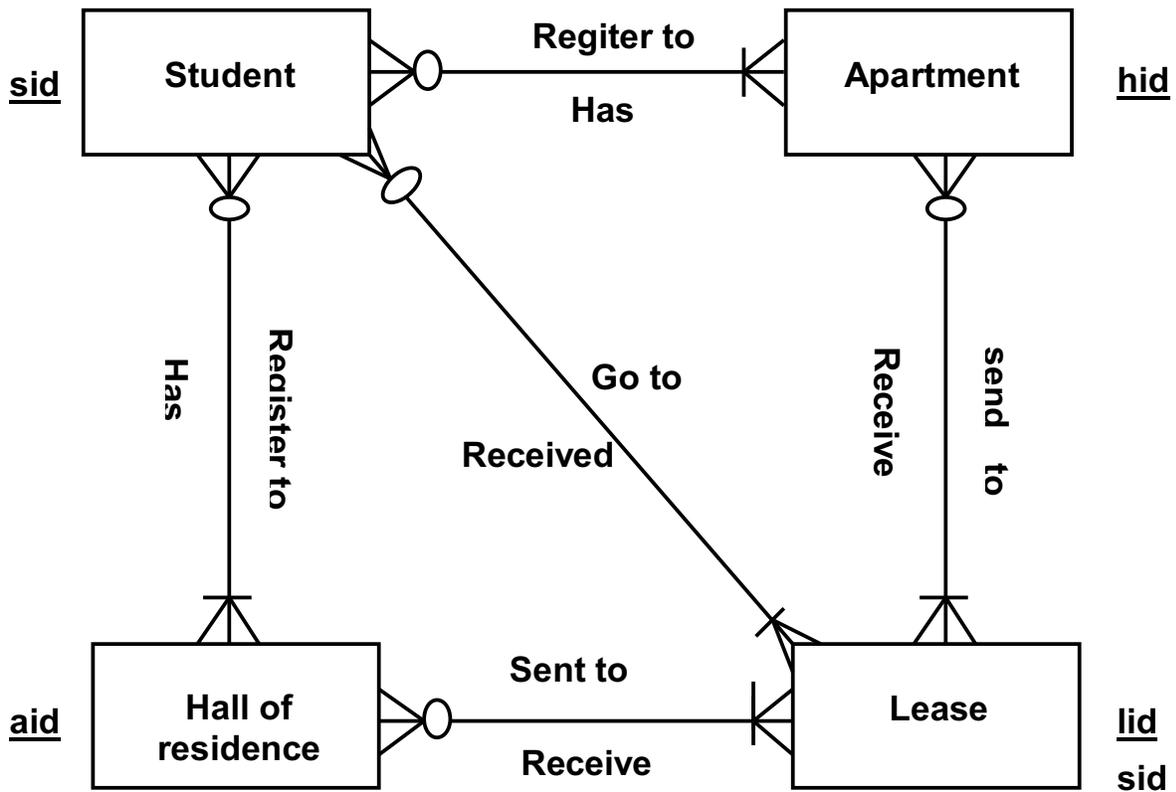


a) A fully annotated E-R diagram 1 and 2 showing the entities, primary and foreign keys, composite keys and relationships.

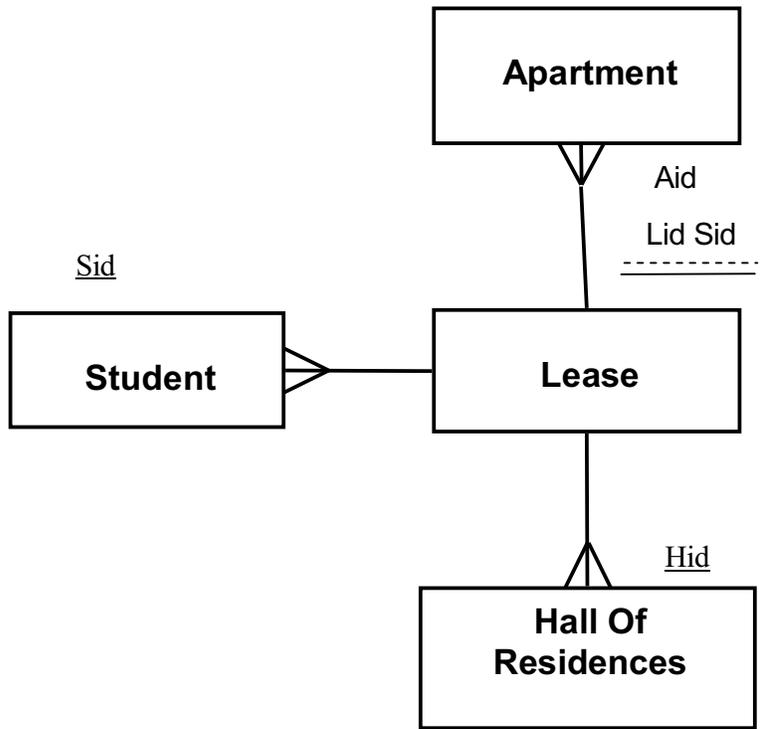
Entity Relationship Diagram

An entity-relationship (ER) diagram is a specialized graphic that illustrates the interrelationships between entities in a database. ER diagrams often use symbols to represent three different types of information. Boxes are commonly used to represent entities. Diamonds are normally used to represent relationships and ovals are used to represent attributes.

ER 1



ER 2



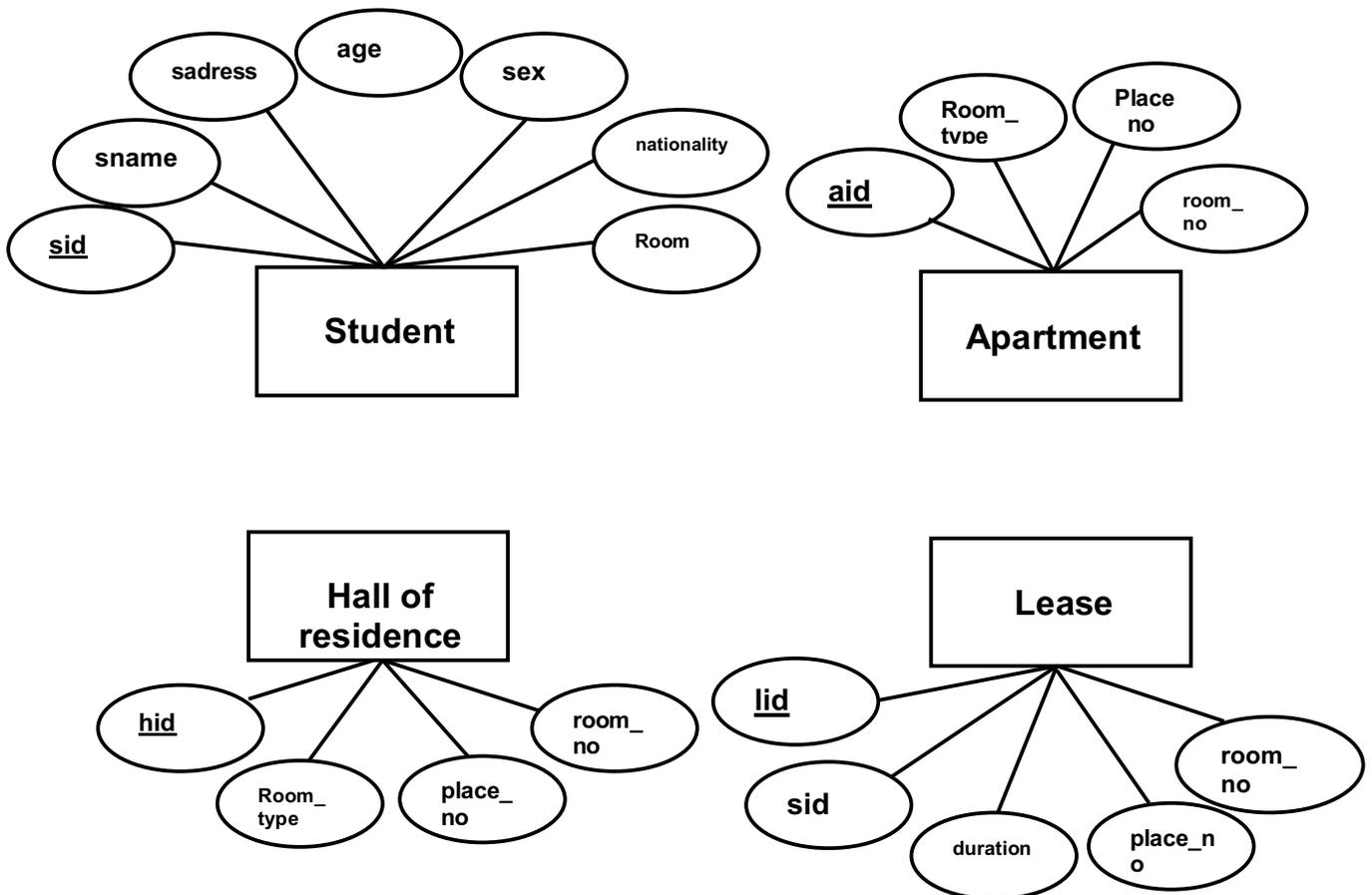
b) A Relational schema of your database in 3NF, clearly indicating attributes, the data type of each attribute, primary and foreign keys, candidate keys, and which attributes are nullable, giving reasons. List any assumptions you need to make.

Normalization (BCNF)

In the relational model of databases, a candidate key of a relation is a minimal *superkey* and also is a field that can be part of the primary key to uniquely identify a record for each entity can have more candidate keys but it's not necessary to use them all as part of the primary key in figure 3.1.

Relation

Key attribute (Ordinary or circle shape) is a key attribute that is the unique and distinguishing characteristic of the entity in diagram below.



DatabaseSchema

3NF

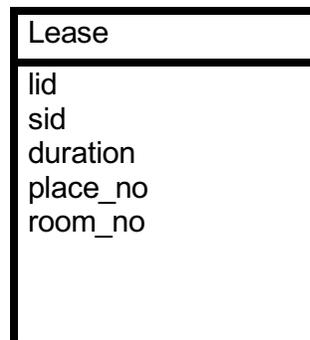
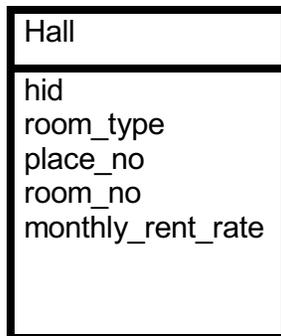
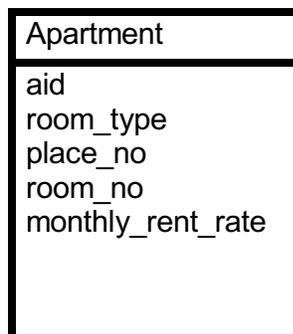
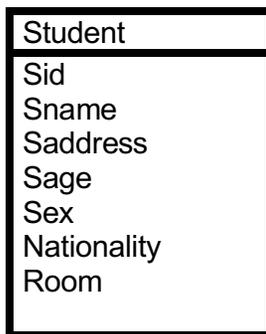
Student (SID, SNAME, SADDRESS, SAGE, SEX, NATIONALITY, ROOM_TYPE)

Apartment (AID, ROOM_TYPE, PLACE_NO, ROOM_NO, COST)

Hall Of Residences (HID, ROOM_TYPE, PLACE_NUMBER, ROOM_NO, COST)

Lease (LID, SID, DURATION, PLACE_NO, ROOM_NO)

Table	Primary Key	Foreign Key	Composite Key
Student	Sid		
apartment	Aid		
hall	Hid		
lease	lid	sid	



Assumptions

used for this scenario are as following

- Student need to choose apartment or hall of residence
- Student need information what room they stay and how long they stay with cost

c) Listings of the records in each table. There should be at least 10 records in each.

SQL> select * from student;

SID	SNAME	SADDRESS	SAGE	SEX	NATIONALITY	ROOM
1001	JH low	23 Taman Bangi	21	male	chinese	apartment
1002	Khar Fai	28 Taman Kepong	20	male	chinese	apartment
1003	Kenny Lee	8 Jalan Rawang	28	male	chinese	apartment
1004	Eugene Yap	76 Taman Kepong	23	male	chinese	apartment
1005	Sam Low	4 Taman Cheras	26	male	chinese	apartment
1006	Suntheran	1 Taman Sentu	27	male	indian	apartment
1007	Lloyd	6 Taman Sentosa	29	male	indian	apartment
1008	Mohamad	9 Taman Rawang	26	male	indian	apartment
1009	Alice Tew	88 Taman Rawang	20	female	chinese	apartm ent
1010	Lina Koh	27 Taman Puchong	19	female	chinese	apartment
1011	Mindy Aw	77 Taman Kuantan	21	female	chinese	apartment

SID	SNAME	SADDRESS	SAGE	SEX	NATIONALITY	ROOM_TYPE
1012	Karena Ng	32 Taman Selayang	24	female	chinese	apartment
1013	Chris Lee	3 Taman Genny	24	male	chinese	hall of residence
1014	Alex Wong	12 Taman Istana	23	male	chinese	hall of residence
1015	Chifford	9 Taman Bangsa	24	male	Indian	hall of residence
1016	Jenny Khoo	22 Taman Imbi	24	female	chinese	hall of residence
1017	Ken Ng	4 Taman Bintang	23	male	chinese	hall of residence
1018	Kogilar	38 Taman Bangsa	22	female	indian	hall of residence
1019	Jacky Tan	5 Taman Rawang	24	male	chinese	hall of residence
1020	Sabrina	34 Taman Kepong	20	female	indian	hall of residence
1021	Ben Lee	5 Taman Genny	29	male	chi nese	hall of residence
1022	Silva	29 Taman Imbi	29	male	Indian	hall of residence

22 rows selected.

SQL> select * from apartment;

AID	ROOM_TYPE	PLACE_NO	ROOM_NO	cost
A1	A-Group by3	A-01	101-3	RM 150
A2	A-Group by4	A-01	101-4	RM 130
A3	A-Group by5	A-01	101-5	RM 100
A4	A-Group by3	A-02	201-3	RM 150
A5	A-Group by4	A-02	201-4	RM 130
A6	A-Group by5	A-02	201-5	RM 100
A7	A-Group by3	A-03	301-3	RM 150
A8	A-Group by4	A-03	301-4	RM 130
A9	A-Group by5	A-03	301-5	RM 100
A10	A-Group by3	A-04	401-3	RM 150

10 rows selected.

SQL> select * from hall;

HID	ROOM_TYPE	PLACE_NO	ROOM_NO	cost
H1	H-Single room	H-01	101	RM 80
H2	H-Single room	H-01	102	RM 80
H3	H-Single room	H-01	103	RM 80
H4	H-Single room	H-01	104	RM 80
H5	H-Single room	H-01	105	RM 80
H6	H-Single room	H-01	106	RM 80
H7	H-Single room	H-01	107	RM 80
H8	H-Single room	H-01	108	RM 80
H9	H-Single room	H-01	109	RM 80
H10	H-Single room	H-01	110	RM 80

10 rows selected.

```
SQL> select * from lease;
```

LID	SID	DURATION	PLACE_NO	ROOM_NO
L1	1001	1 Year	A-01	101-5
L2	1002	1 Year	A-01	101-5
L3	1003	1 Year	A-01	101-5
L4	1004	1 Year	A-01	101-5
L5	1005	1 Year	A-01	101-5
L6	1006	1 Semester	A-01	101-4
L7	1007	1 Semester	A-01	101-4
L8	1008	1 Semester	A-01	101-4
L9	1009	1 Semester	A-01	101-4
L10	1010	1 Year	A-01	101-3
L11	1011	1 Year	A-01	101-3

LID	SID	DURATION	PLACE_NO	ROOM_NO
L12	1012	1 Year	A-01	101-3
L13	1013	1 Year	H-01	101
L14	1014	1 Semester	H-01	102
L15	1015	1 Year	H-01	103
L16	1016	1 Semester	H-01	104
L17	1017	1 Year	H-01	105
L18	1018	1 Year	H-01	106
L19	1019	1 Semester	H-01	107
L20	1020	1 Semester	H-01	108
L21	1021	1 Year	H-01	109
L22	1022	1 Year	H-01	110

```
22 rows selected.
```

```
SQL>
```

d) Produce SQL listings on the 3 specific questions (given below) based on Case Study.

1. List all the different rooms in order of cost.

```
SQL> select distinct a.room_type,a.monthly_rent_rate ,b.room_type,b.monthly_rent_rate
2   from apartment a,hall b where a.room_type=b.room_type(+)
3   union
4   select distinct a.room_type,a.monthly_rent_rate ,b.room_type,b .monthly_rent_rate
5   from apartment a,hall b where a.room_type(+)=b.room_type;
```

ROOM_TYPE	cost	ROOM_TYPE	cost
A-Group by3	RM 150		
A-Group by4	RM 130		
A-Group by5	RM 100		
		H -Single room	RM 80

2. List the student name, room number and lease details.

```
SQL> select a.sname,b.* from student a,lease b where a.sid =b.sid;
```

SNAME	LID	SID	DURATION	PLACE_NO	ROOM_NO
JH low	L1	1001	1 Year	A-01	101-5
Khar Fai	L2	1002	1 Year	A-01	101-5
Kenny Lee	L3	1003	1 Year	A-01	101-5
Eugene Yap	L4	1004	1 Year	A-01	101-5
Sam Low	L5	1005	1 Year	A-01	101-5
Suntheran	L6	1006	1 Semester	A-01	101-4
Lloyd	L7	1007	1 Semester	A-01	101-4
Mohamad	L8	1008	1 Semester	A-01	101-4
Alice Tew	L9	1009	1 Semester	A-01	101-4
Lina Koh	L10	1010	1 Year	A-01	101-3
Mindy Aw	L11	1011	1 Year	A-01	101-3

SNAME	LID	SID	DURATION	PLACE_NO	ROOM_NO
Karena Ng	L12	1012	1 Year	A-01	101-3
Chris Lee	L13	1013	1 Year	H-01	101
Alex Wong	L14	1014	1 Semester	H-01	102
Chifford	L15	1015	1 Year	H-01	103
Jenny Khoo	L16	1016	1 Semester	H-01	104
Ken Ng	L17	1017	1 Year	H-01	105
Kogilar	L18	1018	1 Year	H-01	106
Jacky Tan	L19	1019	1 Semester	H-01	107
Sabrina	L20	1020	1 Semester	H-01	108
Ben Lee	L21	1021	1 Year	H-01	109
Silva	L22	1022	1 Year	H-01	110

3. List the Room number, the apartment it is in, and the students who are living in those rooms.

```
select a.room_no,b.sname from lease a,student b where a.sid=b.sid and place_no like'A%';
```

```
ROOM_NO SNAME
```

```
-----
```

```
101-5   JH low
101-5   Khar Fai
101-5   Kenny Lee
101-5   Eugune Yap
101-5   Sam Low
101-4   Suntheran
101-4   Lloyd
101-4   Mohamad
101-4   Alice Tew
101-3   Lina Koh
101-3   Mindy Aw
```

```
ROOM_NO SNAME
```

```
-----
```

```
101-3   Karena Ng
```

e) 10 Different SQL Statements

- 1) SQL> insert into student
2 values(1001,'JH low','23 Taman Bangi',21,'male','chinese','apartment');

1 row created.

English

THE INSERT INTO Statement

The INSERT INTO statement is used to insert new rows into a table

Insert Student ID, Student Name, Address, Sex,
Nationality, Room type into Student table.

.....

- 2) SQL> delete from student where sid=1023;

1 row deleted.

English

Delete a record from the System Database

Delete from student table where student ID is 1023

.....

- 3) SQL> select sid,sname,sage,sex from student where room_type='apartment';

SID	SNAME	SAGE	SEX
1001	JH low	21	male
1002	Khar Fai	20	male
1003	Kenny Lee	22	male
1004	Eugene Yap	23	male
1005	Sam Low	26	male
1006	Suntheran	27	male
1007	Lloyd	29	male
1008	Mohamad	26	male
1009	Alice Tew	20	female
1010	Lina Koh	19	female
1011	Mindy Aw	21	female

English

List the student ID, student name, student age and sex where the room type is apartment

4) SQL> select sid,duration,room_no from lease;
 SID DURATION ROOM_N

```
-----
1001 1 Year      101-5
1002 1 Year      101-5
1003 1 Year      101-5
1004 1 Year      101-5
1005 1 Year      101-5
1006 1 Semester 101-4
1007 1 Semester 101-4
1008 1 Semester 101-4
1009 1 Semester 101-4
1010 1 Year      101-3
1011 1 Year      101-3
```

SID DURATION ROOM_N

```
-----
1012 1 Year      101-3
1013 1 Year      101
1014 1 Semester 102
1015 1 Year      103
1016 1 Semester 104
1017 1 Year      105
1018 1 Year      106
1019 1 Semester 107
1020 1 Semester 108
1021 1 Year      109
1022 1 Year      110
```

22 rows selected.

English

List all the student id, duration and room number from lease table

5) SQL> update student
 2 set saddress='8 Jalan Rawang'
 3 where sid=1003;

1 row updated.

English

Update student detail set student new address where student ID is 1003

6) SQL> select sname,sage,room_type from student order by sname;

SNAME	SAGE	ROOM_TYPE
Alex Wong	23	hall of residence
Alice Tew	20	apartment
Ben Lee	29	hall of residence
Chifford	24	hall of residence
Chris Lee	24	hall of residence
Eugene Yap	23	apartment
JH low	21	apartment
Jacky Tan	24	hall of residence
Jenny Khoo	24	hall of residence
Karena Ng	24	apartment
Ken Ng	23	hall of residence

SNAME	SAGE	ROOM_TYPE
Kenny Lee	28	apartment
Khar Fai	20	apartment
Kogilar	22	hall of residence
Lina Koh	19	apartment
Lloyd	29	apartment
Mindy Aw	21	apartment
Mohamad	26	apartment
Sabrina	20	hall of residence
Sam Low	26	apartment
Silva	29	hall of residence
Suntheran	27	apartment

22 rows selected.

English

List all the name and age and room type from student table order them by sname

7) SQL> select a.duration,b.sname
 2 from lease a,student
 3 b where a.sid=b.sid and room_no='101 -5';

DURATION	SNAME
1 Year	JH low
1 Year	Khar Fai
1 Year	Kenny Lee
1 Year	Eugene Yap
1 Year	Sam Low

English

List all the student name and duration from student table where student living in room no 101-5

- 8) SQL> select a.room_no,b.sname
 2 from lease a,student b
 3 where a.sid=b.sid and duration='1 Semester';

ROOM_NO SNAME

```
-----
101-4 Suntheran
101-4 Lloyd
101-4 Mohamad
101-4 Alice Tew
102 Alex Wong
104 Jenny Khoo
107 Jacky Tan
108 Sabrina
```

8 rows selected.

English

List student name and room No.where duration is 1 semester

.....

- 9) SQL> select sid,sname,sage,room_type from student where sname like'A%';

```
SID SNAME      SAGE ROOM_TYPE
-----
009 Alice Tew  20 apartment
014 Alex Wong  23 hall of residence
```

English

List student name ,age and room type from student where name begin with 'A'

.....

- 10) SQL> select * from student where sage between 20 and 23

```
SID SNAME      SADDRESS          SAGE SEX    NATIONALITY ROOM_TYPE
-----
1001 JH low    23 Taman Bangi   21 male  chinese  apartment
1002 Khar Fai  28 Taman Kepong  20 male  chinese  apartment
1004 Eugune Yap 76 Taman Kepong  23 male  chinese  apartment
1009 Alice Tew 88 Taman Rawang  20 female chinese  apartment
1011 Mindy Aw  77 Taman Kuantan 21 female chinese  apartment
1014 Alex Wong 12 Taman Istana 23 male  chinese  hall of residence
1017 Ken Ng    4 Taman Bintang 23 male  chinese  hall of residence
1018 Kogilar   38 Taman Bangsa 22 female indian  hall of residence
1020 Sabrina   34 Taman Kepong  20 female indian  hall of residence
```

9 rows selected.

English

List all the student detail from where student age between 20 to 23

Appendix

```
create table student
( sid      number(4),
  sname    varchar2(10),
  saddress varchar2(17),
  sage     number(2),
  sex      varchar2(6),
  nationality varchar2(7),
  room     varchar2(17),
  primary key(sid));
```

```
insert into student
values(1001,'JH low','23 Taman Bangi',21,'male','chinese','apartment');
insert into student
values(1002,'Khar Fai','28 Taman Kepong',20,'male','chinese','apartment');
insert into student
values(1003,'Kenny Lee','90 Taman Cheras',22,'male','chinese','apartment') ;
insert into student
values(1004,'Eugene Yap','76 Taman
Kepong',23,'male','chinese','apartment');
insert into student
values(1005,'Sam Low','4 Taman Cheras',26,'male','chinese','apartment');
insert into student
values(1006,'Suntheran','1 Taman Sentu',27,'male','indian','apartment');
insert into student
values(1007,'Lloyd','6 Taman Sentosa',29,'male','indian','apartment');
insert into student
values(1008,'Mohamad','9 Taman Rawang',26,'male','indian','apartment');
insert into student
values(1009,'Alice Tew','88 Taman
Rawang',20,'female','chinese','apartment');
insert into student
values(1010,'Lina Koh','27 Taman
Puchong',19,'female','chinese','apartment');
insert into student
values(1011,'Mindy Aw','77 Taman
Kuantan',21,'female','chinese','apartment') ;
insert into student
values(1012,'Karena Ng','32 Taman
Selayang',24,'female','chinese','apartment');
insert into student
values(1013,'Chris Lee','3 Taman Genny',24,'male','chinese','hall of
residence');
insert into student
```

```
values(1014,'Alex Wong','12 T aman Istana',23,'male','chinese','hall of
residence');
insert into student
values(1015,'Chifford','9 Taman Bangsa',24,'male','Indian','hall of
residence');
insert into student
values(1016,'Jenny Khoo','22 Taman Imbi',24,'female','chinese','hall of
residence');
insert into student
values(1017,'Ken Ng','4 Taman Bintang',23,'male','chinese','hall of
residence');
insert into student
values(1018,'Kogilar','38 Taman Bangsa',22,'female','indian','hall of
residence');
insert into student
values(1019,'Jacky Tan','5 Taman Rawang',24,'male','chinese','hall of
residence');
insert into student
values(1020,'Sabrina','34 Taman Kepong',20,'female','indian','hall of
residence');
insert into student
values(1021,'Ben Lee','5 Taman Genny',29,'male','chinese','hall of
residence');
insert into student
values(1022,'Silva','29 Taman Imbi',29,'male','Indian','hall of residence');
```

```
create table apartment
( aid varchar2(3),
  room_type varchar2(13),
  place_no varchar2(4),
  room_no varchar2(5),
  monthly_rent_rate varchar2(6),
  primary key (aid));
```

```
insert into apartment values('A1','A -Group by3','A-01','101-3','RM 150');
insert into apartment values('A2','A -Group by4','A-01','101-4','RM 130');
insert into apartment values('A3','A -Group by5','A-01','101-5','RM 100');
insert into apartment values('A4','A -Group by3','A-02','201-3','RM 150');
insert into apartment values('A5','A -Group by4','A-02','201-4','RM 130');
insert into apartment values('A6','A -Group by5','A-02','201-5','RM 100');
insert into apartment values('A7','A -Group by3','A-03','301-3','RM 150');
insert into apartment values('A8','A -Group by4','A-03','301-4','RM 130');
insert into apartment values('A9','A -Group by5','A-03','301-5','RM 100');
insert into apartment values('A10','A -Group by3','A-04','401-3','RM 150');
```

```
create table hall
(hid varchar2(3),
 room_type Varchar2(13),
 place_no varchar2(4),
 room_no varchar2(3),
 monthly_rent_rate varchar2(6),
 primary key(hid));
```

```
insert into hall values('H1','H -Single room','H-01','101','RM 80');
insert into hall values('H2','H -Single room','H-01','102','RM 80');
insert into hall values('H3','H -Single room','H-01','103','RM 80');
insert into hall values('H4','H -Single room','H-01','104','RM 80');
insert into hall values('H5','H -Single room','H-01','105','RM 80');
insert into hall values('H6','H -Single room','H-01','106','RM 80');
insert into hall values('H7','H -Single room','H-01','107','RM 80');
insert into hall values('H8','H -Single room','H-01','108','RM 80');
insert into hall values('H9','H -Single room','H-01','109','RM 80');
insert into hall values('H10','H -Single room','H-01','110','RM 80');
```

```
create table lease
(lid varchar2(3),
sid number(4),
duration varchar2(10),
place_no varchar2(4),
room_no varchar2(5),
primary key(lid),
foreign key (sid)references student);
```

```
insert into lease values('L1',1001,'1 Year','A -01','101-5');
insert into lease values('L2',1002,'1 Year','A -01','101-5');
insert into lease values('L3',1003,'1 Year','A -01','101-5');
insert into lease values('L4',1004,'1 Year','A -01','101-5');
insert into lease values('L5',1005,'1 Year','A -01','101-5');
insert into lease values('L6',1006,'1 Semester','A -01','101-4');
insert into lease values('L7',1007,'1 Semester','A -01','101-4');
insert into lease values('L8',1008,'1 Semester','A -01','101-4');
insert into lease values('L9',1009,'1 Semester','A -01','101-4');
insert into lease values('L10',1010,'1 Year','A -01','101-3');
insert into lease values('L11',1011,'1 Year','A -01','101-3');
insert into lease values('L12',1012,'1 Year','A -01','101-3');
insert into lease values('L13',1013,'1 Year','H -01','101');
insert into lease values('L14',1014,'1 Semester','H -01','102');
insert into lease values('L15',1015,'1 Year','H -01','103');
insert into lease values('L16',1016,'1 Semester','H -01','104');
insert into lease values('L17',1017,'1 Year','H -01','105');
insert into lease values('L18',1018,'1 Year','H -01','106');
insert into lease values('L19',1019,'1 Semester','H -01','107');
insert into lease values('L20',1020,'1 Semester','H -01','108');
insert into lease values('L21',1021,'1 Year','H -01','109');
insert into lease values('L22',1022,'1 Year','H -01','110');
```

```
SQL> column sage format 9999
SQL> column sid format 9999
SQL> column nationality format a1
SQL> /
```

Reference

<http://cs-netlab-01.lynchburg.edu/courses/Oracle/SQLPlus.htm>

<http://cisnet.baruch.cuny.edu/holowczak/oracle/sqlplus/>

<http://www.orafaq.com/forum/t/128650/2/>

http://homepages.uel.ac.uk/u0228569/UEL_files/SD%202052/SD2052.pdf