



VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

DBMS ITE1003

J COMPONENT

Under Guidance of Prof. Bimal Kumar Ray

PAYROLL MANAGEMENT SYSTEM

SUBMITTED BY: -

ARADHYA MATHUR 17BIT0146

AYUSH DHIMAN 17BIT0306

ASMIT KUMAR SHARMA 17BIT0053

ABOUT

Payroll Management System is basically used to build an application program, that a company uses to manage a record of the employees working in the company. It records the information regarding salaries in detail along with the required details of the employees and the employer.

Only the administration has the legal rights to work with the system. Employees can only log on the system to see their current status. The Payroll Management System deals with the financial aspects of employee's salary, allowances, deductions, gross pay, net pay etc. and generation of pay-slips for a specific period. The outstanding benefit of Payroll Management System is its easy implementation.

A payroll system is software designed to organize all the tasks of employee payment and the filing of employee taxes. These tasks can include keeping track of hours, calculating wages, withholding taxes and deductions, printing and delivering checks and paying employment taxes to the government.

Payroll software often requires very little input from the employer. The employer is required to input employee wage information and hours then the software calculates the information and performs withholdings automatically. Most payroll software is automatically updated whenever a tax law changes and will remind employers when to file various tax forms.

DATA REQUIREMENTS

The following are data requirements for a Payroll management system:

Company have a Company Id denoted by CID, a name CName.

Company consists of different branches.

**There is one to many relations between company
and branch (E.g.)**

CName: - ABC Company, CID: - 1

Company has a branch (n number of branches), Each branch has a CID, Branch Id (BID) and Branch name (BNAME). There are several departments of a branch.

**There is one to many relations between company and
branch There is one to one relation between branch and
administrator (E.g.) CID: -1, BID: -1, BNAME: - IT**

CID: -1, BID: -2, BNAME: - HR

CID: -1, BID: -3, BNAME: - IT

CID: -1, BID: -4, BNAME: - HR

Each branch is headed by a Administrator.

**Each administrator has a Designation, Name, Department, Branch
Id (BID) and Administrator Id (AID), Administrator year of joining**

There is one to one relation between branch and administrator

There is one to many relation administrator and salary

There is one to many relation administrator and employee

(E.g.)

**Designation: -GM, Name: -MNQ PQU, Department: -IT, BID: -1, AID: -1
Admin Year Of joining: - 2000**

**Designation: -GM, Name: - PPQU QBG, Department: -IT, BID: -2, AID: -2
Admin Year Of joining: - 2003**

**Designation: -GM, Name: -ABC GHI, Department: -HR, BID: -3, AID: -3
Admin Year Of joining: - 2005**

**Designation: -GM, Name: -RTY UIO, Department: -HR, BID: -4, AID: -4
Admin Year Of joining: - 2004**

**Administrator employs Employee (n number of Employees).
Employee have a department and work under Administrator**

Employee have a Phone no, Date of Birth (DOB), Name (EName), Employee Id (EID), Designation, Basic and Administrator Id (AID) and Year of joining

**There is one to many relation between administrator and Employee
There is one to many relation between salary and Employee
There is one to one relation between attendance and employee (E.g.)**

Phone No: -9999654413, DOB: -6/6/1980, EName: - BHU JIJO, EID: - 1, Designation: - Manager, Basic: - 30000, AID: -1, Year of joining: -2010

Phone No: -9845223453, DOB: -16/2/1984, EName: - BHU JIJO, EID: - 2, Designation: - Manager, Basic: - 32000, AID: -1, Year of joining: -2010

Phone No: -9998715443, DOB: -26/6/1980, EName: - BHU JIJO, EID: - 3, Designation: - Manager, Basic: - 30800, AID: -1, Year of joining: -2010

Phone No: -9125533413, DOB: -8/6/1983, EName: - BHU JIJO, EID: - 4, Designation: - Manager, Basic: - 39000, AID: -1, Year of joining: -2010

Each Employee gets Salary which is paid by Administrator on basis of attendance

Attendance is mandatory for each employee

Attendance comprises of status (whether present or absent), Date, In-time, Out-time, leave type in-case of leave and leave id in-case of leave

There is one to one relation between attendance and employee (E.g.)

Status: - Present, Date: -11/7/18, In-time: -10:00, Out-time:19:00, Leave type: NULL, Leave id: -NULL

Status: - Present, Date: -15/7/18, In-time: -10:05, Out-time:19:01, Leave type: NULL, Leave id: -NULL

Status: Absent, Date: -11/7/18, In-time: -NULL, Out-time: NULL, Leave type: Fever, Leave id: - 1090

Administrator pays salary to n number of Employee

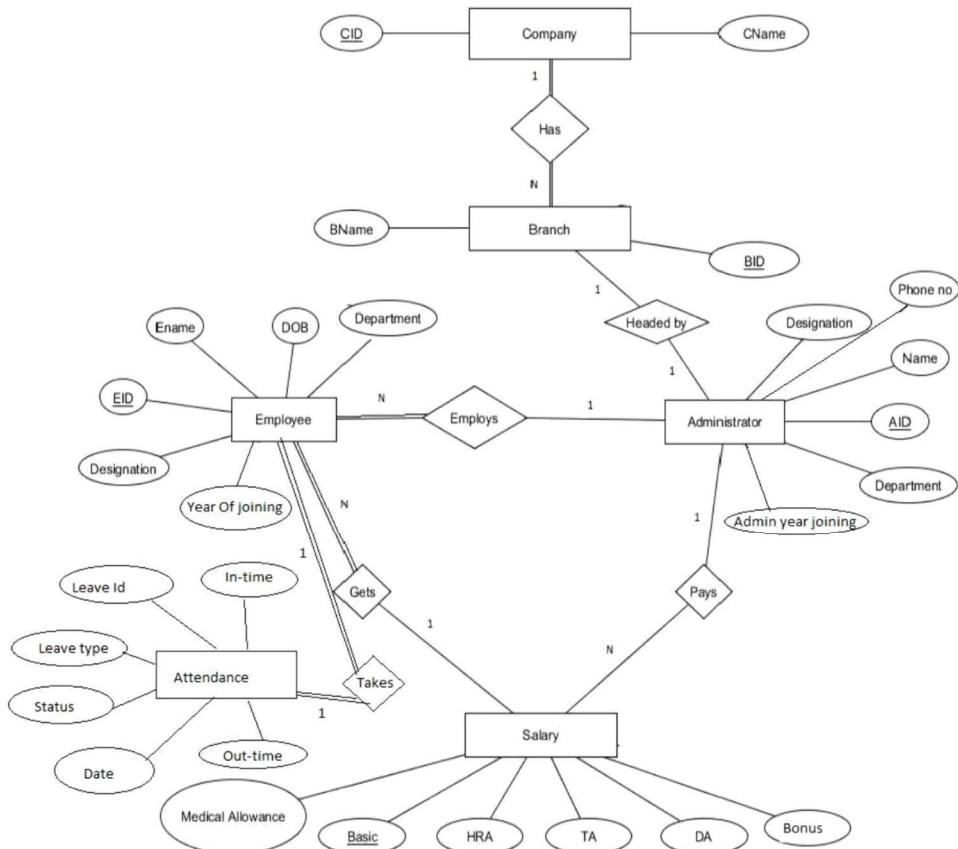
Salary has Basic (Basic payment), Medical Allowance, HRA, TA, DA, AID, Bonus

Salary is paid to employee on basis of their attendance There is one to many relation between salary and Employee There is one to many relation administrator and salary (E.g.)

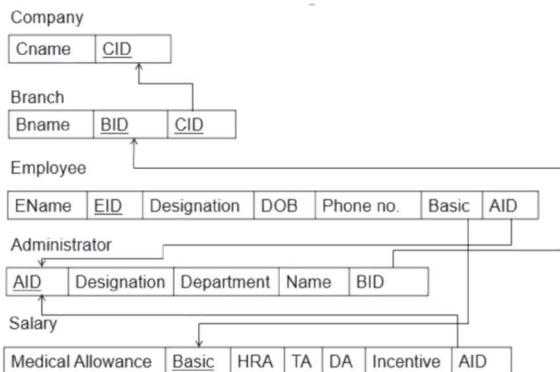
Basic: 30000, Medical Allowance: 5000, HRA: 2000, TA: 3000, DA: -5000, AID: -1, BONUS: -1000

Basic: 32000, Medical Allowance: 3000, HRA: 1000, TA: 6000, DA: -8000, AID: -2, BONUS: -1500

ER DIAGRAM



RELATIONAL SCHEMA



FUNCTIONAL REQUIREMENTS

1 Company:

Company has branches and a CID for reference

There are n number of branches in a company

CID is primary key

2 Branch:

Kind of work done by employee depends on the branch

Branch has administrators and a BID for reference

BID is primary key

CID is foreign key

3 Administrator:

Each branch is headed by Administrator

Administrator heads a branch, employs an employee and provides salary to employee.

Administrator is given AID for reference

AID is primary key

BID is foreign key

4 Employee:

Employee works in a department

Employee work under administrator and are provided salary.

Each employee is given EID for reference

EID is primary key

AID is foreign key

Basic is foreign key

5 Salary:

Basic salary is provided to employee on the basis of attendance

Salary is provided to employee and is paid by administrator

Basic is primary key

AID is foreign key

6 Attendance:

Salary is provided to employee on the basis of attendance Attendance has Status for reference
HRA, TA, DA, Bonus and medical allowance are provided on certain conditions
Leave Id is primary key
EID is foreign key

7 Search:

This module helps to search the employee details EID wise, salary wise and designation wise

8 Report:

Administrative reports contain reports like the Salary Report and the Employee Report

9 Performance requirements:

The overall system should be fast and error free.
System should be made to handle modification, removal and retrieval of data The system should be able to handle large amount of data comfortably.

10 Design constraints:

The system runs under Windows 10.
The application is developed on MySQL server as back end.

11 Availability:

This system is designed to run 24/7 and be readily available to the user.

12 Security:

The access to the software is given only to valid operators. We need a specific ID and password to get access to the software.

13 Hardware interfaces:

Memory minimum of 3GB RAM
Hard disk space of 20 GB
Monitor/Laptop
Mouse
Keyboard
Printer

SCENARIO

REMOVAL:

- 1) In case of new tax rules all the calculation of Salary will be changed, in that case we need to remove the Salary and create NEW SALARY according to new rules**
- 2) If timing (in-time and out-time) of company are changed, in that case old Attendance needs to be removed and the NEW ATTENDANCE according to new timings**

MODIFICATION:

- 1) In case of change in designation of an employee, we need to modify the designation.**
E.g. In case of promotion from Manager to Sr. Manager we need to modify.
- 2) In case of change in phone number of an employee, we need to modify the Phone no.**
E.g. In case of change in number from 9898989874 to 9009009009 we need to modify the Phone no value.

DATA RETRIEVAL:

- 1) In case of calculating pension for a retired person, we require his then salary as well as current salary. We need to retrieve the previous (old) salary of that person.**
- 2) In case of providing increment and promotion we require his then salary, year of joining, current designation and leaves. We need to retrieve his old information, work report and leaves of past**
- 3) In case of calculating number of leaves taken by an employee in a year. We need to retrieve his leaves from past months of the year**
- 4) In case of hiring an employee, we need to retrieve salary of previous employee at that designation. So, we can hire the new employee according to the salary of previous employee at the same designation**

NON-FUNCTIONAL REQUIREMENT

Expenses

The expenses of making and keeping up another framework are regular non-functional issues that affect the creation and improvement of a finance program. Most firms have spending plans, and venture costs must be inside the planning requirements. This implies a portion of the useful prerequisites might be excessively costly, making it impossible to wind up the real world, while others might be deferred in usage. Expenses of updating and keeping up a program must be sensible, or options must be tried to address the issues -, for example, purchasing an instant framework that is 80 percent done, while just 20 percent may should be redone.

Network Bandwidth

You can have the best payroll program, however except if you have appropriate Network Bandwidth, the framework won't function admirably. Contingent upon what number of individuals get to the framework in the meantime and on capacities the program offers, it can turn into a weight to the current system, backing off procedures to a stop.

Bandwidth is not the same as capacity - you may have enough stockpiling in your hard drive, yet the interchanges between the server and payroll may not be adequate.

Guarantee you record your current bandwidth and check on the off chance that you have to add to it, which could be expensive. Note that documentation in itself is thought to be a non-functional necessity

Flexibility

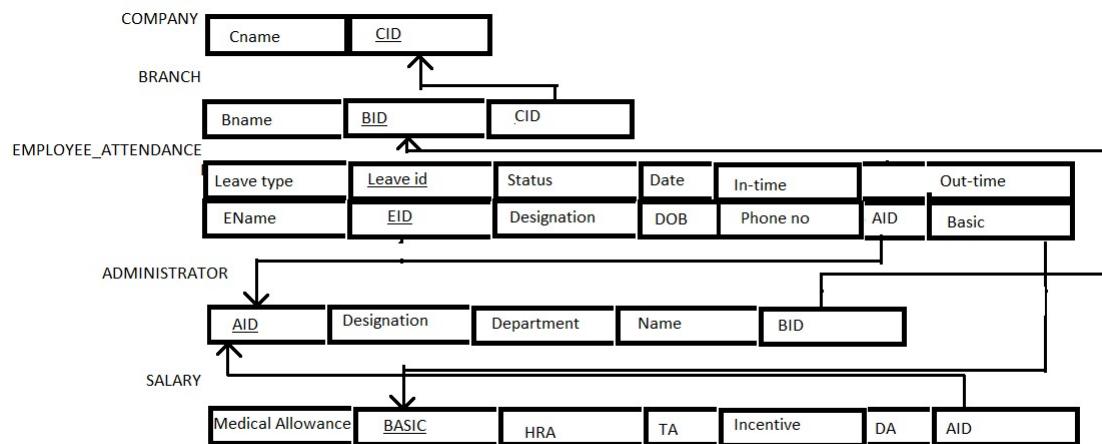
A payroll system must be quick enough to permit for easy changes. Flexibility is an important non-functional requirement of a payroll program. As laws and protocols change, the system must be updated as well. For instance, tax suppressions may change from one calendar year to the next, and these items should be altered in the system quickly. Firms may institute new benefits or modify current ones; the payroll system must allow for these updates to be made without much fuss. Without a high level of flexibility, the payroll program will become outdated, and a new one will need to be obtained or shaped, which is typically not in the plans.

Reliability

Users expect the payroll system to be reliable, a joint non-functional requirement for most systems. Information entered yesterday in the system should be there today. Correctness is part of the sense of reliability - payroll checks and reports must be mathematically correct, including calculations involving cents. Another issue related to reliability is security. Users assume that the system will be secured and the information will be kept safe. A tricky part of security for payroll systems is the process of backup, which should be done often and be extremely secure, not allowing nonauthorized

personnel access to the data. You don't want individuals changing data in payroll, creating havoc.

RELATIONAL DATABASE SCHEMA DIAGRAM



LOGIN AND CREATING DATABASE

```

MySQL 8.0 Command Line Client
Your MySQL connection id is 12
Server version: 8.0.12 MySQL Community Server - GPL

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE payroll_system;
Query OK, 1 row affected (0.25 sec)

mysql> use payroll_system;
Database changed
    
```

CREATE TABLE COMPANY

```
mysql> create table company(
    -> cname varchar(10) NOT NULL,
    -> cid varchar(10) NOT NULL,
    -> PRIMARY KEY(cid)
    -> );
Query OK, 0 rows affected (0.45 sec)
```

CREATE TABLE BRANCH

```
mysql> create table branch(
    -> bname varchar(20),
    -> bid varchar(10) NOT NULL,
    -> cid varchar(10) NOT NULL,
    -> CONSTRAINT fk_cid FOREIGN KEY(cid)
    -> REFERENCES company(cid)
    -> );
Query OK, 0 rows affected (0.61 sec)
```

ALTER TABLE ADMINISTRATOR

```
mysql> alter table branch
    -> add primary key(bid)
    -> ;
Query OK, 0 rows affected (1.17 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

ALTER TABLE ADMINSTRATOR

```
mysql> alter table administrator
    -> add foreign key(bid) REFERENCES branch(bid);
Query OK, 0 rows affected (1.76 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

CREATE TABLE EMPLOYEE

```
mysql> create table employee(
    -> ename varchar(20),
    -> eid varchar(10) NOT NULL,
    -> designation varchar(10) NOT NULL,
    -> dob date,
    -> phone_no varchar(10) not null,
    -> basic varchar(10) NOT NULL,
    -> aid varchar(10) NOT NULL,
    -> PRIMARY KEY(eid)
    -> );
Query OK, 0 rows affected (0.60 sec)
```

CREATE TABLE SALARY

```
mysql> create table salary(
    -> medical_allowance varchar(10) NOT NULL,
    -> basic varchar(10) NOT NULL,
    -> hra varchar(10),
    -> ta varchar(10),
    -> da varchar(10),
    -> incentive varchar(10),
    -> aid varchar(10) NOT NULL,
    -> FOREIGN KEY(aid) REFERENCES administrator(aid)
    -> );
Query OK, 0 rows affected (0.69 sec)
```

CREATE TABLE ATTENDANCE

```
mysql> create table attendance(
    -> leave_id varchar(10) NOT NULL,
    -> leave_type varchar(20) NOT NULL,
    -> status varchar(10) NOT NULL,
    -> date date,
    -> in_time varchar(10) NOT NULL,
    -> out_time varchar(10) NOT NULL,
    -> eid varchar(10) NOT NULL,
    -> FOREIGN KEY(eid) REFERENCES employee(eid)
    -> );
Query OK, 0 rows affected (0.53 sec)
```

ALTER TABLE EMPLOYEE AND COMPANY

```
mysql> alter table employee
    -> add constraint fk_aid
    -> FOREIGN KEY(aid) REFERENCES administrator(aid)
    -> ;
Query OK, 0 rows affected (1.61 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table company
    -> add constraint chk_cid
    -> check(cid>99 and cid<1000);
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

ALTER TABLE ADMINNISTRATOR, EMPLOYEE, BRANCH AND SALARY

```

mysql>
mysql> alter table administrator
      -> add constraint chk_aid
      -> check (aid>99 and aid<1000);
Query OK, 0 rows affected (0.11 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table salary
      -> add primary key(basic);
Query OK, 0 rows affected (1.18 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table employee
      -> add foreign key(basic) references salary(basic);
Query OK, 0 rows affected (1.76 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table branch
      -> add constraint chk_bid
      -> check (bid>99999 and bid<1000000);
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0

```

INSERTION INTO COMPANY

```

mysql> insert into company (cname, cid) values ('Sony', '100');
Query OK, 1 row affected (0.22 sec)

mysql> insert into company (cname, cid) values ('LG', '155');
Query OK, 1 row affected (0.25 sec)

mysql> insert into company (cname, cid) values ('Samsung', '285');
Query OK, 1 row affected (0.13 sec)

mysql> insert into company (cname, cid) values ('Dell', '125');
Query OK, 1 row affected (0.20 sec)

mysql> insert into company (cname, cid) values ('HP', '395');
Query OK, 1 row affected (0.25 sec)

```

```
mysql> select* from company;
```

cname	cid
Sony	100
Dell	125
LG	155
Samsung	285
HP	395

INSERTION INTO BRANCH

```

mysql> insert into branch (bname,bid,cid) values ('it','100001','100')
      -> ;
Query OK, 1 row affected (0.23 sec)

mysql> insert into branch (bname,bid,cid) values ('marketing','100002','100');
Query OK, 1 row affected (0.46 sec)

mysql> insert into branch (bname,bid,cid) values ('finance','100003','100');
Query OK, 1 row affected (0.29 sec)

mysql> insert into branch (bname,bid,cid) values ('it','155001','155');
Query OK, 1 row affected (1.11 sec)

mysql> insert into branch (bname,bid,cid) values ('marketing','155002','155');
Query OK, 1 row affected (0.17 sec)

mysql> insert into branch (bname,bid,cid) values ('finance','155003','155');
Query OK, 1 row affected (0.22 sec)

mysql> insert into branch (bname,bid,cid) values ('it','285001','285');
Query OK, 1 row affected (0.21 sec)

mysql> insert into branch (bname,bid,cid) values ('marketing','285002','285');
Query OK, 1 row affected (0.13 sec)

mysql> insert into branch (bname,bid,cid) values ('finance','285003','285');
Query OK, 1 row affected (0.21 sec)

mysql> select* from branch;
+-----+-----+-----+
| bname | bid  | cid  |
+-----+-----+-----+
| it   | 100001 | 100 |
| marketing | 100002 | 100 |
| finance | 100003 | 100 |
| it   | 155001 | 155 |
| marketing | 155002 | 155 |
| finance | 155003 | 155 |
| it   | 285001 | 285 |
| marketing | 285002 | 285 |
| finance | 285003 | 285 |
+-----+-----+-----+
9 rows in set (0.00 sec)

```

INSERTION INTO ADMINISTRATOR

```

mysql> insert into administrator(aid,designation,department,name,bid) values ('101','manager','it','arun','100001');
Query OK, 1 row affected (0.19 sec)

mysql> insert into administrator(aid,designation,department,name,bid) values ('102','hod','marketing','mahesh','100002');
Query OK, 1 row affected (0.23 sec)

mysql> insert into administrator(aid,designation,department,name,bid) values ('103','hod','finance','rajesh','100003');
Query OK, 1 row affected (0.19 sec)

mysql> insert into administrator(aid,designation,department,name,bid) values ('201','manager','it','ashul','155001');
Query OK, 1 row affected (0.13 sec)

mysql> insert into administrator(aid,designation,department,name,bid) values ('202','dean','marketing','aman','155002');
Query OK, 1 row affected (0.20 sec)

mysql> insert into administrator(aid,designation,department,name,bid) values ('203','hod','finance','pooja','155003');
Query OK, 1 row affected (0.08 sec)

mysql> select* from administrator;
+----+-----+-----+-----+-----+
| aid | designation | department | name   | bid   |
+----+-----+-----+-----+-----+
| 101 | manager    | it        | arun   | 100001 |
| 102 | hod        | marketing | mahesh | 100002 |
| 103 | hod        | finance   | rajesh | 100003 |
| 201 | manager    | it        | ashul  | 155001 |
| 202 | dean       | marketing | aman   | 155002 |
| 203 | hod        | finance   | pooja  | 155003 |
+----+-----+-----+-----+-----+
6 rows in set (0.00 sec)

```

INSERTION INTO SALARY

```

mysql> insert into salary(medical_allowance,basic,hra,ta,da,incentive,aid) values ('5000','25000','2500','1000','1500','500','101');
Query OK, 1 row affected (0.21 sec)

mysql> insert into salary(medical_allowance,basic,hra,ta,da,incentive,aid) values ('5000','40000','3000','1500','1800','800','101');
Query OK, 1 row affected (0.46 sec)

mysql> insert into salary(medical_allowance,basic,hra,ta,da,incentive,aid) values ('6500','45000','4000','1500','1900','1000','201');
Query OK, 1 row affected (0.18 sec)

mysql> insert into salary(medical_allowance,basic,hra,ta,da,incentive,aid) values ('7500','55000','5000','5500','1000','500','201');
Query OK, 1 row affected (0.17 sec)

mysql> insert into salary(medical_allowance,basic,hra,ta,da,incentive,aid) values ('9500','75000','8000','2500','4000','2500','202');
Query OK, 1 row affected (0.25 sec)

mysql> select* from salary;
+-----+-----+-----+-----+-----+-----+-----+
| medical_allowance | basic | hra   | ta   | da   | incentive | aid |
+-----+-----+-----+-----+-----+-----+-----+
| 5000            | 25000 | 2500  | 1000 | 1500 | 500      | 101  |
| 5000            | 40000 | 3000  | 1500 | 1800 | 800      | 101  |
| 6500            | 45000 | 4000  | 1500 | 1900 | 1000     | 201  |
| 7500            | 55000 | 5000  | 1000 | 500  | 201      | 201  |
| 9500            | 75000 | 8000  | 2500 | 4000 | 2500     | 202  |
+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

```

INSERTION INTO EMPLOYEE

```

mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('surya','4001','AM','21-OCT-98','9879589774','55000','101');
ERROR 1292 (22007): Incorrect date value: '21-OCT-98' for column 'dob' at row 1
mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('surya','4001','AM','1998-10-21','9879589774','55000','101');
Query OK, 1 row affected (0.24 sec)

mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('tanya','2508','AGM','1995-10-29','8879589800','45000','201');
Query OK, 1 row affected (0.29 sec)

mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('rishab','8129','GM','1995-07-04','8875589637','75000','202');
Query OK, 1 row affected (0.10 sec)

mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('aditya','3562','DGM','1995-04-14','9427272654','55000','101');
Query OK, 1 row affected (0.23 sec)

mysql> insert into employee(ename,eid,designation,dob,phone_no,basic ,aid) values ('anish','9860','GM','1995-08-14','9408502564','40000','101');
Query OK, 1 row affected (0.11 sec)

mysql> select* from employee;
+-----+-----+-----+-----+-----+-----+
| ename | eid  | designation | dob      | phone_no | basic  | aid   |
+-----+-----+-----+-----+-----+-----+
| tanya | 2508 | AGM       | 1995-10-29 | 8879589800 | 45000 | 201  |
| aditya | 3562 | DGM       | 1995-04-14 | 9427272654 | 55000 | 101  |
| surya | 4001 | AM        | 1998-10-21 | 9879589774 | 55000 | 101  |
| rishab | 8129 | GM        | 1995-07-04 | 8875589637 | 75000 | 202  |
| anish  | 9860 | GM        | 1995-08-14 | 9408502564 | 40000 | 101  |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

```

INSERTION INTO ATTENDANCE

```

mysql> insert into attendance(leave_type,leave_id,date,in_time,out_time,status,eid) values ('Vacation','28500','2018-04-05','NONE','NONE','Absent','4001');
Query OK, 1 row affected (0.34 sec)

mysql> insert into attendance(leave_type,leave_id,date,in_time,out_time,status,eid) values ('Medical','12550','2018-06-08','NONE','NONE','Absent','2508');
Query OK, 1 row affected (0.15 sec)

mysql> insert into attendance(leave_type,leave_id,date,in_time,out_time,status,eid) values ('NONE','NONE','2018-09-09','10:00','19:00','Present','8129');
Query OK, 1 row affected (0.21 sec)

mysql> insert into attendance(leave_type,leave_id,date,in_time,out_time,status,eid) values ('NONE','NONE','2018-10-04','09:00','20:00','Present','3562');
Query OK, 1 row affected (0.15 sec)

mysql> insert into attendance(leave_type,leave_id,date,in_time,out_time,status,eid) values ('MARRIAGE','36002','2018-01-01','NONE','NONE','Absent','9860');
Query OK, 1 row affected (0.18 sec)

mysql> select* from attendance;
+-----+-----+-----+-----+-----+-----+
| leave_id | leave_type | status | date      | in_time | out_time | eid   |
+-----+-----+-----+-----+-----+-----+
| 28500    | Vacation   | Absent | 2018-04-05 | NONE    | NONE    | 4001 |
| 12550    | Medical    | Absent | 2018-06-08 | NONE    | NONE    | 2508 |
| NONE     | NONE       | Present | 2018-09-09 | 10:00   | 19:00   | 8129 |
| NONE     | NONE       | Present | 2018-10-04 | 09:00   | 20:00   | 3562 |
| 36002    | MARRIAGE  | Absent | 2018-01-01 | NONE    | NONE    | 9860 |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

```

MERGING EMPLOYEE AND ATTENDANCE

```

mysql> select* from employee_attendance;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| ename | eid  | designation | dob      | phone_no | basic  | aid   | leave_id | leave_type | status | date      | in_time | out_time |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| tanya | 2508 | AGM       | 1995-10-11 | 987924174 | 45000 | 201  | 12550   | Medical   | Absent  | 2018-06-08 | None    | None    |
| aditya | 3562 | DGM       | 1995-04-14 | 9427272654 | 55000 | 101  | None    | None    | Present  | 2018-10-04 | 09:00   | 20:00   |
| surya | 4001 | AM        | 1998-10-21 | 9879589774 | 55000 | 101  | 28500   | Vacation  | Absent  | 2018-04-05 | None    | None    |
| rishab | 8129 | GM        | 1995-07-04 | 8875589637 | 75000 | 202  | None    | None    | Present  | 2018-09-09 | 10:00   | 19:00   |
| anish  | 9860 | GM        | 1995-08-14 | 9408502564 | 40000 | 101  | 36002   | Marriage  | Absent  | 2018-01-01 | None    | None    |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

```

SQL QUERY

```
mysql> select a.aid, a.bid, b.bname from administrator a, branch b where a.bid=b.bid;
+-----+-----+-----+
| aid | bid   | bname  |
+-----+-----+-----+
| 101 | 100001 | it      |
| 102 | 100002 | marketing |
| 103 | 100003 | finance  |
| 201 | 155001 | it      |
| 202 | 155002 | marketing |
| 203 | 155003 | finance  |
+-----+-----+-----+
6 rows in set (0.29 sec)
```

```
mysql> select c.cname, b.bid, b.bname from company c, branch b where c.cid=b.cid and cname='Sony';
+-----+-----+-----+
| cname | bid   | bname  |
+-----+-----+-----+
| Sony  | 100001 | it      |
| Sony  | 100002 | marketing |
| Sony  | 100003 | finance  |
+-----+-----+-----+
3 rows in set (0.05 sec)

mysql> select c.cname,b.bid,a.aid from company c,branch b, administrator a where c.cid=b.cid and cname='Sony' and a.bid=b.bid;
+-----+-----+-----+
| cname | bid   | aid   |
+-----+-----+-----+
| Sony  | 100001 | 101  |
| Sony  | 100002 | 102  |
| Sony  | 100003 | 103  |
+-----+-----+-----+
3 rows in set (0.00 sec)

mysql> select c.cid,x.bid,x.aid from company c,(select * from branch natural join administrator) x where c.cid=x.cid and c.cname='Sony';
+-----+-----+-----+
| cid  | bid   | aid   |
+-----+-----+-----+
| 100  | 100001 | 101  |
| 100  | 100002 | 102  |
| 100  | 100003 | 103  |
+-----+-----+-----+
3 rows in set (0.06 sec)

mysql> select cname,cid,bid,bname from company natural join branch;
+-----+-----+-----+-----+
| cname | cid  | bid   | bname  |
+-----+-----+-----+-----+
| Sony  | 100  | 100001 | it      |
| Sony  | 100  | 100002 | marketing |
| Sony  | 100  | 100003 | finance  |
| LG    | 155  | 155001 | it      |
| LG    | 155  | 155002 | marketing |
| LG    | 155  | 155003 | finance  |
| Samsung | 285 | 285001 | it      |
| Samsung | 285 | 285002 | marketing |
| Samsung | 285 | 285003 | finance  |
+-----+-----+-----+-----+
9 rows in set (0.00 sec)
```

```

mysql> select b.cid,b.bid,b.bname,a.aid,a.designation,a.name from administrator a,branch b where a.bid=b.bid;
+-----+-----+-----+-----+-----+
| cid | bid | bname | aid | designation | name |
+-----+-----+-----+-----+-----+
| 100 | 100001 | it | 101 | manager | arun |
| 100 | 100002 | marketing | 102 | hod | mahesh |
| 100 | 100003 | finance | 103 | hod | rajesh |
| 155 | 155001 | it | 201 | manager | ashul |
| 155 | 155002 | marketing | 202 | dean | aman |
| 155 | 155003 | finance | 203 | hod | pooja |
+-----+-----+-----+-----+-----+
6 rows in set (0.01 sec)

mysql> select a.aid,a.name from administrator a,branch b where a.bid=b.bid and bname='marketing';
+-----+
| aid | name |
+-----+
| 102 | mahesh |
| 202 | aman |
+-----+
2 rows in set (0.00 sec)

mysql> select c.cname from company c,(select * from branch natural join administrator) x where x.cid=c.cid and x.name ='arun';
+-----+
| cname |
+-----+
| Sony |
+-----+
1 row in set (0.00 sec)

mysql> select e.ename,e.eid,a.name from administrator a,employee e where a.aid=e.aid;
+-----+-----+-----+
| ename | eid | name |
+-----+-----+-----+
| tanya | 2508 | ashul |
| aditya | 3562 | arun |
| surya | 4001 | arun |
| rishab | 8129 | aman |
| anish | 9860 | arun |
+-----+-----+-----+
5 rows in set (0.12 sec)

mysql> select e.ename from administrator a,employee e where a.aid=e.aid and a.name='arun';
+-----+
| ename |
+-----+
| aditya |
| surya |
| anish |
+-----+
3 rows in set (0.02 sec)

mysql> select e.eid,e.ename from administrator a, employee e, branch b where a.aid=e.aid and a.bid=b.bid and b.bname='it';
+-----+-----+
| eid | ename |
+-----+-----+
| 3562 | aditya |
| 4001 | surya |
| 9860 | anish |
| 2508 | tanya |
+-----+-----+
4 rows in set (0.00 sec)

mysql> select e.eid, e.ename from employee e, (select * from administrator natural join branch) x where x.aid=e.aid and x.bname='it';
+-----+-----+
| eid | ename |
+-----+-----+
| 3562 | aditya |
| 4001 | surya |
| 9860 | anish |
| 2508 | tanya |
+-----+-----+
4 rows in set (0.00 sec)

```

```
mysql> select e.eid,e.ename from administrator a, employee e, branch b, company c where a.aid=e.aid and a.bid=b.bid and b.cid=c.cid and c.cname='Lg';
+-----+-----+
| eid | ename |
+-----+-----+
| 2508 | tanya |
| 8129 | rishab |
+-----+-----+
2 rows in set (0.00 sec)
```

```
mysql> select s.medical_allowance from employee e,salary s where e.basic=s.basic and e.ename='surya';
+-----+
| medical_allowance |
+-----+
| 7500 |
+-----+
1 row in set (0.11 sec)
```

```
mysql> select e.eid, s.hra,s.ta,s.da from employee e,salary s where e.basic=s.basic and e.designation='GM';
+-----+-----+-----+
| eid | hra | ta | da |
+-----+-----+-----+
| 8129 | 8000 | 2500 | 4000 |
| 9860 | 3000 | 1500 | 1800 |
+-----+-----+-----+
2 rows in set (0.00 sec)

mysql> select c.cname,b.bname,a.name,e.ename from company c,branch b,administrator a, employee e, salary s where c.cid=b.cid and b.bid=a.bid and a.aid=e.aid and e.basic=s.basic and s.incentive=500;
+-----+-----+-----+
| cname | bname | name | ename |
+-----+-----+-----+
| Sony | it | arun | aditya |
| Sony | it | arun | surya |
+-----+-----+-----+
2 rows in set (0.04 sec)
```

```
mysql> select c.cname,z.bname,z.name,z.ename from company c,(select b.cid,b.bname,y.name,y.ename from branch b,(select a.bid,a.name,x.ename from administrator a,(select e.ename,e.aid from salary s,employee e where e.basic=s.basic and incentive=500) x where a.aid=x.aid) y where b.bid=y.bid) z where z.cid=c.cid;
+-----+-----+-----+
| cname | bname | name | ename |
+-----+-----+-----+
| Sony | it | arun | aditya |
| Sony | it | arun | surya |
+-----+-----+-----+
2 rows in set (0.00 sec)
```

ORDER BY

```
mysql> use payroll_system
Database changed
mysql> SELECT incentive
   -> FROM salary
   -> WHERE basic='25000'
   -> ORDER BY aid ASC;
+-----+
| incentive |
+-----+
| 500 |
+-----+
1 row in set (0.09 sec)

mysql> SELECT ename
   -> FROM employee
   -> WHERE aid='101'
   -> ORDER BY basic ASC;
+-----+
| ename |
+-----+
| anish |
| aditya |
| surya |
+-----+
3 rows in set (0.12 sec)
```

GROUP BY

```
mysql> SELECT basic, MIN(hra) AS "LOWEST HRA"
    -> FROM salary
    -> GROUP BY aid;
+-----+-----+
| basic | LOWEST HRA |
+-----+-----+
| 25000 | 2500
| 45000 | 4000
| 75000 | 8000
+-----+
3 rows in set (0.70 sec)

mysql>
```

HAVING

```
mysql> SELECT ename, aid, eid, MIN(basic) AS "min basic"
    -> FROM employee
    -> GROUP BY designation
    -> HAVING MIN(basic) < 56000 ;
+-----+-----+-----+-----+
| ename   | aid   | eid   | min basic |
+-----+-----+-----+-----+
| Aradhya | 201  | 2508  | 45000
| aditya  | 101  | 3562  | 55000
| surya   | 101  | 4001  | 55000
| rishab  | 202  | 8129  | 40000
+-----+-----+-----+
4 rows in set (0.00 sec)
```

UPDATE

```
mysql> update administrator
    -> set designation='dean',department='research'
    -> where aid= 101;
Query OK, 1 row affected (0.21 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from administrator;
+-----+-----+-----+-----+-----+
| aid | designation | department | name  | bid  |
+-----+-----+-----+-----+-----+
| 101 | dean      | research   | arun   | 100001
| 102 | hod       | marketing  | mahesh | 100002
| 103 | hod       | finance    | rajesh | 100003
| 201 | manager    | it         | ashul  | 155001
| 202 | dean      | marketing  | aman   | 155002
| 203 | hod       | finance    | pooja  | 155003
+-----+-----+-----+-----+
6 rows in set (0.00 sec)
```

```

mysql> update branch
      -> set bname='research'
      -> where bid=100001;
Query OK, 1 row affected (0.19 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from branch;
+-----+-----+-----+
| bname | bid  | cid  |
+-----+-----+-----+
| research | 100001 | 100 |
| marketing | 100002 | 100 |
| finance | 100003 | 100 |
| it | 155001 | 155 |
| marketing | 155002 | 155 |
| finance | 155003 | 155 |
| it | 285001 | 285 |
| marketing | 285002 | 285 |
| finance | 285003 | 285 |
+-----+-----+-----+
9 rows in set (0.00 sec)

```

DELETE

```

mysql> DELETE from branch where bid='100001';
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails ('payroll_system'.'administrator', CONSTRAINT 'administrator_ibfk_1' FOREIGN KEY ('bid') REFERENCES 'branch' ('bid'))
mysql> DELETE from branch where bname='research';
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails ('payroll_system'.'administrator', CONSTRAINT 'administrator_ibfk_1' FOREIGN KEY ('bid') REFERENCES 'branch' ('bid'))
mysql> select from administrator where designation='manager';
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails ('payroll_system'.'employee', CONSTRAINT 'fk_aid' FOREIGN KEY ('aid') REFERENCES 'administrator' ('aid'))
mysql> delete from administrator where designation='manager';
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails ('payroll_system'.'employee', CONSTRAINT 'fk_aid' FOREIGN KEY ('aid') REFERENCES 'administrator' ('aid'))
mysql>

```

PL SQL

PROCEDURE

```

mysql> DELIMITER //
mysql> CREATE PROCEDURE create_hire_table()
      -> BEGIN
      -> CREATE TABLE hire_table(
      -> name VARCHAR(10),
      -> primary key(name)
      -> );
      -> END //
Query OK, 0 rows affected (0.31 sec)

mysql>

```

```
mysql> insert into hire_table(name) values ("Mob");
Query OK, 1 row affected (0.24 sec)

mysql> select * from hire_table;
+-----+
| name |
+-----+
| Bob  |
| Mob  |
+-----+
2 rows in set (0.00 sec)
```

FUNCTION

```
mysql> create function edata (s CHAR(20))
      -> RETURNS CHAR(20) DETERMINISTIC
      -> RETURN CONCAT('Aradhya, ',s,'!');
Query OK, 0 rows affected (0.34 sec)

mysql> select edata('Mathur');
+-----+
| edata('Mathur')  |
+-----+
| Aradhya, Mathur! |
+-----+
1 row in set (0.07 sec)
```

TRIGGER

```
mysql> create table empaudit(
      -> id INT AUTO_INCREMENT PRIMARY KEY,
      -> eid int not null,
      -> ename VARCHAR(50) NOT NULL,
      -> changedat DATETIME DEFAULT NULL,
      -> action VARCHAR(50) DEFAULT NULL
      -> );
Query OK, 0 rows affected (0.66 sec)
```

```

mysql> CREATE TRIGGER before_employee_update
    -> BEFORE UPDATE ON employee
    -> FOR EACH ROW
    -> BEGIN
    ->     INSERT INTO empaudit
    ->         SET action = 'update',
    ->             eid=OLD.eid,
    ->             ename=OLD.ename,
    ->             changedat= NOW();
    -> END$;
Query OK, 0 rows affected (0.55 sec)

mysql> DELIMITER ;
mysql> SHOW TRIGGERS;
+-----+-----+-----+-----+-----+-----+
| Trigger | Event | Table | Statement | collation_connection | Database Collation |
+-----+-----+-----+-----+-----+-----+
| before_employee_update | UPDATE | employee | BEGIN
    INSERT INTO empaudit
        SET action = 'update',
        eid=OLD.eid,
        ename=OLD.ename,
        changedat= NOW();
END | BEFORE | 2018-11-12 18:26:05.28 | STRICT_TRANS_TABLES,NO_ENGINE_SUBSTITUTION | root@localhost | cp850
+-----+-----+-----+-----+-----+-----+
1 row in set (0.12 sec)

mysql> UPDATE employee
    -> SET
    ->     ename='Nohan'
    -> WHERE
    ->     eid=79;
Query OK, 0 rows affected (0.28 sec)
Rows matched: 0  Changed: 0  Warnings: 0

mysql> SELECT * FROM empaudit;
Empty set (0.00 sec)

```

```

mysql> UPDATE employee
    -> SET
    ->     ename='Aradhya'
    -> WHERE
    ->     eid=2508;
Query OK, 1 row affected (0.28 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from employee;
+-----+-----+-----+-----+-----+-----+-----+
| ename | eid | designation | dob       | phone_no | basic | aid |
+-----+-----+-----+-----+-----+-----+-----+
| Aradhya | 2508 | AGM          | 1995-10-29 | 8879589800 | 45000 | 201 |
| aditya | 3562 | DGM          | 1995-04-14 | 9427272654 | 55000 | 101 |
| surya | 4001 | AM           | 1998-10-21 | 9879589774 | 55000 | 101 |
| rishab | 8129 | GM           | 1995-07-04 | 8875589637 | 75000 | 202 |
| anish | 9860 | GM           | 1995-08-14 | 9408502564 | 40000 | 101 |
+-----+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> select * from empaudit;
+-----+-----+-----+-----+
| id | eid | ename | changedat      | action |
+-----+-----+-----+-----+
| 1  | 2508 | tanya | 2018-11-13 12:42:32 | update |
+-----+-----+-----+-----+
1 row in set (0.00 sec)

```

TRIGGER

```
mysql> create table compaudit(
    -> id INT AUTO_INCREMENT PRIMARY KEY,
    -> cid int not null,
    -> cname VARCHAR(50) NOT NULL,
    -> changedat DATETIME DEFAULT NULL,
    -> action VARCHAR(50) DEFAULT NULL
    -> );
```

```
mysql> DELIMITER $$  
mysql> CREATE TRIGGER before_company_update  
-> BEFORE UPDATE ON company  
-> FOR EACH ROW  
-> BEGIN  
-> INSERT INTO compaudit  
-> SET action = 'update',  
-> cid=OLD.cid,  
-> cname=OLD.cname,  
-> changedat= NOW();  
-> END$$  
Query OK, 0 rows affected (0.27 sec)  
  
mysql> DELIMITER ;
```

```

mysql> SHOW TRIGGERS;
+-----+-----+-----+-----+-----+-----+-----+
| Trigger | Event | Table | Statement | character_set_client | collation_connection | Database Collation |
+-----+-----+-----+-----+-----+-----+-----+
| before_company_update | UPDATE | company | BEGIN
    INSERT INTO companyaudit
    SET action = 'update',
    eidOLD.eid,
    cnameOLD.cname,
    changedate= NOW();
END | BEFORE | 2018-11-13 12:36:57.42 | STRICT_TRANS_TABLES,NO_ENGINE_SUBSTITUTION | root@localhost | cp850                 | cp850_general_ci      | utf8mb4_0900_ai_ci |
| before_employee_update | UPDATE | employee | BEGIN
    INSERT INTO empaudit
    SET action = 'update',
    eidOLD.eid,
    enameOLD.ename,
    changedate= NOW();
END | BEFORE | 2018-11-12 18:26:05.28 | STRICT_TRANS_TABLES,NO_ENGINE_SUBSTITUTION | root@localhost | cp850                 | cp850_general_ci      | utf8mb4_0900_ai_ci |
+-----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.13 sec)

```

```
mysql> UPDATE company
      -> SET
      -> cname='Apple'
      -> WHERE
      -> cid=100;
Query OK, 1 row affected (0.20 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from company;
+-----+-----+
| cname | cid  |
+-----+-----+
| Apple | 100 |
| Dell  | 125 |
| LG    | 155 |
| Samsung | 285 |
| HP   | 395 |
+-----+-----+
5 rows in set (0.00 sec)

mysql> select * from compaudit;
+----+----+-----+-----+-----+
| id | cid | cname | changedat           | action |
+----+----+-----+-----+-----+
| 1  | 100 | Sony  | 2018-11-13 12:38:53 | update |
+----+----+-----+-----+-----+
1 row in set (0.00 sec)
```