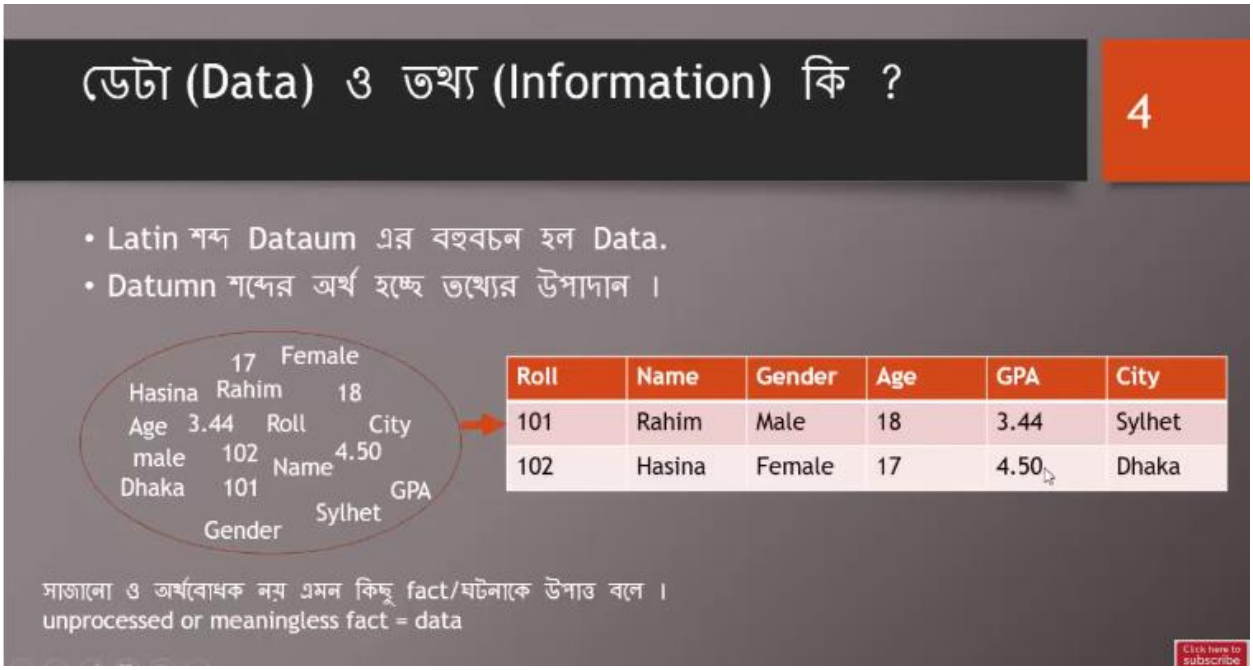
Database

Data & information

Database = Data + Base



What is Difference Data & Information?

উপাত্ত / Data	তথ্য / Information
১. সাজানো ও অর্থবোধক নয় এমন কিছু fact/ঘটনাকে উপাত্ত বলে ।	১. সাজানো ও অর্থবোধক উপাত্তকে তথ্য বলে ।
২. উপাত্ত কোন বিষয় সম্পর্কে আংশিক ধারণা ।	২. তথ্য কোন বিষয় সম্পর্কে সম্পূর্ণ ধারণা ।
৩. উপাত্তকে সরাসরি ব্যাবহার করা যায়না ।	৩. তথ্যকে সরাসরি ব্যাবহার করা যায়।
৪. উদাহরণ :	৪. উদাহরণ :

What is Database?

A database is an organized collection of structured information, or data, typically stored electronically in a computer system.

Type of Database?

1. Normal Database
2. Relational Database

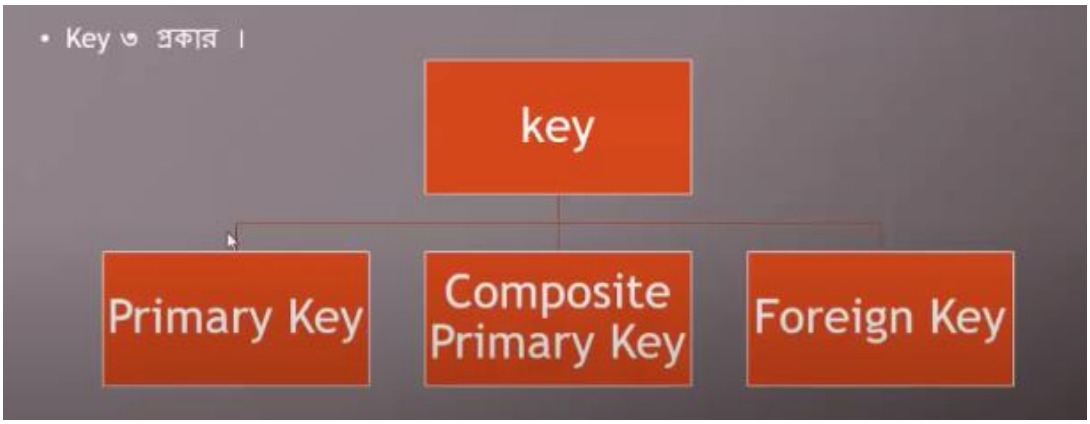
Table-> Row + Column

Database-basic-components

What is key Fluid?

It is used to uniquely identify any record or row of data from the table. It is also used to establish and identify relationships between tables.

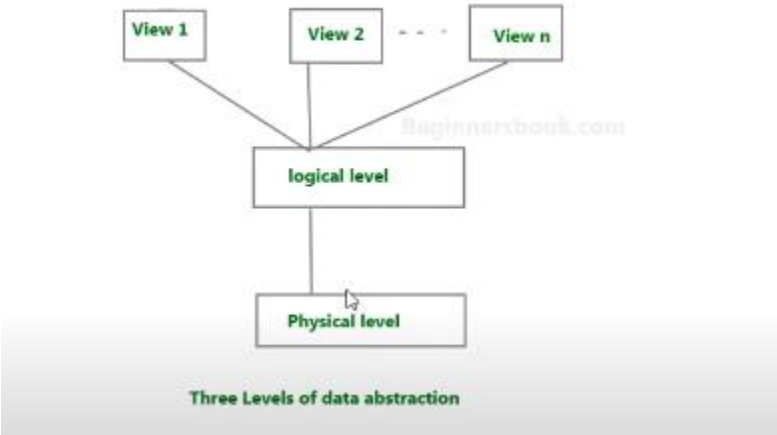
Type of key



What is DBMS?

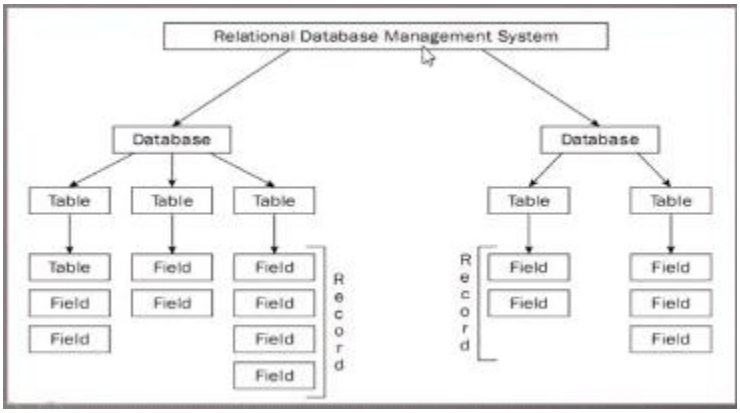
A database management system (or DBMS) is essentially nothing more than a computerized data-keeping system. Users of the system are given facilities to perform several kinds of operations on such a system for either manipulation of the data in the database or the management of the database structure itself. Database Management Systems (DBMSs) are categorized according to their data structures or types.

Data view system



What is RDBMS?

The software used to store, manage, query, and retrieve data stored in a relational database is called a relational database management system (RDBMS). The RDBMS provides an interface between users and applications and the database, as well as administrative functions for managing data storage, access, and performance.



What is database Relation?

Database relationships are associations between tables that are created using join statements to retrieve data.

Type of database Relation?

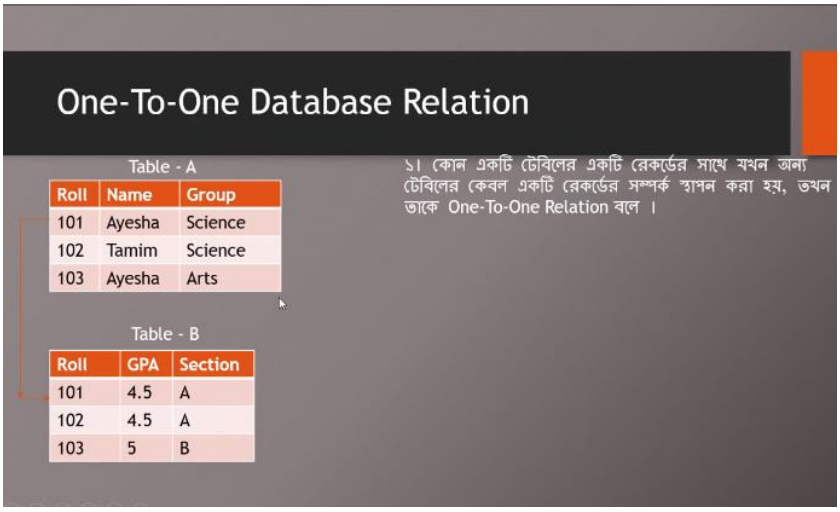
1 one to one

2 one to many

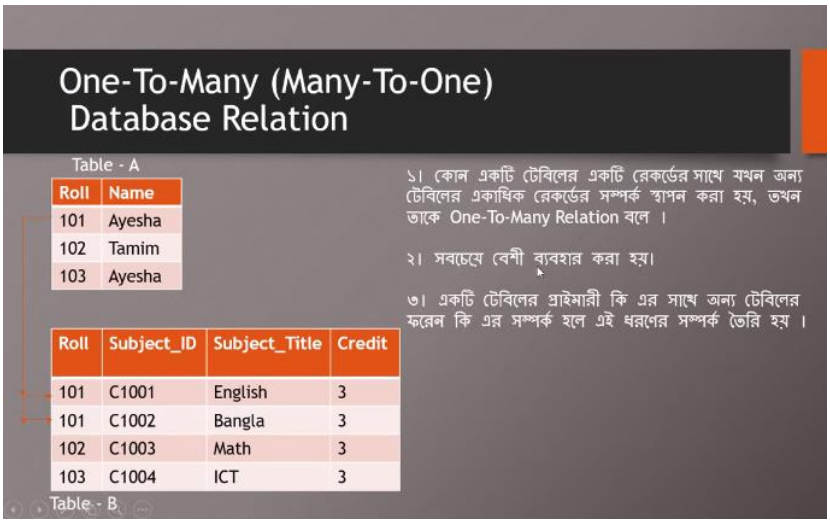
3 many to many

4 many to one

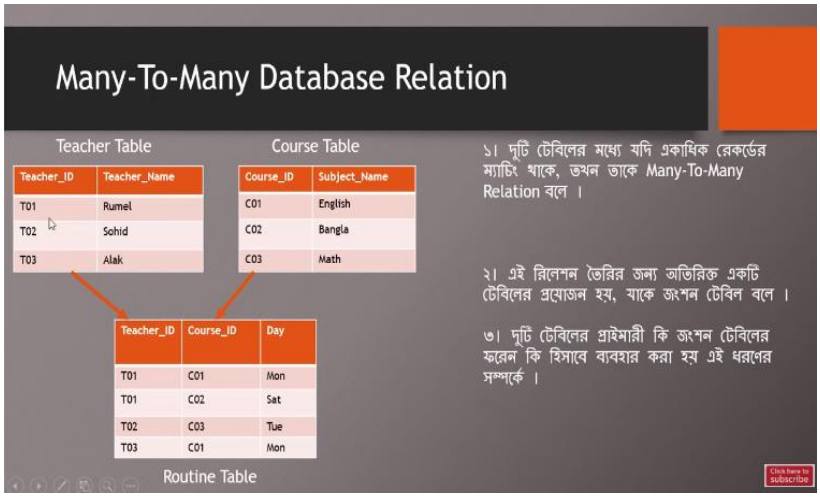
One to One Relation



One to many Relation



Many to many



Data encryption

Data encryption is a way of translating data from plaintext (unencrypted) to cipher text (encrypted). Users can access encrypted data with an encryption key and decrypted data with a decryption key.

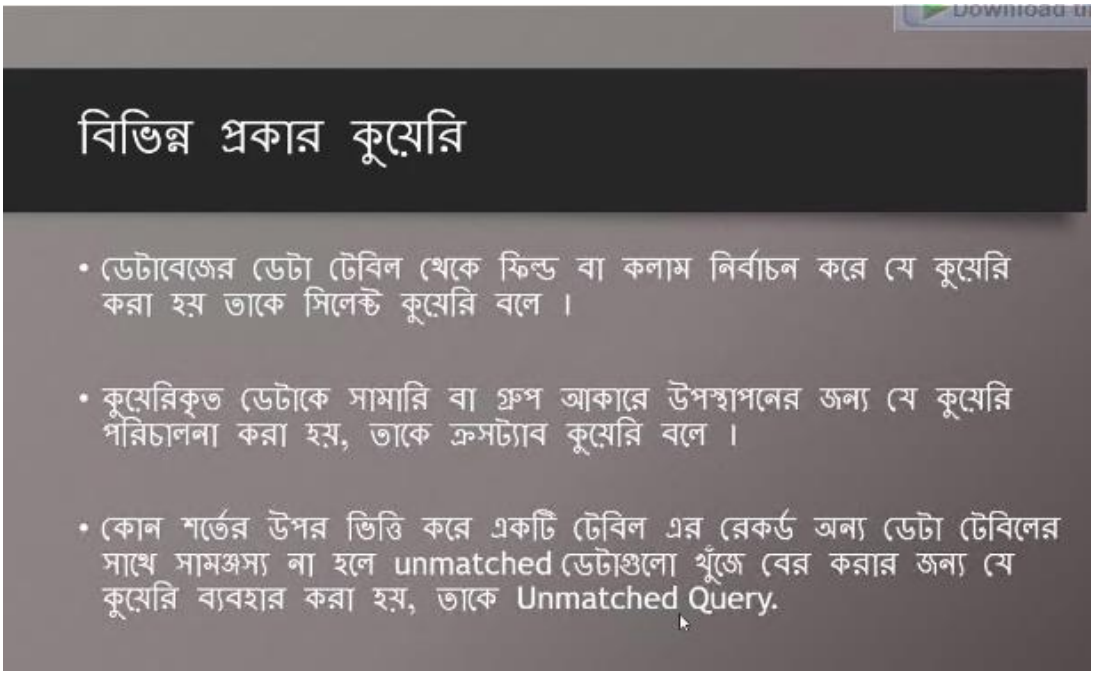
Example for encryption

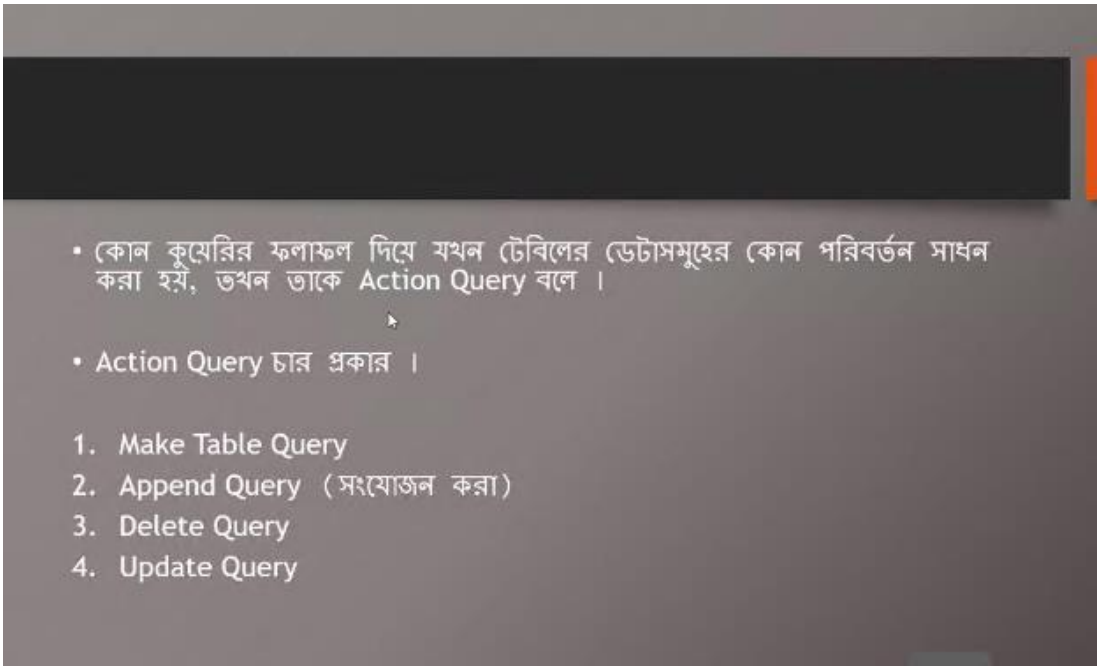
Database security?

Database security refers to the range of tools, controls, and measures designed to establish and preserve database confidentiality, integrity, and availability.

What is a query?

A query is a question or a request for information expressed in a formal manner. In computer science, a query is essentially the same thing, the only difference is the answer or retrieved information comes from a database.





What is Query Language Mean?

It works on user entered structured and formal programming command based queries to find and extract data from host databases.

Type of Query Language?

I. QUEL (Query Language)
II. QBE (Query By Example)
III. SQL (Structured Query Language)

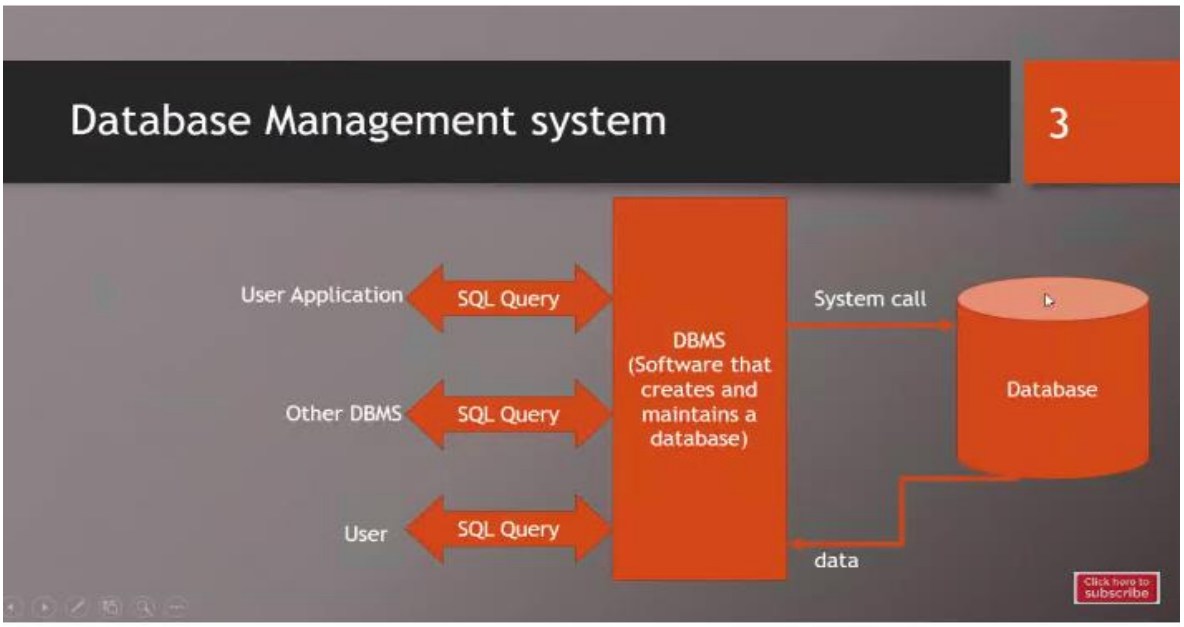
SQL Specialty?

- SQL স্টেটমেন্ট এর বৈশিষ্ট্য

I. কেস সেনসিটিভ নয় । SELECT / select
II. স্টেটমেন্ট এর শেষে সেমিকোলন (;) দিতে হয় ।
III. স্টেটমেন্টকে ভেঙ্গে একাধিক লাইনে লেখা যায় ।

Type of SQL Statement?

DBMS User flowchart



SQL Statement?

Database Show Command
->SHOW DATABASES;
Database Create Command
-> CREATE DATABASES **TESTDATABASE;**
Database Delete Command
-> DROP DATABASE **TESTDATABASE;**

Data Type

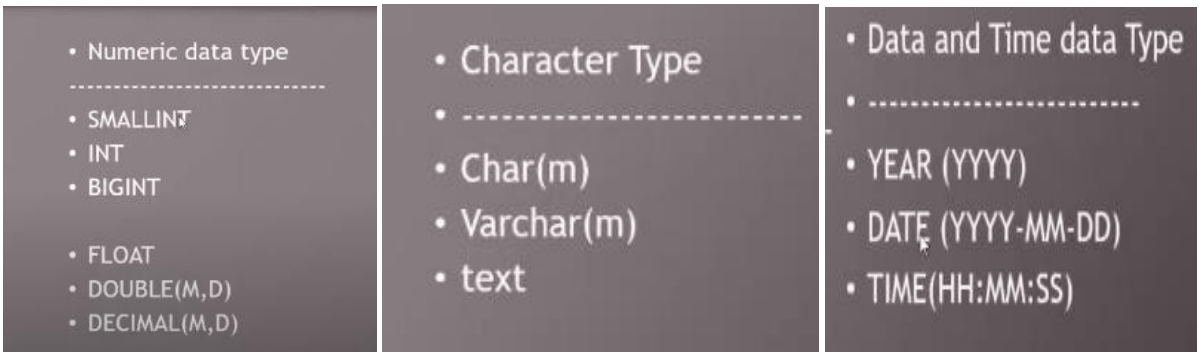


Table Create Statement

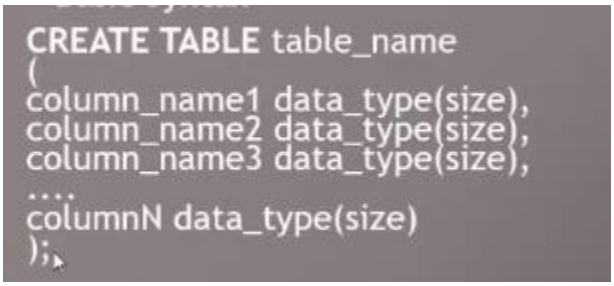


Table Create Example

```
CREATE TABLE STUDENT
 (
  Roll int,
  Name varchar(15),
  Gender varchar(10),
  Age int(5),
  GPA Double (3,2),
  City varchar(15),
  PRIMARY KEY(Roll)
 );
```

Table Rename

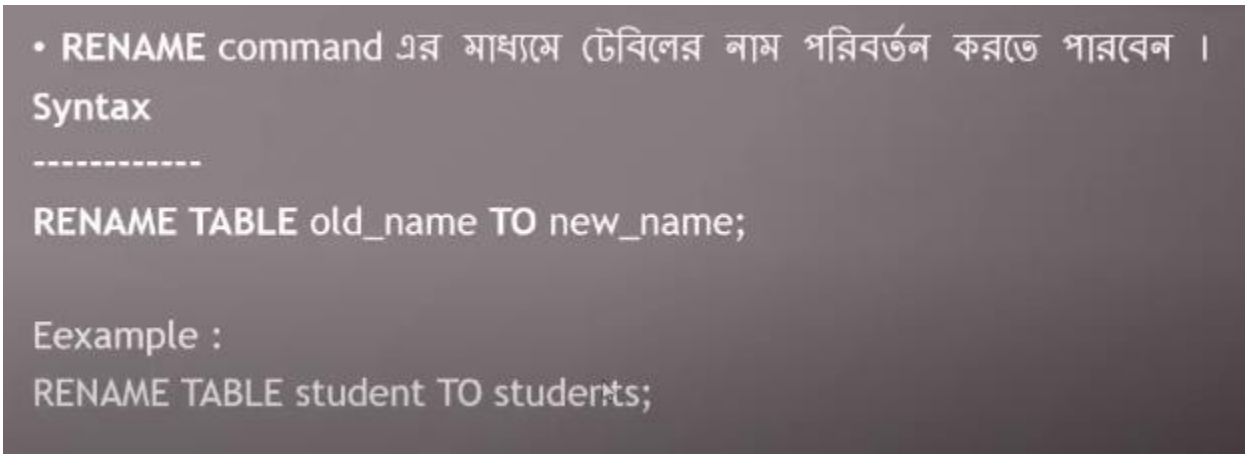


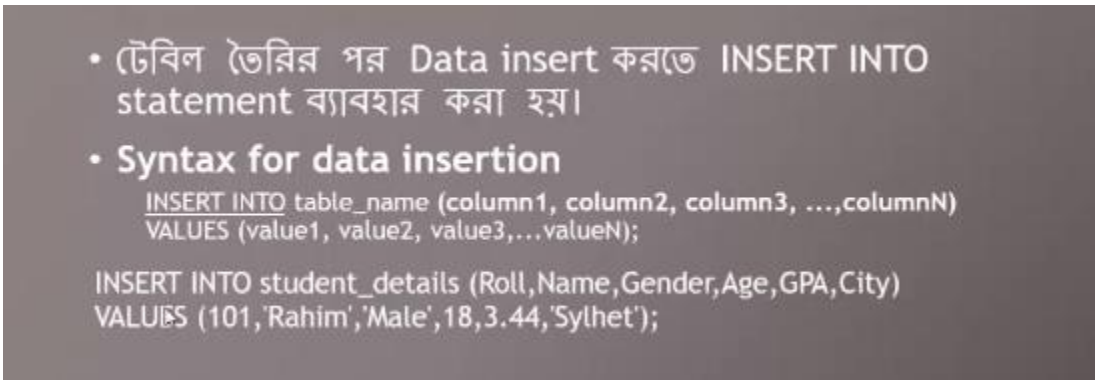
Table Rename Example

```
RENAME TABLE student to student_info
```

Table DROP

DROP TABLE student_info;

Database Table inserting



Example

Insert into student (Roll,Name,Gender,Age,GPA,City) Values(01,'sabbir','Male',25,3.50,'Dhaka');
Or
Insert into student Values (02,'kalam','Male',23,3.70,'Dhaka');

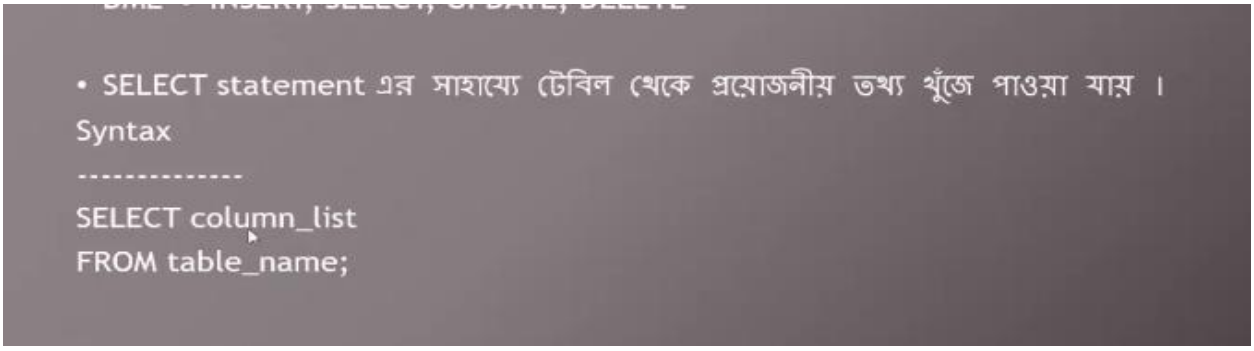
Multiple data insert

Insert into student Values
(03,'kalam','Male',23,3.70,'Dhaka'),
(04,'rifat','Male',24,3.60,'Dhaka'),
(05,'mizan','Male',29,3.40,'Dhaka');

Output

	Roll	Name	Gender	Age	GPA	City
Edit Copy Delete	1	sabbir	Male	25	3.50	Dhaka
Edit Copy Delete	2	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	3	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	4	rifat	Male	24	3.60	Dhaka
Edit Copy Delete	5	mizan	Male	29	3.40	Dhaka

Select Statement



Example

Single Row -> SELECT Name FROM student;

Multiple Row-> SELECT Name,AGE,City FROM Student;

	Name	AGE	City
Edit Copy Delete	sabbir	25	Dhaka
Edit Copy Delete	kalam	23	Dhaka
Edit Copy Delete	kalam	23	Dhaka
Edit Copy Delete	rifat	24	Dhaka
Edit Copy Delete	mizan	29	Dhaka
Edit Copy Delete	shuvo	33	Dhaka
Edit Copy Delete	sihan	22	Dhaka
Edit Copy Delete	kamrul	24	Dhaka

SELECT * FROM Student;

	Roll	Name	Gender	Age	GPA	City
Edit Copy Delete	1	sabbir	Male	25	3.50	Dhaka
Edit Copy Delete	2	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	3	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	4	rifat	Male	24	3.60	Dhaka
Edit Copy Delete	5	mizan	Male	29	3.40	Dhaka
Edit Copy Delete	6	shuvo	Male	33	3.30	Dhaka
Edit Copy Delete	7	sihan	Male	22	3.50	Dhaka
Edit Copy Delete	8	kamrul	Male	24	3.70	Dhaka

Distinct

Select Distinct City FROM Student;

Limit

Select * FROM Student Limit 5;

	Roll	Name	Gender	Age	GPA	City
Edit Copy Delete	1	sabbir	Male	25	3.50	Dhaka
Edit Copy Delete	2	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	3	kalam	Male	23	3.70	Dhaka
Edit Copy Delete	4	rifat	Male	24	3.60	Dhaka
Edit Copy Delete	5	mizan	Male	29	3.40	Dhaka

Order by Clouse

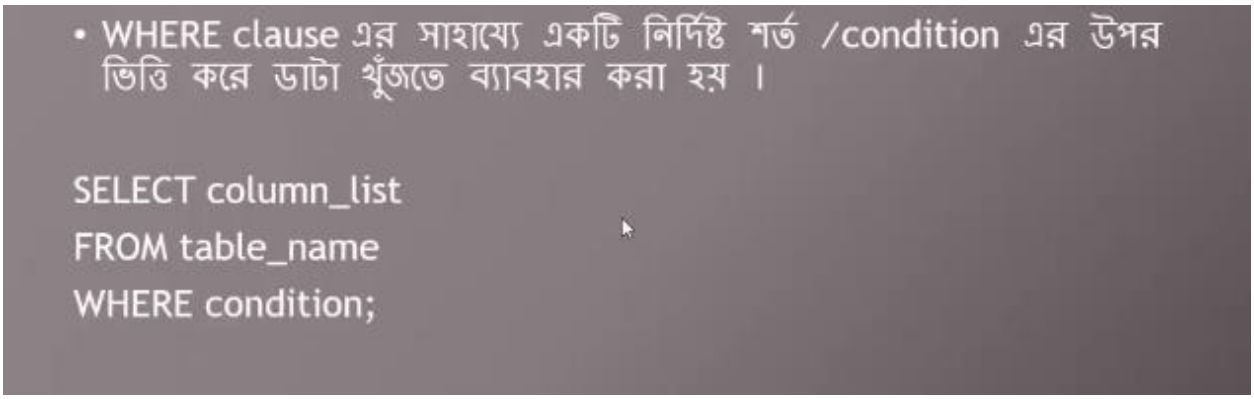
Select Name FROM Student Order By Name;

Select Name FROM Student Order By DESC;

Operator in SQL

1/ Arithmetic Operator
2/ Comparison operator
3/ Logical Operator

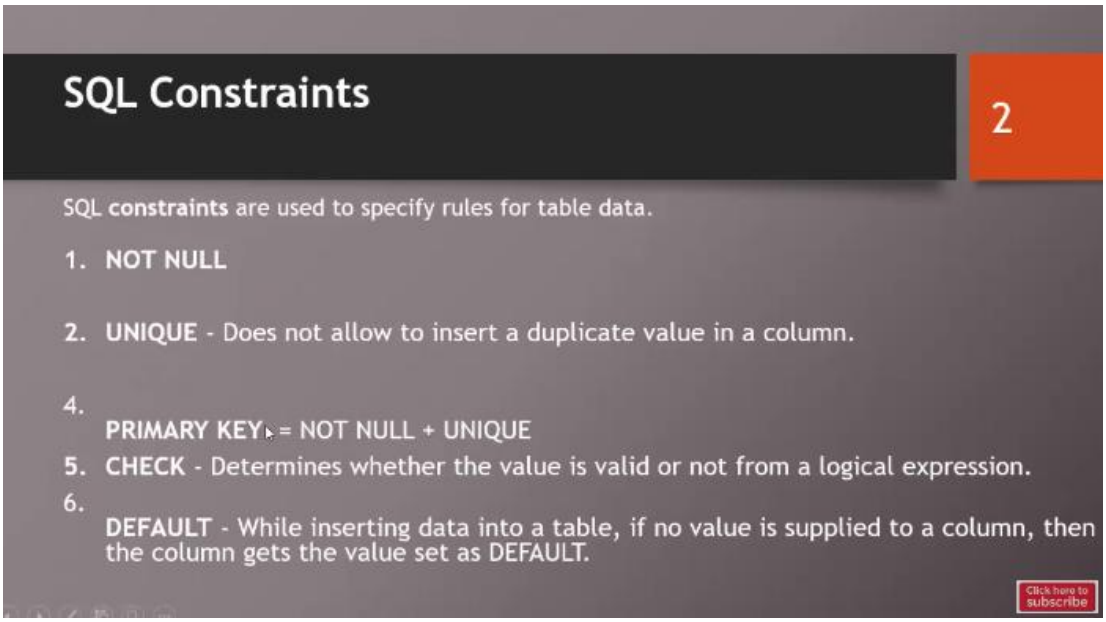
WHERE | find records conditionally



Example
SELECT Name From Student WHERE Roll= 101;

SELECT Roll,Name,GPA from Student WHERE Roll BETWEEN 3 AND 7;
Like **Operator**
SELECT * FROM student where Name LIKE 'S%';
SELECT * FROM student where Name LIKE '%S%';
SELECT * FROM student where Name LIKE '_S';

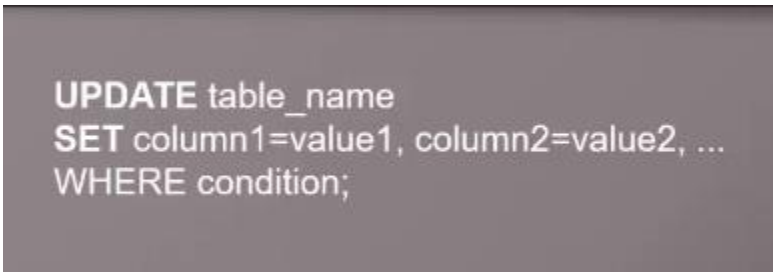
AS Keyword for custom name
SELECT name AS First_name, Roll AS ID FROM Student;



Example
INSERT INTO Techer (ID,NAME,SALARY) VALUES (101,'KALAM',20000);

← T →			ID	NAME	SALARY
Edit	Copy	Delete	101	KALAM	20000.00
Edit	Copy	Delete	102	KALAM	20000.00
Edit	Copy	Delete	103	rafat	NULL

Update Statement

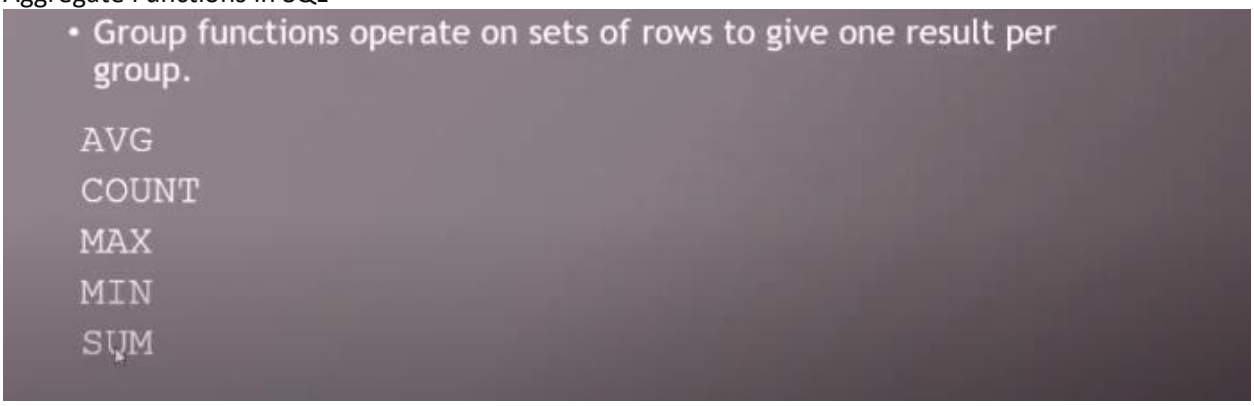


UPDATE Techer SET SALARY =32000 WHERE ID = 103;

DELETC Statement
DELETE FROM Techer where ID = 103;

Database Function
Example
SELECT UPPER ('Upper Case Test'); OR SELECT UPPER (CITY) FROM Student;
SELECT LOWER ('Upper Case Test');
SELECT CONCAT (Name, 'is', age , 'years Old') FROM STUDENT;
SELECT LEAST(10,2,31,20);
SELECT GREATEST(10,2,31,20);
SELECT POW (2,5);
SELECT LOG (2);
SELECT TRUNCATE (10.831783813,2);

Aggregate Functions in SQL



Example
SELECT COUNT (*) FROM STUDENT;
SELECT MAX (GPA) FROM Student;
SELECT AVG(GPA) FROM Student;
SELECT MIN(GPA) FROM Student;

Sub query

```
1
2 SELECT *
3 FROM teacher
4 WHERE Salary > (SELECT AVG(Salary)FROM teacher);
```

Adding a column (টেবিলে নতুন কলাম যুক্ত করা)

- syntax
- ALTER TABLE table_name
  ADD column_name datatype[size];

- ALTER TABLE student_details
  ADD Phone text(20);

Example
ALTER TABLE teacher ADD AGE int(5);

Renaming column (কোন কলামের নাম পরিবর্তন করা)

Syntax

- ALTER TABLE table_name
  CHANGE oldcolumn_name newcolumn_name dataType(size);

- ALTER TABLE student_details
  CHANGE phone phone_number text(15);

ALTER TABLE teacher CHANGE AGE VARCHAR int(5);

Dropping a column (কলাম delete করা)

- Syntax
- **ALTER TABLE** table_name
  DROP COLUMN column_name;

- **ALTER TABLE** student_details
  DROP COLUMN phone_number;

ALTER TABLE techer DROP COLUMN DEPT;

Group By

```
SELECT     column, group_function(column)
FROM       table
[WHERE     condition]
[GROUP BY group_by_expression]
[ORDER BY column];
```

```
SELECT Department,SUM(Salary)
FROM teacher
GROUP BY Department;
```

Join Table

```
SELECT student_details.Roll,Reg_Number,
Name,Gender,Group_Name,GPA
FROM student_details,exam_result
WHERE student_details.Roll = exam_result.Roll;
```

```
SELECT std.Roll,exam.Reg_Number,
std.Name,std.Gender,
exam.Group_name,exam.GPA

FROM student_details AS std JOIN exam_result AS exam
ON std.Roll = exam.Roll;
```

Inner Join

```
SELECT std.Roll,exam.Reg_Number, std.Name, std.Gender, exam.GPA, exam.Group_Name

FROM student_details AS std INNER JOIN  exam_result AS exam

ON std.Roll = exam.Roll;
```

Left Join

```
SELECT std.Roll,exam.Reg_Number, std.Name, std.Gender, exam.GPA, exam.Group_Name

FROM student_details AS std LEFT JOIN  exam_result AS exam

ON std.Roll = exam.Roll;
```

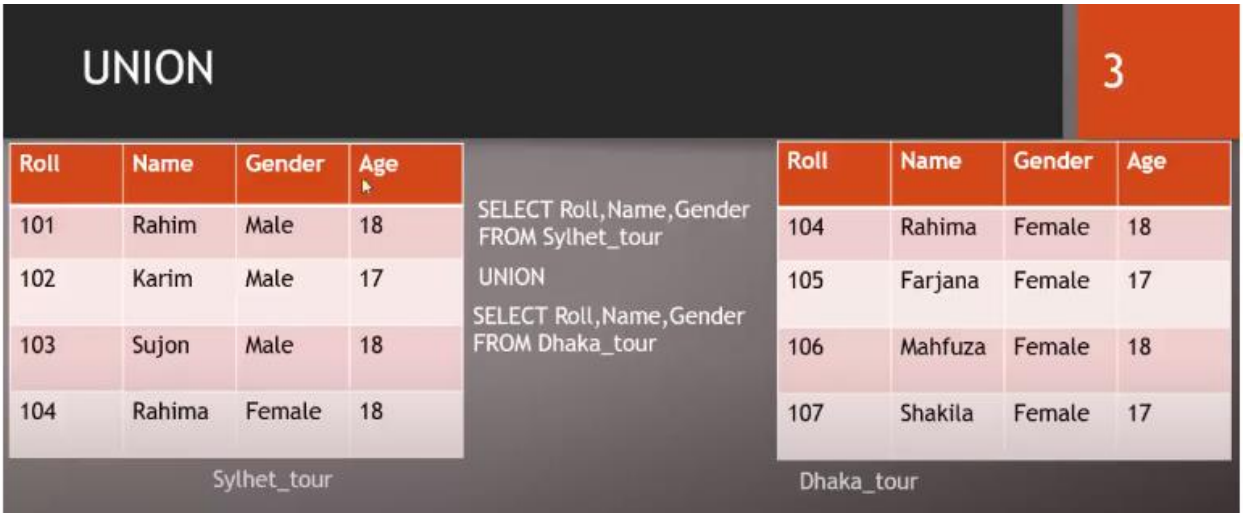
Right Join

```
SELECT std.Roll,exam.Reg_Number, std.Name, std.Gender,
exam.GPA, exam.Group_Name

FROM student_details AS std RIGHT JOIN  exam_result AS exam

ON std.Roll = exam.Roll;
```

Union



- **CREATE VIEW** view_name **AS**
  SELECT column_name(s)
  FROM table_name
  WHERE condition;

- **CREATE VIEW** student_view **AS**
  SELECT Roll, Name
  FROM student_details;