R

R(A1, A2, A3, Au, A5, A6) X may be { A1, A3} - Functional dependency from X to y May be donated by X-> Y In functional dependency X-> y 2 x is called determinant.





g. Student		we know	Sid of the	e Student
Sid Shame	Contact ther	ame af that	niquely deter	mine
Based on the So B	dependency the	iame at that	student in become detou	the table
given relational	789) Sid - Sname 123) Holds in the relation	7 Sname bec	amen dependent	1
Punctional dependencies			ictional depender	J.
I lay hold Tour.	a) the student to	e Sname non we may no	+	name
Sid -> Sname Sid -> Contact Sid Sname -> Contact	determine the Sid	' uniquely was	.t that Shame	
Sid, Sname -> Contact Sid, Contact -> Sname Sname Contact -> Sid	o. Thame	does not hold	in The relation	<u>L.</u>





- Functional dependency defines the relationship between two sets of attributes in a relational table.
- It states that the values of dependent attribute set can be completely determined by the values of determinant attributes set. In other words, if a determinant attribute's value is known, the value of the dependent attribute can be deduced.





Let R be the relational schema with X and Y as the attribute sets over relation R.

Functional dependency  $X \rightarrow Y$  exists in R only if For all pair of tuples  $t1,t2 \in R$ If t1.X = t2.X then t1.Y = t2.Y

If functional dependency  $X \rightarrow y$  exists in relation R then for all pair of tuples  $t_1, t_2 \in \mathbb{R}$  wif  $t_1 \cdot x = t_2 \cdot x$  then  $t_1 \cdot y = t_2 \cdot y$ 

exists in R. R also exists in R Functional dep Values at A1 & A5 are valid W. 8.4 A1 -> A5 Values af A2 & A3 are Valid Wirt. A2 -> A3





If functional dependency X-> Y exists in R=P

then

Whenever values of attribute set X are same in any 9

two types then corresponding value of Y should also be same in those types.

In a relational instance whenever values of attribute set X are same in any pair of tupler, if values of Y are also same in those tupler, then functional dependency X->>> may or may not hold true

Consider the Pollowing relational

from this relational instance What Can we Conclude about functional dependency B -> A \* From the given relational instance We can conclude that functional dependency B-> A will never

instance

hold true in Volation R When Values of B are same Voluss of A ariane Consider the Pollowing relational instance from this relational instance What Can we conclude about tunctional dependency A-B In given relational instance whenever Values at A are same in two tuples Consupondintalues al B is also same in those tuples may or may not hold

#### Consider the following relational instance #Q.



Α	В	С
1	2	3
1	2	4
2	2	1
3	1	2
4	1	2

Which of the following functional dependency may hold true (not based on given relational instance.

b)  $A \rightarrow B$ 

a)  $A \rightarrow C$ c)  $AB \rightarrow C$ 

d) BC  $\rightarrow$  A

#### Consider the following relational instance #Q.

1	P_)	
	W	
"		

Α	В	С
1	1	1
1	2	2
2	4	3
3	3	4
4	1	5
5	3	6

Which of the following functional dependency may hold true (not based on given relational instance.

b)  $A \rightarrow B$ 

a)  $B \rightarrow C$ c)  $C \rightarrow B$ 

d)  $B \rightarrow A$ 

e)  $C \rightarrow A$ 





- If necessary condition for functional dependency "X→Y" does not hold true based on given relation instance, then functional dependency "X→Y" can never exist in the given relation.
- Even if necessary condition for functional dependency "X→Y" does hold true based on given relation instance, then also we can not be sure whether functional dependency X→Y exists in the relation or not, because it is just the relational instance.

#Q. From the following instance of a relation schema R (A,B,C), we can conclude that:

А	В	С
1	1	1
1	1	0
2	3	2
2	3	2

(A)A functionally determines B, and B functionally determines C

(B)A functionally determines B, and B does not functionally determine C

(C)B does not functionally determine C

(D)A does not functionally determine B, and B does not functionally determine C



#### 2 mins Summary



Topic

Relational Database Model

Topic

Functional dependency



# THANK - YOU