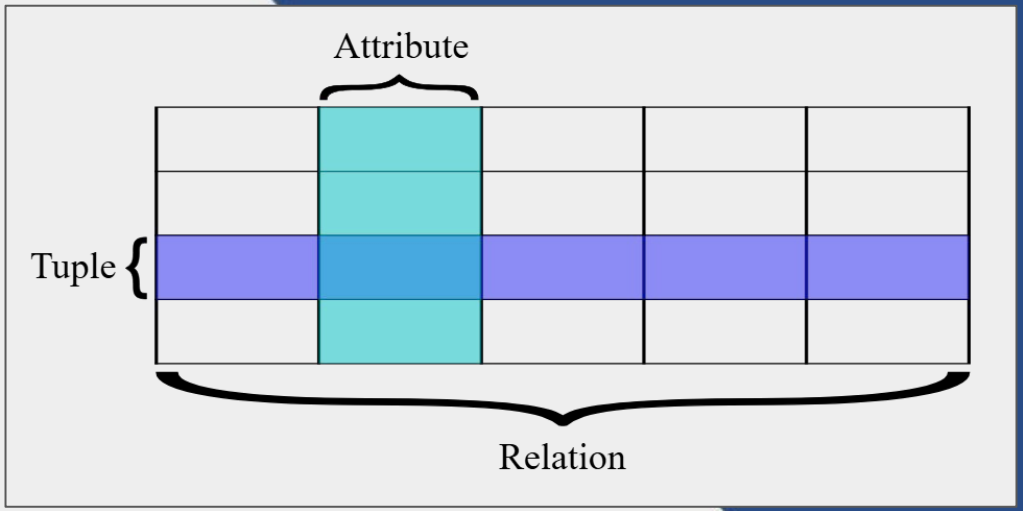
Relational Database Model

Learning Objectives

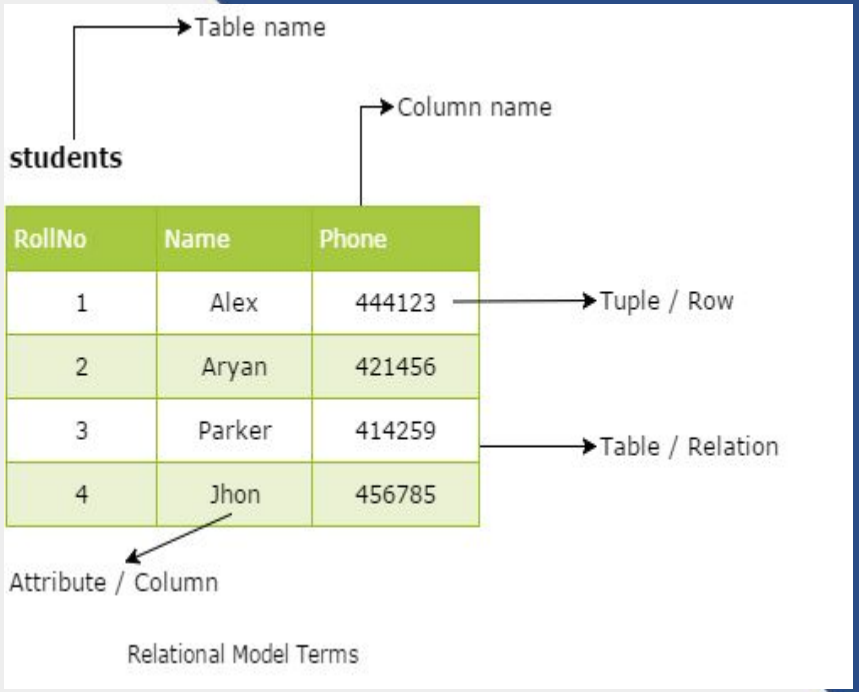
- What is the Relational Model
- Relational Design
- Issues of Relational Design
- Improving a Relational Design
- Relational Operations

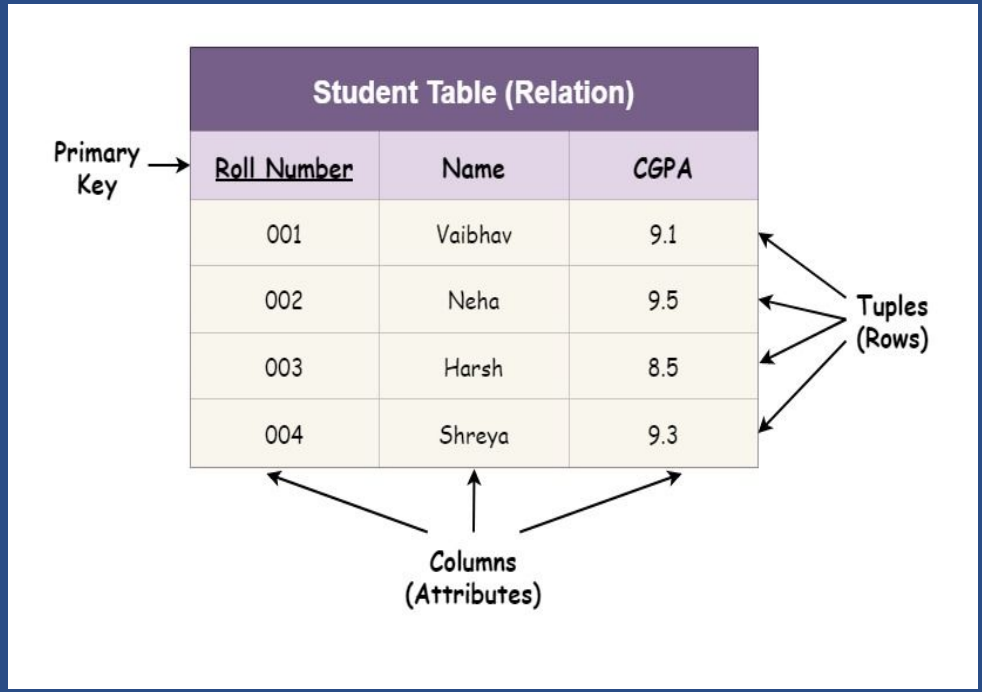
What Is the Relational Model?



The Relational Model portrays data as being stored in rectangular tables, called relations.

Examples Of Relations





Relational Design

Id	Name	BirthDate
2234121	Samuel Cartier	24/13/1992
2234122	Ezra L. Jackson	18/01/2000
2234123	Sandra Vasquez	04/12/1989

- Relational design allows multiple entries for an entity just not in the same row.
- Avoid having multiple concepts in one relation and null values.

Issues of Relational Design

A main step in designing a relational database is to design the relations that make up the database.

Id	Name	Birth_Date	Job_Id	Job_Title	Start_Date	End_Date
2234121	Samuel Cartier	24/12/1992	100	Cashier	24/01/2012	30/05/2012
2234121	Samuel Cartier	24/12/1992	101	Sales Clerk	03/02/2017	03/02/2022
2234121	Samuel Cartier	24/12/1992	112	Sales Director	08/09/2023	22/11/2024
2234122	Ezra L. Mccarthy	18/01/2000	100	Cashier	05/07/2019	05/07/2023
2234122	Ezra L. Mccarthy	18/01/2000	121	HR Manager	21/11/2024	21/11/2025
2234123	Sandra Vasquez	04/12/1989				

Improving a Relational Design

- Decomposition means splitting one table into two or more tables.
- You also want a “loss-less” decomposition.

Job_Id(PK)	Job_Title	Start_Date	End_date
100	Cashier	24/01/2012	30/05/2012
100	Cashier	05/07/2019	05/07/2023
101	Sales Clerk	24/08/2012	24/08/2016
112	Sales Director	08/09/2023	22/11/2024
121	HR Manager	21/11/2024	21/11/2025

Relation 1 - Employee_Data

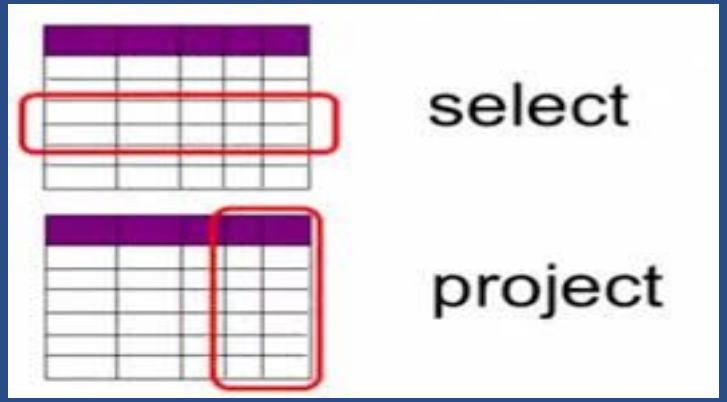
Id(PK)	Name	Birth_Date
2234121	Samuel Cartier	24/12/1992
2234122	Ezra L. Mccarthy	18/01/2000
2234123	Sandra Vasquez	04/12/1989

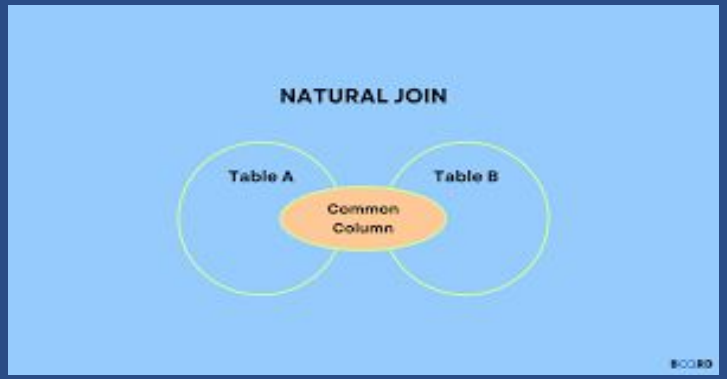
Relation 2 - Job_ History

Job_Id(PK)	ID(FK)	Job_Title	start date	end date
100	2234121	Cashier	24/01/2012	30/05/2012
101	2234121	Sales Clerk	22/08/2012	01/08/2016
112	2234121	Sales Director	08/06/2023	08/06/2023
100	2234122	Cashier	08/09/2023	22/11/2024
121	2234122	HR Manager	21/11/2024	21/11/2025

Relational Operations

- There are 3:
- Select - Choose Tupules
- Project - Choose Attributes
- Join - Connects relations using data that they share.





Select

Objective: Show all job records where the job was Sales Clerk.

SELECT from Job_History where Job = “Sales Clerk”

ID(FK)	Job	start date	end date
2234121	Sales Clerk	24/08/2012	24/08/2016

Project

Objective: Project all names in Employee_Data.

Project Name from Employee_Data

Name
Samuel Cartier
Ezra L. Mccarthy

Join

Objective: Join where Employee_Data and Job_History have the same ids.

Join Employee_Data and Job_History where Employee_Data.ID = Job_History.ID

ID (Employee_ Date)	Name	Birth_Date	Job_Id	ID (Job_ History)	Job_Title	Start_Date	End_Date
2234121	Samuel Cartier	24/12/1992	100	2234121	Cashier	24/01/2012	30/05/2012
2234121	Samuel Cartier	24/12/1992	101	2234121	Sales Clerk	22/08/2012	01/08/2016
2234121	Samuel Cartier	24/12/1992	112	2234121	Sales Director	08/06/2023	08/06/2023
2234122	Ezra L. Mccarthy	18/01/2000	100	2234122	Cashier	08/09/2023	22/11/2024
2234122	Ezra L. Mccarthy	18/01/2000	121	2234122	HR Manager	21/11/2024	21/11/2025


THANK YOU!