



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 :

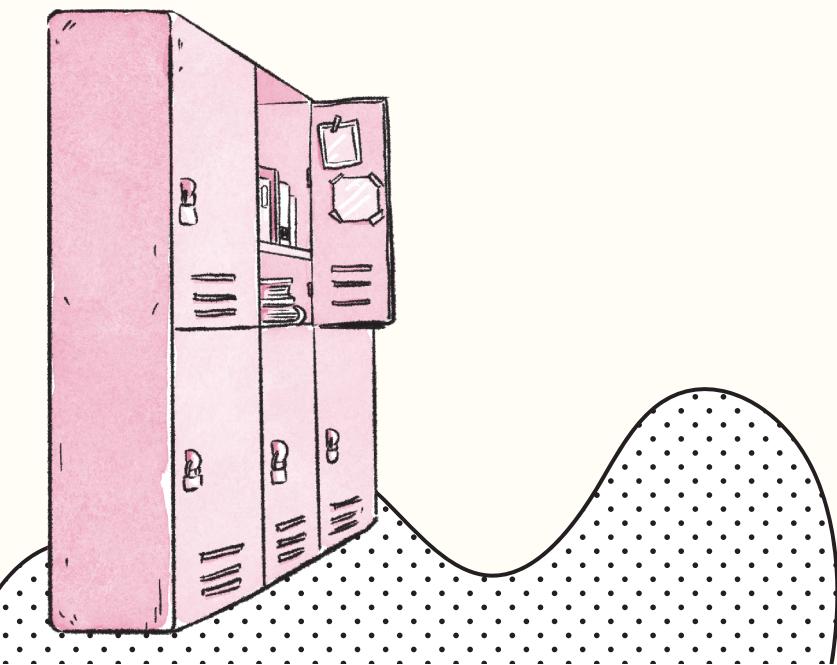
Student must be enroll at the university. The data stored for student include university ID ,name ,phone ,email, and collage.

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:

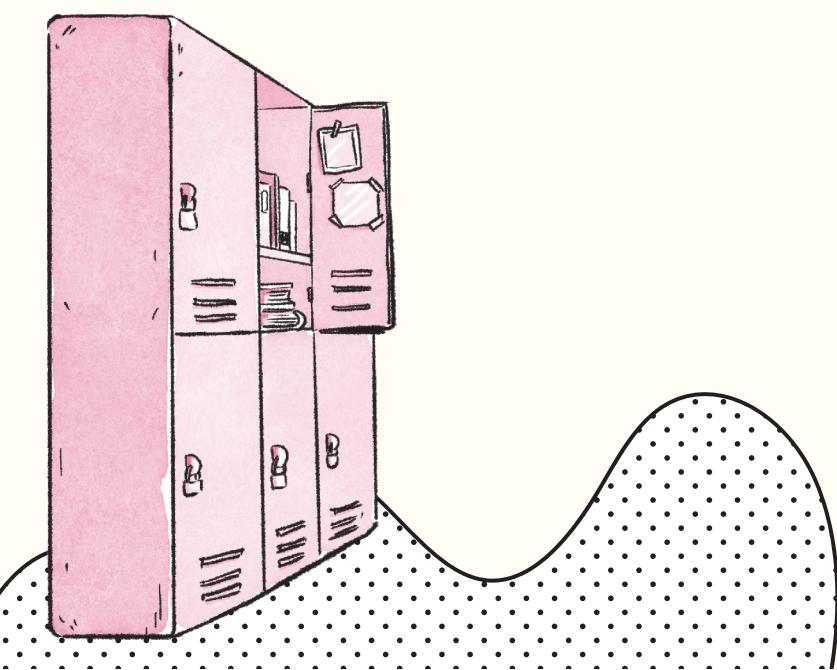
- Add new student to the database.
- Add new locker to the database.
- Rent a locker to a student.
- Renew a locker rental for a student.
- Terminate a locker rental for a student.
- Update student information in the database.
- Update locker information in the database.

2. Queries:

- List available lockers.
- List rental locker.

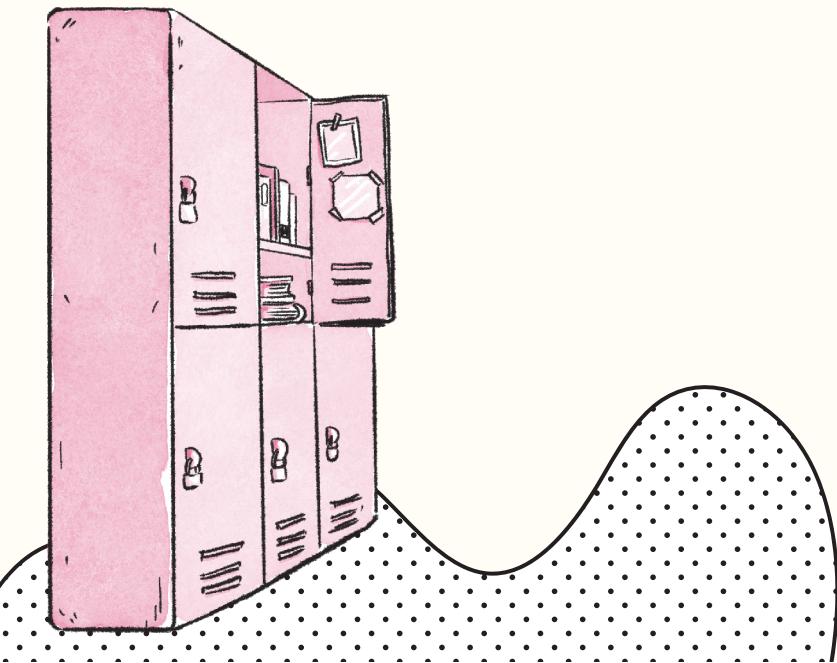
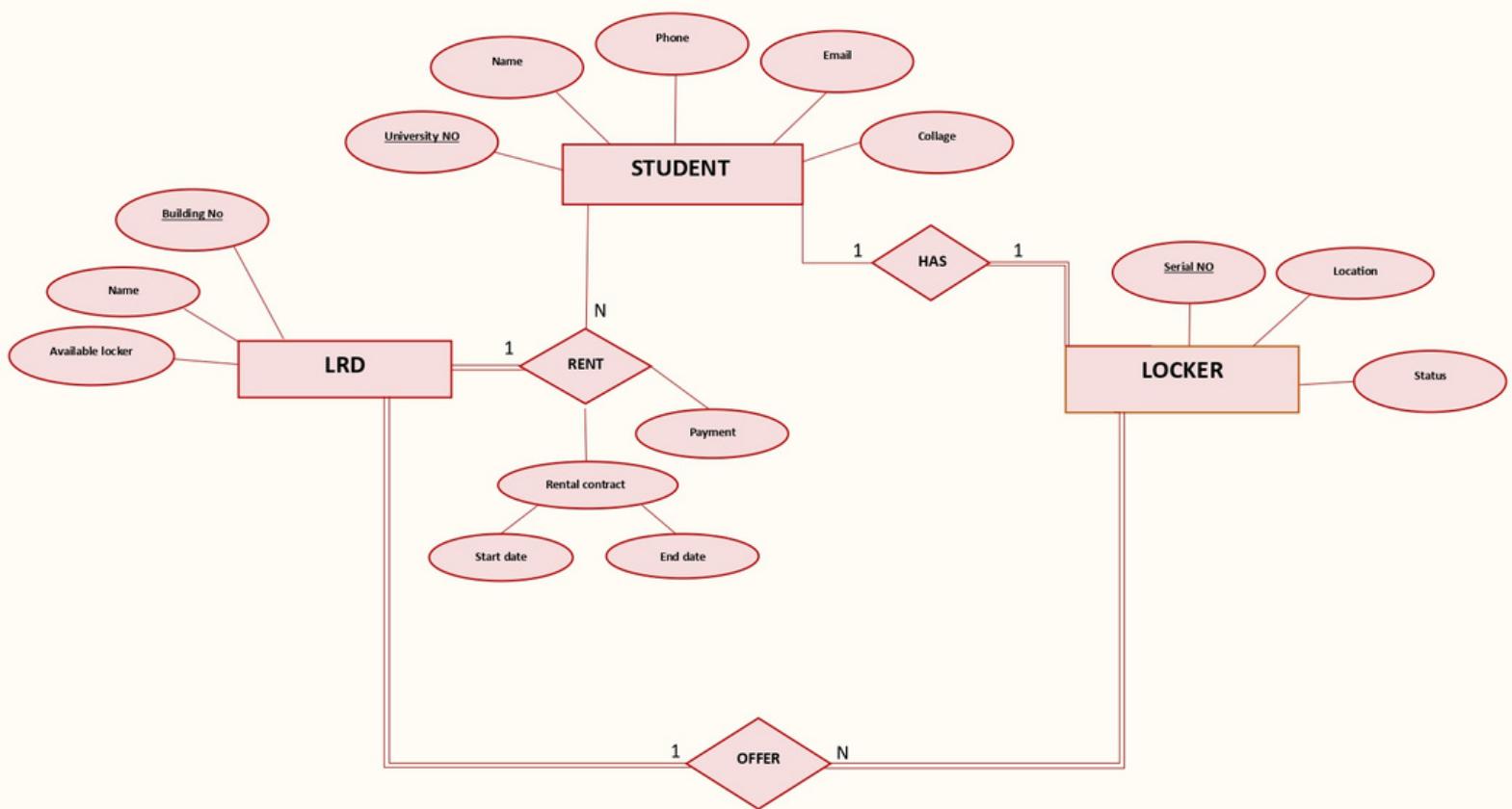
- Business Rules:

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.

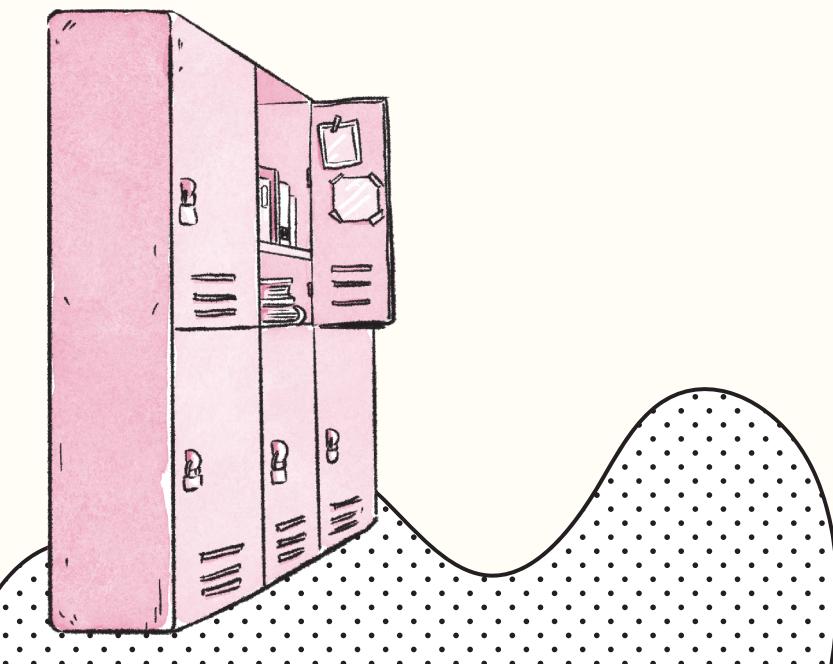
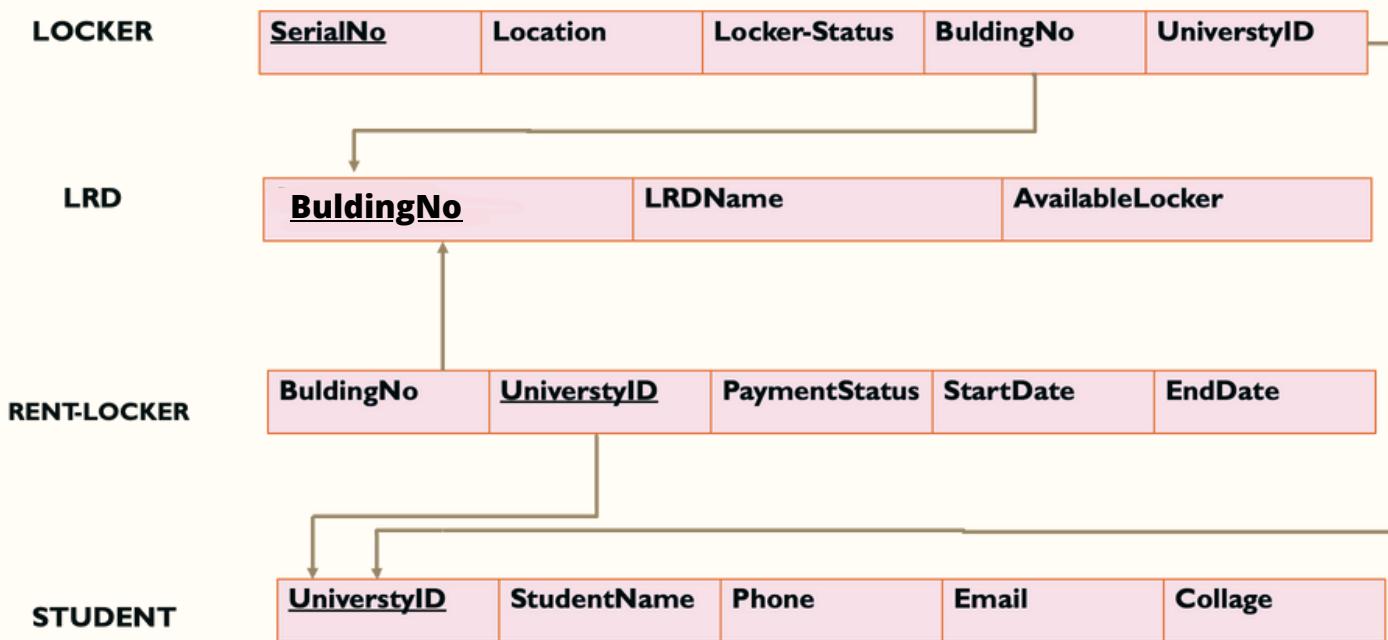


PHASE 2: ER MODEL

- ER Model :



- Relational Model/Schema :

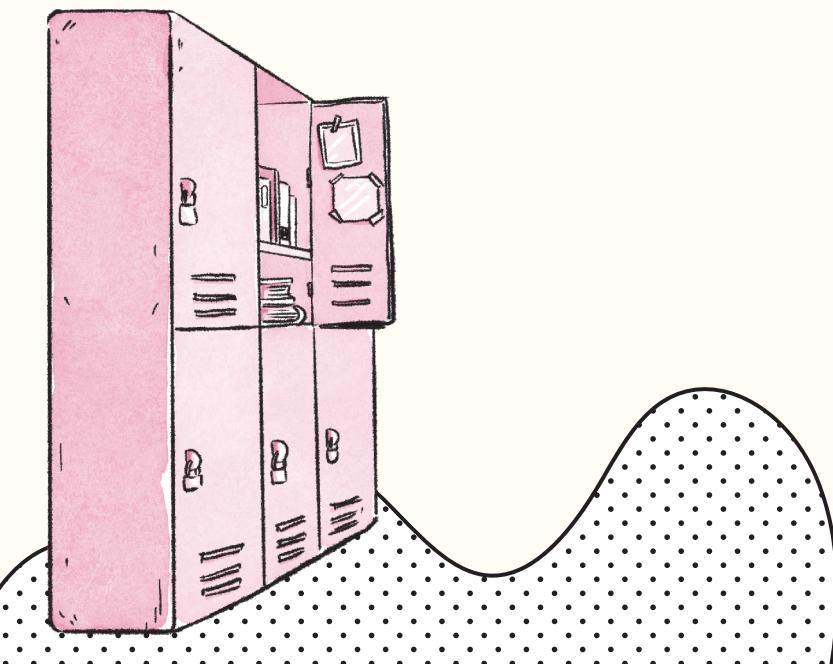


- Documentation for entity:

Entity name	Description	Aliases
Student	Contains information about students who rent the locker	

Entity name	Description	Aliases
LRD	Contains information about the locker rental unit	

Entity name	Description	Aliases
Locker	It contains information about the locker itself	

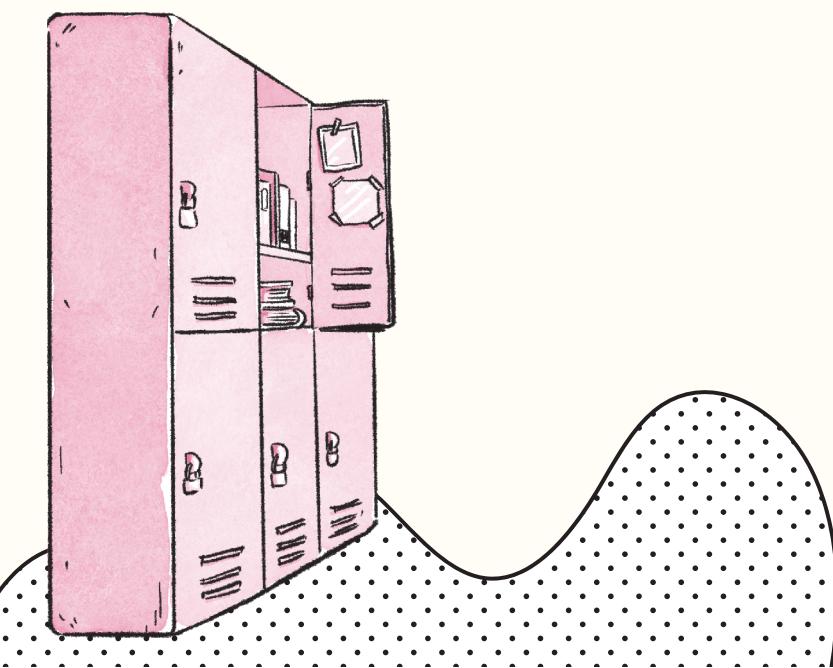


- Documentation for relationship:

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:

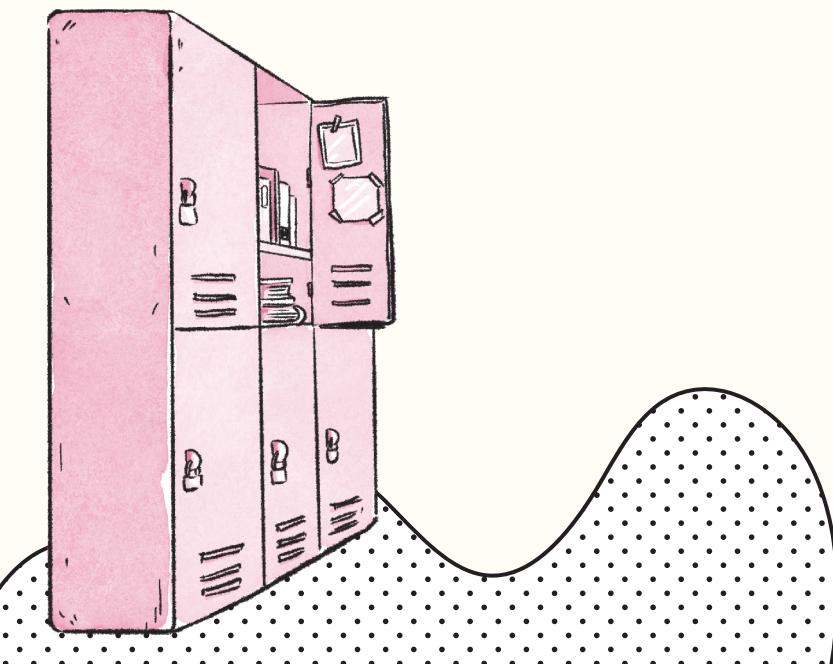
Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
STUDENT	UniversityID	It contains a student ID	INT	null is not accepted	not accepted		

Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
STUDENT	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
STUDENT	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
STUDENT	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
STUDENT	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		

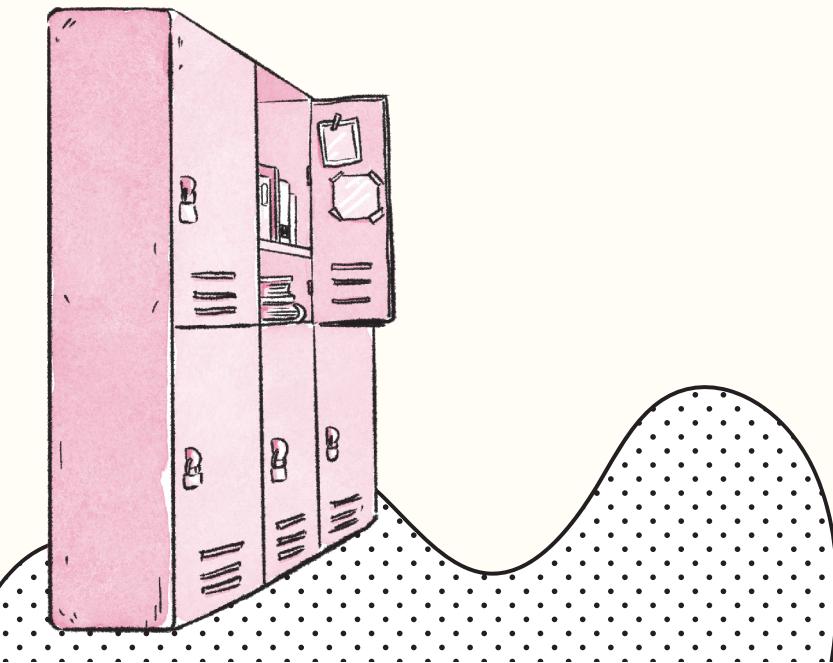
Entity name	attributes	Description	Data type & length	Nulls	Multi-valued	Derived	Default
LRD	LRDName	It contains locker rental unit name	Varchar(30)	null is not accepted	not accepted		

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 'Available 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
```

Results Messages

	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
```

Results Messages

	BuildingNO	LRDName	AvailableLocker
1	364	LOCKER RENTAL DEPARTMENT	15

- Retrieve all lockers information:

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

Results Messages

	SerialNO	Location_info	Locker_Status	Rental_BuildingNum	Student_id
1	1	laibrary building /ground...	RENT	364	4152242
2	2	laibrary building /ground...	AVAILIABLE	364	NULL
3	3	laibrary building /ground...	AVAILIABLE	364	NULL
4	4	laibrary building /ground...	RENT	364	4250107
5	5	laibrary building /ground...	RENT	364	4156892
6	6	laibrary building /ground...	AVAILIABLE	364	NULL
7	7	laibrary building /ground...	AVAILIABLE	364	NULL
8	8	laibrary building /first ...	RENT	364	4152243
9	9	laibrary building /first ...	AVAILIABLE	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