

# Application

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Application is a set of programs to do a particular task

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## Standalone application

- Installation is mandatory.
  - Internet is not required.
  - Browser is not required/
  - Stored in own device. e.g. => notepad, paint, word, excel, temple run etc.
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## Web application

- Installation is not mandatory.
  - Internet is required.
  - Browser is required.
  - Stored in server. e.g. => facebook, instagram, whatsapp, gmail, amazon etc.
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## Client-server application/ mobile application.

- installation is mandatory.
  - Internet is required.
  - Browser is required.
  - Stored in server and in own device. e.g. => facebook, telegram, instagram, amazon, gmail, pubg etc.
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## SQL (structured query language)

- SQL is also called as
  - S - Simple
  - E - English
  - SQL - Query
  - L - Language

## Data

It is a raw fact which describes attributes of an entity. (Attributes = properties) (Entity = living / non-living thing / object)

## Database

Database is a place or medium which is used to store the data in systematic and organised manner.

On database we can perform CRUD operations:

- Create / Insert

- Read / Retrieve
  - Update / Modify
  - Drop / Delete
- 

## (DBMS) Database Management System.

DBMS is a software which is used to maintain and manage the database.

- In DBMS we can store the data in file format.
- Here we are using Query Language (QL) to interact with (DBMS).
- Security and Authorization are the important features of DBMS.

Security: No third party can access it.

Authorization: is giving permission and take back the given permission.

## RDBMS (Relational DBMS)

RDBMS is a software which is used to maintain and manage the database.

- In RDBMS we can store the data in table form.
  - Here we are using structured query language to interact with RDBMS.
  - Security and authorization are two important features.
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**02/02/2023**

## Structure of table

- Columns => The vertical sectors in the table is known as columns.
  - Rows => The horizontal sectors in the table is known as rows.
  - Cell => The smallest unit in the table. or => The intersection of rows & columns is called as cell.
  - Table => The organisation of rows and columns is called as table.
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## Relational Model

- The data scientist called E.F.Codd invented relational model.
- Any DBMS software which follows relational model in it is called becomes RDBMS.
- In relational model we will store everything in the form of table.
- DBMS + RN = RDBMS

## Rules of E.F.Codd

1. The data entered in the cell should be a single values data (atomic data).
2. In RDBMS we can store everything in the form of tables including metadata. metadata => the data about the data is called as metadata and it is stored in metadata. for example: time, size, date, format of image present in table. this metadata is stored in metatable. metadata is created by software.

3. In RDBMS we can store the data in multiple tables if we want we can create the connection between the tables by using the "Key Attributes"
4. The data entered in the table can be validated in 2 steps: a) By assigning Datatype (mandatory). b) By assigning constraints (optional).

Student

SID	SNAME	BRANCH	PH_NO	TID
10	Nandhini	ECE	1234567890	90
11	Nithish	CSE	9998887771	
12	Sindhu	MCA	1234567891	30
13	Harish	BCA	9986549068	60

Teacher

TID	TNAME	SAL
30	DHONI	10000
60	SACHIN	10000
90	VIRAT	10000

Student

SID	SNAME	BRANCH	PH_NO	TID	PID
10	Nandhini	ECE	1234567890	90	102
11	Nithish	CSE	9998887771		101
12	Sindhu	MCA	1234567891	30	100
13	Harish	BCA	9986549068	60	102

PARENTS

PID	PNAME	PLACE
100	RAMESH	DELHI
101	SURESH	PUNE
102	MAHESH	GOA

Teacher

TID	TNAME	SAL
30	DHONI	10000
60	SACHIN	10000
90	VIRAT	10000

**03/02/2023**

## Data Types

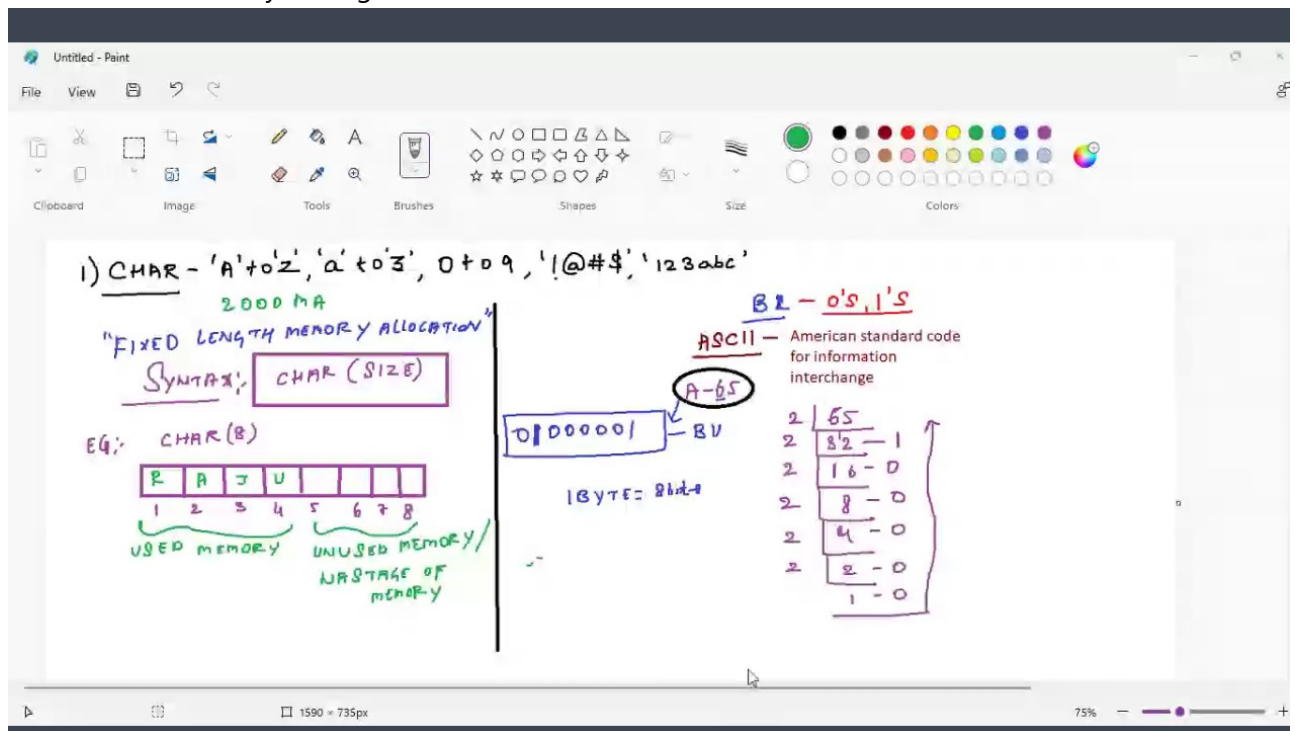
**Datatypes are used to find what kind of is present in a particular column.**

**Types:**

- 1) Char datatype
- 2) Varchar/Varchar2 datatype
- 3) Date datatype
- 4) Number datatype
- 5) Large Object
  - a) Character large object (LOB)
  - b) Binary large object (BLOB)

**1) Char datatype:**

- It will accept A-Z, a-z, 0-9, '!', '@', '#', '\$', '%', '^', '&', '!', '@', '#', 'abc'
- whenever we use char datatype we want to mention size for it.
- we can store upto 2000 memory allocation
- char uses "fixed length memory allocation".
- syntax = Char(size)
- it uses fixed length memory allocation.
- we have to define the length first.
- it can lead to memory wastage.

**2) Varchar:**

- It will accept 'A' to 'Z', 'a' to 'z', 0 to 0, '!', '@', '#', '\$', '%', '^', '&', '!', '@', '#', 'abc'.

- whenever we use varchar datatype we want to mention some size for it.
- we can store upto 2000 memory allocation.
- varchar uses "variable length memory allocation".
- Syntax = VARCHAR(size)
- unused memory will be used for other data,. (no memory wastage.)

**Varchar2:**

- It is an updated version of varchar
- we can store upto 4000 memory allocation\
- syntax = varchar2(size)

**3) Date:**

- it is used to store the data in a particular date format.
- syntax = Date

**oracle date formats:**

- a) DD-MON-YYYY eg.=> '10-NOV-2023'
- b) DD-MON-YY eg.=> '10-NOV-23'

**4) NUMBER datatype:**

- it is used to store numerical values.
- syntax = Number(Precision[,scale])

eg. 999.99

where 999 is precesion and .99 is scale.

- Precision
  - Precision is nothing but interger values.
  - Precision cant be 0
  - Precision ranges from 1 to 38
  - There is no default value for precision
- Scale
  - Scale is nothing but decimal values
  - The default value of scale is 0.
  - scale ranges from -84 to 127

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**5) Large Object:-**

a) Character large object:

- It is used to store the Binary value of image, mp4, mp3, document .....upto 4GB size.
- Syntax: **CLOB**

b) Binary large object :

- It is used to store the binary value of image, mp4, mp3, document ....upto 4GB of size.
  - Syntax: **BLOB**
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## Constraints

- Constraints are the extra validation given for a particular column.

Types:

1. Unique constraint
2. Not Null constraint
3. Check constraint
4. Primary key
5. Foreign key

### 1) Unique constraint:

- Unique is a constraint in which it will not accept repeated and duplicate values.

### 2) Not Null constraint:

- Not Null is a constraint in which it will not accept null values.

#### Notes:-

- Null means empty or nothing.
- 0 is not a null value.
- Any operations that can be performed with Null becomes Null.
- eg:-
  - $1 + \text{Null} = \text{Null}$
  - $1 - \text{Null} = \text{Null}$
  - $1 * \text{Null} = \text{Null}$
  - $1 / \text{Null} = \text{Null}$

### 3) Check constraint:

- Check is the constraint in which it will be given as extra validation depending upon the condition, if the condition is true it will accept the values else it will reject.
- eg:-
  - 1. check ( $\text{SAL} > 0$ )
  - 2. check ( $\text{LENGTH}(\text{PH\_No}) = 10$ )

### 4) Primary Key:-

- Primary key is a constraint which is used to identify the record uniquely from the table characteristics of primary key.
- Primary key will not accept duplicate and repeated values.
- Primary key will not accept Null values.
- Primary key is a combination of unique and Not Null.
- Primary key is not mandatory but recommended to have one in an table.

## 5) Foreign Key:-

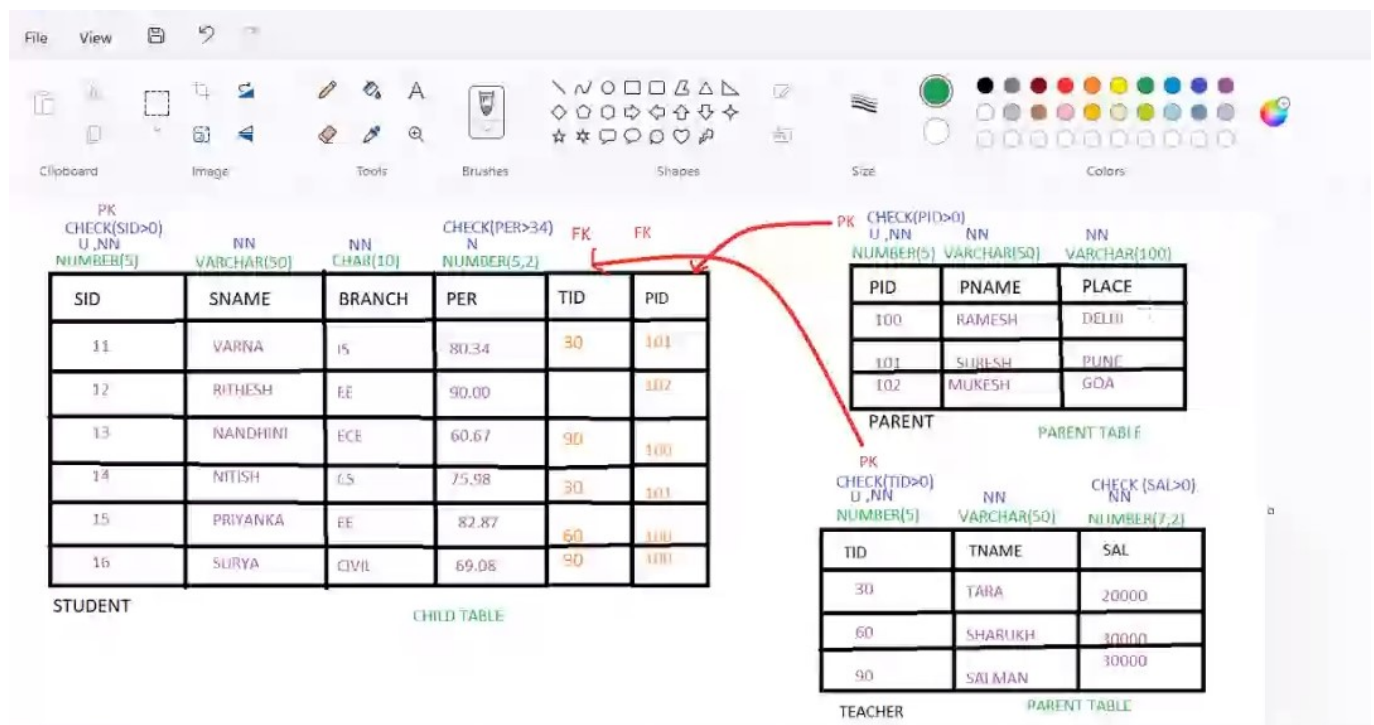
+Foreign key is used to create connection between multiple table characteristics of foreign key.

+Foreign key will accept repeated and duplicate values.

+Foreign key will accept Null values.

- To be a foreign key it should be the primary key in its own table.
- Actually foreign key is present in child table but belong to parents table.
- foreign key is also called as 'Referential integrity constraint'.

-Foreign key is not a combination of Unique and Not Null.



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## Overveiw of SQL:-

### 1) Data Definition Language(DDL)

- Create
- Rename
- Alter

- Truncate
- Drop

## 2) Data Manipulation Language(DML)

- Insert
- Update
- Delete

## 3) Transaction Controlled Language

- Commit
- Rollback
- Savepoint

## 4) Data Controlled Language

- Grant
- Revoke

## 5) Data Query Language

- Select

- Projection
- Selection
- Joins

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### Important questions

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- 1. what is data?
- 2. what is database?
- 3. what are CRUD and operations? give an example.
- 4. what is DBMS and RDBMS and tell the difference.
- 5. Tell the alternative name for Rows, Columns.
- 6. Definition for Rows, Cell and Table
- 7. who invented Relational Model.
- 8. Rules of E.F. Codd
- 9. Explain Datatypes and tell the Difference between Var and Varchar.



- 10. Explain constraints and tell the difference between Primary key and Foreign key
- 11. Another name for foreign key.
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## Data Query language (DQL):-

- It is a language in which we can get/fetch the data from already created table.
- types of statements:

### Projection

- projection is used to fetch the data by selecting only columns.
- Syntax
 

```

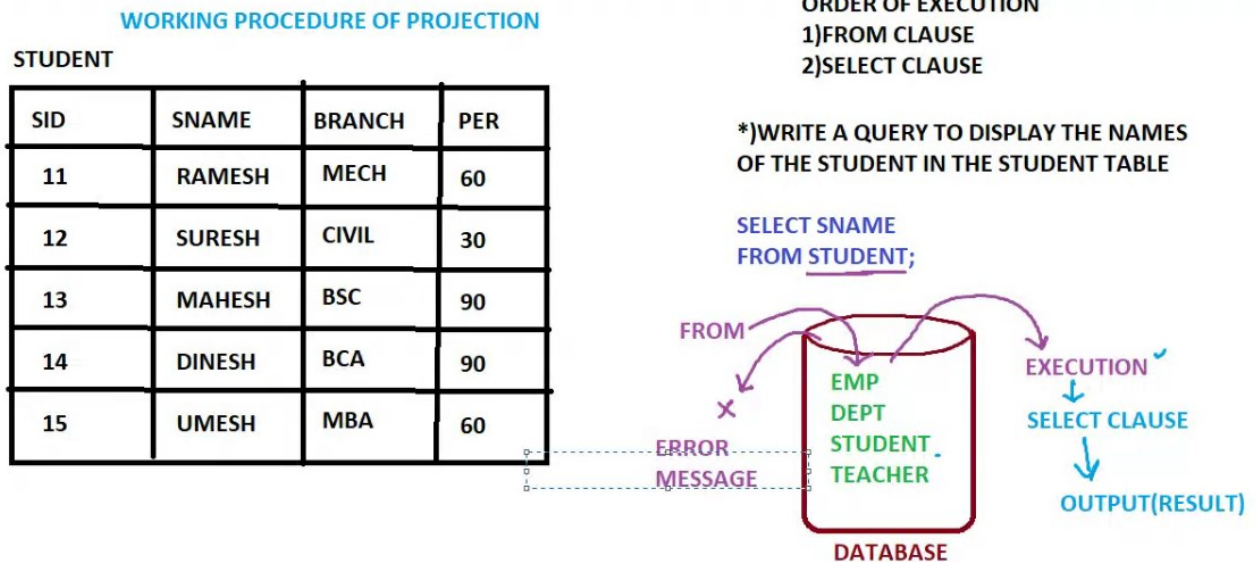
      ...
      SELECT*/[DISTINCT],COL_NAME,EXPRESSION/[ALIAS]FROM TABLE_NAME;
      ...
      
```

  - arguments written in [] square braces are optional
  - there are 5 arguments in above example.
  - 3 are mandatory and 2 are not mandatory.

### ORDER OF EXECUTION:

- 1) FROM CLAUSE
- 2) SELECT CLAUSE
  - we have to specify SELECT clause first then FROM clause.
  - but from clause will be executed first.

### working procedure of projection img:



working procedure of projection:

- first FROM clause will starts the execution and search for the given table.
- if the table is present in the database it will be kept under execution.
- if the table is not present in the database, it will be throwing you an error message.
- after the execution of FROM clause, SELECT clause will starts the execution and gives you the output.

SELECT clause :-

- the job of select clause is to display the result and it is also responsible for the result table.

Semicolon(😉) :-

- it is used to end the statement or Query.

Seperator(,) :-

- it is used to write the Multiple column names or Multiple arguments under the SELECT clause.

Example:

**Question. WAQTD (Write a query to display) name and branch of students.**

- SELECT SNAME,BRANCH FROM STUDENT;
- **Answer:**

STUDENT

F □ □ □ STUDENT DB

SID	SNAME	BRANCH	PER
11	RAMESH	MECH	60
12	SURESH	CIVIL	30
13	MAHESH	BSC	90
14	DINESH	BCA	90
15	UMESH	MBA	60

O/P OF FROM CLAUSE

\*)WAQTD NAME AND BRANCH OF STUDENTS

SELECT SNAME,BRANCH  
FROM STUDENT;

SNAME	BRANCH
RAMESH	MECH
SURESH	CIVIL
MAHESH	BSC
DINESH	BCS
UMESH	MBA

O/P OF SELECT CLAUSE

Ro helpmate (youtube channel for sql installation issues)