Program: 2

Professors have a PROFID, a name, an age, a rank, and a research specialty. Projects have a project number, a sponsor name (e.g. UGC/AICTE/...), a starting date, an ending date, and a budget. Graduate students have an USN, a name, an age, and a degree program (e.g. MCA/ MPhil/BE/ME ..). Each project is managed exactly by one professor (known as the project's principal investigator). Each project is worked on by one or more professors (known as the project's co-investigators). Professors can manage/work on multiple projects. Each project is worked on by one or more graduate students (known as the project's research assistants). Graduate students can work on multiple projects. Each professor can supervise many students. A student who is working on a project can be supervised by only one professor.

Queries

a) Retrieve the names of all professors who do not have an ongoing project of more than 1 lakh.

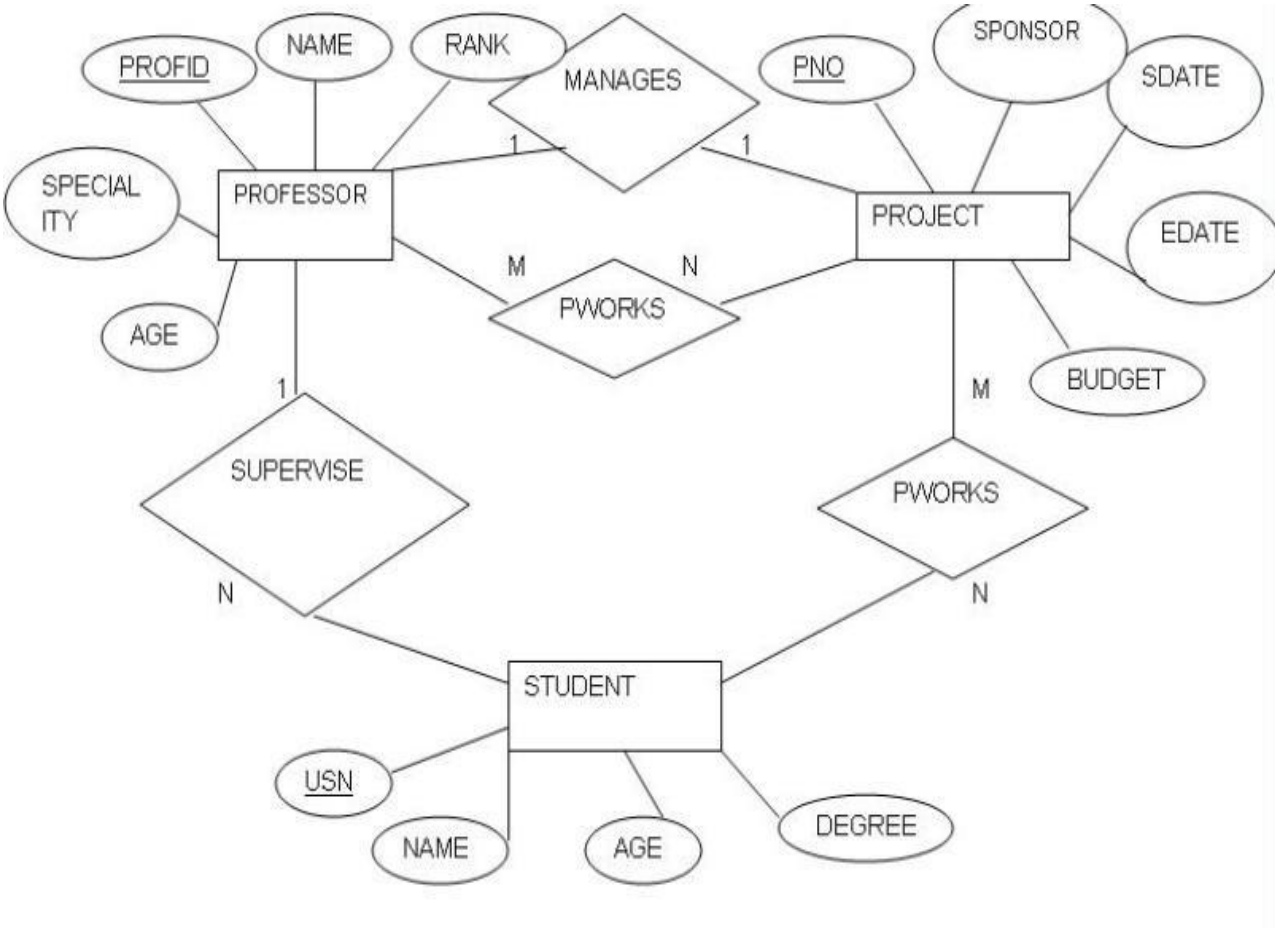
b) Retrieve the names of all graduate students along with their professors under whom they work and project sponsor.

c) List the professors and sum of the budget of their projects started after 2005 but ended in 2010.

d) List the names of professors who has a total worth of project greater than the average budget of projects sanctioned

e) List the professors who work on all the projects.

ER DIAGRAM



RELATIONAL SCHEMA

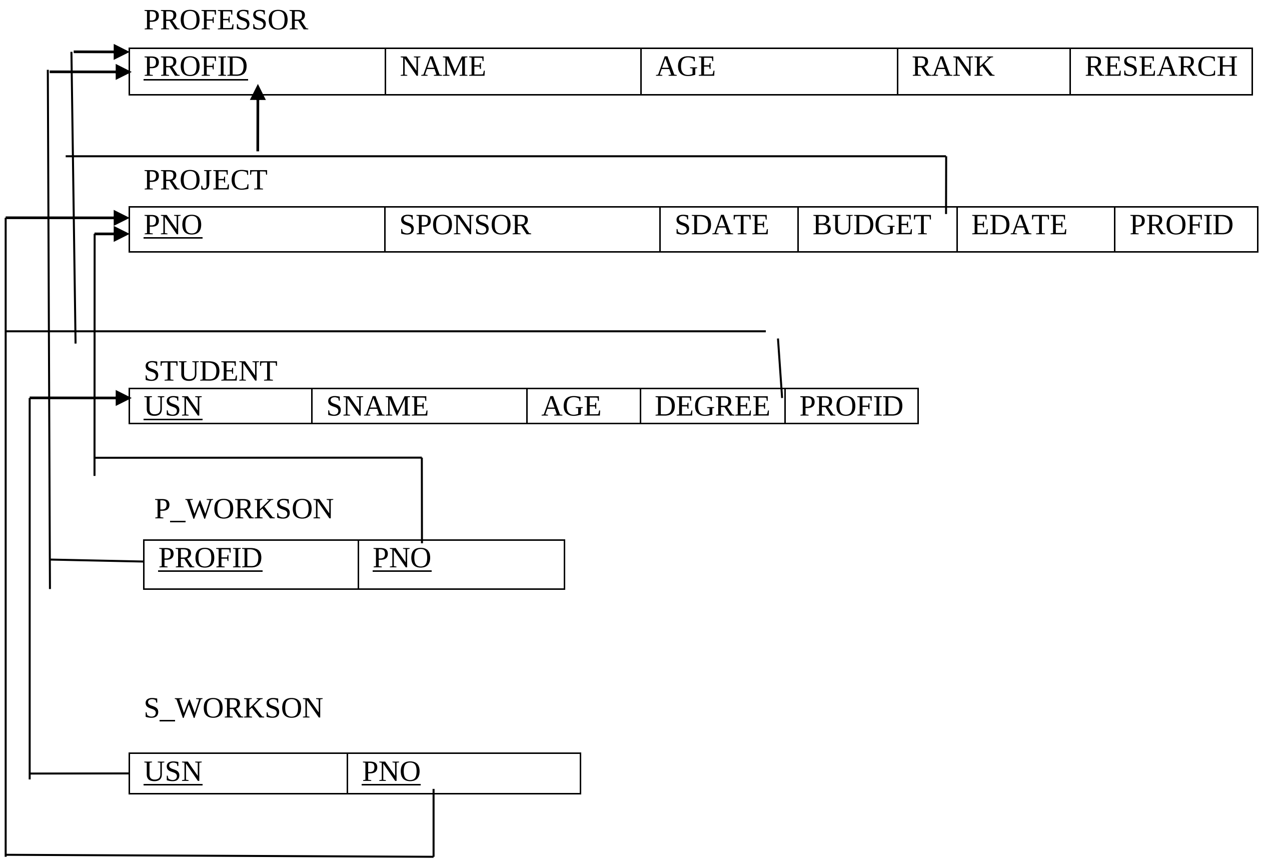


Table creation:

1) create table professor2(profid number(3) primary key ,name varchar(20),age number(3), rank number(3), research varchar(20));

2) create table projects2 (pno number(3) primary key,sponsor varchar(10), sdate date, edate date, budget number(5), p_investigator number(3) references professor(profid));

3) create table student2(usn number(5) primary key,sname varchar(20),age number(3),degree varchar(10), profid number(3) references professor(profid));

4)create table pworkson(profid number(3) references professor(profid), pno number(3) references projects(pno), primary key(profid,pno))

5)create table sworkson(usn number(5) references student(usn),pno number(3) references projects(pno), primary key(usn,pno));

Table Description:

```
desc professor
Name                                    Null?    Type
---------------------------------------- -------- ---------------------
PROFID                                    NOT NULL NUMBER(3)
```

```
NAME                                   VARCHAR2(20)
AGE                                  NUMBER(3)
RANK                                   NUMBER(3)
RESEARCH                                   VARCHAR2(20)

desc projects
Name                              Null?    Type
----------------------------------------- -------- ----------------------------
PNO                               NOT NULL NUMBER(3)
SPONSOR                                     VARCHAR2(10)
SDATE                                   DATE
EDATE                                   DATE
BUDGET                                   NUMBER(5)
P_INVESTIGATOR                                   NUMBER(3)


desc student
Name                              Null?    Type
----------------------------------------- -------- ----------------------------
USN                               NOT NULL NUMBER(5)
SNAME                                   VARCHAR2(20)
AGE                                  NUMBER(3)
DEGREE                                   VARCHAR2(10)
PROFID                                  NUMBER(3)

desc pworkson
Name                              Null?    Type
----------------------------------------- -------- ----------------------------
PROFID                              NOT NULL NUMBER(3)
PNO                               NOT NULL NUMBER(3)

desc sworkson
Name                              Null?    Type
----------------------------------------- -------- ----------------------------
USN                               NOT NULL NUMBER(5)
PNO                               NOT NULL NUMBER(3)
```

Values inside Tables:

select * from professor;

```
   PROFID  NAME           AGE       RANK     RESEARCH
---------- -------------------- ---------- ---------- --------------------
        1    hemanth              35           1                 sp
        2    vishwanath            35          1                 os
        3   r aghu                  31          1               unix
```

```
         4    kumar                      28         1                oops
         5   basavaraju                  28         1             oomd

 select * from projects;

     PNO  SPONSOR    SDATE      EDATE        BUDGET    P_INVESTIGATOR
---------- ---------- --------- --------- ---------- --------------
       111  vtu        12-JAN-12    12-JAN-2005        100000            1
       222  govt        18-MAR-13  18-MAR-2004      400000            2
       333  vtu        22-AUG-14   22-AUG-2005      600000            3
       444  central    20-APR-14  20-APR-2010      75000              4
       555  central    25-FEB-12  25-FEB-2006     90000             5


 select * from student
       USN SNAME                      AGE DEGREE        PROFID
---------- -------------------- ---------- ---------- ----------
       123 shashi                      22 mca              1
       124 rajath                     21 mca              2
       125 harish                     21 be              3
       126 ram                        24 msc              4
       127 kiran                      22 mca              5

 select * from pworkson;

    PROFID        PNO
---------- ----------
         1        111
         2        222
         3        333
         4        444
         5        555
         2        111
         2        333
         2        444
         2        555

select * from sworkson;

       USN        PNO
---------- ----------
       123        111
       124        222
       125        333
       126        444
       127        555
```

Queries:

Query 1:) Retrieve the names of all professors who do not have an ongoing project of more than 1 lakh.

```
 select name from professor p , pworkson pw , projects pj where p.profid = pw.profid and
pw.pno=pj.pno and budget >100000;
```

```
NAME
--------------------
hemanth
raghu
kumar
basavaraju
```

query 2:) Retrieve the names of all graduate students along with their professors under whom they work and project sponsor.

```
 select sname,name as "professor", sponsor  from professor p ,student s , sworkson sw , projects pr
where p.profid=s.profid and s.usn=sw.usn and sw.pno=pr.pno
```

```
SNAME                professor            SPONSOR
-------------------- -------------------- ----------
shashi              vishwanath          vtu
rajath             hemanth             govt
harish              raghu              vtu
ram                kumar              central
kiran              basavaraju          central
```

Queries3: List the professors and sum of the budget of their projects started after 2005 but ended in 2010.

```
select name, (select sum(budget) from projects where p_investigator=p.profid group by
p_investigator) as "total budget" from  professor p , projects where profid=p_investigator and
sdate like '%15' and edate like '%10'
```

(or)

```
select pf.name,sum(pj.budget) as Total_budget  from work_prof wp, professor pf, project pj where
pf.profid = wp.rofidid and pj.pno=wp.pno and EXTRACT(YEAR FROM sdate)>2005 and
EXTRACT(YEAR FROM edate)=2010 group by pf.name;
```

```
NAME                 total budget
-------------------- ------------
vishwanath               120000
basavaraju               90000
```

query4: List the names of professors who has a total worth of project greater than the average budget   of projects sanctioned

```
select name from professor ,projects where profid= p_investigator and budget>(select avg(budget)
from projects)
```

```
NAME
```

```
----------------
vishwanath
basavaraju
```

query5:) List the professors who work on all the projects.

```
select name from professor where profid=(select p.profid from pworkson p group by p.profid having count(p.profid)=(select count(pno) from projects))
```

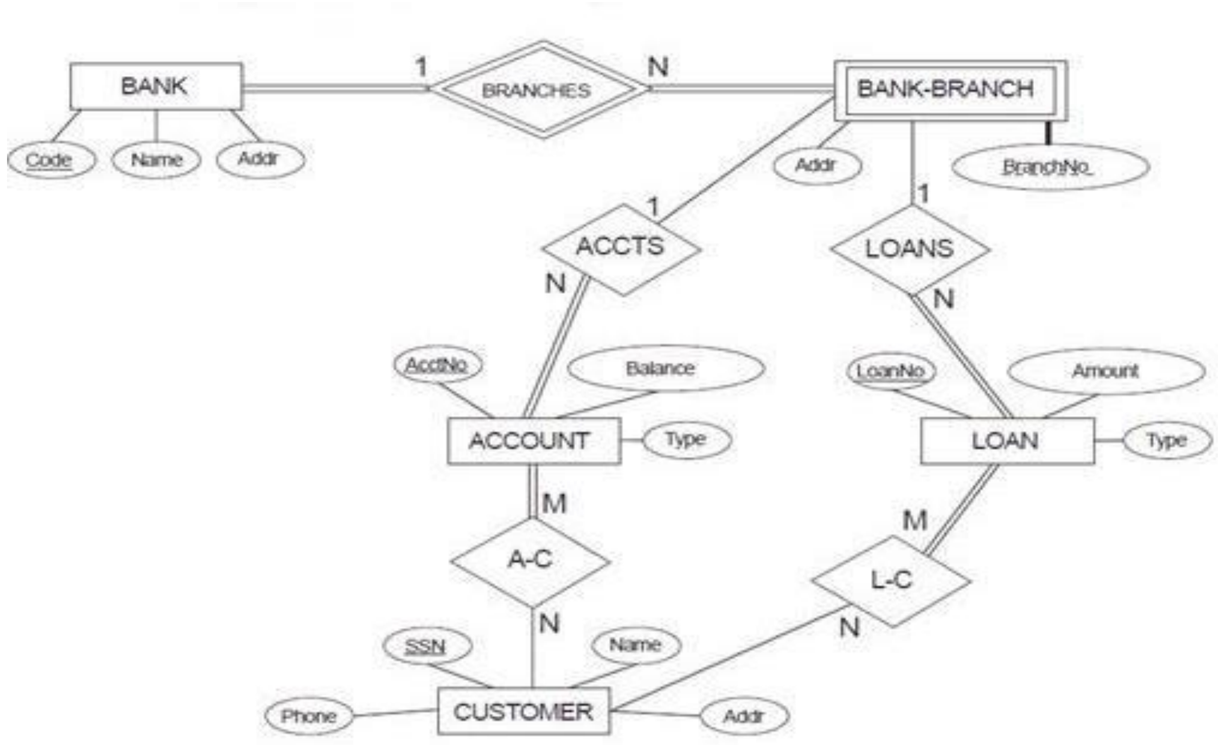
```
NAME
------------------
hemanth
```

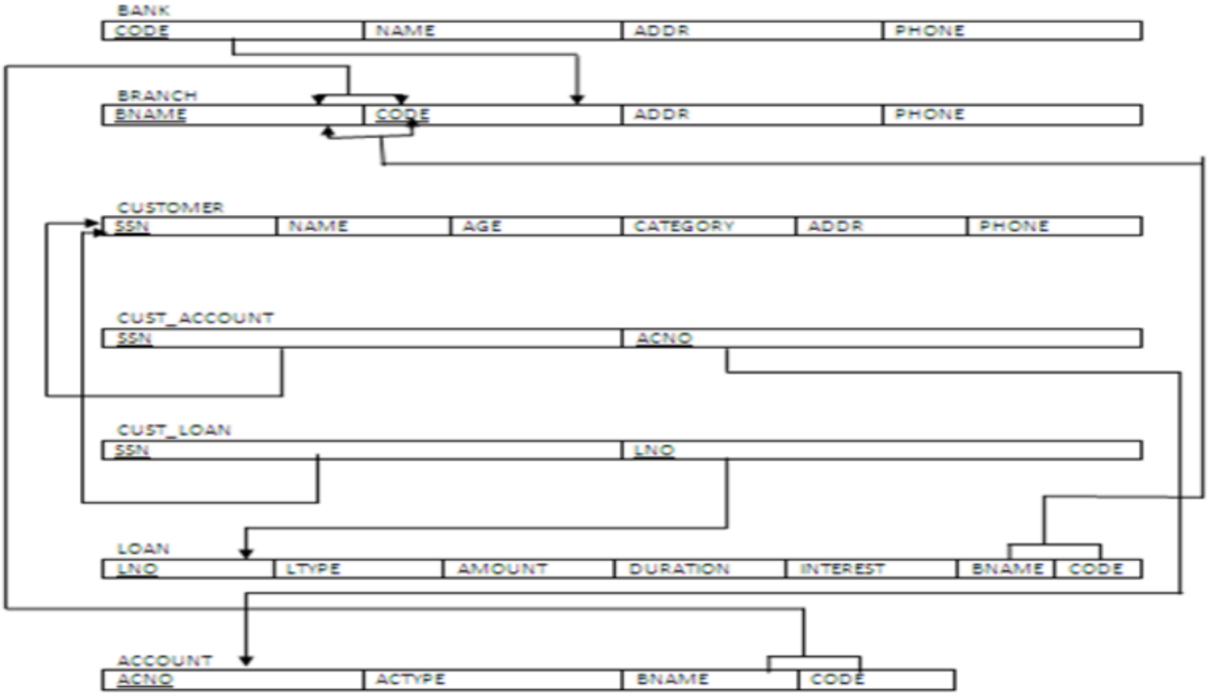
Program: 3

A bank has many branches and a large number of customers. Bank is identified by its code.Other details like name, address and phone for each bank are also stored. Each branch isidentified by its bank. Branch has name, address and phone. A customer can open differentkinds of accounts with the branches. An account can belong to more than one customer.Customers are identified by their SSN, name, address and phone number. Age is used as afactor to check whether customer is a major. There are different types of loans, each identifiedby a loan number. A customer can take more than one type of loan and a loan can be given tomore than one customer. Loans have a duration and interest rate. Make suitable assumptionsand use them in showing maximum and minimum cardinality ratios.

Queries:
a) List the details of customers who have joint account and also have at least one loan.
b) List the details of the branch which has given maximum loan.
c) List the details of saving accounts opened in the SBI branches located at Bangalore.
d) List the name of branch along with its bank name and total amount of loan given by it.
e) Retrieve the names of customers who have accounts in all the branches located in a specific city

ER diagram:





Create Table Query

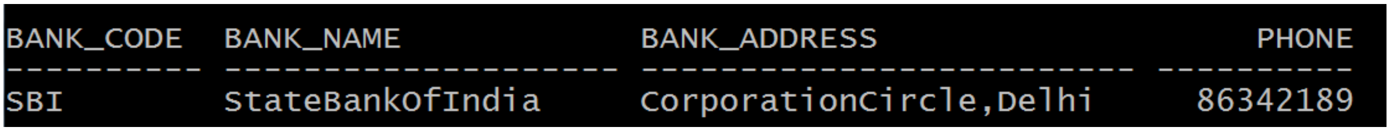
```
1)   SQL> create table bank(
          bank_code varchar2(10) primary key,
          bank_name varchar2(20),
          bank_address varchar2(25),
          phone number(10));
2)   SQL> create table branch(
          branch_name varchar2(20) primary key,
          city   varchar2(25), phone number(10),
          bank_code varchar2(10) references bank(bank_code));

3)   SQL> create table customer(
          ssn number(9) primary key,
          cust_name varchar2(25),
          cust_address varchar2(25), cust_phone number(10),
          age number(2) check(age >18));
4)   SQL> create table account(
          account_no number(10) primary key,
          account_type varchar2(10),
      account_access varchar(10),
      amount number(10,2),
      branch_name varchar2(20) references branch(branch_name));
5)   SQL> create table depositor(
          account_no number(10) references account(account_no),
          ssn number(9) references customer(ssn));
6)   SQL> create table loan(
          loan_no  number(10) primary key,
          duration number(10),
          interest_rate number(10),
          loan_amount number(10,2),
          branch_name varchar2(20) references branch(branch_name));
7)  SQL> create table borrower(
          ssn number(10) references customer(ssn),
          loan_no number(10) references loan(loan_no));
```

Insert Into

```
1)  SQL> insert into bank values ('SBI','StateBankOfIndia','CorporationCircle,Delhi',86342189);

        1 Row Created.
2)  SQL> insert into branch values ('SBIJayanagar','JayaNagar,Bangalore',78945612,'SBI');

        1 Row Created.
3)  SQL> insert into customer values(852147963,'Vasanth','Jayanagar',85223147,35);

        1 Row Created.
4)  SQL> insert into account values(456456,'savings','single',50000,'SBIT.Nagar');

        1 Row Created.
5)  SQL> insert into depositor values (456456,357869142);

        1 Row Created.
6)  SQL> insert into loan values(123456,20,10,1000000,'SBIJayanagar');

        1 Row Created.
7)  SQL> insert into borrower values(852147987,123459);

        1 Row Created.
```

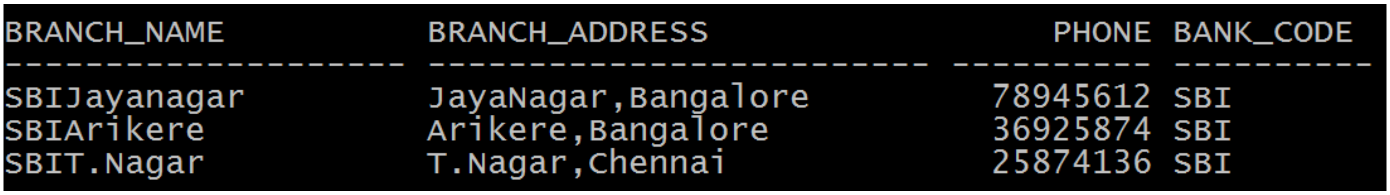
Tables

BANK Table



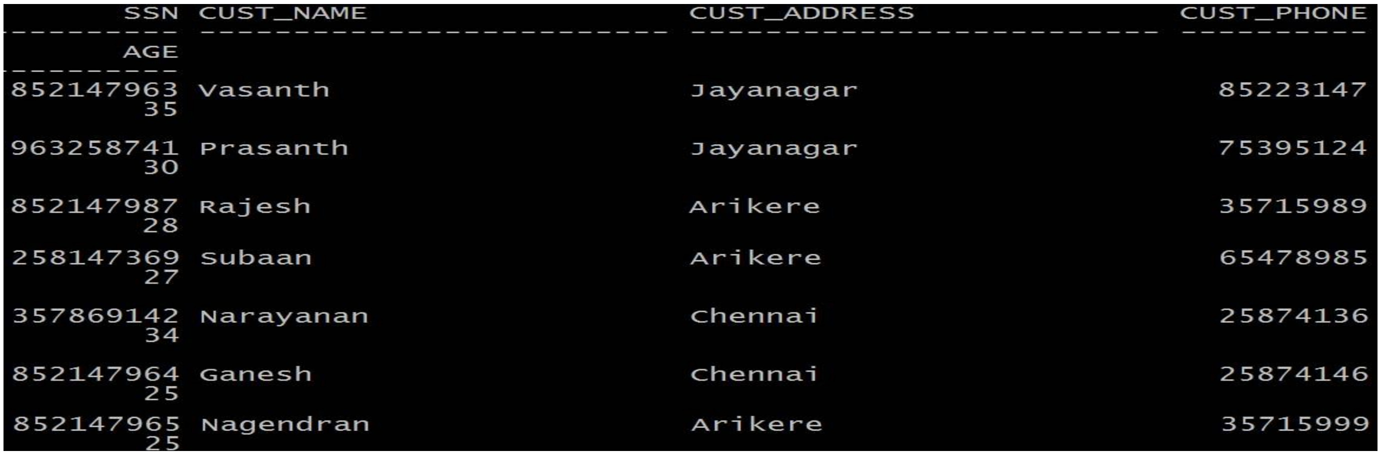
```
BANK_CODE  BANK_NAME            BANK_ADDRESS                   PHONE
---------- -------------------- ------------------------- ----------
SBI        StateBankOfIndia     CorporationCircle,Delhi     86342189
```

BRANCH Table



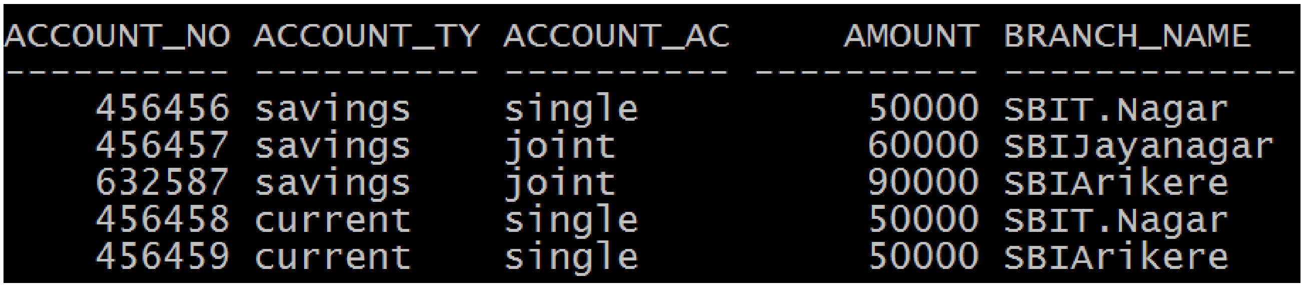
```
BRANCH_NAME          BRANCH_ADDRESS                 PHONE BANK_CODE
-------------------- ------------------------- ---------- ----------
SBIJayanagar         JayaNagar,Bangalore         78945612 SBI
SBIArikere           Arikere,Bangalore           36925874 SBI
SBIT.Nagar           T.Nagar,Chennai             25874136 SBI
```

CUSTOMER Table



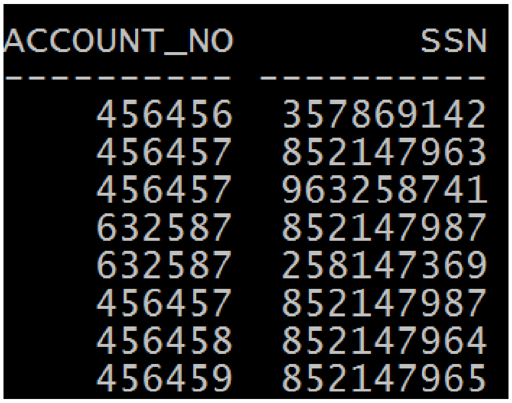
```
       SSN CUST_NAME                 CUST_ADDRESS              CUST_PHONE
---------- ------------------------- ------------------------- ----------
       AGE
----------
 852147963 Vasanth                   Jayanagar                   85223147
        35

 963258741 Prasanth                  Jayanagar                   75395124
        30

 852147987 Rajesh                    Arikere                     35715989
        28

 258147369 Subaan                    Arikere                     65478985
        27

 357869142 Narayanan                 Chennai                     25874136
        34

 852147964 Ganesh                    Chennai                     25874146
        25

 852147965 Nagendran                 Arikere                     35715999
        25
```

ACCOUNT Table



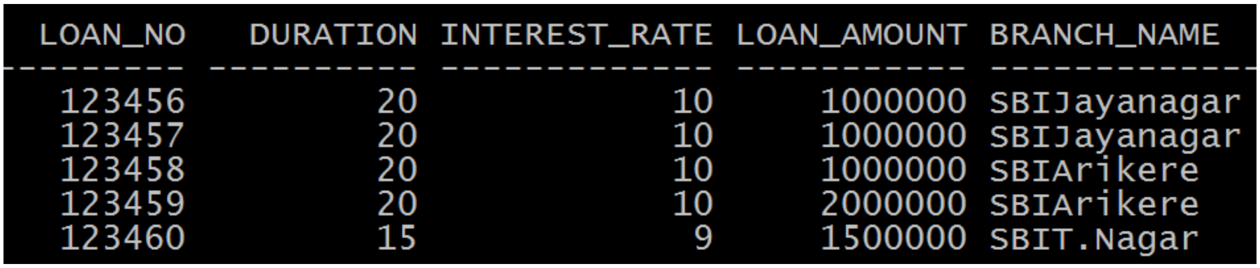
```
ACCOUNT_NO ACCOUNT_TY ACCOUNT_AC     AMOUNT BRANCH_NAME
---------- ---------- ---------- ---------- ------------
    456456 savings    single          50000 SBIT.Nagar
    456457 savings    joint           60000 SBIJayanagar
    632587 savings    joint           90000 SBIArikere
    456458 current    single          50000 SBIT.Nagar
    456459 current    single          50000 SBIArikere
```

DEPOSITOR Table



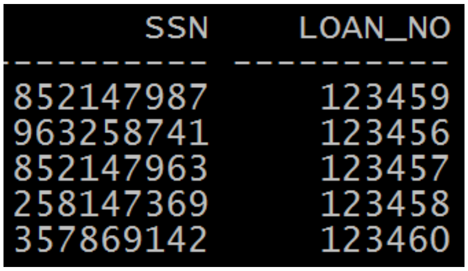
```
ACCOUNT_NO        SSN
---------- ----------
    456456  357869142
    456457  852147963
    456457  963258741
    632587  852147987
    632587  258147369
    456457  852147987
    456458  852147964
    456459  852147965
```

LOAN Table



```
   LOAN_NO   DURATION INTEREST_RATE LOAN_AMOUNT BRANCH_NAME
---------- ---------- ------------- ----------- ------------
    123456         20            10     1000000 SBIJayanagar
    123457         20            10     1000000 SBIJayanagar
    123458         20            10     1000000 SBIArikere
    123459         20            10     2000000 SBIArikere
    123460         15             9     1500000 SBIT.Nagar
```

BORROWER Table

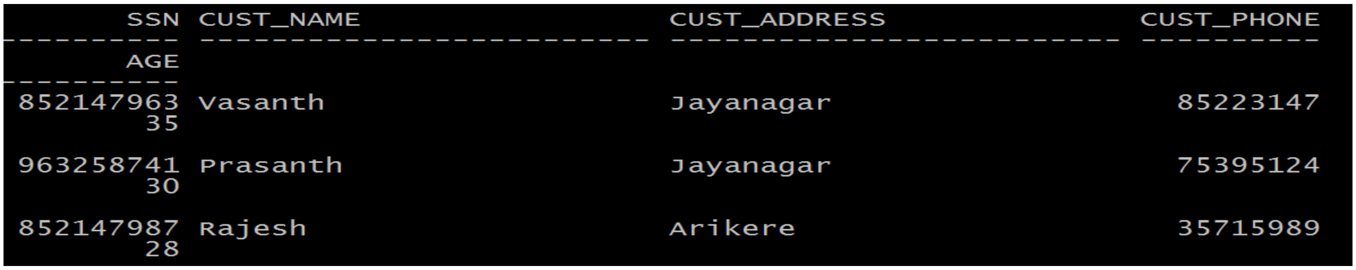


```
       SSN    LOAN_NO
---------- ----------
852147987      123459
963258741      123456
852147963      123457
258147369      123458
357869142      123460
```

Queries

a) **List the details of customers who have joint account and also have at least one loan**.

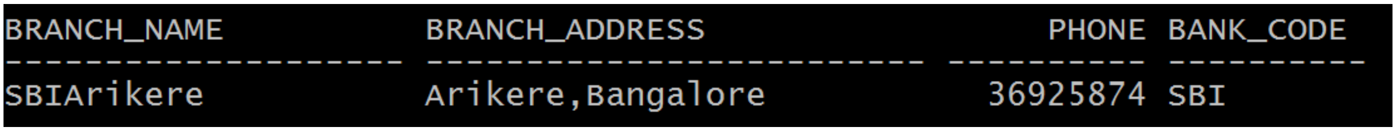
```
SQL> select * from customer where ssn in
   (select ssn from depositor where account_no in
   (select account_no from account where account_access = 'joint') intersect
   select ssn from borrower);
```



```
       SSN CUST_NAME                 CUST_ADDRESS              CUST_PHONE
---------- ------------------------- ------------------------- ----------
       AGE
----------
 852147963 Vasanth                   Jayanagar                   85223147
        35

 963258741 Prasanth                  Jayanagar                   75395124
        30

 852147987 Rajesh                    Arikere                     35715989
        28
```

b) List the details of the branch which has given maximum loan.

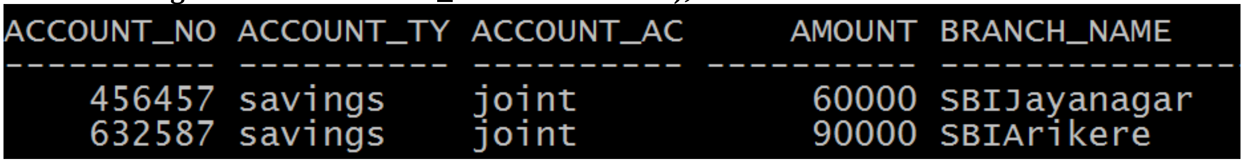
```
SQL> select * from branch where branch_name in
   (select branch_name from (select branch_name, sum(loan_amount) l_amt
   from loan group by branch_name) where
   l_amt in (select max(sum(loan_amount)) from loan
   group by branch_name));
```



```
BRANCH_NAME          BRANCH_ADDRESS                 PHONE BANK_CODE
-------------------- ------------------------- ---------- ----------
SBIArikere           Arikere,Bangalore           36925874 SBI
```

c) List the details of saving accounts opened in the SBI branches located at Bangalore.

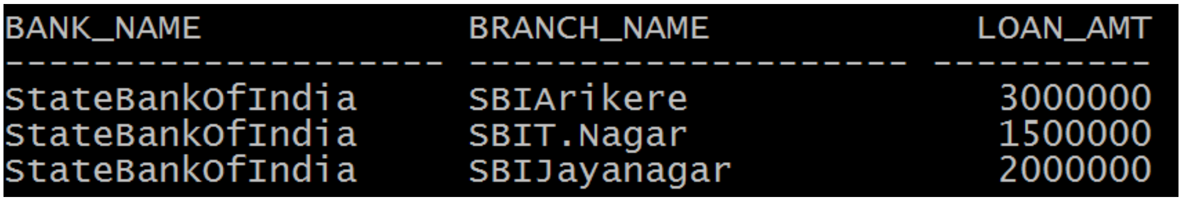
```
SQL> select * from account where account_type = 'savings' and
   branch_name in (select branch_name from branch where city
   like '%Bangalore%' and branch_name like 'SBI%');
```



```
ACCOUNT_NO ACCOUNT_TY ACCOUNT_AC     AMOUNT BRANCH_NAME
---------- ---------- ---------- ---------- --------------
    456457 savings    joint           60000 SBIJayanagar
    632587 savings    joint           90000 SBIArikere
```

d) List the name of branch along with its bank name and total amount of loan given by it.

```
SQL> select distinct b.bank_name, br.branch_name, l.loan_amt from
   bank b, branch br , loan l, (select branch_name,sum(loan_amount)
   from loan group by branch_name) where b.bank_code = br.bank_code
   and br.branch_name = l.branch_name;
```



```
BANK_NAME            BRANCH_NAME            LOAN_AMT
-------------------- -------------------- ----------
StateBankOfIndia     SBIArikere              3000000
StateBankOfIndia     SBIT.Nagar              1500000
StateBankOfIndia     SBIJayanagar            2000000
```

e) Retrieve the names of customers who have accounts in all the branches located in a specific city.

```
SQL>  select cust_name from customer where ssn in ( select ssn from depositor where
    account_no in (select account_no from account where (branch_name) in (select branch_name
    from branch where city='bangalore' group by (branch_name))));
```

Program 4

Patients are identified by an SSN, and their names, addresses, and ages must be recorded.Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experiencemust be recorded. Each pharmaceutical company is identified by name; it has an address andone phone number. For each

```
 SSN NAME                 ADDR                     AGE
----- -------------------- -------------------- ----------
    1 harish              bangalore                  28
```

2) select * from doctor where dssn in (select dssn from prescription where pdate like '%13' group by dssn having count(pssn)>=2);

```
 DSSN   NAME                 SPECIALITY          EXPERIENCE
----- -------------------- -------------------- ----------
  124     raghu               eye                         8
```

3) select * from pharma_company where name in (select name from pharma_contract where phname in (select phname from pharmacy where pharma_company.addr=pharmacy.addr) group by name having count(phname)>=2);

```
NAME                 ADDR                    PHONE
-------------------- -------------------- ----------
drreddy             bangalore            977654689
```

4) select * from drug where trname in (select tname from pcomp_drug where name='cipla');

```
TRNAME               FORMULA
-------------------- ---------
anacin              xyz
saridon             abc
```

5) select * from drug where trname in (select distinct tname from pcomp_drug);

```
TRNAME               FORMULA
-------------------- --------
anacin              xyz
crocin              www
dolopar              ggg
saridon             abc
```

Program: 5

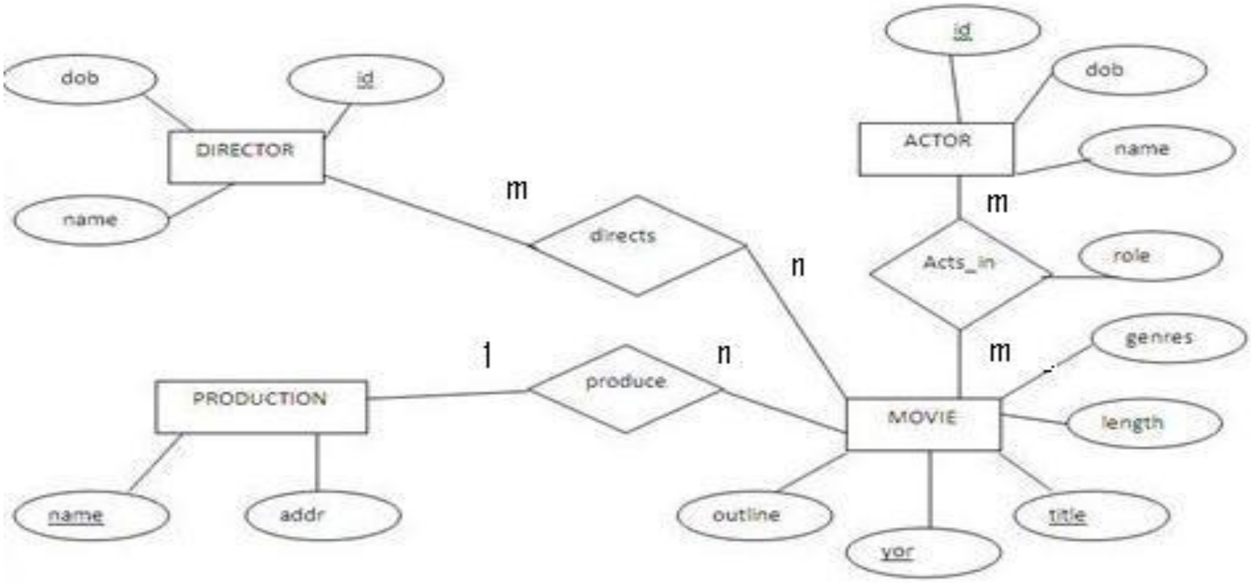
Data requirements of movie industry are captured. Each movie is identified by title andyear of release. Each movie has length in minutes and classified under one genres (like action,horror etc.). Each movie has a plot outline. Production companies are identified by name andeach has an address. A production company produces one or more movies. Actors are identifiedby id. Other details likename and date of birth of actors are also stored. Each actor acts in oneor more movies. Each actor has a role in movie. Directors are identified by id. Other details likename and date of birth of directors are also stored. Each director directs one or more movies.Each movie has one or more actors and one or more directors and is produced by a productioncompany.

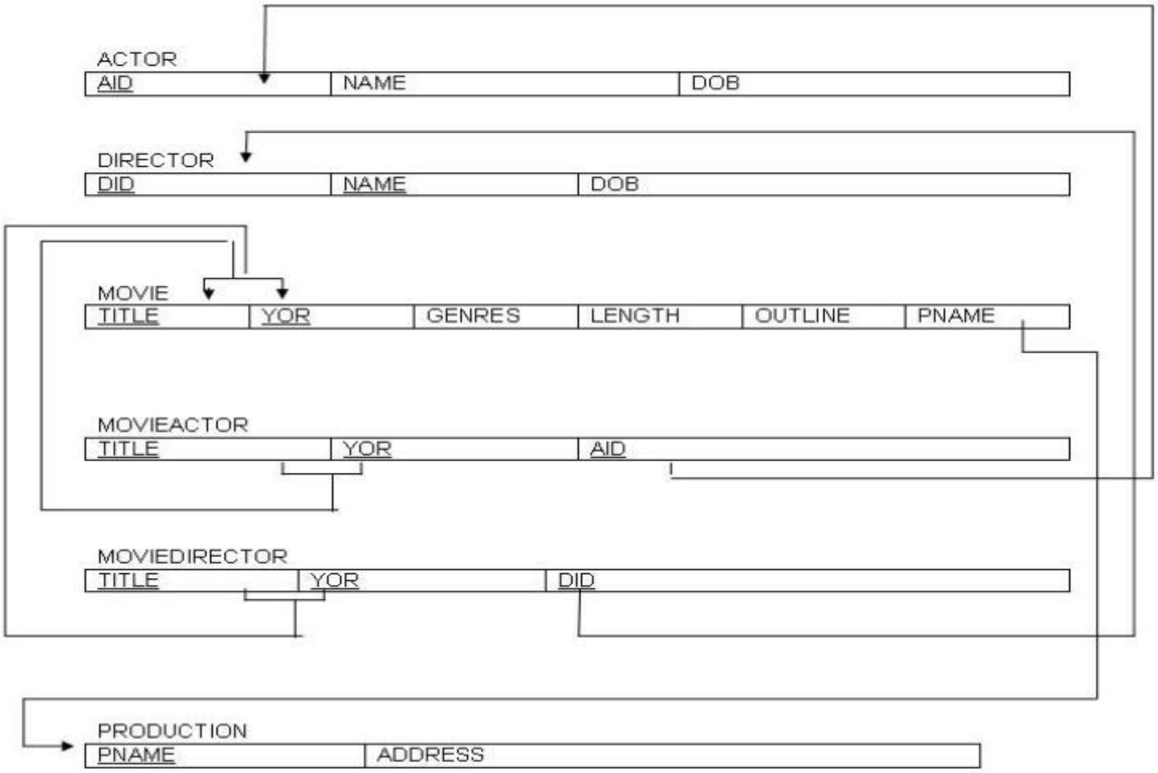
Queries:

a) List the details of horror movies released in 2012 and directed by more than 2 directors.
b) List the details of actors who acted in movies having same titles but released before 2000 and after 2010.
c) List the details of production companies producing maximum movies.
d) List the details of movies where director and actor have same date of birth.

e) Retrieve the names of directors directed all the movies produced by any one production company.

ER and Relationa schema




ACTOR

AID	NAME	DOB

DIRECTOR

DID	NAME	DOB

MOVIE

TITLE	YOR	GENRES	LENGTH	OUTLINE	PNAME

MOVIEACTOR

TITLE	YOR	AID

MOVIEDIRECTOR

TITLE	YOR	DID

PRODUCTION

PNAME	ADDRESS

CREATION OF TABLES:

```
create table production
(pc_name varchar2(15) primary key,
 pc_address varchar2(15));

 create table movie
(m_title varchar2(15) ,
m_length number(3),
 m_yor number(4),
m_genres varchar2(10),
outline varchar2(15),
m_pcname references production ,
primary key(m_title,m_yor));

create table actors
(a_id number(5) primary key,
a_name varchar2(15),
a_dob date);

create table directors
(d_id number(5) number(5) primary key,
d_name varchar2(15),
d_dob date);

create table moviedirectors
(m_title varchar(15) ,
 m_yor number(4) ,
foreign key (m_title,m_yor) references movie,
 d_id number(5) references directors,
 primary key(m_title,m_yor,md_id));

create table movieactors
(m_title varchar(15),
m_yor number(4),
ma_id number(5) references actors,
role varchar2(15),
foreign key(m_title, m_yor) references movie,
primary key(m_title,m_yor,ma_id));

desc movie;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 M_TITLE                                   NOT NULL VARCHAR2(15)
 M_LENGTH                                           NUMBER(3)
 M_YOR                                     NOT NULL NUMBER(4)
 M_GENRES                                           VARCHAR2(10)
 OUTLINE                                            VARCHAR2(15)
 M_PCNAME                                           VARCHAR2(15)

desc actors;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 A_ID                                      NOT NULL NUMBER(5)
 A_NAME                                    VARCHAR2(15)
 A_DOB                                     DATE

desc directors;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 D_ID                                      NOT NULL NUMBER(5)
 D_NAME                                             VARCHAR2(15)
 D_DOB                                              DATE

desc production;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 PC_NAME                                   NOT NULL VARCHAR2(15)
 PC_ADDRESS                                         VARCHAR2(15)

desc moviedirectors;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 M_TITLE                                   NOT NULL VARCHAR2(15)
 M_YOR                                     NOT NULL NUMBER(4)
 MD_ID                                     NOT NULL NUMBER(5)

desc movieactors;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 M_TITLE                                   NOT NULL VARCHAR2(15)
 M_YOR                                     NOT NULL NUMBER(4)
 A_ID                                      NOT NULL NUMBER(5)
 ROLE                                               VARCHAR2(15)

select * from production;

PC_NAME         PC_ADDRESS
--------------- ---------------
avm             chennai
yashraj         bangalore
sun             bangalore
rockline        bangalore
ram             mumbai

select * from movie;

M_TITLE         M_LENGTH   M_YOR      M_GENRES        OUTLINE         M_PCNAME
--------------- ---------- ---------- ---------- -------------- ---------------
ddlj                     2       1996 romantic        love            avm
srikrishna               3       2010 myth            devotion        sun
krish                    2       2014 animated        cartoon         yashraj
chennaexp                2       2013 drama           comedy          rockline
robo                     3       2012 horror          comedy          ram
ddlj                     2       2012 horror          love            avm
sur                      2       2012 romantic        love            avm
```

```
select * from actors;

     A_ID                A_NAME         A_DOB
---------- --------------- ---------
      111                amitabh        10-MAR-55
      222              shahrukh       15-MAR-77
      333                hrithik       15-JAN-99
      444                akshay        13-APR-75
      555                 amir          15-JAN-76
```

```
select * from directors;

     D_ID       D_NAME              D_DOB
---------- --------------- ---------
        1          abc              12-MAR-77
        2         x yz            22-MAR-88
        3     mno               15-JAN-99
        4      pqr                15-JUL-89
        5       jkl                 25-FEB-85
```

```
select * from moviedirectors;

M_TITLE            M_YOR       MD_ID
--------------- ---------- ----------
ddlj              1996           1
srikrishna        2010           2
krish             2014           3
chennaexp          2013          4
robo              2012           5
 rrobo             2012          3
```

```
select * from movieactors

M_TITLE            M_YOR      A_ID           ROLE
--------------- ---------- ---------- ---------------
ddlj                1996       111                  hero
krish             2014       333                 hero
chennaexp          2013       222                  hero
robo              2012       444                  hero
srikrishna          2010       555                 hero
ddlj                2012           111                   h ero
```

query1:

```
 select * from movie where m_yor='2012'and m_genres='horror' and m_title in
(select m_title from moviedirectors group by m_title having count(*)>=2);
```

```
M_TITLE          M_LENGTH     M_YOR   M_GENRES   OUTLINE        M_PCNAME
--------------- ---------- ---------- ---------- --------------- ------------
robo                   3       2012            horror     comedy         ram
```

query2:

```
select * from actors where A_ID in (select m.A_ID from movieactors m,
movieactors n where m.m_title=n.m_title and m.m_yor<2000 and n.m_yor >2010);
```

```
 A_ID A_NAME          A_DOB
----- --------------- ---------
  111 amitabh         10-MAR-55
```

query3:

```
 select * from production  where PC_NAME in
(select M_PCNAME from movie group by m_pcname having count(m_pcname)
>=(select max(count(m_pcname)) from movie group by m_pcname));
```

```
PC_NAME         PC_ADDRESS
--------------- --------------
avm             Chennai
```

query4:

```
select * from movie where m_title in
(select m_title from moviedirectors where m_title in
(select m_title from movieactors where a_id in
(select a_id from actors a, directors d where a.a_dob=d.d_dob)));
```

```
M_TITLE           M_LENGTH      M_YOR M_GENRES   OUTLINE         M_PCNAME

--------------- ---------- ---------- ---------- --------------- ---------
krish                    2       2014 animated   cartoon         yashraj
```

query5:

```
select d_name from directors where d_id in
(select md_id from moviedirectors where (m_title,m_yor) in
(select m_title,m_yor from movie where M_PCNAME='avm'));
```

```
D_NAME
----------
abc
```