What is data

data – piece of information

Number of students - 100

Student name - bob

Pincode of a city – 1100100

How to work with data

place all the data in a text file and use it for processing (No)

Technique used for working with data – organiise the data so that it can be easily stored and retrieved

Systems used for organising data

Unstructured Data – Mongodb

RDBMS – oracle, mysql, postgresql, ms-sql

DBMS - foxpro

HMS – ims

Find the difference between DBMS and RDBMS

1. In DBMS, the data is stored as a file, whereas in RDBMS, data is stored in the form of tables.

2. single users are supported by DBMS,multiple users supported by RDBMS

3. DBMS deals with small data whereas RDBMS deals with large data

4. Normalisation is not supported in DBMS and it is supported in RDBMS

5. DBMS does not support integrity constraint. RDBMS supports integrity constraints

Data can be managed even using spreadsheets. Why there is a need for RDBMS

Because in RDBMS we can store huge amount of data in db in the form of rows and columns

Table - 1

sname sno age std\_id

bob 123 12 2

alice 124 12 2

Table – 3

id std

1 sixth

2 seventh

What is the process that is used for reducing/eliminating data redundancy.

Normalization

First Normal Form - a table with primary key is said to be in 1NF

Second Normal Form – all columns that are not primary key should depend on primary key

Third Normal Form - all non-primaty key columns are only dependent on primary key

Table - 2

id sno subject\_id mark

1 123 1 80

2 123 2 81

3 124 1 80

4 124 2 81

Table - 4

subject\_id subject

1 maths

2 science

Data – stored in the form of tables

Relations – by using primay key, foreign key

Integrity constraint – Ensure consistency

Treat Null is a better way

Table - 1

sname sno age std\_id

bob 123 12 2

alice 124 12 2

Table – 2

subject\_id subject

1 maths

2 science

3 english

Table -3

id sno subject\_id mark

1 123 1 80

2 123 2 81

3 124 1 80

4 124 2 81

123 3 80

124 3 81

RDBMS – data is stored in the table

table has something columns and rows

columns form the metadata of the table

row forms the values against each column

columns – primary key ( each row is identified with unique value)

- foreign key ( references column in another table)

- unique key ( row values are indexed and helps in enabling faster search)

constraints - Not Null

Range – 25000 – 200000

Structured Query Language - To Store and Retrieve the data

SQL – Classified into 3 categories

DDL – Data Definition Language

DML – Data Manipulation Lanaguage

TCL – Transaction Control Language

ACID -

A – Atomicity – transaction happens at once or doesn’t happen at all

C – Consistency – consistent before and after the transaction happens

I – Isolation – multiple transactions happen independently

D – Durability – stays durable

MySQL – RDBMS – 8.0

List available databases - show databases;

create database – create database databasename;

To work with the databases – use databasename

create table – create table tablename (colname datatype constraints,…..)

create a table name books with columns bookid(int), booktitle(varchar-50) and bookauthor(varchar-50) set bookid as primary key

create table books(bookid int,booktitle varchar(50),bookauthor varchar(50),primary key(bookid))

increase the size of booktitle to 100

alter table books modify column booktitle varchar(100)

add a new column publisher(varchar-50)

alter table books add column publisher varchar(50)

To add records

insert into books values(1,’programming in python’,’van rossum’,’packt’)

select first\_name,last\_name,salary from employee where salary=5000.00;

select first\_name,last\_name,salary from employee where first\_name like 'S%';

select \* from employee where first\_name like 'S%';

select avg(salary) as average from employee;

select max(salary) as maxsal from employee;

select min(salary) as minsal from employee;

select gender,min(salary) as minsal from employee group by gender;

Example for left join

select emp\_no,first\_name,last\_name,dept\_name from employee left join department on employee.dept\_no=department.dept\_no;

Example for right join

select emp\_no,first\_name,last\_name,dept\_name from employee right join department on employee.dept\_no=department.dept\_no;

To connect from python to MySQL databases

Install pymysql library – pip install pymysql

Script

import pymysql

conn = pymysql.connect(host=’localhost’,user=’root’,password=’’,db=’demodb\_1’)

cur = conn.cursor()

cur.execute(“select emp\_no,first\_name,last\_name from employee”)

# records = cur.fetchall() - returns all records

# cur.fetchone() - returns one record at a time

for rec in records:

print(rec[0],rec[1],rec[2])

conn.close()