



KINGDOM OF SAUDI ARABIA  
MINISTRY OF HIGHER EDUCATION  
TAIBAH UNIVERSITY (039)  
COLLEGE OF COMPUTER SCIENCE AND ENGINEERING (CCSE)

# LOCKER RENTAL DEPARTMENT (LRD)

CS372 PROJECT

Database Systems

## Team Members

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Instructor:  
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# PHASE 1: SYSTEM REQUIREMENTS

## - Data Requirements :

### 1. student :

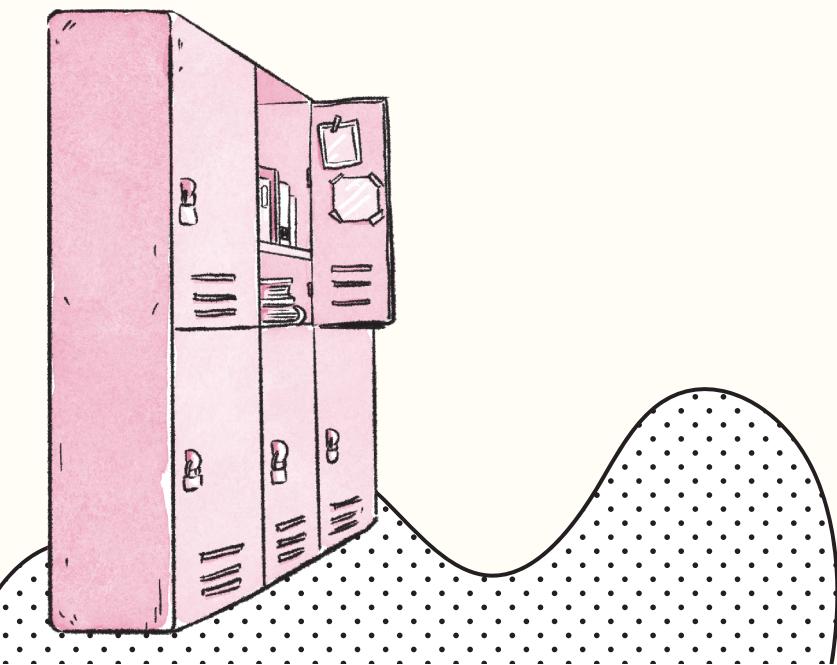
Student must be enroll at the university. The data stored for student include university ID ,name ,phone ,email, and collage.

### 2. Locker:

LRD has a many locker . The data stored for locker include Serial NO, location, and lockers status .

### 3. LRD:

Student must register in LRD to complete rental process. The data stored for LRD include name, building No, total of available lockers , and Rental contract(start date, Rental end date, Payment status).



## **- Transaction requirements:**

### **1. Data manipulation:**

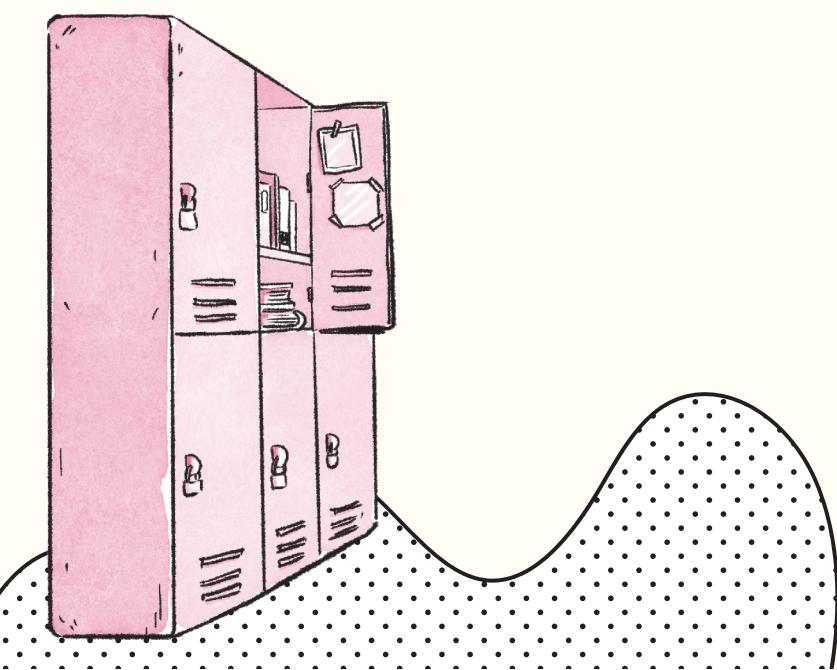
- Add new student to the database.
- Add new locker to the database.
- Rent a locker to a student.
- Renew a locker rental for a student.
- Terminate a locker rental for a student.
- Update student information in the database.
- Update locker information in the database.

### **2. Queries:**

- List available lockers.
- List rental locker.

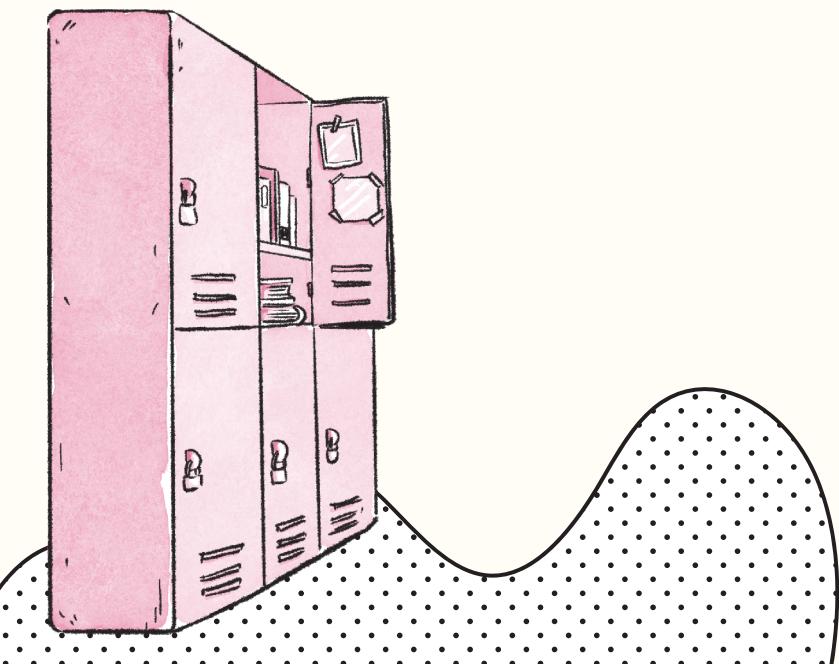
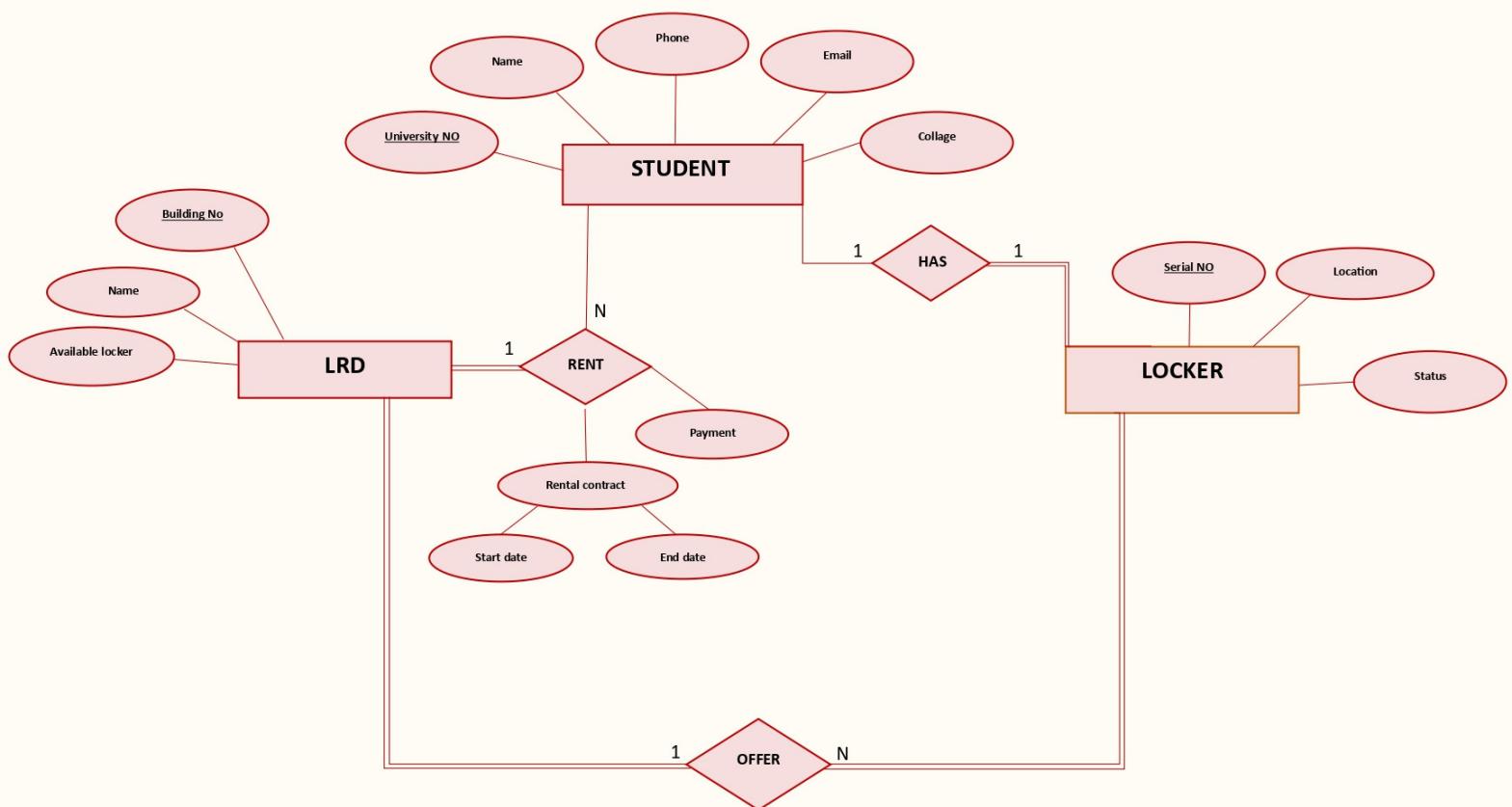
## **- Business Rules:**

1. Each student can rent only one locker at a time.
2. Rental price must be paid in advance before renting a locker or renewing the rental period.
3. Rental periods can be extended but cannot be shortened once started.

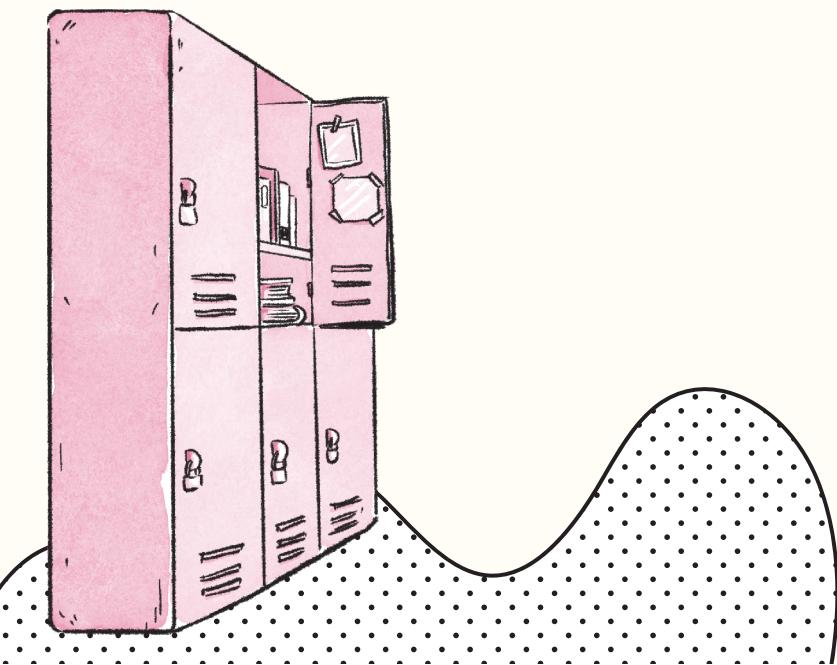
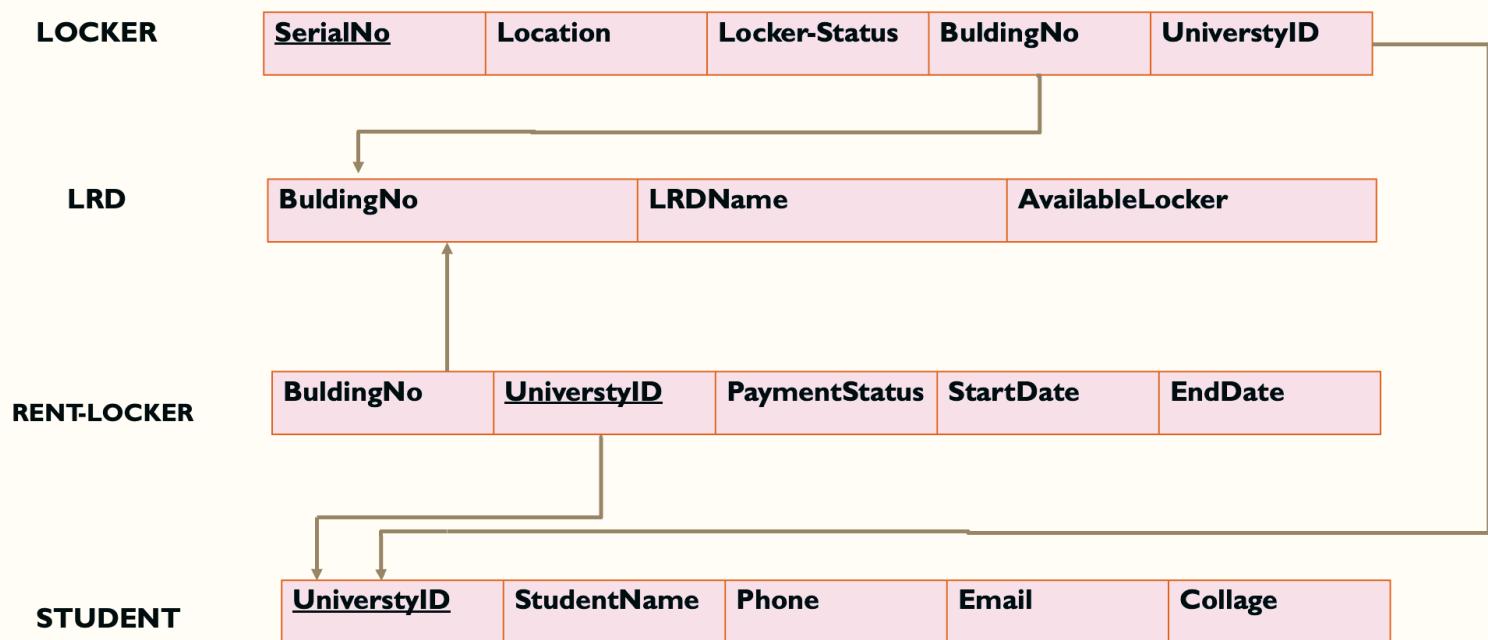


# PHASE 2: ER MODEL

- ER Model :



## - Relational Model/Schema :

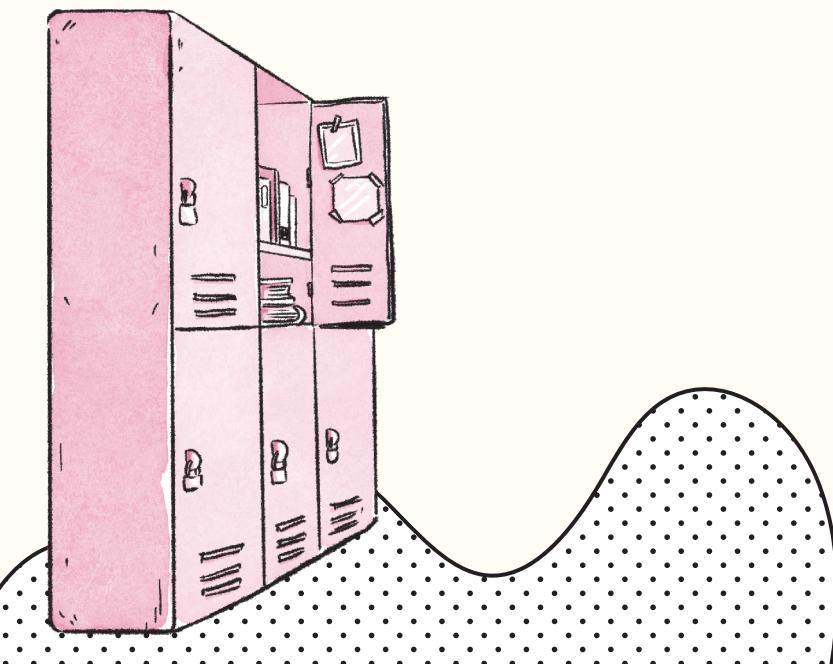


## - Documentation for entity:

Entity name	Description	Aliases
<b>Student</b>	Contains information about students who rent the locker	

Entity name	Description	Aliases
<b>LRD</b>	Contains information about the locker rental unit	

Entity name	Description	Aliases
<b>Locker</b>	It contains information about the locker itself	

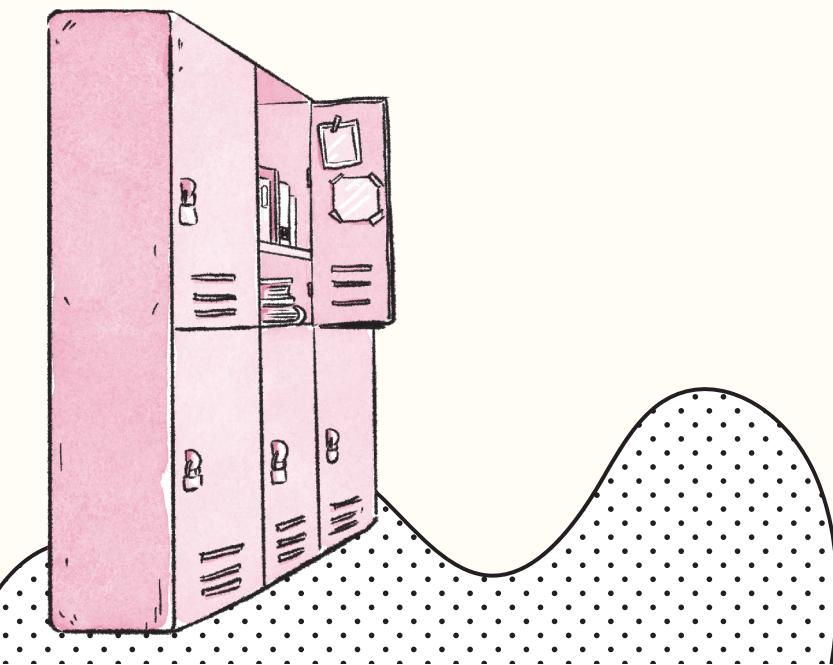


## - Documentation for relationship:

Entity name	Multiplicity	Relationship	Multiplicity	Entity name
LRD	1	RENT	N	STUDENT

Entity name	Multiplicity	Relationship	Multiplicity	Entity name
STUDENT	1	HAS	1	LOCKER

Entity name	Multiplicity	Relationship	Multiplicity	Entity name
LRD	1	OFFER	N	LOCKER



## - Documentation for attributes:

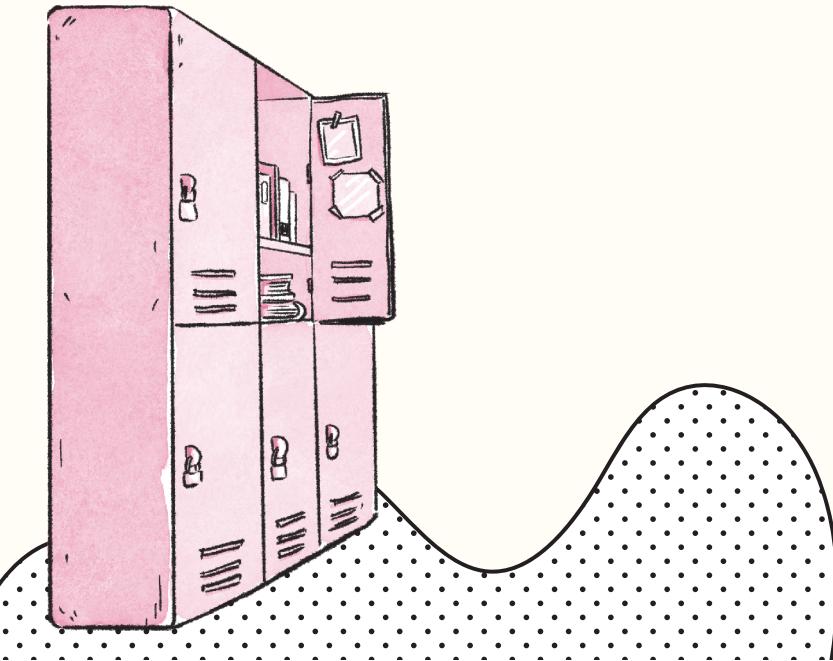
Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
<b>STUDENT</b>	UniversityID	It contains a student ID	INT	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
<b>STUDENT</b>	StudentName	It contains a student name	VARCHAR(20)	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
<b>STUDENT</b>	Phone	It contains a student phone	Varchar(10)	null is not accepted	Not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
<b>STUDENT</b>	Email	It contains a student Email	Varchar(50)	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
<b>STUDENT</b>	Collage	Contains the name of the college the student attended	Varchar(20)	null is not accepted	not accepted		



Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LRD	BuildingNo	It contains Building number	INT	null is not accepted	not accepted		

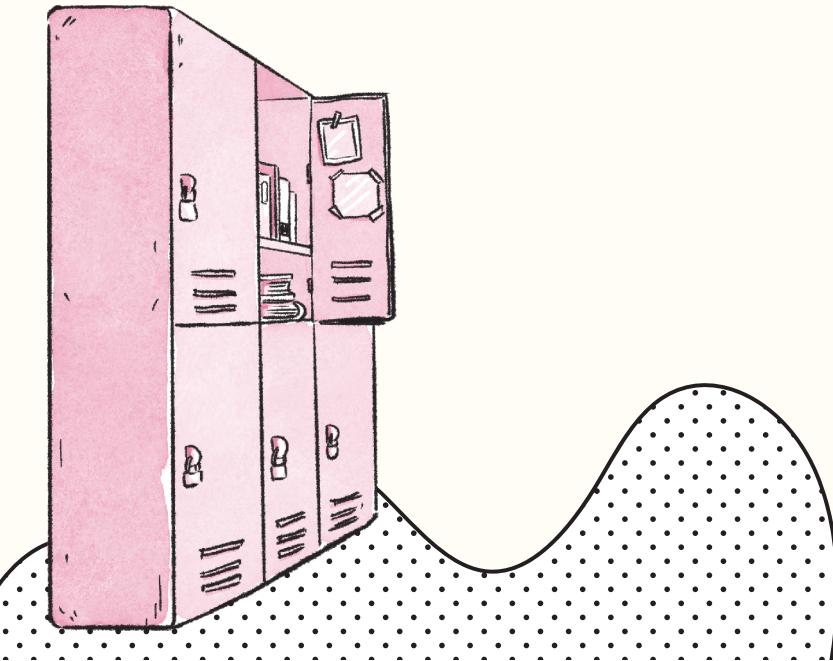
Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LRD	LRDName	It contains locker rental unit name	Varchar(30)	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LRD	AvailableLocker	It contains the total number of available locker	Int	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LOCKER	Serial-NO	Contains the locker number	Int	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LOCKER	Location	Contains the locker location	Varchar(80)	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LOCKER	LockerStatus	Contains the locker status	Varchar(20)	null is not accepted	not accepted		



# PHASE 3: IMPLEMENTATION

```
1  CREATE TABLE Student(
2      UniversityID INT PRIMARY KEY,
3      StudentName VARCHAR(20),
4      Phone VARCHAR(10),
5      Email VARCHAR(50),
6      College VARCHAR(20),
7  )
8
9
10 CREATE TABLE LRD (
11     BuildingNO INT PRIMARY KEY,
12     LRDName VARCHAR(30),
13     AvailableLocker INT,
14 )
15
16 CREATE TABLE Locker (
17     SerialNO INT PRIMARY KEY,
18     Location_info VARCHAR(80),
19     Locker_Status VARCHAR(20),
20     Rental_BuildingNum INT foreign key references LRD (BuildingNO),
21     Student_id INT foreign key references Student (UniversityID)
22 )
23
24
25 CREATE TABLE RentLocker (
26     Student_id INT foreign key references Student (UniversityID),
27     Rental_Start_Date DATE,
28     Rental_End_Date DATE,
29     Payment_Status VARChar(10) CHECK (Payment_Status = 'valid'),
30     Rental_BuildingNum INT foreign key references LRD (BuildingNO)
31 )
32
33
34
35 -- Add Students data to the database:
36 INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
37 VALUES(4250107,'Lama Alfreakh', '0539294442', 'Tu4250107@taibahu.edu.sa', 'CCSE')
38
39 INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
40 VALUES(4152242,'Manar Althubyani', '0548604346', 'Tu4152242@taibahu.edu.sa', 'CCSE')
41
```

```

42  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
43    VALUES (4156892, 'Shada Aloufi', '0509349315','Tu4156892@taibahu.edu.sa', 'CCSE')
44
45  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
46    VALUES (4152243, 'Shouq Alharbi', '0509722939','Tu4152243@taibahu.edu.sa', 'CCSE')
47
48  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
49    VALUES(4152479,'Bshayer Rakan','0536360563','Tu4152479@taibahu.edu.sa','CCSE')
50
51  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
52    VALUES(4151658,'Reham Almezini','0530103384','TU4151658@taibahu.edu.sa','CCSE')
53
54  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
55    VALUES(4253618,'Asmaa Alsharif','0501670306','TU4253618@taibahu.edu.sa','CCSE')
56
57  INSERT INTO Student(UniversityID,StudentName,Phone,Email,College)
58    VALUES(4253563,'Danya Alhazmi','0595020244','TU4253563@taibahu.edu.sa','CCSE')
59
60  INSERT INTO Student(UniversityID,StudentName,Email,College)
61    VALUES(4252022,'Dana Rakan','TU4252022@taibahu.edu.sa','CCSE')
62
63  INSERT INTO Student(UniversityID,StudentName,Email,College)
64    VALUES(435015,'Rana Almezini','TU435015@taibahu.edu.sa','CCSE')
65
66
67  -- Add LRD data to the database:
68  INSERT INTO LRD(BuildingNO,LRDName,AvailableLocker)
69    VALUES(364,'LOCKER RENTAL DEPARTMENT',15)
70
71
72  -- Add lockers data to the database:
73  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
74    VALUES(1,'laibrary building /ground floor','RENT',364,4152242)

```

```

75
76  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum)
77    VALUES(2,'laibrary building /ground floor','AVALIABLE',364)
78
79  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum)
80    VALUES(3,'laibrary building /ground floor','AVALIABLE',364)
81
82  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
83    VALUES(4,'laibrary building /ground floor','RENT',364,4250107)
84
85  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
86    VALUES(5,'laibrary building /ground floor','RENT',364,4156892)
87
88  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum)
89    VALUES(6,'laibrary building /ground floor','AVALIABLE',364)
90
91  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum)
92    VALUES(7,'laibrary building /ground floor','AVALIABLE',364)
93
94  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
95    VALUES(8,'laibrary building /first floor','RENT',364,4152243)
96
97  INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum)
98    VALUES(9,'laibrary building /first floor','AVALIABLE',364)
99
100 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
101   VALUES(10,'laibrary building /first floor','RENT',364,4152479)
102
103 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
104   VALUES(11,'laibrary building /first floor','RENT',364,4253618)
105
106 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
107   VALUES(12,'laibrary building /first floor','RENT',364,4253563)
108
109 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
110   VALUES(13,'laibrary building /first floor','RENT',364,435015)
111
112 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
113   VALUES(14,'laibrary building /first floor','RENT',364,4252022)

```

```

114
115 INSERT INTO Locker(SerialNO,Location_info,Locker_Status,Rental_BuildingNum,Student_id)
116 VALUES(15,'laibrary building /first floor','RENT',364,4151658)
117
118
119 -- Rent a locker to a Student:
120 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
121 VALUES(4152242,'2022/08/24','2023/08/24','valid',364)
122
123 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
124 VALUES(4151658,'2023/05/12','2024/05/12','valid',364)
125
126 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
127 VALUES(4252022,'2022/12/10','2023/12/10','valid',364)
128
129 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
130 VALUES(435015,'2023/03/09','2024/03/09','valid',364)
131
132 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
133 VALUES(4152479,'2022/12/12','2023/12/12','valid',364)
134
135 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
136 VALUES(4152243,'2023/01/01','2024/01/01','valid',364)
137
138 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
139 VALUES(4156892,'2023/11/01','2024/11/01','valid',364)
140
141 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
142 VALUES(4250107,'2022/12/16','2023/12/16','valid',364)
143
144 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
145 VALUES(4253618,'2022/12/16','2023/12/16','valid',364)
146
147 INSERT INTO RentLocker(Student_id,Rental_Start_Date,Rental_End_Date,Payment_Status,Rental_BuildingNum)
148 VALUES(4253563,'2022/12/16','2023/12/16','valid',364)
149

150
151 -- Retrieve all students information:
152 SELECT * FROM Student
153
154 -- Retrieve LRD information:
155 SELECT * FROM LRD
156
157 -- Retrieve all Lockers information:
158 SELECT * FROM Locker
159
160 -- Retrieve all RentLocker information:
161 SELECT * FROM RentLocker
162
163 -- Generate reports on rented lockers:
164 SELECT count(Student_id) AS 'Rental lockers'
165 FROM Locker
166
167 -- Generate reports on available lockers:
168 SELECT count(Locker_Status) AS 'Avaliable lockers'
169 FROM Locker
170 WHERE Locker_Status = 'AVAILABLE'
171

```

## - Retrieve all students information:

```
150
151 -- Retrieve all students information:
152 SELECT * FROM Student
153
```

	UniversityID	StudentName	Phone	Email	College
1	435015	Rana Almezini	NULL	TU435015@taibahu.edu.sa	CCSE
2	4151658	Reham Almezini	0530103384	TU4151658@taibahu.edu.sa	CCSE
3	4152242	Manar Althubyani	0548604346	Tu4152242@taibahu.edu.sa	CCSE
4	4152243	Shouq Alharbi	0509722939	Tu4152243@taibahu.edu.sa	CCSE
5	4152479	Bshayer Rakan	0536360563	Tu4152479@taibahu.edu.sa	CCSE
6	4156892	Shada Aloufi	0509349315	Tu4156892@taibahu.edu.sa	CCSE
7	4250107	Lama Alfreah	0539294442	Tu4250107@taibahu.edu.sa	CCSE
8	4252022	Dana Rakan	NULL	TU4252022@taibahu.edu.sa	CCSE
9	4253563	Danya Alhzamri	0595020244	TU4253563@taibahu.edu.sa	CCSE
10	4253618	Asmaa Alsharif	0501670306	TU4253618@taibahu.edu.sa	CCSE

## - Retrieve LRD information:

```
153
154 -- Retrieve LRD information:
155 SELECT * FROM LRD
156
```

	BuildingNO	LRDName	AvailableLocker
1	364	LOCKER RENTAL DEPARTMENT	15

## - Retrieve all lockers information:

```
156
157 -- Retrieve all Lockers information:
158 SELECT * FROM Locker
159
```

	SerialNO	Location_info	Locker_Status	Rental_BuildingNum	Student_id
1	1	laibrary building /ground...	RENT	364	4152242
2	2	laibrary building /ground...	AVAILABLE	364	NULL
3	3	laibrary building /ground...	AVAILABLE	364	NULL
4	4	laibrary building /ground...	RENT	364	4250107
5	5	laibrary building /ground...	RENT	364	4156892
6	6	laibrary building /ground...	AVAILABLE	364	NULL
7	7	laibrary building /ground...	AVAILABLE	364	NULL
8	8	laibrary building /first ...	RENT	364	4152243
9	9	laibrary building /first ...	AVAILABLE	364	NULL
10	10	laibrary building /first ...	RENT	364	4152479
11	11	laibrary building /first ...	RENT	364	4253618
12	12	laibrary building /first ...	RENT	364	4253563
13	13	laibrary building /first ...	RENT	364	435015
14	14	laibrary building /first ...	RENT	364	4252022
15	15	laibrary building /first ...	RENT	364	4151658

## - Retrieve all rent lockers information:

```
159
160    -- Retrieve all RentLocker information:
161    SELECT * FROM RentLocker
162
```

Results Messages

	Student_id	Rental_Start_Date	Rental_End_Date	Payment_Status	Rental_BuildingNum
1	4152242	1444-01-26	1445-02-08	valid	364
2	4151658	1444-10-22	1445-11-04	valid	364
3	4252022	1444-05-16	1445-05-26	valid	364
4	435015	1444-08-17	1445-08-28	valid	364
5	4152479	1444-05-18	1445-05-28	valid	364
6	4152243	1444-06-08	1445-06-19	valid	364
7	4156892	1445-04-17	1446-04-29	valid	364
8	4250107	1444-05-22	1445-06-03	valid	364
9	4253618	1444-05-22	1445-06-03	valid	364
10	4253563	1444-05-22	1445-06-03	valid	364

## - Retrieve the total of rented and available lockers:

```
162
163    -- Retrieve the total number of rented lockers:
164    SELECT count(Student_id) AS 'Total rental lockers'
165    FROM Locker
166
167    -- Retrieve the total number of Available lockers:
168    SELECT count(Locker_Status) AS 'Total available lockers'
169    FROM Locker
170    WHERE Locker_Status = 'AVAILABLE'
171
```

Results Messages

	Total rental lockers
1	10

	Total available lockers
1	5

- Update some student information and retrieve it after that:

```

173  -- Update some student information in the database
174  UPDATE Student
175  SET Phone = '0504367771'
176  WHERE UniversityID = 4250107
177
178  UPDATE Student
179  SET Phone = '0538764791'
180  WHERE UniversityID = 4253618
181
182  -- Retrieve all students information:
183  SELECT * FROM Student
184

```

#### Results Messages

	Univers...	StudentName	Phone	Email	College
1	435015	Rana Almezini	NULL	TU435015@taibahu.edu...	CCSE
2	4151658	Reham Almezini	0530103384	TU4151658@taibahu.edu...	CCSE
3	4152242	Manar Althubyani	0548604346	Tu4152242@taibahu.edu...	CCSE
4	4152243	Shouq Alharbi	0509722939	Tu4152243@taibahu.edu...	CCSE
5	4152479	Bshayer Rakan	0536360563	Tu4152479@taibahu.edu...	CCSE
6	4156892	Shada Aloufi	0509349315	Tu4156892@taibahu.edu...	CCSE
7	4250107	Lama Alfreah	0504367771	TU4250107@taibahu.edu...	CCSE
8	4252022	Dana Rakan	NULL	TU4252022@taibahu.edu...	CCSE
9	4253563	Danya Alhazmi	0595020244	TU4253563@taibahu.edu...	CCSE
10	4253618	Asmaa Alsharif	0538764791	TU4253618@taibahu.edu...	CCSE

- Renew a locker rental for a student and retrieve all rent lockers information after that:

```

190
191  -- Renew a locker rental for a Student
192  UPDATE RentLocker
193  SET Rental_End_Date = '2024-12-16'
194  WHERE Student_id = 4250107
195
196
197  -- Retrieve all RentLocker information:
198  SELECT * FROM RentLocker
199

```

#### Results Messages

	Student_id	Rental_Start_Date	Rental_End_Date	Payment_Status	Rental_BuildingNum
1	4152242	1444-01-26	1445-02-08	valid	364
2	4151658	1444-10-22	1445-11-04	valid	364
3	4252022	1444-05-16	1445-05-26	valid	364
4	435015	1444-08-17	1445-08-28	valid	364
5	4152479	1444-05-18	1445-05-28	valid	364
6	4152243	1444-06-08	1445-06-19	valid	364
7	4156892	1445-04-17	1446-04-29	valid	364
8	4250107	1444-05-22	1446-06-15	valid	364
9	4253618	1444-05-22	1445-06-03	valid	364
10	4253563	1444-05-22	1445-06-03	valid	364

## - Terminate a locker rental for a Student, update locker information and then retrieve all databases tables:

```

199
200
201    -- Terminate a locker rental for a Student
202    DELETE FROM RentLocker
203    WHERE Student_id = 4152243
204
205    -- Update locker information in the database
206    UPDATE Locker
207    SET Locker_Status = 'AVAILABLE', Student_id = NULL
208    WHERE Student_id = 4152243
209
210    -- Retrieve all Lockers information:
211    SELECT * FROM Locker
212
213    -- Retrieve all RentLocker information:
214    SELECT * FROM RentLocker
215
216    -- Retrieve the total rental lockers:
217    SELECT count(Student_id) AS 'Total rental lockers'
218    FROM Locker
219
220    -- Retrieve the total available lockers:
221    SELECT count(Locker_Status) AS 'Total available lockers'
222    FROM Locker
223    WHERE Locker_Status = 'AVAILABLE'
224

```

### Results    Messages

	SerialNO	Location_info	Locker_Status	Rental_BuildingNum	Student_id
1	1	laibrary building /ground...	RENT	364	4152242
2	2	laibrary building /ground...	AVAILABLE	364	NULL
3	3	laibrary building /ground...	AVAILABLE	364	NULL
4	4	laibrary building /ground...	RENT	364	4250107
5	5	laibrary building /ground...	RENT	364	4156892
6	6	laibrary building /ground...	AVAILABLE	364	NULL
7	7	laibrary building /ground...	AVAILABLE	364	NULL
8	8	laibrary building /first ...	AVAILABLE	364	NULL
9	9	laibrary building /first ...	AVAILABLE	364	NULL
10	10	laibrary building /first ...	RENT	364	4152479

	Student_id	Rental_Start_Date	Rental_End_Date	Payment_Status	Rental_BuildingNum
1	4152242	1444-01-26	1445-02-08	valid	364
2	4151658	1444-10-22	1445-11-04	valid	364
3	4252022	1444-05-16	1445-05-26	valid	364
4	435015	1444-08-17	1445-08-28	valid	364
5	4152479	1444-05-18	1445-05-28	valid	364
6	4156892	1445-04-17	1446-04-29	valid	364
7	4250107	1444-05-22	1446-06-15	valid	364
8	4253618	1444-05-22	1445-06-03	valid	364
9	4253563	1444-05-22	1445-06-03	valid	364

	Total rental lockers
1	9

	Total available lockers
1	6