Department of Computer Science and Engineering

National Institute of Technology, Warangal

DBMS PROJECT:

BYCYCLE SALE AND RENTAL

DATABASE MANAGEMENT SYSTEM

Prepared by:-

- Tejas Makode (21CSB0A34)
- Aaryan (21CSB0A01)
B. TECH   CSE-A

INTRODUCTION

Welcome to our Sale or Rental Bicycle Management System database management system (DBMS) project for students of NITW. The design and implementation of a DBMS that can effectively handle bicycle sales and rentals is the aim of this project.

There is a rising need for dependable and effective bicycle management systems as cycling as a mode of transportation gains popularity. By developing a system that can track inventory, rental history, client data, and sales data, our project attempts to fill this demand.

The DBMS will include a database that includes all pertinent data pertaining to the management of bicycles. The database will have a user-friendly interface and be available to authorised staff. Its design will guarantee data integrity, correctness, and reliability.

TABLES:

- Cycles- It has information about the cycles like cycle_id, purchase_id, their prices, etc.
- Cycle_Specs- It has info about the specifications of the cycle like does it has gear or not,etc.
- Manufacturer- It has info about the manufacturer of the cycle like the contact info,manufacture_id,etc.
- Sale_Table- contains info about the cycles sold
- Rent_Table- contains info about the cycles rented

- Students- have info about the students like stud_id,name.etc.

☐ Payments- contains info about all the payments made in the database.

ENTITY RELATION MODEL:
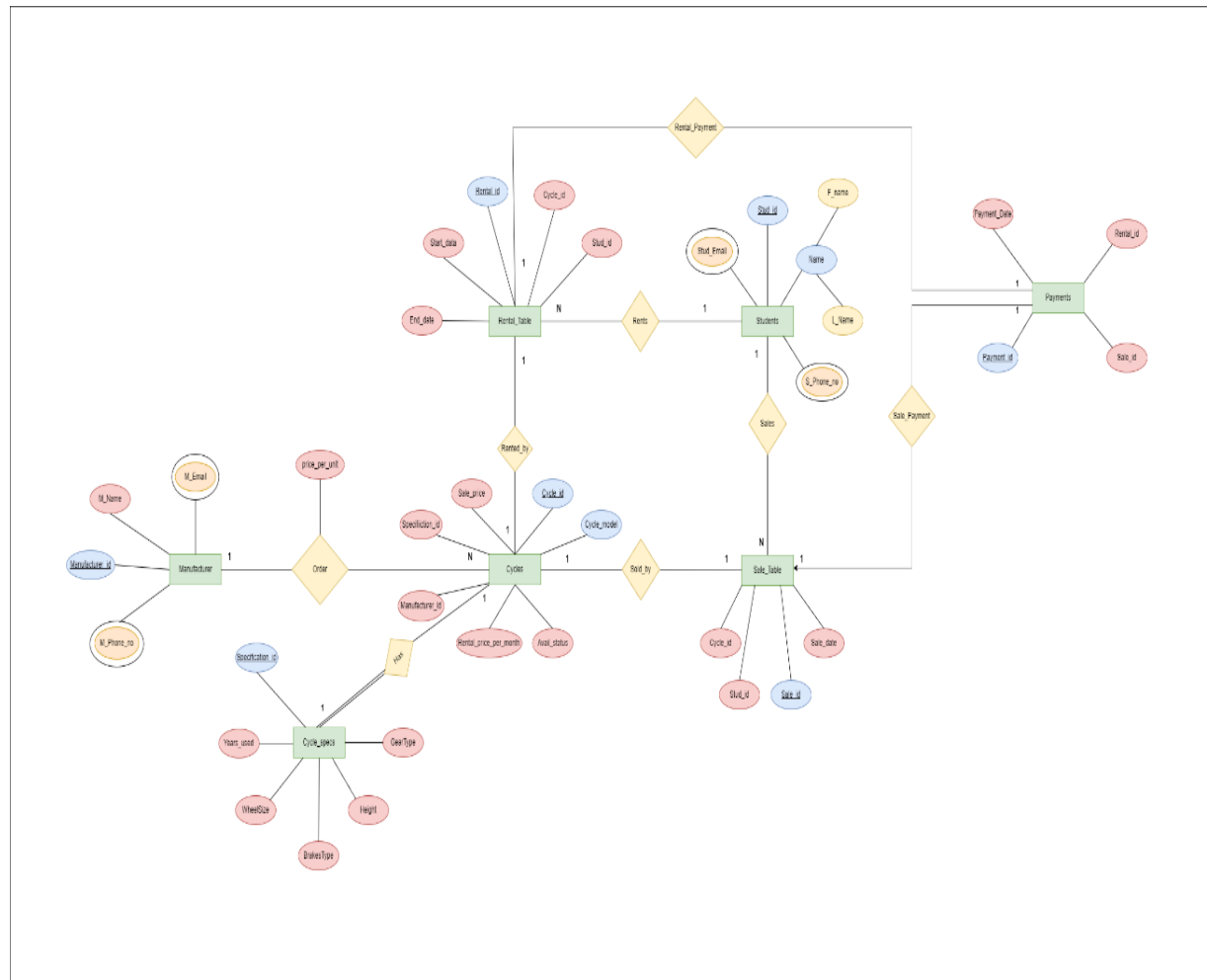
RELATIONAL SCHEMA :

Cycles:(cycle_id(PK),specification_id(FK),manufacturer_id(FK),rental_price_per_mo nth,av ail_status,cycle_type,sale_price)

Cycle_specs:(specification_id(PK),years_used,gear_type,height,brakestypes, wheelsize)
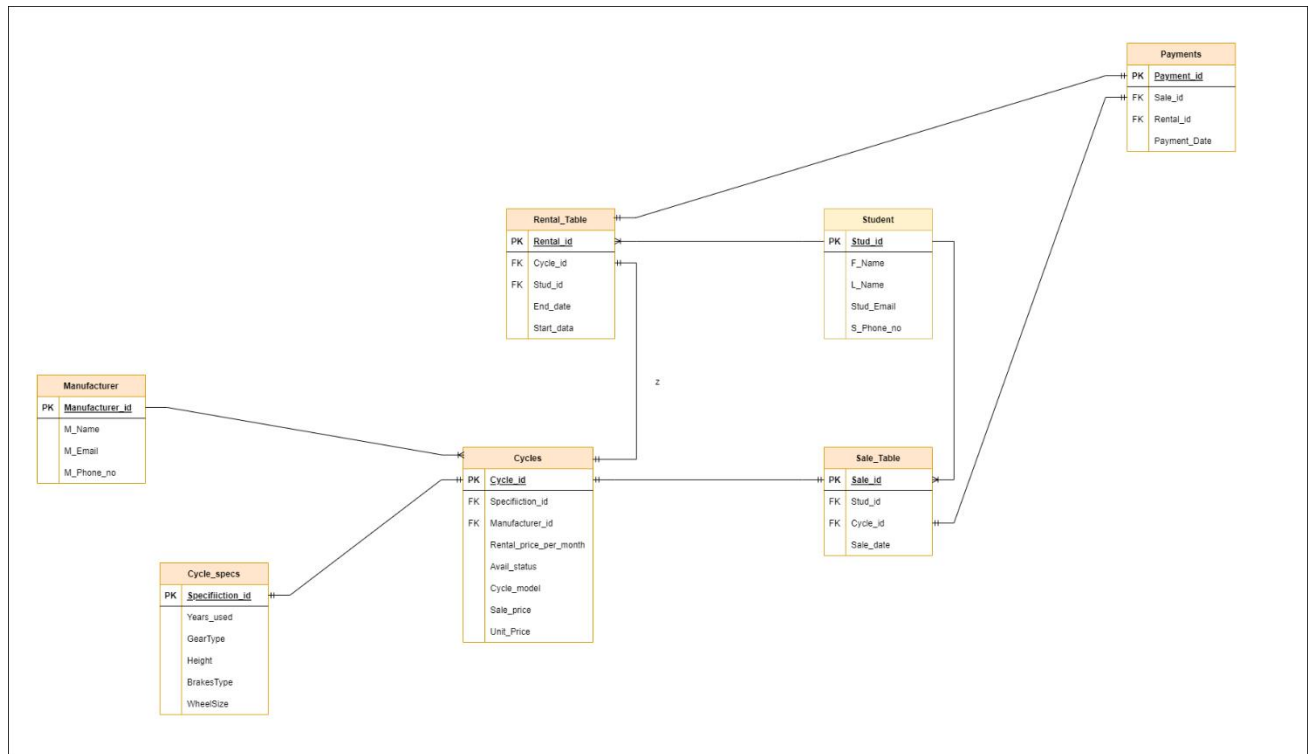
Manufacturer:(manufacturer_id(PK),_m_name,m_email,m_phone_no)

Rental_Table:(rental_id(PK),cycle_id(FK),stud_id(FK),end_date,start_date,rental_cost)

Sale_Table:(sale_id(PK),stud_id(FK),cycle_id(FK),sale_date,sale_price)

Student:(Stud_id(PK),F_name,L_name,Stud_email,S_phone_no)

Payments:(Payment_id(PK), Sale_id(FK), Rental_id(FK),Payment_date)

RELATIONS:

ONE- ONE:

1. Cycles to Cycle_Specs
2. Rental_Table to Cycles
3. Sale_Table to Cycles
4. Rental_Table to Payments
5. Sale_Table to Payment

ONE-MANY:

1. Student to Sale_Table

2. Student to Rental_Table
3. Manufacturer to Cycles

NORMALIZATION:-

What is Normalization ?

○ Normalization is the process of organizing the data in the database.

○ Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like Insertion, Update, and Deletion Anomalies.

○ Normalization divides the larger table into smaller and links them using relationships.

○ The normal form is used to reduce redundancy from the database table.

Normalization in this project:-

CYCLE TABLE:

Cycles(cycle_id,specification_id,manufacturer_id,rental_price_per_month,avail _status,cycle_model,sale_price,unit_price)

Cycle_id-> specification_id,
Cycle_id->manufacturer_id,
Cycle_id->rental_price_per_month,
Cycle_id->avail_status,
Cycle_id->cycle_model,
Cycle_id->sale_price,
Cycle_id->unit_price

No Partial Dependencies exists. Hence it is also in 2NF

No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

STUDENT TABLE:

Student(stud_id,f_name,l_name,stud_email,s_phone_no)
Stud_id-> f_name,
Stud_id->l_name,
Stud_id->stud_email,
Stud_id->s_phone_no

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

RENTAL TABLE:

Rental_table(rental_id,cycle_id,stud_id,end_date,start_date)

Rental_id-> cycle_id,
Rental_id->stud_id,
Rental_id->end_date,
Rental_id->start_date

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

SALE TABLE:

Sale_table(sale_id,stud_id,cycle_id,sale_date)

Sale_id-> stud_id,
Sale_id->cycle_id,
Sale_id->sale_date

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

MANUFACTURER TABLE:

Manufacturer(Manufacturer_id,m_name,m_email,m_phone_no)

Manufacturer_id-> m_name,
Manufacturer_id->m_email,
Manufacturer_id->m_phone_no

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

CYCLE_SPECS TABLE:

Cycle_specs(specification_id,years_used,geartype,height,brakestype,wheelsize)

Specification_id-> years_used,
Specification_id->geartype,
Specification_id->height,
Specification_id->brakestype,
Specification_id->wheelsize

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

PAYMENTS TABLE:

Payments(payment_id,sale_id,rental_id,payment_date)

Payment_id-> sale_id,
Payment_id->rental_id,
Payment_id->payment_date

No Partial Dependencies exists. Hence it is also in 2NF
No Transitive Dependencies exists. Hence it is also in 3NF.
The given table is in BCNF form.

CREATION AND INSERTION OF TABLES MENTIONED ABOVE:

STUDENT TABLE –
create table student(
stud_id varchar(30) not null primary key,
fname varchar(30),
lname varchar(30),
stud_email varchar(30),
s_phone_no varchar(20)
);
desc student;

TABLE STUDENT

Column	Null?	Type
STUD_ID	NOT NULL	VARCHAR2(30)
FNAME	-	VARCHAR2(30)
LNAME	-	VARCHAR2(30)
STUD_EMAIL	-	VARCHAR2(30)
S_PHONE_NO	-	VARCHAR2(20)

MANUFACTURER TABLE –

```
create table manufacturer(
manufacturer_id varchar(30),
m_name varchar(30),
m_email varchar(30),
m_phone_no varchar(10),
primary key(manufacturer_id)
);
desc manufacturer;
```

TABLE MANUFACTURER

Column	Null?	Type
MANUFACTURER_ID	NOT NULL	VARCHAR2(30)
M_NAME	-	VARCHAR2(30)
M_EMAIL	-	VARCHAR2(30)
M_PHONE_NO	-	VARCHAR2(10)

CYCLE_SPECS TABLE –

```
create table cycle_specs(
specification_id varchar(30)not null  primary key,
years_used int,
geartype varchar(30),
height number,
brakestype varchar(30),
wheelsize number
);
desc cycle_specs;
```

```
TABLE CYCLE_SPECS
```

Column	Null?	Type
SPECIFICATION_ID	NOT NULL	VARCHAR2(30)
YEARS_USED	-	NUMBER
GEARTYPE	-	VARCHAR2(30)
HEIGHT	-	NUMBER
BRAKESTYPE	-	VARCHAR2(30)
WHEELSIZE	-	NUMBER

CYCLE TABLE –

```
create table cycles(
cycle_id varchar(30) ,
specification_id varchar(30),
manufacturer_id varchar(30),
cycle_model varchar(30),
price_per_unit number,
rental_price_per_month int,
avail_status varchar(2),
sale_price number,
primary key(cycle_id),
foreign key (specification_id) references cycle_specs(specification_id),
foreign key (manufacturer_id) references manufacturer(manufacturer_id)
);
desc cycles;
```

TABLE CYCLES

Column	Null?	Type
CYCLE_ID	NOT NULL	VARCHAR2(30)
SPECIFICATION_ID	-	VARCHAR2(30)
MANUFACTURER_ID	-	VARCHAR2(30)
CYCLE_MODEL	-	VARCHAR2(30)
PRICE_PER_UNIT	-	NUMBER
RENTAL_PRICE_PER_MONTH	-	NUMBER
AVAIL_STATUS	-	VARCHAR2(2)
SALE_PRICE	-	NUMBER

RENTAL TABLE –

```
create table rental_table(
rental_id varchar(30) primary key,
cycle_id varchar(30),
stud_id varchar(30),
start_date date,
end_date date,
foreign key (cycle_id) references cycles(cycle_id),
foreign key (stud_id) references student(stud_id)
);

desc rental_table;
```

Table created.

TABLE RENTAL_TABLE

Column	Null?	Type
RENTAL_ID	NOT NULL	VARCHAR2(30)
CYCLE_ID	-	VARCHAR2(30)
STUD_ID	-	VARCHAR2(30)
START_DATE	-	DATE
END_DATE	-	DATE

SALES TABLE –

create table sale_table(
sale_id varchar(30) primary key,
stud_id varchar(30),
cycle_id varchar(30),
foreign key (cycle_id) references cycles(cycle_id),
foreign key (stud_id) references student(stud_id)
);
desc sale_table;

Table created.

TABLE SALE_TABLE

Column	Null?	Type
SALE_ID	NOT NULL	VARCHAR2(30)
STUD_ID	-	VARCHAR2(30)
CYCLE_ID	-	VARCHAR2(30)

PAYMENT TABLE –

create table payments(
payment_id varchar(30) primary key,
sale_id varchar(30),
rental_id varchar(30),
payment_date TIMESTAMP,
foreign key (sale_id) references sale_table(sale_id),
foreign key (rental_id) references rental_table(rental_id)
);
desc payments;

Table created.

TABLE PAYMENTS

Column	Null?	Type
PAYMENT_ID	NOT NULL	VARCHAR2(30)
SALE_ID	-	VARCHAR2(30)
RENTAL_ID	-	VARCHAR2(30)
PAYMENT_DATE	-	TIMESTAMP(6)

INSERTION OF VALUES:

STUDENT TABLE:

insert into student
values('ST01','AMAN','RANA','RANA@GMAIL.COM',8334567891);
insert into student
values('ST02','DHRUV','PATEL','PATEL@GMAIL.COM',8334567823);
insert into student
values('ST03','AARYAN','MADAL','MADAL@GMAIL.COM',9234563491);
insert into student
values('ST04','GOKANI','BHAI','BHAI@GMAIL.COM',7542345678);
insert into student
values('ST05','DHYEY','YEY','YEY@GMAIL.COM',1234532781);
insert into student
values('ST06','TEJAS','MAKODE','MAKODE@GMAIL.COM',8964527891);
insert into student
values('ST07','BHOLU','RAI','RAI@GMAIL.COM',9434467891);
insert into student
values('ST08','AMIT','KUMAR','KUMAR@GMAIL.COM',8765345891);
insert into student
values('ST09','RAHUL','KUMAR','RAHUL@GMAIL.COM',9934563891);
insert into student
values('ST10','JATIN','SANGA','SANGA@GMAIL.COM',7734564691);

SELECT * FROM STUDENT;

STUD_ID	FNAME	LNAME	STUD_EMAIL	S_PHONE_NO
ST01	AMAN	RANA	RANA@GMAIL.COM	8334567891
ST02	DHRUV	PATEL	PATEL@GMAIL.COM	8334567823
ST03	AARYAN	MADAL	MADAL@GMAIL.COM	9234563491
ST04	GOKANI	BHAI	BHAI@GMAIL.COM	7542345678
ST05	DHYEY	YEY	YEY@GMAIL.COM	1234532781
ST06	TEJAS	MAKODE	MAKODE@GMAIL.COM	8964527891
ST07	BHOLU	RAI	RAI@GMAIL.COM	9434467891
ST08	AMIT	KUMAR	KUMAR@GMAIL.COM	8765345891
ST09	RAHUL	KUMAR	RAHUL@GMAIL.COM	9934563891
ST10	JATIN	SANGA	SANGA@GMAIL.COM	7734564691

MANUFACTURER TABLE:

INSERT INTO MANUFACTURER VALUES('MT01','A-COMPANY','A@GMAIL.COM',9426781919);
INSERT INTO MANUFACTURER VALUES('MT02','B-COMPANY','B@GMAIL.COM',9834534919);
INSERT INTO MANUFACTURER VALUES('MT03','C-COMPANY','C@GMAIL.COM',4334535419);
INSERT INTO MANUFACTURER VALUES('MT04','D-COMPANY','D@GMAIL.COM',6436343519);
INSERT INTO MANUFACTURER VALUES('MT05','E-COMPANY','E@GMAIL.COM',4326453219);

SELECT * FROM MANUFACTURER;

MANUFACTURER_ID	M_NAME	M_EMAIL	M_PHONE_NO
MT01	A-COMPANY	A@GMAIL.COM	9426781919
MT02	B-COMPANY	B@GMAIL.COM	9834534919
MT03	C-COMPANY	C@GMAIL.COM	4334535419
MT04	D-COMPANY	D@GMAIL.COM	6436343519
MT05	E-COMPANY	E@GMAIL.COM	4326453219

CYCLE_SPECS TABLE:

INSERT INTO CYCLE_SPECS VALUES('SP01',1,'GR',26,'DISC',10);
INSERT INTO CYCLE_SPECS VALUES('SP02',0,'NGR',20,'NDISC',12);
INSERT INTO CYCLE_SPECS VALUES('SP03',1,'NGR',20,'NDISC',14);
INSERT INTO CYCLE_SPECS VALUES('SP05',0,'GR',18,'NDISC',13);
INSERT INTO CYCLE_SPECS VALUES('SP06',0,'GR',22,'NDISC',11);
INSERT INTO CYCLE_SPECS VALUES('SP07',2,'NGR',24,'NDISC',14);
INSERT INTO CYCLE_SPECS VALUES('SP08',0,'GR',20,'DISC',12);
INSERT INTO CYCLE_SPECS VALUES('SP09',0,'NGR',20,'DISC',10);

SELECT * FROM CYCLE_SPECS;

SPECIFICATION_ID	YEARS_USED	GEARTYPE	HEIGHT	BRAKESTYPE	WHEELSIZE
SP01	1	GR	26	DISC	10
SP02	0	NGR	20	NDISC	12
SP03	1	NGR	20	NDISC	14
SP05	0	GR	18	NDISC	13
SP06	0	GR	22	NDISC	11
SP07	2	NGR	24	NDISC	14
SP08	0	GR	20	DISC	12
SP09	0	NGR	20	DISC	10

CYCLES TABLE:

INSERT INTO CYCLES
VALUES('CY01','SP01','MT01','M1',6000,300,'Y',8000);
INSERT INTO CYCLES
VALUES('CY02','SP02','MT02','M2',6500,200,'Y',7000);
INSERT INTO CYCLES
VALUES('CY03','SP01','MT03','M2',5500,100,'Y',6000);
INSERT INTO CYCLES
VALUES('CY04','SP03','MT01','M2',5000,200,'Y',5000);
INSERT INTO CYCLES
VALUES('CY05','SP02','MT04','M1',4000,300,'Y',5500);
INSERT INTO CYCLES
VALUES('CY06','SP05','MT03','M1',6000,100,'Y',6500);
INSERT INTO CYCLES
VALUES('CY07','SP05','MT01','M1',7500,100,'Y',9000);

INSERT INTO CYCLES
VALUES('CY08','SP03','MT02','M3',6000,150,'Y',7000);
INSERT INTO CYCLES
VALUES('CY09','SP02','MT02','M3',6000,100,'Y',7000);
INSERT INTO CYCLES
VALUES('CY010','SP01','MT01','M3',7000,100,'Y',8000);

SELECT * FROM CYCLES;

CYCLE_ID	SPECIFICATION_ID	MANUFACTURER_ID	CYCLE_MODEL	PRICE_PER_UNIT	RENTAL_PRICE_PER_MONTH	AVAIL_STATUS	SALE_PRICE
CY01	SP01	MT01	M1	6000	300	Y	8000
CY02	SP02	MT02	M2	6500	200	Y	7000
CY03	SP01	MT03	M2	5500	100	Y	6000
CY04	SP03	MT01	M2	5000	200	Y	5000
CY05	SP02	MT04	M1	4000	300	Y	5500
CY06	SP05	MT03	M1	6000	100	Y	6500
CY07	SP05	MT01	M1	7500	100	Y	9000
CY08	SP03	MT02	M3	6000	150	Y	7000
CY09	SP02	MT02	M3	6000	100	Y	7000
CY010	SP01	MT01	M3	7000	100	Y	8000

RENTAL TABLE:

INSERT INTO RENTAL_TABLE
VALUES('RT01','CY01','ST01',TO_DATE('12-2-2022','DD-MM-YYYY'),TO_DATE('12-2-2023','DD-MM-YYYY'));
INSERT INTO RENTAL_TABLE
VALUES('RT02','CY02','ST03',TO_DATE('10-3-2022','DD-MM-YYYY'),TO_DATE('10-12-2022','DD-MM-YYYY'));
INSERT INTO RENTAL_TABLE
VALUES('RT03','CY03','ST02',TO_DATE('09-2-2022','DD-MM-YYYY'),TO_DATE('09-4-2022','DD-MM-YYYY'));

INSERT INTO RENTAL_TABLE
VALUES('RT04','CY04','ST05',TO_DATE('22-2-2022','DD-MM-YYYY'),TO_DATE('22-6-2022','DD-MM-YYYY'));
INSERT INTO RENTAL_TABLE
VALUES('RT05','CY05','ST06',TO_DATE('12-6-2022','DD-MM-YYYY'),TO_DATE('12-6-2023','DD-MM-YYYY'));

SELECT * FROM RENTAL_TABLE;

RENTAL_ID	CYCLE_ID	STUD_ID	START_DATE	END_DATE
RT01	CY01	ST01	12-FEB-22	12-FEB-23
RT02	CY02	ST03	10-MAR-22	10-DEC-22
RT03	CY03	ST02	09-FEB-22	09-APR-22
RT04	CY04	ST05	22-FEB-22	22-JUN-22
RT05	CY05	ST06	12-JUN-22	12-JUN-23

SALE TABLE:

INSERT INTO SALE_TABLE VALUES('SA01','ST06','CY06');
INSERT INTO SALE_TABLE VALUES('SA02','ST06','CY07');
INSERT INTO SALE_TABLE VALUES('SA03','ST06','CY08');
INSERT INTO SALE_TABLE VALUES('SA04','ST06','CY09');

SELECT * FROM SALE_TABLE;

SALE_ID	STUD_ID	CYCLE_ID
SA01	ST06	CY06
SA02	ST06	CY07
SA03	ST06	CY08
SA04	ST06	CY09

PAYMENT TABLE:

INSERT INTO PAYMENTS VALUES('PY01','SA01',NULL,'11-APR-2023 11:45:11 AM');
INSERT INTO PAYMENTS VALUES('PY02','SA02',NULL,'12-JUN-2023 09:02:11 PM');
INSERT INTO PAYMENTS VALUES('PY03',NULL,'RT01','12-FEB-2022 03:10:11 PM');
INSERT INTO PAYMENTS VALUES('PY04',NULL,'RT02','10-MAR-2022 09:45:11 PM');
INSERT INTO PAYMENTS VALUES('PY05',NULL,'RT03','09-FEB-2022 02:33:11 PM');
INSERT INTO PAYMENTS VALUES('PY06',NULL,'RT04','22-FEB-2022 08:23:11 AM');
INSERT INTO PAYMENTS VALUES('PY07',NULL,'RT05','12-JUN-2022 10:02:11 PM');
INSERT INTO PAYMENTS VALUES('PY08','SA03',NULL,'09-AUG-2022 6:45:11 PM');
INSERT INTO PAYMENTS VALUES('PY09','SA04',NULL,'11-JAN-2023 7:55:11 PM');

SELECT * FROM PAYMENTS;

PAYMENT_ID	SALE_ID	RENTAL_ID	PAYMENT_DATE
PY01	SA01	-	11-APR-23 11.45.11.000000 AM
PY02	SA02	-	12-JUN-23 09.02.11.000000 PM
PY03	-	RT01	12-FEB-22 03.10.11.000000 PM
PY04	-	RT02	10-MAR-22 09.45.11.000000 PM
PY05	-	RT03	09-FEB-22 02.33.11.000000 PM
PY06	-	RT04	22-FEB-22 08.23.11.000000 AM
PY07	-	RT05	12-JUN-22 10.02.11.000000 PM
PY08	SA03	-	09-AUG-22 06.45.11.000000 PM
PY09	SA04	-	11-JAN-23 07.55.11.000000 PM