

Types of Databases

SQL Data ------Tabular , Structured

* Oracle -------- Licensed ------ Java is managed by Oracle
* mysql-------- freeware -------java
* postgreSQL------freeware
* SQL Server ------ Microsoft ----- Licensed ------- .NET technology

NoSQL data--------unstructured, JSON (java script object notation)

MongoDB

Cassendra

CouchbaseDB

Hbase

GraphDB

Neo4j

Memory Database (HQL,Memdb)

Research type project

memory database----- data is less------faster ---- volatile

Server-------

Those companies are going to store data, programs , bakups

to store these data multiple servers are required.

Data centres

MySQL -------- Table format -------RDBMS(Relational Database Management System)

to store data in persistent way.------- ways of storing file,

Features

* retrieval of data is very easy
* Sharing data becomes extremely easy.
* redundancy of data decreases (repeatation)
* Transaction control ----- ACID ----- every SQL database supports ACID property

Secure ----- financial application, voting, census ------- RDBMS

Atomicity ----- every transaction gets executed as a single unit.

Consistency ----- after every transaction data should be in correct state

Isolation ----- any user when login to data base should read same data

durability ----- longer period of time consistency will be maintained by application

|  |  |
| --- | --- |
| SQL DataBase | NoSQL |
| In all secure applications----financial app | Less security-----social media |
| Structured | Unstructured |
| Table | Collection |
| Transaction control | Less transaction control |

SQL Database ------MySQL

Tabular ------ Rules

every row should be uniquely identifiable.

1. primary key ---- account no

minimal subset of attributes which identifies the row uniquely

1. composite key------- many times your primary key is formed by more than one column, then the key is called as composite key
2. candidate key ------ account num, passport num, adhar num

minimal subset of attributes that identifies the row uniquely and which may become primary key

1. unique key ----- It doesnot allow duplicate values in the column, but it allows to store multiple null values.
2. foreign key -----before we enter data in a column, if we refer primary key of same table or different table then it is called as foreign key

use foreign key to maintain correctness of data

1. surrogate key ----- if you want to identify the row uniquely with database, then we need to add some external or virtual column in the table which id not part of data is calles as surrogate key.
2. super key ------ any combination that identifies the row uniquely

account no, passport, adhar number, account no+cusid, account num+cname, account no+cname+custid+passport

Bank store ---- account number

Account table

accno ----primary key

cust id ---- foreign key

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Custid | Accno | Balance | Type | relmgr |
| 1 | 1 | 12345 | Saving | AA |
| 1 | 2 | 123451 | Current | AA |
| 1 | 3 | 12345 | demat | AA |
| 2 | 4 | 1111111 | Saving | BB |
| 3 | 11 | 444444 | Saving | BB |

customer

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Custid | Cname | Address | Email | Adhar card | Passport |
| 1 | Kishori | Aundh | a.b@gmail.com | 22222222 | 1234555 |
| 2 | Rajan | Baner | r.b@gmail.com |  |  |
| 3 | Revati | Aundh | Zdvnxj | 233333 |  |

studid ,subject ----- primary key ----- composite key

|  |  |  |
| --- | --- | --- |
| Studid | Subjectid | marks |
| 1 | 100 | 98 |
| 1 | 200 | 98 |
| 2 | 100 | 95 |
| 2 | 200 | 99 |

SQL(structured query language) ----PLSQL(procedural language --- structured query language)

loops , if statement ,variable declaration is not there ---- 4GL (4 generation Language)

loops , if statement ,variable declaration, cursor --- PLSQL(procedural language --- structured query language)

employee

primary------empid

candidate key----empid, adhar no, passport no

unique key----adhar no, passport no

foreign key ---- mgrno ---- references empno , deptno ----reference deptid of dept

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Empid | Ename | Sal | Adhar no | Mgrno | Passport no | deptno |
| 1 | Rajan | 11111 |  | 3 |  | 10 |
| 2 | Revati | 2221 |  | 3 |  | 20 |
| 3 | Anil | 444444 |  |  |  | 10 |
| 4 | Rajasi |  |  | 10 |  | 40 |
| 10 | Sunil | 44444 |  |  |  |  |

department

primary-----deptid

candidate key- deptid, dname

super key --deptid+dname, deptid, dname, deptid+dname+dloc

foreign key

|  |  |  |
| --- | --- | --- |
| Deptid | Dname | loc |
| 10 | HR | Mumbai |
| 20 | Accounts | Pune |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| Types of statement |  |  |
| DQL | Data query language | Select |
| DDL | Data definition language | Create table,Alter table,Truncate,drop, |
| DML | Data Manipulation Language | Insert, update, delete |
| DCL | Data control language | Grant , revoke |
| TCL | Transaction Control Language | Commit, Rollback,savepoint |

install mysql on your machine

step 1:

open mysql client window

step 2:

To create database

create database iacsdedacmay21

step 3

To switch to the database

use iacsdedacmay21

step 4

------download demobldmysql.sql

and store it in d:\mydata

mysql>source d:\mydata\demobldmysql.sql

---to create database

create database iacsdedacmay21;

------- switch to the database

use iacsdedacmay21

----see list of tables within the database

show tables;

----- to see the columns within table emp and dept

desc emp

desc dept

-------- to see all the fields and all the rows within the table

select \* from emp;

-------to empno,ename,sal,deptno

select empno,ename,sal,deptno

from emp;

--------to display rows in which sal > 2000

select empno,ename,sal

from emp

where sal >2000

------- to display all employees with sal>2000 and ename=’BLAKE’

select empno,ename,sal,deptno

-> from emp

-> where sal>2000 and ename='BLAKE';

sal>2000 ----- will get checked 14 time it is true for 6 times

ename=’BLAKE’ ------ will get checked 6 times

total condition 14+6=20

select empno,ename,sal,deptno

-> from emp

-> where ename='BLAKE' and sal>2000;

ename=’BLAKE’ ------ will get checked 14 times this is true only once

sal>2000 ----- will get checked 1 time

total condition 14+1=15

hence this is more time efficient

------ display all employees with sal>2000 or ename=’BLAKE’

select empno,ename,sal,deptno

from emp

where ename='BLAKE' or sal>2000;

ename=’BLAKE’ ---- 14 times it is false 13 times

Hence sal>2000 -----🡪 13 times

total condition checked ----- 14+13

select empno,ename,sal,deptno

from emp

where sal>2000 or ename=’BLAKE’

sal>2000 ------ this will get checked 14 ------- 8 times false

ename=’BLAKE’ ------- 8 times

total condition check ------ 14+8

--------rule to improve efficiency of the query

in and operator the condition which is false more times should be the first condition

in or operator the condition which is true more times should be the first condition

-------the 1 st query is less efficient than the 2nd

select \*

from product

where price>2000 and pname=’bag’

select \*

from product

where pname=’bag’ and price>2000

----fina all employee who joined on 28 sept 1981

select \*

from emp

where hiredate=’1981-09-28’

----to find all employees who do not earn commission

select \*

from emp

where comm is null or comm=0;

----to find all employees who earn commission

select \*

from emp

where comm is not null or comm!=0;

------to find all employees with sal >= 1500 and sal <= 3000

select \*

from emp

where sal>=1500 and sal <=3000;

to check range of data

select \*

from emp

where sal between 1500 and 3000;

--------- between …and 1500 and 3000 are inclusive

------to find all employees with sal >1500 and sal < 3000

select \*

from emp

where sal between 1501and 2999;

------to find all employees with sal not >=1500 and sal not <= 3000

select \*

from emp

where sal not between 1500 and 3000;

------- to find all employees with sal is either 1600 or 2000 or 1250

select \*

from emp

where sal=1250 or sal=1600 or sal=2000

use in operator

select \*

from emp

where sal in (1250,1600,2000)

----to display names of all employees who work in deptno either 10 ,20

select \*

from emp

where deptno in (10,20)

----to display names of all employees who do not work in deptno either 10 ,20

select \*

from emp

where deptno not in (10,20)

------ to find all employees with name starts with A

to chek the pattern use like operator

% --- matches with 0 or more character

\_ ------ matches with one character

select \*

from emp

where ename like ‘A%’

------to find all employees with name ends with N

%N

select \*

from emp

where ename like ‘%N’;

------to find all employees with name has A at second position and ends with N

\_A%N

select \*

from emp

where ename like ‘\_A%N’;

----to find all employees with name has A at second position

select \*

from emp

where ename like ‘\_A%’;

----to find all employees with L at 3 rd position or starts with M or I at second last position

\_\_L%

M%

%L\_

select \*

from emp

where ename like ‘\_\_L%’ or ename like ‘M%’ or ename like ‘%I\_’

----to find all employees with A at 2 nd position or does not starts with M or not having I at second last position

select \*

from emp

where ename like ‘\_\_L%’ or ename not like ‘M%’ or ename not like ‘%I\_’

---to find all employees name starts with M or starts with A or starts with B

select \*

from emp

where ename like ‘A%’ or ename like ‘M%’ or ename not like ‘B%’

-------- REGEXP

^ ----- match the pattern at the beginning

$ ---- matches the pattern at the end

\*----- matches with 0 or more characters

+ ------ matches with 1 or more characters

? ----- matches with 0 or one character

[a-zA-Z0-9] ---- it matches with any one character or number

[aeiou] --- it matches with any vowel

[^aeiou] ----- anything other vowel

[^0-9] ----except numbers every character

. ------ matches with any one character

{m}—exactly m occurrences

{m,n} ---- minimum m and maximum n occurrences

( a|b |c) ---- multiple patterns

---to find all employees name starts with M or starts with A or starts with B

^[MAB]

(^M|^B|^A)

select \*

from emp

where ename REGEXP ‘^[MAB]’

----to find all employees with A at 2 nd position or does not starts with M or not having I at second last position

^.A

^[^M]

[^I].$

select \*

from emp

where ename REGEXP ‘(^.A|^[^M]|[^I].$)’

-----to find all names which starts with A and ends with N and L at 3 rd position

select \*

from emp

where ename like ‘A\_L%N’

select \*

from emp

where ename REGEXP ‘^A.L.\*N$’

AL\*N

AN

ALN

ALLN

ALLLLLN

AL+N

ALN

ALLN

ALLLLLN

AB?C

AC

ABC

ABBC

AB{3}C

ABBC

ABBBC

AB.{3}C

---- to find all name which has LL anywhere in the name

‘LL’

‘L{2}’

select \*

from emp

where ename like ‘%LL%’;

or

select \*

from emp

where ename REGEXP ‘L{2}’;

or

select \*

from emp

where ename REGEXP ‘LL’;

---- to find all names which starts with any character between range A to H

select \*

from emp

where ename REGEXP ‘^[A-Ha-h]’

-------to calculate net sal = sal+ commission and displat column names as net sal, commission , Name

select empno,ename "Name",sal "salary",comm,ifnull(comm,0) "commision",sal+ifnull(comm,0) "net sal"

from emp;

------display empno,ename, sal and increased salary by 10%

sal+0.10\* sal ==🡺 sal\*1.10 “new sal”

select empno,ename,sal,sal\*1.10 “new sal”

from emp;

-----display all employees arranged on name

select empno,ename,job,sal,sal\*1.10 "new sal"

from emp

order by ename;

-----display all employees arranged by job and if job is same then arrange on ename in descending order

in order by clause we can use maximum 255 columns

select empno,ename,job,sal,sal\*1.10 "new sal"

from emp

order by job, ename desc;

-------built in functions are available

2 types

1. aggregate function ------ functions those work on group of rows
2. single row functions ----- the functions which works once on each row is called as single row function
   1. number—abs,round,truncate,floor,ceil,sqrt
   2. character
   3. dates

-------display ename and email of every employee

email ----- ename followed by “@mycompany.com”

select empno,ename,concat(ename,’@mycompany.com’) email

from emp

--------to display name,job and email

email ename followed by . followed by 2,3 and 4 character of job followed by @mycompany.com

concat(ename,’.’,substr(job,2,3),’@mycompany.com’)

select empno,ename,job, concat(ename,’.’,substr(job,2,3),’@mycompany.com’) “email”

from emp;

----- find how many characters are there ename

select ename,length(ename)

from emp;

number and character related functions

|  |  |  |
| --- | --- | --- |
| Function | Use | Example |
| abs() | To convert -ve number to +ve number | Select abs (20-30)----🡪10 |
| round() | It will round the number to specified number of digits after decimal point | Select round(20.5634,2)-🡪 20.56  Select round(20.5650,2)-🡪 20.57 |
| truncat() | It will truncat the number to specified number of digits after decimal point | Select truncat(20.5634,2)-🡪 20.56  Select truncat(20.5650,2)-🡪 20.56 |
| ceil() | It will remove all digits after decimal point and always show next number | Ceil(20.57)--🡪21  Ceil(20.13)--🡪21 |
| floor() | It will remove all digits after decimal point and always show same number | floor(20.57)--🡪20  floor(20.13)--🡪20 |
| Sqrt() | It will display square root of the number | Sqrt(4) --🡪 2 |
| ASCII(‘A’) | This will print ascii value of given character | ASCII(‘A’)----🡪 65 |
| Upper() | Convert given string in uppercase | Upper(“hEllo”)---🡪HELLO |
| lower() | Convert given string in lowercase | lower(“hEllo”)---🡪hello |
| Concat(expr1,expr2,expr3,…..) | It will concatenate all the strings | Concat(‘a’,’xx’,’c’)--🡪axxc |
| Left(expr,n) | This will retrieve n characters from leftmost side of the string | Left(“Hello”,3)----🡪Hel |
| right(expr,n) | This will retrieve n characters from rightmost side of the string | rigth(“Hello”,3)----🡪llo |
| Substr(str,start,n) | This will retrieve n characters from the start position from the given string | Substr(“welcome”,3,4)-🡪lcom |
| Reverse(str) | It will display string in reverse order | Reverse(‘Hello’)--🡪olleH |
| Trim(str) | It will remove extra spaces from both sides | Trim(‘ Hello ‘)---🡪Hello  (Without spaces) |
| LTrim(str) | It will remove extra spaces from left sides | ltrim(‘ Hello ‘)---🡪Hello  (Without spaces from left side) |
| rtrim(str) | It will remove extra spaces from right sides | rtrim(‘ Hello ‘)---🡪Hello  (Without spaces from right side) |
| Length(str) | Will display number of characters in the string | Length(‘Welcome’)---🡪7 |
| LPAD(str,length,char) | It will add char on left side to make length number of characters | Lpad(“Hello”,10,”-“)--🡪 -----Hello |
| RPAD(str,length,char) | It will add char on right side to make length number of characters | Rpad(“Hello”,10,”-“)--🡪 Hello----- |