INTRODUCTION TO DATABASE

PROJECT

SECTION : I

TOPIC : UNIVERSITY MANAGEMENT SYSTEM

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DEPARTMENT : BSc. CSE

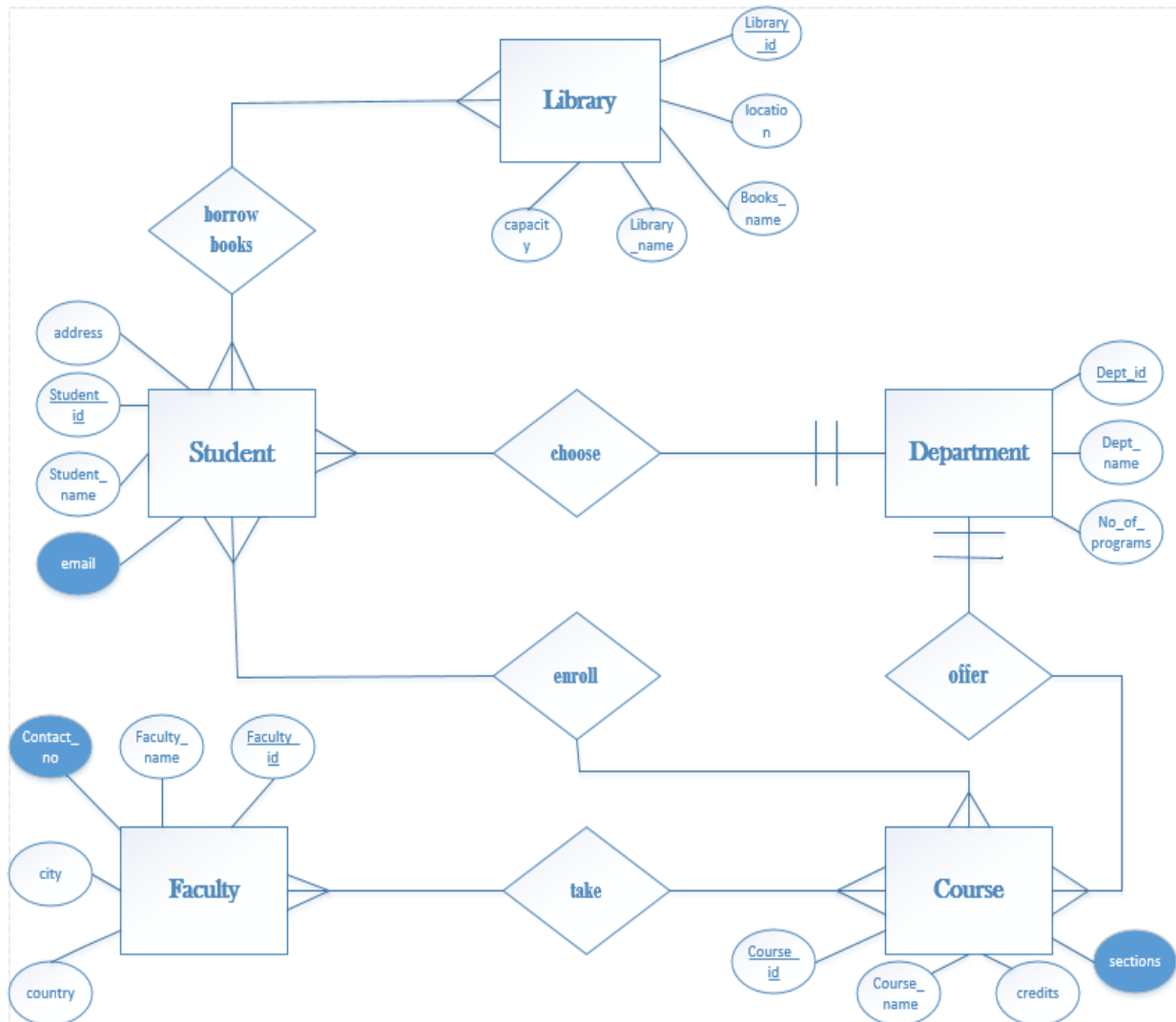| NAME	ID
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DATE 0F SUBMISSION : 11.12.2019

UNIVERSITY MANAGEMENT SYSTEM

University Management System is the process of several manages. It used structured data and to define the relationships between structured data groups of University Management System. Here are the requirements of a university management system :

- Students are identified by an s_id, sname,email,address.
- Student can choose only one depertment in a University.
- Departments are identified by an d_id,dname,no_of _program.
- Department offered different types of course.
- Courses are identified by an c_id,cname,credits,section.
- Faculties are identefied by their f_id,fname,contact_no,city,country.
- Faculty can take different types of course.
- Student enroll different types of course.
- Library has l_id,lname,books_name,location,capacity.
- Student can borrow book from library.

ER-DIAGRAM

NORMALIZATION

Step 1 :

Borrow book : (s_id,sname,email,address,l_id,lname,

Books_name,location,capacity)

1NF : email is a multivalued attribute

2NF : s_id,sname,email,address

l_id,lname,books_name,location,capacity

3NF : No transitive dependency

TABLE FOR borrow book:

1. s_id,sname ,address,
2. [S_id,email] ⟹ composite pk
3. l_id,lname,location,books_name,capacity
4. n_id , (l_id) , (S_id)

Step 2:

Choose : (s_id,sname,email,,address,d_id,dname,no_of_program)

1NF : email is a multivalued attribute

2NF : s_id,sname,email ,address

d_id,dname,no_of_program

3NF : No transitive dependency

TABLE FOR choose :

1. <u>s_id</u>,sname ,address, ⬭ d_id
2. [S_id,email] ⟹ composite pk
3. <u>d_id</u>,dname,no_of_program

Step 3 :

Offer : (d_id,dname,no_of_program,c_id,cname,section,credits)

1NF : **section** is a multivalued attribute

2NF : d_id,dname,no_of_program

      c_id,cname,section,credits

3NF : No transitive dependency

TABLE FOR offer:

1. <u>d_id</u>,dname,no_of_program
2. <u>c_id</u>,cname,credits, ⬭ d_id
3. [C_id,section] ⟹ composite pk

step 4:

enroll: (s_id,sname,email,,address, c_id,cname,section,credits)

1NF : **email & section** are multivalued attributes

2NF : s_id,sname,email,,address

      c_id,cname,section,credits

3NF : No transitive dependency.

TABLE FOR enroll :

1) <u>s_id</u>,sname,address

2) | <u>S_id</u>,email | ⟹ composite pk

3) <u>c_id</u>,cname,credits

4) | <u>c_id</u>,section | ⟹ composite pk

5) <u>n1_id</u>, (S_id) , (C_id)

Step 5

take : (f_id,fname,contact_no,city,country,c_id,cname,section,credits)

1NF: contact_no & section are multivalued attributes.

2NF: <u>f_id</u>,fname,contact_no,city,country

    <u>c_id</u>,cname,section,credits

3NF: <u>f_id</u>,fname,contact_no

    <u>pass_no</u>,city,country

    <u>c_id</u>,cname,section,credits

TABLES FOR take:

1. <u>f_id</u>,fname, (pass_no)

2. | <u>f_id,contact_no</u> | ⟹ composite pk

3. <u>pass_no</u>,city,country

4. <u>c_id</u>,cname,credits

5. | <u>c_id</u>,section | ⟹ composite pk

6. <u>n2_id</u>, (f_id) , (c_id)

TOTAL TABLES

1) ~~s_id,sname ,address~~
2) ~~s_id,email~~
3) l_id,lname,location,books_name,capacity
4) n_id , l_id , s_id
5) s_id,sname ,address,d_id
6) s_id,email
7) d_id,dname,no_of_program
8) ~~d_id,dname,no_of_program~~
9) c_id,cname,credits, d_id

10) c_id,section

11) ~~s_id,sname,address~~

12) ~~s_id,email~~

13) ~~c_id,cname,credit~~

14) ~~c_id,section~~

15) n1_id,s_id,c_id

16) f_id,fname,pass_no

17) f_id,contact_no

18) pass_no,city,country

19) ~~c_id,cname,credits~~

20) ~~c_id,section~~

21) n2_id,f_id,c_id

FINAL TABLES

Table No	Table Name	Column name
1	Library	li_id,lname,location,books_name, capacity
2	Information	n_id , l_id , s_id
3	Student	s_id,sname ,address,d_id
4	Student_Information	s_id,email
5	Department	d_id,dname,no_of_program
6	Course	c_id,cname,credits, d_id
7	Course_Information	c_id,section
8	Information1	n1_id,s_id,c_id
9	Faculty	f_id,fname,pass_no
10	Faculty_Contact	f_id,contact_no
11	Faculty_Information	pass_no,city,country
12	Information2	n2_id,f_id,c_id

TABLE CREATION

DESCRIPTIONS

Library:

```
desc library
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **LIBRARY**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
LIBRARY	LIBRARY_ID	Number	-	20	0	1	-	-	-
	LIBRARY_NAME	Varchar2	100	-	-	-	-	-	-
	BOOKS_NAME	Varchar2	50	-	-	-	✓	-	-
	LOCATION	Varchar2	20	-	-	-	-	-	-
	CAPACITY	Number	-	10	0	-	✓	-	-
									1 - 5

Department:

```
desc Department
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **DEPARTMENT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DEPARTMENT	DEPARTMENT_ID	Number	-	20	0	1	-	-	-
	DEPARTMENT_NAME	Varchar2	20	-	-	-	-	-	-
	NO_OF_PROGRAM	Number	-	10	0	-	✓	-	-
									1 - 3

Student

```
desc Student
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **STUDENT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
STUDENT	STUDENT_ID	Number	-	-	0	1	-	-	-
	FIRST_NAME	Varchar2	25	-	-	-	-	-	-
	LAST_NAME	Varchar2	25	-	-	-	-	-	-
	ADDRESS	Varchar2	30	-	-	-	✓	-	-
	DEPARTMENT_ID	Number	-	-	0	-	✓	-	-
									1 - 5

Course:

```
desc Course
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **COURSE**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
COURSE	COURSE_ID	Number	-	-	0	1	-	-	-
	COURSE_NAME	Varchar2	25	-	-	-	-	-	-
	DEPARTMENT_ID	Number	-	-	0	-	✓	-	-
								1 - 3	

Faculty:

```
desc Faculty
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **FACULTY**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FACULTY	FACULTY_ID	Number	-	20	0	1	-	-	-
	FACULTY_NAME	Varchar2	100	-	-	-	-	-	-
	PASSPORT_NO	Varchar2	20	-	-	-	✓	-	-
								1 - 3	

Faculty_contract:

```
desc Faculty_contract
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **FACULTY_CONTRACT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FACULTY_CONTRACT	FACULTY_ID	Number	-	20	0	1	-	-	-
	CONTRACT_NO	Varchar2	100	-	-	-	-	-	-
								1 - 2	

Faculty_information:

`desc Faculty_information`

Results   Explain   **Describe**   Saved SQL   History

Object Type **TABLE** Object **FACULTY_INFORMATION**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FACULTY_INFORMATION	PASSPORT_NO	Varchar2	50	-	-	1	-	-	-
	CITY	Varchar2	100	-	-	-	-	-	-
	COUNTRY	Varchar2	50	-	-	-	✓	-	-
									1 - 3

Information:

`desc information`

Results   Explain   **Describe**   Saved SQL   History

Object Type **TABLE** Object **INFORMATION**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
INFORMATION	NEW_ID	Number	-	-	0	1	-	-	-
	LIBRARY_ID	Number	-	-	0	-	✓	-	-
	STUDENT_ID	Number	-	-	0	-	✓	-	-
									1 - 3

Student_information:

`desc student_information`

Results   Explain   **Describe**   Saved SQL   History

Object Type **TABLE** Object **STUDENT_INFORMATION**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
STUDENT_INFORMATION	STUDENT_ID	Number	-	20	0	1	-	-	-
	EMAIL_NO	Varchar2	100	-	-	-	✓	-	-
									1 - 2

Course_information:

`desc course_information`

Object Type **TABLE** Object **COURSE_INFORMATION**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
COURSE_INFORMATION	COURSE_ID	Number	-	20	0	1	-	-	-
	SECTION	Varchar2	100	-	-	-	✓	-	-
									1 - 2

Information_1:

`desc information_1`

Object Type **TABLE** Object **INFORMATION_1**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
INFORMATION_1	NEW_ID_1	Number	-	-	0	1	-	-	-
	STUDENT_ID	Number	-	-	0	-	✓	-	-
	COURSE_ID	Number	-	-	0	-	✓	-	-
									1 - 3

Information_2:

`desc information_2`

Object Type **TABLE** Object **INFORMATION_2**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
INFORMATION_2	NEW_ID_2	Number	-	-	0	1	-	-	-
	FACULTY_ID	Number	-	-	0	-	✓	-	-
	COURSE_ID	Number	-	-	0	-	✓	-	-
									1 - 3

TABLE INFORMATION

Library:

```
select*
from library
```

Results **Explain** **Describe** **Saved SQL** **History**

LIBRARY_ID	LIBRARY_NAME	BOOKS_NAME	LOCATION	CAPACITY
1021	Bongobondhu	Tantra_illuminater	Iblish_chottor	1000
1023	Saya_nazrul	When_to_jump	Modhur_canteen	3000
1024	M_mounsur_ali	After_the_prophet	Hakim_chottor	2500
1025	M_Kamruzzaman	The_decision_book	Paris_road	1500
1022	Ta_juddin	Ted_talks	Central_library	2000

Department:

```
select*
from department
```

Results **Explain** **Describe** **Saved SQL** **History**

DEPARTMENT_ID	DEPARTMENT_NAME	NO_OF_PROGRAM
2003	BBA	128
2004	ECONOMICS	130
2001	CSE	148
2002	EEE	145
2005	ENGLISH	125

Student:

```
select *
from student
```

Results **Explain** **Describe** **Saved SQL** **History**

STUDENT_ID	FIRST_NAME	LAST_NAME	ADDRESS	DEPARTMENT_ID
1111	Nusrat	Jahan	Rampura	2001
1113	Zamil	Ahmed	Khilkhet	2003
1114	Ehsan	Talukder	Uttara	2004
1112	Emrul	Hasan	Mirpur	2002
1115	Ritu	Basak	Bashundhara	2005

Course:

```
select *
from course
```

Results **Explain** **Describe** **Saved SQL** **History**

COURSE_ID	COURSE_NAME	DEPARTMENT_ID
50005	Programming Language	2003
50007	English 1	2004
50001	Data structure	2001
50003	Electrical circuit 1	2002
50009	java	2005

Faculty:

```
select *
from faculty
```

Results **Explain** **Describe** **Saved SQL** **History**

FACULTY_ID	FACULTY_NAME	PASSPORT_NO
6002	FARHAT TASANNUM FARAH	dd--37763672
6005	NADIA NOWSHIN	yy--8382726378
6001	RIFAT TASIM ANANNYA	ka--19902376
6003	PROF. DR. KHONDAKER ABDUL MALEQUE	aa--672827822
6004	DR. A.K. MONAW-WAR UDDIN AHMAD	he--872876328

Faculty_contract:

```
select *
from faculty_contract
```

Results **Explain** **Describe** **Saved SQl**

FACULTY_ID	CONTRACT_NO
6002	farah@aiub.edu
6004	akmwuahmad@aiub.edu
6001	rifat.tasnim@aiub.edu
6003	maleque@aiub.edu
6005	nowshin@aiub.edu

Faculty_information:

```
select *
from faculty_information
```

Results Explain Describe Saved SQL History

PASSPORT_NO	CITY	COUNTRY
dd--37763672	CHOTTOGRAM	BANGLADESH
he--872876328	RANGPUR	BANGLADESH
yy--8382726378	SYDNEY	AUSTRALIA
ka--19902376	DHAKA	BANGLADESH
aa--672827822	SYLHET	BANGLADESH

Information:

```
select *
from information
```

Results Explain Describe Saved SQL Hi:

NEW_ID	LIBRARY_ID	STUDENT_ID
4	1024	1114
1	1021	1111
2	1022	1112
3	1023	1113
5	1025	1115

Student_information:

```
select *
from student_information
```

Results Explain Describe Saved SQL H

STUDENT_ID	EMAIL_NO
1112	imrulhasan003@.com
1115	ritubasak009@gmail.com
1111	nusratjahan009@gmail.com
1113	zamilahmed990@gmail.com
1114	eshantalukder00@gmail.com

Course_information:

```
Select *
from  course_information
```

Results Explain Describe S

COURSE_ID	SECTION
50001	DD9091-A
50007	DD9094-D
50003	DD9092-B
50005	DD9093-C
50009	DD9095-E

Information_1:

```
select *
from information_1
```

Results Explain Describe Saved SQL Hist

NEW_ID_1	STUDENT_ID	COURSE_ID
9091	1111	50001
9093	1113	50005
9092	1112	50003
9094	1114	50007
9095	1115	50009

Information_2:

```
select *
from information_2
```

Results Explain Describe Saved SQL His

NEW_ID_2	FACULTY_ID	COURSE_ID
10003	6003	50005
10004	6004	50007
10001	6001	50001
10002	6002	50003
10005	6005	50009

CONSTRAINT DISABLE / ENABLE

For department table:

Disable constraint not null:

```
alter table Department
disable constraint Department_name_nn
```

```
desc department
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **DEPARTMENT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DEPARTMENT	DEPARTMENT_ID	Number	-	20	0	1	-	-	-
	DEPARTMENT_NAME	Varchar2	20	-	-	-	✓	-	-
	NO_OF_PROGRAM	Number	-	10	0	-	✓	-	-
									1 - 3

Enable constraint not null:

```
alter table Department
enable constraint Department_name_nn
```

```
desc department
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **DEPARTMENT**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
DEPARTMENT	DEPARTMENT_ID	Number	-	20	0	1	-	-	-
	DEPARTMENT_NAME	Varchar2	20	-	-	-	-	-	-
	NO_OF_PROGRAM	Number	-	10	0	-	✓	-	-
									1 - 3

Insert value:

```
select*
from department
```

Results Explain Describe Saved SQL History

DEPARTMENT_ID	DEPARTMENT_NAME	NO_OF_PROGRAM
2003	BBA	128
2004	ECONOMICS	130
2001	CSE	148
2002	EEE	145
2005	ENGLISH	125
2021	MATH	126

6 rows returned in 0.00 seconds   CSV Export

For faculty table:

Disable constraint not null:

```
alter table faculty
disable constraint faculty_name_ww

desc Faculty
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **FACULTY**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FACULTY	FACULTY_ID	Number	-	20	0	1	-	-	-
	FACULTY_NAME	Varchar2	100	-	-	-	✓	-	-
	PASSPORT_NO	Varchar2	20	-	-	-	✓	-	-
									1 - 3

Enable constraint not null:

```
alter table faculty
enable constraint faculty_name_ww

desc Faculty
```

Results Explain **Describe** Saved SQL History

Object Type **TABLE** Object **FACULTY**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FACULTY	FACULTY_ID	Number	-	20	0	1	-	-	-
	FACULTY_NAME	Varchar2	100	-	-	-	-	-	-
	PASSPORT_NO	Varchar2	20	-	-	-	✓	-	-
									1 - 3

Insert value:

```
select *
from faculty
```

Results Explain Describe Saved SQL History

FACULTY_ID	FACULTY_NAME	PASSPORT_NO
6002	FARHAT TASANNUM FARAH	dd--37763672
6005	NADIA NOWSHIN	yy--8382726378
6021	ZARIN KHAN	yd--83827987378
6001	RIFAT TASNIM ANANNYA	ka--19902376
6003	PROF. DR. KHONDAKER ABDUL MALEQUE	aa--672827822
6004	DR. A.K. MONAW-WAR UDDIN AHMAD	he--872876328

6 rows returned in 0.00 seconds   CSV Export

SEQUENCES

Library Table:

create sequence library_seq

   increment by 1

   start with 1021

   maxvalue 100000

```
select Library_id
from library sequence
```

Results **Explain** **Describe**

LIBRARY_ID
1021
1022
1023
1024
1025

Course Information Table:

create sequence course_information_seq

   increment by 2

   start with 50001

   maxvalue 100000

```
select Course_id
from course_information sequence
```

Results **Explain** **Describe** **Saved SQL**

COURSE_ID
50001
50003
50005
50007
50009

VIEW

Faculty Table:

```
create or replace view FACULTY_1
as select Faculty_id "F_ID",Faculty_name "F_NAME",Passport_no "PASS_NO"
from faculty

Select *
from FACULTY_1
```

Results **Explain** **Describe** **Saved SQL** **History**

F_ID	F_NAME	PASS_NO
6002	FARHAT TASANNUM FARAH	dd--37763672
6005	NADIA NOWSHIN	yy--8382726378
6021	ZARIN KHAN	yd--83827987378
6001	RIFAT TASNIM ANANNYA	ka--19902376
6003	PROF. DR. KHONDAKER ABDUL MALEQUE	aa--672827822
6004	DR. A.K. MONAW-WAR UDDIN AHMAD	he--872876328

Course Table:

```
create or replace view COURSE_1
as select course_id "C_NO",Course_name "C_NAME'
from course

Select *
from COURSE_1
```

Results **Explain** **Describe** **Saved SQL** **History**

C_NO	C_NAME
50005	Programming Language
50007	English 1
50001	Data structure
50003	Electrical circuit 1
50009	java

QUERY QUESTIONS

1.Display department name where student id is 1112.

Select Department_name

from Department

where Department_id=(select Department _id

from Student

where Student-id=111)

2.Find out in which library Ted Talks book is available and select the location of that library.

Select Library_name,Location

from Library

where Books_name='Ted_talks'

3.Find out the faculty_id and passport _no of faculty whose name starts with R and ends with A.

Select faculty_id,passport_no

from faculty

where faculty_name like 'R%A'

4.Find out the passport no and contract no of Rifat Tasnim Anannya.

Select Passport_no,Contract_no

from Faculty,Faculty_contract

where Faculty_contract.Faculty_id=Faculty.Faculty_id and Faculty_name='RIFAT TASNIM ANANNYA'

5.Find the city and Country of a faculty with faculty_id-6001.

Select City,Country

from Faculty_information

where Passport_no = (select passport_no

from Faculty

where faculty_id=6001)

6.find out the library where zamil is allow.

Select Library_id

from information

where student_id=(Select student_id

from student

where First_name='Zamil ')

7.Find out the Email_no of Zamil or Ehsan.

Select Email_no

from student_information

where student_id in(select student_id

from Student

where first_name in('Zamil','Ehsan'))

8.Find out the section of java course.

Select section

from course_information

where course_id= (select course_id

from course

where Course_name='java')

9.Find out all info of student course id with 5001.

Select *

from Student

where student _id =(select student_id

from Information_1

where course_id=5001)

10.Find out the faculty id of java course.

Select faculty_id

from information_2 where course_id= (select course_id

from course

where course_name= 'java')

RELATIONAL ALGEBRA

1.Display department name where student id of a student is 1112.

Answer: $\pi_{department\_name}[\sigma_{student\_id=1112}$ and $\sigma_{student.department\_id=department.department\_id}(department \times student)]$

2.Find out in which library ted_talk book is available and select the location of this library.

Answer: $\pi_{library\_name,location}[\sigma_{book\_name="ted\_talk"}(library)]$

3.Find out the passport number and contact no of the faculty.

Answer: $\pi_{passport\_no}(faculty) \cap \pi_{contact\_no}(faculty\_contact)$

4.Find out all information of student course id with 5001.

Answer: $\sigma\sigma_{course\_id=5001}$ and (student $\times$ information1)

$\sigma_{information1.student\_id=student.student\_id}$

5.Find out the faculty id of Java course.

Answer: $\pi_{faculty\_id}[\sigma_{course\_name="JAVA"}$ and $\sigma_{information2.course\_id=course.course\_id}(information \times course)]$

This project helped us to understand how can we store many data and never loose them . We faced problem when we were normalizing this data .Normalization is very sensitive. We have learnt how SQL works and the program thinks. Now future plan is to observe our surrounding more carefully and try to make a database based on that.