DATABASE MANAGEMENT SYSTEM

DBMS :

WEB APPLICATIONS : Websites + Web Application (Dynamic webpage)

Projects : Data creation (Form)

Form (Designing)

Data implement – Programming

DBMS – Database management system

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DBMS : DBMS is a software that is used to manage data at backend side. DBMS provides facility to store , manipulate and access data from the database.

DBMS also provides many facilities to make sure that right data is being stored in the database.

DBMS provides table structure to developer to store and manage data.

There are many applications of DBMS is present , you can use any one of these to store & manage data :

Like : MYSQL, MSSQL , MSACCESS, ORACLE, MONGODB , SQLITE……….

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To communicate with the all application of DBMS , there is a systemic way , that is SQL.

SQL : SQL stands for Structured Query Language . It provides some pre-defined syntax of queries. These queries are used to create , manipulate and access data in the DBMS application.

SQL mainly provides a way to work with DBMS application.

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Standard way to store data in DBMS is :

Database🡪Tables -> Rows/Tuples & Columns/Fields -> Data

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TYPES OF SQL COMMANDS :

1. DDL: Data Definition Language
2. DML : Data Manipulation Language
3. TCL : Transaction Control Language
4. DCL : Data Control Language

SCHOOL MGMT -> DB -> MANY TABLES

DDL : DDL stands for Data Definition Language . It has some queries list, which specifies the schema of table.

That means all DDL commands are applied on the schema of table.

Create

Alter: delete data and schema permanently.

Truncate: delete data permanently but schema saved for future.

Drop

Rename

DML : DML stands for Data Manipulation Language . It has some queries that Is applied on data/records of table.

DML commands are used to create , manipulate and access the records of table.

INSERT

UPDATE

DELETE

SELECT

TCL : TCL stands for Transaction Control Language . TCL has some commands that is used to control the transactions of database.

Commit

Rollback

Save transaction

DCL : DCL stands for Data Control Language . DCL commands are used to define users of database that who can access the data and who can read and write both on database.

Grant

Revoke

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Data Type :

Numeric :

INTEGER

Int

Shortint

longint

float

money

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Char :

Char : name char(100) : fixed length string

Varchar : name varchar(100) : variable length string

Nchar : multi-languages fixed length string

Nvarchar : multi language variable length string

Text : long size string

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Date : Used to store date in pre-defined format like yyyy-mm-dd

Date : only date : yyyy-mm-dd

Time : only time : hh :mm : ss

Datetime : collection of date and time : yyyy-mm-dd hh:mm:ss

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Create : Create command is used to make a new database or table.

Syntax to create database :

Create database database\_name;

Syntax to create table :

Create table table\_name

(

Field\_name datatype(size) integritity\_constrainits,

Field\_name datatype(size)

-

-

-

);

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Integrity Constraints : Integrity constraints are used with create command that is used to make sure that integrity of database will not be disturbed.

So integrity constraints are some keywords that is used to make sure that your table will hold correct data.

Not null : Not null defines that this field can not be null for any tuple.

Default : It sets a by -default value for fields that will be automatic inserted when this field is NULL.

Unique : duplicate value is not accepted , but NULL value is accepted.

Primary key : UNIQUE + NOT NULL

Foreign key : It stores a value that is already a Primary key column value in another table.

Check : check validates the value that is inserted into table before insertion.

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Create table employee (

Empid int primary key,

Emp\_name char(50) not null,

Salary int check (salary>10000 and salary<50000) ,

Mobile\_no char(13) default ‘7007237006’,

Age int check (age>15)

);

Insert : Insert command is used to add new tuples in tables.

Syntax :

Insert into table\_name values(value\_1, value\_2 , value\_3 , ………….);

Ex :

Insert into employee value(1, ‘Riya Singh’, 5000 , ‘908776655’ , 20);

Syntax \_2 :Insert values in specified columns , remains left NULL,

Insert into table\_name (column\_name\_1, column\_name\_2 , column\_name\_3……….) values(value\_1, value\_2 , value\_3 , ……..);

Ex :

Insert into employee (emp\_id, salary) values(2, 40000);

BULK INSERTION : You can insert multiple rows with single insert command by seprating each rows by comma.

Insert into table\_name values(3,’’,30000,’’,20),(4,’’, 40000, ‘’ , 25);

Insert into table\_name(emp\_id, empname) values (), (), (), () , ();

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Identity : Identity property can be used only with integer type column.

It is used to increment columns value automatic . In some DBMS applications it is also known as Auto\_increment.

Create a table with id should be primary key and name should have default value User.

SYNTAX :

COLUMN\_NAME data\_type(size) identity (seed, increment);

Seed : starting value

Increment : how much value would plus to max value of column

Indentity(100, 5);

Create table trainees

(

Id int primary key identity(1,1),

Name char(20) default ‘user’

);

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Database -> Technical

DBMS ->

MSSQL , MYSQL, MSACCESS, MONGODB

CRUD Operations

Create - c

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| sn | name | Fathername | mobileno | age | email | Profilephoto |
| 1 | ram | NULL | 8090988776 | 20 | ram@gmail.com | NULL |
| 2 | ram | NULL | 8090988776 | 20 | r@gmail.com |  |
| 3 | ram | NULL | 8090988776 | 20 | [rama@gmail.com](mailto:rama@gmail.com) |  |

Create : DDL

Update , delete , select

Create , alter , truncate, drop , insert

Ddl : create, alter , drop, truncate , rename

Create table table\_name

Alter table table\_name

Drop table table\_name

Truncate table table\_name

Rename table table\_name t

Dml : insert, update, delete, select ,

Insert into table\_name : rows

Update table\_name set : cols

Delete from table\_name : rows

Select \*/column\_name from table\_name

Drop database

Drop table

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User input

|  |
| --- |
| [r@gmail.com](mailto:r@gmail.com) |

Select \* from tbl where email=’’

INSERT INTO TBL (email) values(‘ram@gmail.com’)

Insert into tbl (sn,name,mobileno,age,email)values(1,’ram’,’8090’,20,’ram@gmail.com’)

INSERT INTO TBL ()

Read – select / fetch – dml

Registration -------- (insert) ->

Login ----🡪 select with condition

Change password ->update

Change profile photo -> update

Delete account -> delete

Change -> update

View profile -> select

Update -

Delete

DDL – CREATE

DML – INSERT

INTEGRITY CONTSRAINTS :

IDENTITY

Select : select \*/column\_names from table\_name

[where clause]

[group by clause]

[having]

[order\_by ]

Login :

|  |
| --- |
| [D@gmail.com](mailto:D@gmail.com) |

|  |
| --- |
| 123 |

Where clause : delete , update , select

= , <> , > , >= , < , <=, and , or

Login : [saloni@gmail.com](mailto:saloni@gmail.com), password

Your scored : 25 Marks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ram | 24 |  |  |  |
| Hari | 23 |  |  |  |
| priya | 20 |  |  |  |
| siya | 25 |  |  |  |

In , not in , between ,is null , is not null , like

DBMS :

SQL :

USER -> request -> SERVER -> Response

User -> request

Developer - >Database MGMT -> Table -> file/folder

Ready the Schema of table

Columns -> column\_name , data type , size , integrity constraints

Not null , , default check , unique key , primary key , foreign key

Records

DDL : applied on schema : create , alter , drop , truncate , rename

DML : insert , update , delete ,select

TCL : commit, rollback, save transaction

DCL : grant, revoke

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Select :

Select \*/column\_names from table\_name where <condition>

=

>

>=

<=

<

<>

And

Or

In

Not in

Between

Is null

Is not null

Like : like operator is used to compare data with a part of data or pattern. When you have concept of part of data or you have a pattern behalf of that you want to select data from table then like operator is used with condition.

%

\_

Syntax :

Select \*/column\_names from table\_name where column\_name like ‘pattern’

To create pattern : you can use % or \_

% - ignores characters

\_ - ignores only a single character

Ex :

Where Name like ‘%singh’ : select all rows where name ends with singh

Where college like ‘Feroze%’ :select all rows where college name starts with feroze .

Where college like ‘%gandhi%’ : select all rows where Gandhi presents somewhere

Where dob like ‘2021-\_\_\_\_\_’ :

2021-04-04

2021-

2021-05-09

2021-12-31

2020-04-04

Order by : In table , data is saved in random manner , is you want to arrange data behalf of a column then order by is used.

Numeric – assending(smaller-onwards) / descending (greater - lower)

String – assending(a-z) / descending (z-a)

Syntax :

Select \*/column\_name from table\_name where <condition> order by column\_name <desc>

Ex :

Select \* from tbl where batch=’All’ order by id desc

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Aggregate Function: Aggregate function are some function that operates on multiple values and provides a single output.

Sum() , count() , avg() , min() , max()

It can be only used with select command . it is only used after select keyword to select a value as a column.

It can be applied only on numeric values/columns.

Select sum(fee)

Select count(college)

select max(fee) from stpayment

select count(\*) from table\_name

select count(column\_name) from table\_name

Note : Count function ignores null values. That means the column which contain NULL value is not counted by count() function.

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String function :

Len() :

select len(name) as Length,lower(name) as studentname from ststudent

Upper() : select upper(name) from table\_name

Lower() : converts string to the lowercase

Ltrim() : select upper(ltrim(rtrim(' techpile technology ')))

Rtrim() : removes extra spaces from the right side of value

Substring() :

select substring(uname,0,13) from ststudent

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Date & Datetime function :

* Getdate() : IT IS A FUNCTION which returns current date and time.
* Current\_TIMESTAMP : it is a property which returns current date and time

select getdate(),Current\_TIMESTAMP,

datename()

dateadd()

datediff()

convert()

2021-11-08 :

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MS SQL : T-SQL : TRANSACT SQL:

T-SQL: T-SQL stands fir transact sql. It provides some advanced tool to perform different operations in database.

Tool od T-SQL:

User-define variables

**Control flow statement**

Begin -end

If-else

While

Try-catch

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User-define variables :user define variables are just a name used to store data from the outside world. In T-sql mainly variables are declared with pre-fix **DECLARE** and always variables are declare with following syntax.

DECALARE @\_VARIABLE\_NAME DATA TYPE(SIZE),….

**Example:** **DECLARE @name varchar(100),@salary int;**

By default value of user-define variables is null;

**Assign value to the variables.**

There is two way to assign value to the variable.

**1.By using set keyword.**

Set key word is used to assign any value to the single one variable.

DECLARE @num1 int,@num2 int;

set @num1=100;

set @num2=100;

select @num1+@num2 as sum;

**2.By using select keyword:**

Select keyword is used to set value to the variables. But by using select you can set multiple value to different variables at one time.

Syntax:

Select @variable\_name=value,

@variable\_name=value…….

declare @name varchar(50),@salary int;

select @name='Techpile' ,@salary=4000

select @name=first\_name,@salary=zip\_code from customers

select @name as Username,@salary+10 as salary;

T-SQL:- Standard sql-ddl,dml

Batch or script

Triggers

User-define variable

Stored procedure

User define function

How to create sql query with case.

Case is used to select any column based on the given condition so normally case is used to apply condition within a query.

Synatax:

Case when<condition> then ‘statement’

End

Example:-

select \* from employee;

select emp\_name, case when emp\_salary between 28000 and 45000 then EMP\_SALARY+10000 end

from employee;

**if-else:**

case when <condition> then statement else <statement>

end.

**Example:**

Select emp\_name,salary,case when salary between 20000 and 40000 then ‘jr.employee’ else ‘sr.employee’ end from employee

String +integer

Select emp\_name,emp\_salary,case when emp\_salary between 28000 and 40000 then 'jr.employee' else concat((emp\_salary+10000),' ') end from employee

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Case when <condition> then statement

when <condition> then statement

--

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Else statement

end

**Example:**

Select emp\_name,emp\_salary,(case when emp\_salary between 1000 and 20000 then 'jr.employee' when

EMP\_SALARY between 20001 and 40000 then 'Sr. Developer' when EMP\_SALARY>40000 then 'Project Manager' end) as Department,EMP\_ID from employee

BEGIN-END :Begin-end is keyword of sql also known as control flow statements. Begin-end contains batch(collection of scripts) that is used to define range of if or else or any conditional statement.

BEGIN-END can be nested.

Begin -end is used to define blocks of conditional or flow control statement like if,else,while etc.

If(condition)

Begin

//batch

End

Else if(condition)

Begin

//batch

End

declare @salary int,

@action int

set @salary=35000

set @action=2

if(@action=1)

begin

update employee set emp\_salary=@salary+10000

where EMP\_SALARY=@salary

select \* from employee

end

ELSE if(@action=2)

begin

select \* from brands

end

**TRY-CATCH:** try catch is used to handle run time errror that may occures at the run time of queries due to some wrong entries or anything else.

run time error of queries is handled by try-catch in sql.

catch comes always after try block.

catch block executes only if there is any error in try block.

If there is any possibility of error in any line of code then those lines are put into try block with a error free message or any code within catch block.

**Synatax:**

Begin try

//statement /queries

End Try

Begin catch

//statement /queries

End catch

Stored Procedures: stored procedures is collection of some pre-written queries/database commands.

Benefits of stored procedures is it provides code reusability and security to the database operation.

Syntax to create a stored procedures:

Create procedure procedures\_name

As

Begin

// sql commands

End

You can create procedure in 2 ways:

1.Stored Procedures with parameter

2. Stored procedures without parameter

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TCL : TCL stands for transaction control language. It is used to control operations of database.

Commit

Rollback

Save transaction

Are some command of TCL.

1. Commit:Commit is a single command used to save transactions of db permanently.

Insert,update,delete are some autocommit type commands.That means you do not need to save it separately after execution.

ACID:

Atomicity: All or none: All transaction should be successful or not.

Consistency: After transaction and before transaction database should be same.

Isolation: one transaction of database should not effect to the another transaction of db.

Durability : each database should have a backup system in case any accident occurs with database.

**Rollback:** Rollback sets database to the initial position.

Syntax:

Begin transaction

Rollback

You can roll back those transaction which are in buffer memory.

those transactions which are written with ‘begin transaction ‘ and did committed those can be rollbacked.

Begin transaction

Insert

Update

Delete

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To remove auto commit system of db ,transaction are written within begin transaction .

//sql statement

Commit;

Implicit control- controlling of transaction is done via database.

Explicit control: controlling of transactions is done via user.

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Save transaction:save transaction is used to set pointer to the particular location of data saved in buffer memory for transactions executed after pointer.

It is used so that you can rollback to the specific number of transactions.

Syntax:

Begin transaction

Save transaction <pointer\_name>

//sql statement

**Rename column name in sql:**

Rename command is used to change name of existing table or column . in mssql rename command is actually is used as a storedd procedures **syntax to rename table name :**

**Exec sp\_rename ‘dbo.old\_table\_name’,’new\_table\_name’**use techpile

exec sp\_rename 'dbo.suraj' ,'surajmishra'

**Syntax to rename column name:**

Exec sep\_rename‘tablename.old\_column\_name’,’new\_column\_name’

,’column’

**EXEC sp\_rename 'suraj.fee', 'Tfees', 'COLUMN';**

**To copy whole table data to a new table:**

Select \* into table\_name from table\_name

select \* into mishrag from techpile.dbo.surajmishra;

select \* from mishrag;

selelct from student as s inner join c on s.class\_id=c.class\_id