

## Database Management system

### Types of databases

1. RDBMS (SQL)---Relational Database Management systems
  - a. Structured data
  - b. data should be secure.
  - c. Transaction control is needed.  
example : oracle, mysql, sql server, postgresSQL
2. NoSQL
  - a. unstructured
  - b. data may not be secure.
  - c. No transaction control  
examples: mongodb, CouchbaseDB, Cassandra
3. GraphDB
  - a. unstructured
  - b. display should be in graph format  
examples : NEO4j
4. Memory databases
  - a. if the size of data is small, and faster access is needed.  
example MemDB, VoltDB
5. Disk based databases.
  - a. These databases are available on the same machine on which it is installed  
examples : SQLite3, MS-ACCESS

### uses of SQL databases

1. Sharing of data is easy
2. data is secure, it supports transaction control
3. managing data becomes easy.
4. retrieval of data is easy.

### Types of statements available

Types of statement		
DQL	Data Query Language	select
DCL	Data Control Language	grant , revoke
TCL	Transaction control language	commit, rollback, savepoint
DDL	Data definition language	create, alter, truncate, drop
DML	Data Manipulation language	Insert, update, delete

### ACID property

1. Atomicity---If a transaction contains many steps, then either all will happen or none will happen, entire transaction will get executed as a single unit
2. consistency--→ after every transaction the data will be correct state
3. isolation--→ the intermediate changes in the transaction are not visible to all users, It will be seen by other users when the transaction is completed(committed), This is called as isolation
4. durability--→ the correctness data after every transaction, will be there for longer duration.

Data gets stored in table format in SQL

1. Table is also called as relation.
2. Columns -> attribute/ fields/ columns
3. record--> record/ row/ tuple

Install mysql

<https://dev.mysql.com/downloads/installer/>

MySQL store data internally in the form files, called as table space,  
It stores data in various types of files

1. control file---> these files are used to store metadata
2. data file-> these files are used to store data
3. redolog files-> these files are used to store all changes happening to data, and can be used at the time of commit, and rollback

### To create database in mysql

create database if not exists <name of the database>

create database if not exists iacsd0925

### To load data from SQL file

mysql> source <filename>

to view data from table emp

select \* from emp;

-----to display emp with empno 7698

```
select empno,ename,sal salary,deptno
from emp
where empno=7698;
```

-----to display emp with ename smith

```
select empno,ename,sal salary,deptno
from emp
where ename='Smith'
```

-----to display emp with

```
select empno,ename,sal salary,deptno
from emp
where hiredate='1981-12-03';
```

Operators in mysql

Arithmetic operators	+, -, /, *, %
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logical operators	and or not
relational operators	=, !=, >=, <=, >, <

-----to display all employees empno, ename, sal , comm, netsal

Sal+sal\*0.10 ---→sal(1+0.10 )---→sal\*1.10

Select empno,ename,sal,sal\*1.10 from emp;

-----to display all employees with sal >=2000 and deptno=10

Select * from emp Where sal>=2000 and deptno=10;
---

-----to display all employees with sal>=1000 and <=2000

Select * from emp Where sal >=1000 and sal<=2000;	Select * from emp Where sal between 1000 and 2000;
--	---

## Operators

[not] between ... and ...	To check the range of values we use between and operator, the given values are inclusive
[not] in	to check multiple values = with either or, the use in
is [not] null	to check null values we use this operator
[not] like	to check the pattern in the field we use like operator and not like operator in this % symbol represents 0 or more characters and _ represents exactly one character

DQL --→ Data query language

1. to display all fields and all rows from emp table  
select \* from emp
2. to display empno,ename for all employees  
select empno,ename from emp;
3. to display all employees with sal > 2000  
select \* from emp  
where sal>2000;
4. to display all employees with job=salesman  
select \* from emp  
where job='Salesman'

5. to display all employees joined on '1981-12-03'  
select \* from emp  
    -> where hiredate='1981-12-03'
6. to display all employees with job=salesman  
    and deptno=10  
  
select \* from emp  
    where job='Salesman' and deptno=10;
7. display all employees working as CLERK and sal >1500  
  
select \* from emp  
    where job='CLERK' and sal>1500
8. display all employees with sal=1500 or 2000 or 3000  
    select \* from emp  
        where sal in (1500,2000,300)
9. display all employees who joined on either 1981-12-03 or 1982-12-03  
  
select \* from emp  
  
    where hiredate in ('1981-12-03','1982-12-03')
10. display all employees with sal not either 1500 or 2000 or 3000  
    select \* from emp  
        where sal not in (1500,2000,300)
11. display all employees with job clerk, salesman or manager  
  
select \* from emp  
  
    where job in ('clerk','salesman','manager')
12. display all employees who work in deptno 10 or 20 and sal > 1500  
  
select \* from emp  
  
    where deptno in (10,20) and sal > 1500;
13. display all employees with sal >=1500 and <= 2500  
  
select \* from emp  
  
    where sal between 1500 and 2000;
14. display all employees with sal < 1500 and > 2500  
  
select \* from emp  
  
    where sal not between 1500 and 2000;
15. display all employee with commission is null  
    select \* from emp

where comm is null;

15. display all employee with commission is null

```
select * from emp
-> where comm is null;
```

16. to find all names starts with A

select * from emp where ename like 'A%'	select * from emp where ename REGEXP '^A'
--	--

17. to find all names ends with N

select * from emp where ename like '%N'	select * from emp where ename regexp 'N\$'
--	---

18. to find all names which has E at 2<sup>nd</sup> last position

select * from emp where ename like '%E_'	select * from emp where ename regexp 'E.\$'
---	--

1. to find all names which has M or E at 2<sup>nd</sup> last position

select * from emp where ename like '%E_' or ename like '%M_'	select * from emp where ename regexp '[ME].\$'
--	---

2. to display all employees with name starts with either A or M

select * from emp where ename like 'A%' or ename like 'M%'	select * from emp where ename regexp '^([AM])'
--	---

3. to display all employees with name starts with A and ends with N  
or starts with m and ends with R

select * from emp where ename like 'A%N' or ename like 'M%R'	select * from emp where ename regexp '^A.*N\$ ^M.*R\$'
--	---

4. display all employees with name starts with A and l is 3<sup>rd</sup> position and ends with N  
or starts with J and ends with either S or N

<pre>select * from emp where ename like 'A_L%N' or ename like 'j%S' or ename like 'j%N'</pre>	<pre>select * from emp where ename regexp '^A.L.*N\$ ^J.*[SN]\$',</pre>
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5. display all employees with name N occurs at either 2 nd position or 3 rd position or starts with J and N at 3<sup>rd</sup> last position

<pre>select * from emp where ename like '_N%' or ename like '__N%' or ename like 'J%N__';</pre>	<pre>select * from emp where ename regexp '^..?N ^j.*N..\$',</pre>
---	--

6. display all employees with name does not start with either J or M

<pre>select * from emp where ename not like 'J%' and ename not like 'M%'</pre>	<pre>select * from emp where ename regexp '^[^JM]'</pre>
--	--

7. display all employees with name starts with either A or M and ends with either N or R

<pre>Select * From emp Where ename like 'A%N' or ename like 'A%R' or ename like 'M%R' or ename like 'M%N'</pre>	<pre>Select * From emp Where ename REGEXP '^([AM]).*([NR])\$',</pre>
---	--

#### Regular expression

^	it will check the pattern at the beginning
\$	it will check the pattern at the end
[a-zA-Z]	will match with any alphabet
[0-9]	will match with any one digit
.	match with any one character
[^0-9]	any character other than 0-9
*	0 or more occurrences
+	1 or more occurrences
?	0 or 1 occurrences

{m}	exactly m occurrences
{m,n}	minimum m occurrences or maximum n occurrences
abc pqr mns	to match with either abc or pqr or mns

	Matches	Not matches
ba*n	bn,ban, baaaaaaaaan, xyzbaaaaanpqr	
^[0-9]{5}\$	12345	123456789
^[0-9]{5}	12345, 123456789	
[0-9]*	this is 123, this is help, this is 1234 test	
^or	origami, organ	normal
or\$	tailor, minor	core
A.?b	Ab , Axb Ayb Abcdsgsdd	Avvccdfdb

1. to display empno,name,sal for all employees  
select empno,name,sal from emp;
2. to display empno,name,sal,comm and netsal for all employees  
where netsal = sal+comm  
select empno,ename name,sal salary,comm,sal+ifnull(comm,0) "net sal" from  
emp;