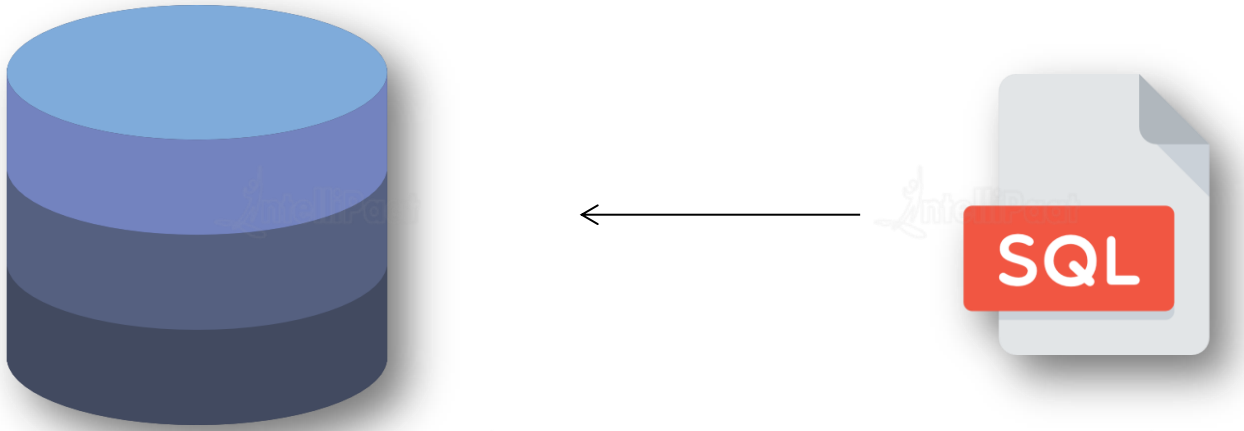
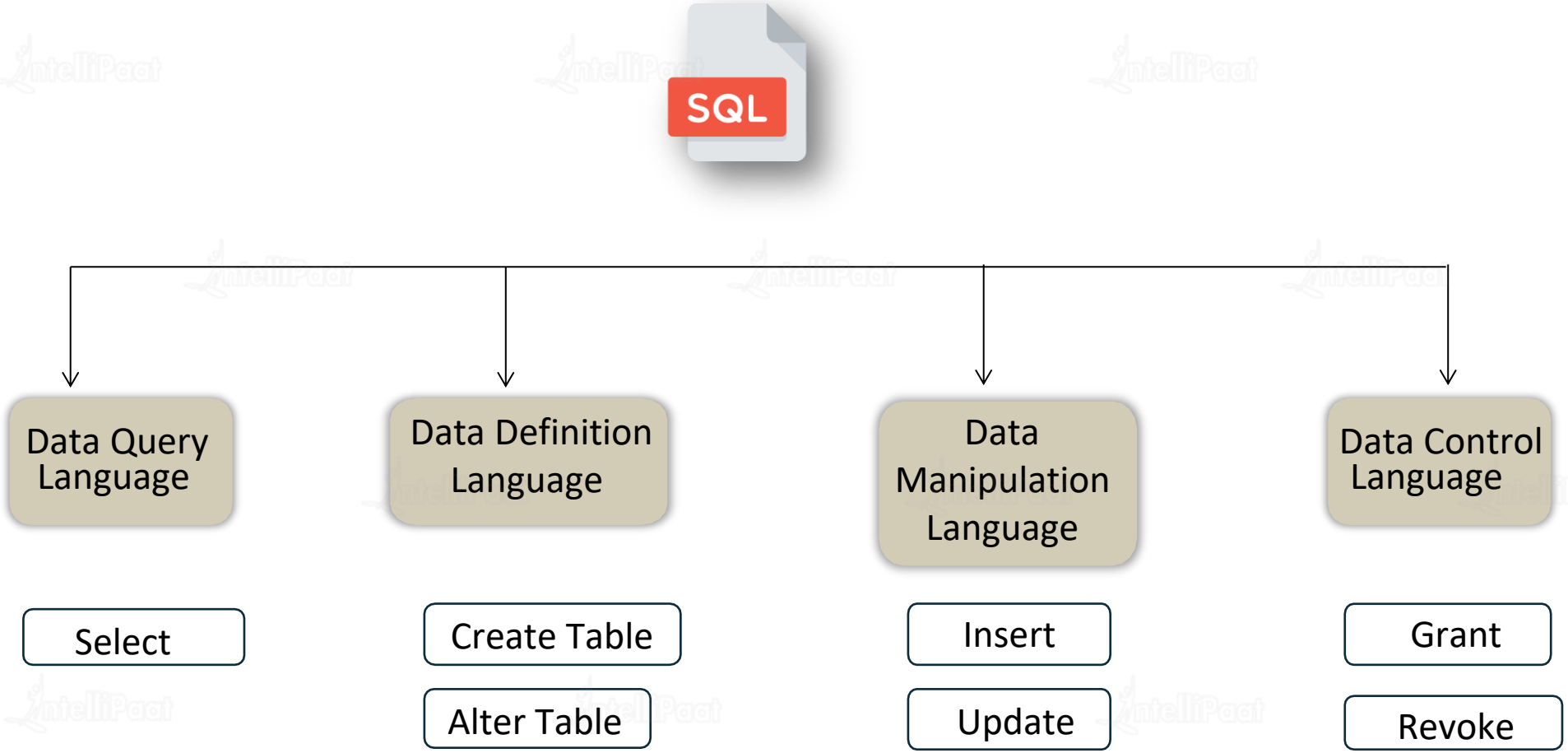
SQL Basics

Introduction to SQL

SQL stands for Structured Query Language which is a standard language for accessing and manipulating databases.



Categories of SQL Commands



Tables in SQL

A table is a database object which comprises rows and columns.

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Fields

A field provides specific information about the data in a table.

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Records

Each individual entry in a table is called a record.

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Fields and Records

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Record

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Field

Creating a Database: Syntax


```
CREATE DATABASE databasename;
```

Using a Database: Syntax


```
USE [DatabaseName];
```

Dropping a Database: Syntax


```
DROP DATABASE  databasename;
```

Constraints

Rules for the data in a table can be specified using SQL constraints.The kinds of data that can be entered into a table are restricted by constraints. This validates the reliability and accuracy of the data in the table.

Types of constraints:

NOT NULL - prevents a column from having a NULL value.
UNIQUE - ensure that each value in a column is unique.
PRIMARY KEY - A combination of a NOT NULL and UNIQUE.
FOREIGN KEY - A field or column used to create a connection between two tables is known as a foreign key.
CHECK - check whether the values in a column satisfy a particular requirement.
DEFAULT - Sets a default value for a column in the absence of a value

Not Null Constraint

Not Null constraint ensures that a column cannot have a Null value

No null values

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Default Constraint

Default constraint sets a default value for a column when no value is specified

	E_id	E_name	E_salary	E_gender	E_dept
1	1	Sam	85000	Male	Analytics
2	2	Anne	85000	Male	Analytics
3	3	Julia	85000	Female	Analytics

Default values

Default values

Unique Constraint

Unique constraint ensures that all values in a column are different

Unique values

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Primary Key Constraint

Primary Key constraint uniquely identifies each record in a table

Not Null + Unique

Primary Key

e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Foreign Key Constraint

- The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables.
- The FOREIGN KEY constraint also prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the table it points to.

P_Id	LastName	FirstName	Address	City
1	Hansen	Ola	Timoteivn 10	Sandnes
2	Svendson	Tove	Borgvn 23	Sandnes
3	Pettersen	Kari	Storgt 20	Stavanger

O_Id	Order No	P_Id
1	77895	3
2	44678	3
3	22456	2
4	24562	1

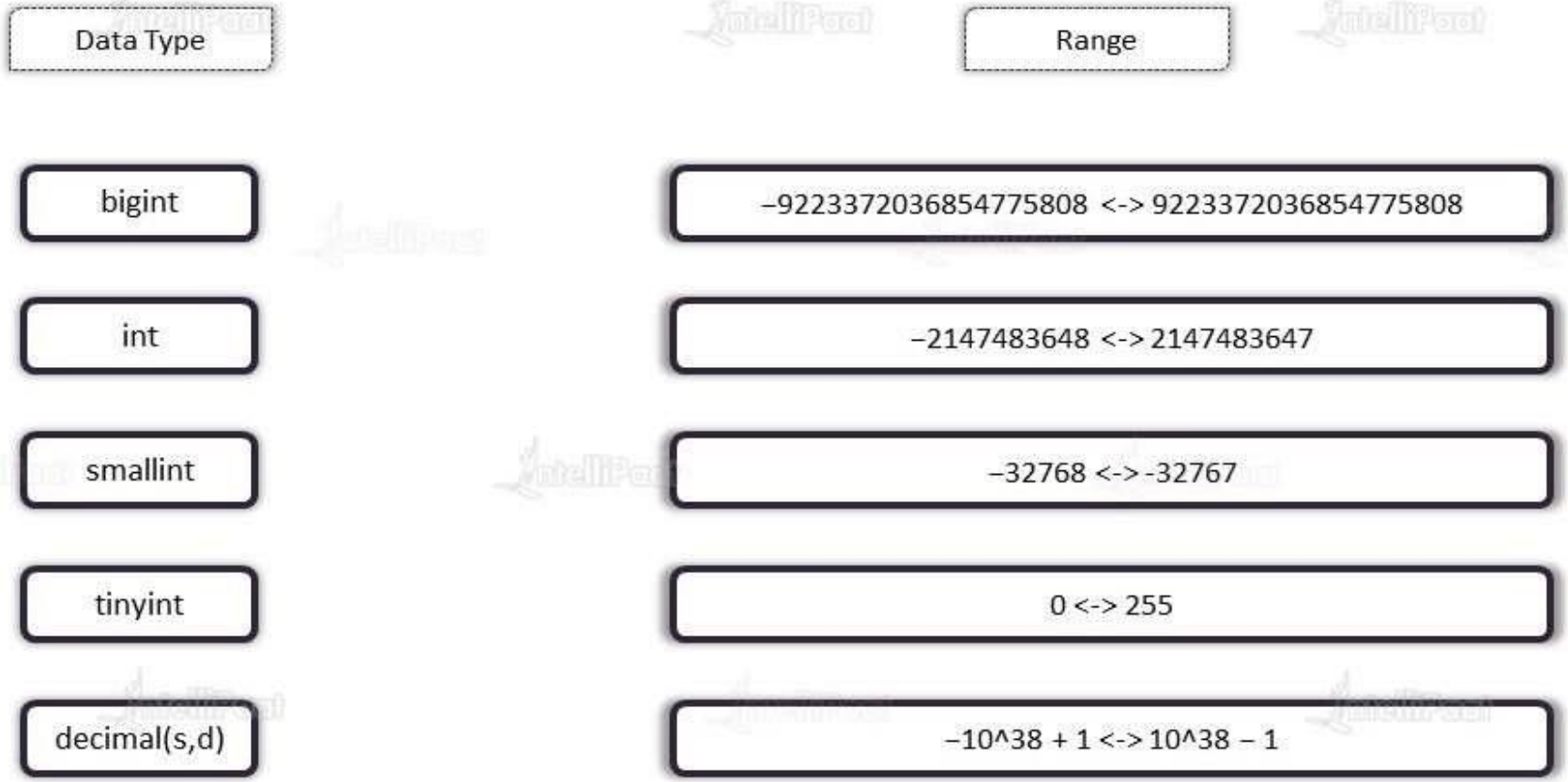
```
CREATE TABLE Orders ( O_Id int NOT NULL PRIMARY KEY, OrderNo int
NOT NULL, P_Id int FOREIGN KEY REFERENCES Persons(P_Id) )
```

Data types in SQL

Data types define what type of data a column can hold.

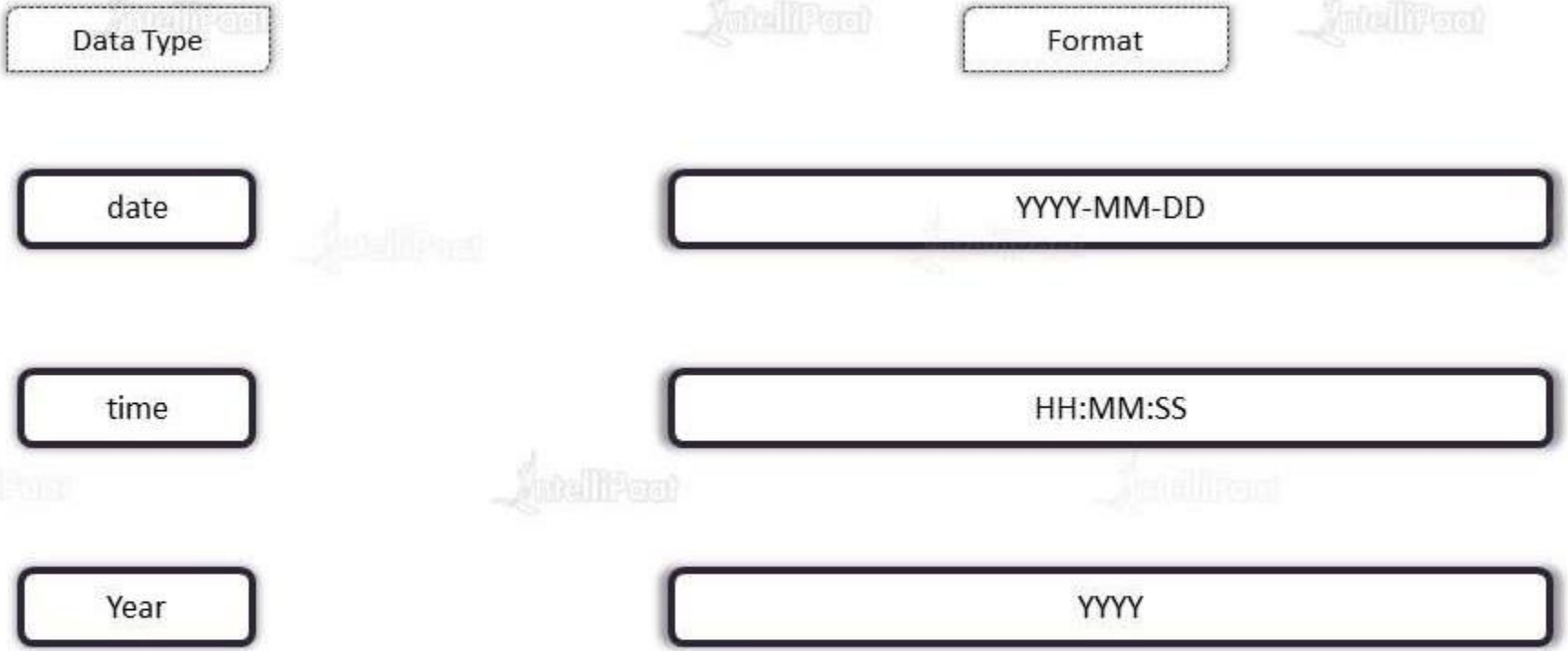
e_id	e_name	e_salary	e_age	e_gender	e_dept
1	Sam	95000	45	Male	Operations
2	Bob	80000	21	Male	Support
3	Anne	125000	25	Female	Analytics
4	Julia	73000	30	Female	Analytics
5	Matt	159000	33	Male	Sales
6	Jeff	112000	27	Male	Operations

Numerical Data Types



Character Data Types

Date and Time Data Types



Create Table

CREATE

It consists of SQL commands which is used to define the database schema.

Syntax – *create table table_name*

Sample Problem Statement -

Write a query to create the Store Details table with following constraints :

1. Store Column As Primary Key
2. Store_name Column As Not Null
3. Sales Column As Check
4. Order_no Column As Unique
5. Store_location Column As Default Constraint With Default Value As Bangalore
6. City Column as Varchar
7. Pincode as int

SQL Query

```
Create table Store_Details(Store int primary
key,Store_Name varchar(200) not
null,Sales int
check(Sales>20),Order_No int unique,
Store_Location varchar(200) Default
“Bangalore”, City varchar(200),pincode int);
```

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode

INSERT

INSERT by adding values for all columns

Syntax - INSERT INTO table_name VALUES (val1,val2,val3,….);

Insert 10 rows into the Store Details table.

```
insert into Store_Details values(1,'Walmart',374,246,'Bentonville, Ark','Montgomery',36104),
(2,'The Kroger Co',115,240,'Cincinnati','Juneau',99801),
(3,'Costco',93,567,'Issaquah, Wash','Phoenix',85001),
(4,'The Home Depot',91,639,'Atlanta','Little Rock',72201),
(5,'Walgreens Boots Alliance',82,484,'Deerfield, Ill','Sacramento',95814),
(6,'CVS Health Corporation',79,890,'Woonsocket, R.I','Denver',80202),
(7,'Target',71,251,'Minneapolis','Hartford',06103),
(8,'Lowe Companies',63,308,'Mooresville, N.C','Dover',19901),
(9,'Albertsons Companies',59,454,'Boise, Idaho','Tallahassee',32301),
(10,'Royal Ahold Delhaize USA',43,254,'Carlisle, Pa','Atlanta',30303);
```

INSERT by adding values for all columns

Output -

	Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	1	Walmart	374	246	Bentonville, Ark	Montgomery	36104
2	2	The Kroger Co	115	240	Cincinnati	Juneau	99801
3	3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	7	Target	71	251	Minneapolis	Hartford	6103
8	8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303

Inserting by both column and values

Syntax- INSERT INTO table-name (column-names) VALUES (values) ;

Code -

```
insert into store_details(Store, Store_name, Sales, Order_No, Store_Location, City, pincode) values
(11,'Jack and Jones',525,148,'Amblipura','Bangalore',560102);
```

	Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	1	Walmart	374	246	Bentonville, Ark	Montgomery	36104
2	2	The Kroger Co	115	240	Cincinnati	Juneau	99801
3	3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	7	Target	71	251	Minneapolis	Hartford	6103
8	8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303
11	11	Jack and Jones	525	148	Amblipura	Bangalore	560102

Inserting data in specified columns

Syntax- Insert into table_name(col1,col2,col3) values(v1,v2,v3);

```
Insert into store_details( Store, Store_name, Sales, City) values
(12,'H&M',676,'Mumbai');
```

	Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	1	Walmart	374	246	Bentonville, Ark	Montgomery	36104
2	2	The Kroger Co	115	240	Cincinnati	Juneau	99801
3	3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	7	Target	71	251	Minneapolis	Hartford	6103
8	8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303
11	11	Jack and Jones	525	148	Amblipura	Bangalore	560102
12	12	H&M	676	NULL	Bangalore	Mumbai	NULL

SELECT

SELECT an Individual column from a table

Syntax - select column_name from table_name

Select Store_name column from Store_details

Code -

```
select Store_Name from Store_Details
```

	Store_Name
1	Walmart
2	The Kroger Co
3	Costco
4	The Home Depot
5	Walgreens Boots Alliance
6	CVS Health Corporation
7	Target
8	Lowe Companies
9	Albertsons Companies
10	Royal Ahold Delhaize USA

SELECT multiple columns from a table

Syntax - select column_name1, column_name2,....,column_nameN from table name

Select Store_name, Store_Location and City columns from Store_details

Code -

```
select Store_Name,Store_Location,City
from Store_Details
```

	Store_Name	Store_Location	City
1	Walmart	Bentonville, Ark	Montgomery
2	The Kroger Co	Cincinnati	Juneau
3	Costco	Issaquah, Wash	Phoenix
4	The Home Depot	Atlanta	Little Rock
5	Walgreens Boots Alliance	Deerfield, Ill	Sacramento
6	CVS Health Corporation	Woonsocket, R.I	Denver
7	Target	Minneapolis	Hartford
8	Lowe Companies	Mooresville, N.C	Dover
9	Albertsons Companies	Boise, Idaho	Tallahassee
10	Royal Ahold Delhaize USA	Carlisle, Pa	Atlanta

SELECT multiple columns from a table

Syntax - select * from table name

Select all the columns from Store_details

Code - select * from Store_Details

	Store	Store_Name	Sales	Order_No	Store_Location	City	pincode	DEPARTMENT
1	1	Walmart	374	246	Bentonville, Ark	Montgomery	36104	COSMETICS
2	2	The Kroger Co	115	240	Cincinnati	Juneau	99801	GROCERIES
3	3	Costco	93	567	Issaquah, Wash	Phoenix	85001	COSMETICS
4	4	The Home Depot	91	639	Atlanta	Little Rock	72201	GROCERIES
5	5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814	STATIONARY
6	6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202	MEDICAL
7	7	Target	71	251	Minneapolis	Hartford	6103	COSMETICS
8	8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901	STATIONARY
9	9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301	SPORTS
10	10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303	STATIONARY

ALTER

ALTER by adding column

It is used to add, modify or delete columns in an existing table

Add a column profit with datatype int in store_details

Syntax -

```
ALTER TABLE table_name
ADD column_name datatype;
```

```
alter table store_details
add profit int;
```

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode	profit
1	Walmart	374	246	Bentonville, Ark	Montgomery	36104	NULL
2	The Kroger Co	115	240	Cincinnati	Juneau	99801	NULL
3	Costco	93	567	Issaquah, Wash	Phoenix	85001	NULL
4	The Home Depot	91	639	Atlanta	Little Rock	72201	NULL
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814	NULL
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202	NULL
7	Target	71	251	Minneapolis	Hartford	6103	NULL
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901	NULL
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301	NULL
10	Royal Ahold Delhaize U...	43	254	Carlisle, Pa	Atlanta	30303	NULL
11	Jack and Jones	525	148	Amblipura	Bangalore	560102	NULL
12	H&M	676	NULL	Bangalore	Mumbai	NULL	NULL

ALTER by Dropping column

Remove the column profit in table store_details

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

```
alter table store_details
drop column profit
```

NOTE: ALTER TABLE is rarely used

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	Walmart	374	246	Bentonville, Ark	Montgomery	36104
2	The Kroger Co	115	240	Cincinnati	Juneau	99801
3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	Target	71	251	Minneapolis	Hartford	6103
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303
11	Jack and Jones	525	148	Amblipura	Bangalore	560102
12	H&M	676	NULL	Bangalore	Mumbai	NULL

UPDATE

Update using WHERE clause

Syntax –
UPDATE table_name
SET column1 = value1, column2 = value2, ...
WHERE condition;

```
update store_details set
store_Name="Nike" Where
 City="Bangalore"
```

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	Walmart	374	246	Bentonville, Ark	Montgomery	36104
2	The Kroger Co	115	240	Cincinnati	Juneau	99801
3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	Target	71	251	Minneapolis	Hartford	6103
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	Royal Ahold Delhaize U...	43	254	Carlisle, Pa	Atlanta	30303
11	Nike	525	148	Amblipura	Bangalore	560102
12	H&M	676	NULL	Bangalore	Mumbai	NULL

Update TOP Statements

The TOP Statement to limit the number of rows that are modified in an UPDATE statement. When a TOP (*n*) clause is used with UPDATE, the update operation is performed on a random selection of '*n*' number of rows

```
UPDATE top (5) store_details set sales = 100;
```

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	Walmart	100	246	Bentonville, Ark	Montgomery	36104
2	The Kroger Co	100	240	Cincinnati	Juneau	99801
3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	Target	100	251	Minneapolis	Hartford	6103
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303
11	Nike	100	148	Amblipura	Bangalore	560102
12	H&M	100	NULL	Bangalore	Mumbai	NULL

Update table with data from another table

Create another table summary with column name store having int datatype as primary key, category column as unique. Insert six records in summary table and update the category column of summary table with Order_no of store_details. (Note- Take store from 1 to 6 for summary table)

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
1	Walmart	100	246	Bentonville, Ark	Montgomery	36104
2	The Kroger Co	100	240	Cincinnati	Juneau	99801
3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
7	Target	100	251	Minneapolis	Hartford	6103
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303
11	Nike	100	148	Amblipura	Bangalore	560102
12	H&M	100	NULL	Bangalore	Mumbai	NULL

Store	category
3	99
1	100
5	103
2	105
4	108
6	110

Update table with data from another table

```
UPDATE summary SET category = (SELECT order_No FROM store_details
WHERE store_details.store = summary.store)
WHERE EXISTS (SELECT order_no FROM store_details WHERE store_details.store = summary.store);
```

OUTPUT

Store	category
2	240
1	246
5	484
3	567
4	639
6	890

Update top 10 records of table

CODE

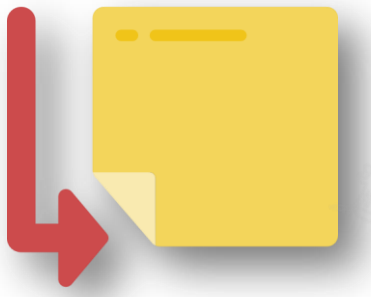
```
alter table sales
add  Profit Varchar(5),Loss
varchar(5)

set rowcount 10
update sales
set Profit='YES',Loss='NO'
where Weekly_Sales>30000
SET ROWCOUNT 0;
select * from sales
```

OUTPUT

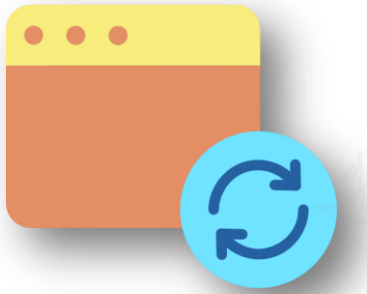
	Store	Dept	Date	Weekly_Sales	IsHoliday	Profit	Loss
1	1	1	2010-05-02	24924.50	FALSE	NULL	NULL
2	1	1	2010-12-02	46039.49	TRUE	YES	NO
3	1	1	2010-02-19	41595.55	FALSE	YES	NO
4	1	1	2010-02-26	19403.54	FALSE	NULL	NULL
5	1	1	2010-05-03	21827.90	FALSE	NULL	NULL
6	1	1	2010-12-03	21043.39	FALSE	NULL	NULL
7	1	1	2010-03-19	22136.64	FALSE	NULL	NULL
8	1	1	2010-03-26	26229.21	FALSE	NULL	NULL
9	1	1	2010-02-04	57258.43	FALSE	YES	NO
10	1	1	2010-09-04	42960.91	FALSE	YES	NO
11	1	1	2010-04-16	17596.96	FALSE	NULL	NULL
12	1	1	2010-04-23	16145.35	FALSE	NULL	NULL
13	1	1	2010-04-30	16555.11	FALSE	NULL	NULL
14	1	1	2010-07-05	17413.94	FALSE	NULL	NULL
15	1	1	2010-05-14	18926.74	FALSE	NULL	NULL

MERGE

MERGE is the combination of INSERT, DELETE, and UPDATE statements.



Insert



Update

Delete

MERGE

It is a combination of insert, delete and update statements. If there is a Source table and a Target table that are to be merged, then with the help of MERGE statement, all the three operations can be performed at once.

Create two tables named source table and target table with columns Productid, Product name and Price . Now insert the values into the same.

	ProductID	ProductName	Price
1	1	Table	100.00
2	2	Desk	80.00
3	3	Chair	50.00
4	4	Computer	300.00

Source Table

ProductID	ProductName	Price
1	Table	100.00
2	Desk	180.00
5	Bed	50.00
6	Cupboard	300.00

Target Table

MERGE

Insert data using merge

On following tables Insert data using merge

```
MERGE TargetProducts AS Target
USING SourceTableAS Source
ON Source.ProductID = Target.ProductID
WHEN NOT MATCHED BY Target THEN
INSERT (ProductID,ProductName, Price)
VALUES (Source.ProductID,Source.ProductName, Source.Price);
```

ProductID	ProductName	Price
1	Table	100.00
2	Desk	180.00
5	Bed	50.00
6	Cupboard	300.00
3	Chair	50.00
4	Computer	300.00

MERGE

Update

On following tables Update data using merge

```
MERGE TargetProducts AS Target
  USING SourceTableAS Source
  ON Source.ProductID = Target.ProductID
  WHEN MATCHED THEN UPDATE SET
     Target.ProductName= Source.ProductName ,
     Target.Price= Source.Price;
```

ProductID	ProductName	Price
1	Table	100.00
2	Desk	80.00
5	Bed	50.00
6	Cupboard	300.00
3	Chair	50.00
4	Computer	300.00

MERGE

Delete

On following tables delete data using merge

ProductID	ProductName	Price
1	Table	100.00
2	Desk	80.00
3	Chair	50.00
4	Computer	300.00

```
MERGE TargetProducts AS Target
USING SourceTableAS Source
ON Source.ProductID = Target.ProductID
WHEN NOT MATCHED BY Source THEN
DELETE;
```

DELETE

It is used to delete existing records in a table
Syntax - DELETE FROM table_name WHERE condition;

Delete the records from store_details where sales = 100

```
DELETE FROM store_details  WHERE Sales=100;
```

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode
3	Costco	93	567	Issaquah, Wash	Phoenix	85001
4	The Home Depot	91	639	Atlanta	Little Rock	72201
5	Walgreens Boots Alliance	82	484	Deerfield, Ill	Sacramento	95814
6	CVS Health Corporation	79	890	Woonsocket, R.I	Denver	80202
8	Lowe Companies	63	308	Mooresville, N.C	Dover	19901
9	Albertsons Companies	59	454	Boise, Idaho	Tallahassee	32301
10	Royal Ahold Delhaize USA	43	254	Carlisle, Pa	Atlanta	30303

TRUNCATE

It is used to delete an existing data in a table , except the table itself.
Syntax - TRUNCATE TABLE table_name;

Drop the existing data from the store_details

Truncate table store_details

Store	Store_Name	Sales	Order_No	Store_Location	City	pincode

DROP

It is used to drop an existing table in a database
Syntax - DROP TABLE table_name;

Drop the existing table store_details

```
drop table store_details
```

```
Invalid object name 'store_details'.
```