20-feb-24

Database :-

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=> a Database is a organized collection of interrelated data. For example a univ db

stores data related to students,courses and faculty etc and a bank db stores

data related to customers,accounts,transactions etc.

Types of Databases :-

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1 OLTP DB (online transaction processing)

2 OLAP DB (online analytical processing)

=> organizations uses OLTP for storing day-to-day transactions and OLAP for analysis.

=> OLTP is for running business and OLAP is for to analyze business.

=> day-to-day opertions on db includes

C create

R read

U update

D delete

DBMS :-

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=> DBMS stands for Database Management System and It is a software used to

create and to manage DB.

USER---------------------------DBMS------------DB

=> DBMS is an interface between user and db.

Evolution of DBMS :-

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1960 FMS (File Mgmt System)

1970 HDBMS (Hierarchical DBMS)

NDBMS (Network DBMS)

1980 RDBMS (Relational DBMS)

1990 ORDBMS (Object Relational DBMS)

RDBMS :-

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=> RDBMS concepts introduced by Edgar Frank CODD

=> E.F.CODD introduced 12 rules called CODD rules

=> a db that supports all 12 rules called perfect rdbms

information rule :-

------------------------

=> according to informtion rule data must be organized in tables i.e. rows and columns

CUST

CID CNAME CITY => columns / fields / attributes

10 SACHIN MUM

11 RAHUL DEL

12 VIJAY HYD => row / record / tuple

DATABASE = COLLECTION OF TABLES

TABLE = COLLECTION OF ROWS AND COLS

ROW = COLLECTION OF FIELD VALUES

COLUMNS = COLLECTION OF VALUES BELONGS TO ONE FIELD

=> every table must contain primary key to uniquely identify the records

ex :- accno,empid,aadharno,panno,voterid

Features :-

--------------

1 easy to access and manipulate data

2 less redundency (duplication of data)

3 more security

4 gurantees data quality or consistency

5 supports data sharing

6 supports transactions

RDBMS softwares :- (SQL Databases)

----------------------------

SQL SERVER microsoft

ORACLE oracle corp

MYSQL oracle corp

DB2 IBM

POSTGRESQL postgresql global development group

RDS amazon

NoSQL Databases :-

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1 MongoDB

2 cassandra

ORDBMS :-

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=> object relational dbms

=> it is the combination of rdbms & oops

ordbms = rdbms + oops (reusability)

=> rdbms doesn't support reusability but ordbms supports reusability

ORDBMS softwares :-

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1 sql server

2 oracle

3 postgresql

22-FEB-24

DB Development Life Cycle :-

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Analysis

Design

Development

Testing

Implementation

Maintenance

Design :-

-----------

=> Designing DB means designing tables

=> DB is designed by DB Designers / Architects

=> DB is designed by using

1 ER Model (Entity Relationship Model)

2 Normalization

Development :-

--------------------

=> DB is developed by DB Developers & DBAs (DB Admins)

=> DB is developed by using any rdbms tools like sql server

Developers DBAs

creating tables installation of sql server

creating views creating database

creating synonyms creating logins

creating sequences db backup & restore

creating indexes db export & import

creating procedures db upgradation & migration

creating functions performance tuning

creating triggers

writing queries

sql server 2014 sql server 2022 upgradation

mysql sql server migration

Testing :-

------------

=> DB is tested by QA team (Quality Assurance)

=> DB is tested by using

1 manual

2 automation

Implementation :-

-----------------------

=> Implementation means moving db from dev environment to prod environment

summary :-

what is db ?

what is dbms ?

what is rdbms ?

what is ordbms ?

what db development ?

23-feb-24 SQL SERVER

===========

=> SQL Server is basically rdbms product from microsoft and also supports

ordbms features and used to create and to manage database.

=> SQL SERVER is used for DB Development and Administration

versions of sql server :-

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Version YEAR

SQL SERVER 1.1 1991

SQL SERVER 4.2 1993

SQL SERVER 6.0 1995

SQL SERVER 6.5 1996

SQL SERVER 7.0 1998

SQL SERVER 2000 2000

SQL SERVER 2005 2005

SQL SERVER 2008 2008

SQL SERVER 2012 2012

SQL SERVER 2014 2014

SQL SERVER 2016 2016

SQL SERVER 2017 2017

SQL SERVER 2019 2019

SQL SERVER 2022 2022

client/server architecture :-

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1 SERVER

2 CLIENT

SERVER :-

---------------

=> server is a system where sql server is installed and running

=> inside the server sql server manages

1 DB

2 INSTANCE

=> DB is created in harddisk and acts as permanent storage

=> INSTANCE is created in ram and acts as temporary storage

CLIENT :-

-------------

=> client is also a system from where users can

1 connects to server

2 submit requests to server

3 receive response from server

client tool :-

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SSMS (SQL SERVER MGMT STUDIO)

USER-----SSMS--------------------------------------------SQL SERVER-------DB

USER----SQLPLUS------------------------------------------ORACLE------------DB

USER------MYSQLWORKBENCH--------------------------MYSQL-----------DB

SQL :-

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=> SQL stands for structured query language.

=> It is a language used to communicate with sql server.

=> user communicates with sql server by sending commands called queries

=> a query is a command / instruction / question given to sql server to perform

some operation over db.

=> SQL is introduced by IBM and initial name of this language was "SEQUEL"

and later it is renamed to SQL.

=> SQL is common to all Relational Databases

SQL SERVER ORACLE MYSQL POSTGRESQL

SQL SQL SQL SQL

USER-----SSMS-----------------SQL---------------------SQL SERVER-------DB

USER-----SQLPLUS------------SQL--------------------ORACLE--------------DB

=> based on operations over db sql lang is categorized into 5 sublanguages

DDL (DATA DEFINITION LANG)

DML (DATA MANIPULATION LANG)

DQL (DATA QUERY LANG)

TCL (TRANSACTION CONTROL LANG)

DCL (DATA CONTROL LANG)

SQL

DDL DML DQL TCL DCL

create insert select commit grant

alter update rollback revoke

drop delete save transaction

truncate merge

DATA & DATA DEFINITION :-

---------------------------------------

EMPID ENAME SAL => DATA DEFINITION / METADATA

100 SACHIN 6000 => DATA

24-feb-24

How to connect to sql server :-

-----------------------------------------

=> to connect to sql server open SSMS and enter following details

SERVER TYPE :- DB ENGINE

SERVER NAME :- DESKTOP-G2DM7GI

AUTHENTICATION :- WINDOWS / SQL SERVER

LOGIN :- SA (SYSTEM ADMIN)

PASSWORD :- 123

=> click connect

=> a connection established between user and sql server through ssms

How to Create Database :-

------------------------------------

=> In object explorer select Databases => New Database

Enter Database Name ;- DB730

=> click OK

=> a DB is created with following two files

1 DATA FILE ( .MDF) (Master Data File)

2 LOG FILE (.LDF) (Log Data File)

=> Data File stores Data and Log File stores operations

NAME TYPE INITIAL SIZE AUTOGROWTH PATH

DB730 DATA 8 MB 64 MB C:\-------\DATA

DB730\_LOG LOG 8 MB 64 MB C:\-------\DATA

Command to Create Database :-

------------------------------------------

CREATE DATABASE <DBNAME>

EX :-

=> open master database and execute the following command

CREATE DATABASE NARESHIT

26-FEB-24

download & install :-

-------------------------

1 sql server

2 ssms (SQL SERVER MANAGEMENT STUDIO)

SQL SERVER :-

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Download :-

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1 go to google type sql server 2022 download

2 https://www.microsoft.com/en-in/sql-server/sql-server-downloads

3 download developer edition

step by step installation :-

--------------------------------

1 go to google type step by step installation of sql server 2022 developere edition

2 https://www.mssqltips.com/sqlservertip/7313/install-sql-server-2022/

SSMS :-

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Download :-

----------------

1 go to google type download sql server management studio

2 https://learn.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-ver16

Datatypes in SQL SERVER :-

--------------------------------------

=> a datatype specifies

1 type of the data allowed in column

2 amount of memory required for column

DATATYPES

CHAR INTEGER FLOAT CURRENCY DATE BINARY

tinyint decimal(p,s) smallmoney date binary

ASCII UNICODE smallint numeric(p,s) money time varbinary

int datetime varbinary(max)

char nchar bigint

varchar nvarchar numeric(p)

varchar(max) nvarchar(max)

CHAR(size) :-

-------------------

=> allows character data upto 8000 chars

=> recommended for fixed length char columns

ex :- NAME CHAR(10)

SACHIN----

wasted

RAVI------

wasted

=> in CHAR datatype extra bytes are wasted , so CHAR is not recommended for variable length

fields and char is recommended for fixed length fields

ex :- GENDER CHAR(1)

M

F

STATE\_CODE CHAR(2)

AP

TS

COUNTRY\_CODE CHAR(3)

IND

USA

VARCHAR(SIZE) :-

------------------------

=> allows character data upto 8000 chars

=> recommended for variable length fields

ex :- NAME VARCHAR(10)

SACHIN----

released

27-feb-24

VARCHAR(MAX) :-

--------------------------

=> allows character data upto 2GB

ex :- review VARCHAR(MAX)

=> CHAR/VARCHAR/VARCHAR(MAX) allows ascii chars (256) that includes A-Z,a-z,0-9 &

special chars.

ex :- PANNO CHAR(10)

IFSC CHAR(10)

EMAILID VARCHAR(30)

NCHAR/NVARCHAR/NVARCHAR(MAX) :- (N => National)

--------------------------------------------------------

=> allows unicode chars (65536 chars) that includes all ascii chars and also chars belongs to

different languages.

Integer Types :-

---------------------

=> allows numbers without decimal (integers)

TINYINT 1 BYTE 0 TO 255

SMALLINT 2 BYTES -32768 TO 32767

INT 4 BYTES -2^31 TO 2^31-1 (-2147483648 to 2147483647)

BIGINT 8 BYTES -2^63 TO 2^63-1

ex :- AGE TINYINT

EMPID SMALLINT

NUMERIC(P) :-

----------------------

=> allows numbers upto 38 digits

=> allows numbers without decimal

ex :- EMPID NUMERIC(4)

10

100

1000

10000 => NOT ALLOWED

AGE NUMERIC(2)

PHONE NUMERIC(10)

AADHARNO NUMERIC(12)

DECIMAL(P,S) / NUMERIC(P,S) :-

----------------------------------------------

=> allows numbers with decimal (float)

P => precision => total no of digits allowed

S => scale => no of digits allowed after decimal

ex :- SALARY DECIMAL(7,2)

5000

5000.55

50000.55

500000.55 => NOT ALLOWED

5000.5678 => ALLOWED => 5000.57

5000.5645 => ALLOWED => 5000.56

NOTE :- if before decimal exceeds number is not accepted

if after decimal exceeds number is rounded

SAVG DECIMAL(5,2)

BALANCE DECIMAL(13,4)

Currency Types :-

-----------------------

=> used for fields related to money

SMALLMONEY 4 BYTES -214748.3648 to 214748.3647

MONEY 8 BYTES -922337203685477.5808

to

922337203685477.5807

EX :- SALARY SMALLMONEY

BALANCE MONEY

DATE & TIME :

--------------------

DATE => allows only date

TIME => allows only time

DATETIME => allows both date & time

=> default date format in sql server is YYYY-MM-DD

=> default time format is HH:MI:SS

EX :- DOB DATE

2003-10-05

LOGIN TIME

9:00:00

TXN\_DT DATETIME

2024-02-27 8:00:00

Binary Types :-

---------------------

=> used for storing multimedia objects like audio,video,images

1 BINARY => allows binary data upto 8000 bytes (fixed length)

2 VARBINARY => allows binary data upto 8000 bytes (variable length)

3 VARBINARY(MAX) => allows binary data upto 2GB

ex :- PHOTO BINARY(5000)

PHOTO VARBINARY(5000)

MOVIE VARBINARY(MAX)

28-feb-24

CREATING TABLE IN SQL SERVER :-

---------------------------------------------------

CREATE TABLE <TABNAME>

(

COLNAME DATATYPE(SIZE),

COLNAME DATATYPE(SIZE),

------------------------------------ ,

--------------------------------------

)

Rules :-

----------

1 tabname should start with alphabet

2 name should not contain spaces & special chars but allows \_ , $ , #

3 name can be upto 128 chars

4 table can have 1024 cols

5 no of rows unlimited

ex :- 123emp INVALID

emp 123 INVALID

emp\*123 INVAILD

emp\_123 VALID

=> create table with following structure ?

EMP

EMPID ENAME JOB SAL HIREDATE AGE DNO

CREATE TABLE EMP

(

EMPID NUMERIC(4) ,

ENAME VARCHAR(10),

JOB VARCHAR(10),

SAL SMALLMONEY,

HIREDATE DATE ,

AGE TINYINT ,

DNO TINYINT

)

=> above command created table structure that includes columns,datatype and size

SP\_HELP :- (SP => stored procedure)

----------------

=> command to see the table structure

SP\_HELP <tabname>

ex :-

SP\_HELP EMP

COLUMN NAME DATATYPE LENGTH

EMPID numeric 5

ENAME varchar 10

JOB varchar 10

SAL smallmoney 4

HIREDATE date 3

AGE tinyint 1

DNO tinyint 1

INSERTING DATA INTO TABLE :-

---------------------------------------------

=> "INSERT" command is used to insert data into table.

=> we can insert

1 single row

2 multiple rows

Inserting single row :-

----------------------------

syn :-

INSERT INTO <tabname> VALUES(v1,v2,v3,--------)

ex :-

INSERT INTO emp VALUES(100,'SACHIN','CLERK',4000,'2024-02-28',25,10)

INSERT INTO emp VALUES(101,'DHONI','MANAGER',8000,GETDATE(),35,20)

inserting multiple rows :-

--------------------------------

INSERT INTO emp VALUES(102,'ARVIND','ANALYST',9000,'2020-03-15',40,30),

(103,'DAVID','MANAGER',10000,'2018-10-05',30,10)

inserting nulls :-

---------------------

=> a null means blank or empty

=> it is not equal to 0 or space

=> nulls can be inserted in two ways

method 1 :-

---------------

INSERT INTO emp VALUES(104,'KUMAR',NULL,5000,'2019-05-10',28,NULL)

method 2 :-

--------------

INSERT INTO emp(empid,ename,sal,hiredate,age) VALUES(105,'RAVI',6000,'2021-04-20',32)

remaining two fields job,dno are filled with NULLs

Operators in SQL SERVER :-

---------------------------------------

Arithmetic Operators => + - \* / %

Relational Operators => > >= < <= = <> !=

Logical Operators => AND OR NOT

Special Operators => BETWEEN

IN

LIKE

IS

ANY

ALL

EXISTS

PIVOT

Set Operators => UNION

UNION ALL

INTERSECT

EXCEPT

Displaying Data :-

-----------------------

=> "SELECT" command is used to display data from table.

=> we can display all rows or specific rows

=> we can display all cols or specific cols

syn :- SELECT columns / \* FROM tabname

SQL = ENGLISH

QUERIES = SENTENCES

CLAUSES = WORDS

\* => all columns

Examples :-

=> display employee names and salaries ?

SELECT ename,sal FROM emp

=> display all the data from emp table ?

SELECT \* FROM emp

WHERE clause :-

--------------------------

=> where clause is used to get specific row/rows from table

=> where clause is based on condition

SELECT columns / \*

FROM tabname

WHERE condition