Assignment 3

Part 1 – Student Database

SQL File: Assignment-3_1.sql

SQL1.py Assignment-3_1.sql

Assignment-3_1.sql

```sql
USE DBMS;

CREATE TABLE STUDENT (
    NAME VARCHAR(30) NOT NULL,
    STUDENT_NUMBER INT NOT NULL PRIMARY KEY,
    CLASS INT NOT NULL,
    MAJOR VARCHAR(30) NOT NULL
);


CREATE TABLE COURSE (
    COURSE_NAME VARCHAR(30) NOT NULL,
    COURSE_NUMBER VARCHAR(10) PRIMARY KEY,
    CREDIT_HOURS INT NOT NULL,
    DEPARTMENT VARCHAR(30) NOT NULL
);

CREATE TABLE PREREQUISITE (
    COURSE_NUMBER VARCHAR(10) NOT NULL FOREIGN KEY REFERENCES COURSE(COURSE_NUMBER),
    PREREQUISITE_NUMBER VARCHAR(10) NOT NULL PRIMARY KEY
);

CREATE TABLE SECTION (
    SECTION_IDENTIFIER INT NOT NULL PRIMARY KEY,
    COURSE_NUMBER VARCHAR(10) NOT NULL FOREIGN KEY REFERENCES COURSE(COURSE_NUMBER),
    SEMESTER VARCHAR(30) NOT NULL,
    YEAR INT NOT NULL,
    INSTRUCTOR VARCHAR(20) NOT NULL
);

CREATE TABLE GRADE_REPORT (
    STUDENT_NUMBER INT NOT NULL FOREIGN KEY REFERENCES STUDENT(STUDENT_NUMBER),
    SECTION_IDENTIFIER INT NOT NULL FOREIGN KEY REFERENCES SECTION(SECTION_IDENTIFIER),
    GRADE VARCHAR(1) NOT NULL,
    PRIMARY KEY(STUDENT_NUMBER,SECTION_IDENTIFIER)
);

INSERT INTO STUDENT VALUES
    ('Smith',17,1,'CS'),
    ('Brown',8,2,'CS');
```

SQL1.py Assignment-3_1.sql

Assignment-3_1.sql

```sql
INSERT INTO STUDENT VALUES
    ('Smith',17,1,'CS'),
    ('Brown',8,2,'CS');

INSERT INTO COURSE VALUES
    ('Intro to Computer Science','CS1310',4,'CS'),
    ('Data Structures','CS3320',3,'CS'),
    ('Discrete Mathematics','MATH2410',3,'MATH'),
    ('Database','CS3380',3,'CS');

INSERT INTO SECTION VALUES
    (85,'MATH2410','Fall',07,'King'),
    (92,'CS1310','Fall',07,'Anderson'),
    (102,'CS3320','Spring',08,'Knuth'),
    (112,'MATH2410','Fall',08,'Chang'),
    (119,'CS1310','Fall',08,'Anderson'),
    (135,'CS3380','Fall',08,'Stone');

INSERT INTO PREREQUISITE VALUES
    ('CS3380','CS3320'),
    ('CS3380','MATH2410'),
    ('CS3320','CS1310');

INSERT INTO GRADE_REPORT VALUES
    (17,112,'B'),
    (17,119,'C'),
    (8,85,'A'),
    (8,92,'A'),
    (8,102,'B'),
    (8,135,'A');

SELECT * FROM STUDENT;
SELECT * FROM COURSE;
SELECT * FROM PREREQUISITE;
SELECT * FROM SECTION;
SELECT * FROM GRADE_REPORT;
```

Python File: SQL1.py

SQL1.py Assignment-3_1.sql

SQL1.py > ...

```python
import pyodbc
connection = pyodbc.connect('Driver={SQL Server};'
                            'Server=LAPTOP-HOLIG319;'
                            'Database=DBMS;'
                            'Trusted_Connection=yes;')
cursor = connection.cursor()
name = input("ENTER STUDENT NAME TO PRINT GPA: ")
number =  list(cursor.execute("SELECT STUDENT_NUMBER FROM STUDENT WHERE NAME = \'"+name+"\'"))[0][0]
grades = cursor.execute("SELECT GRADE FROM GRADE_REPORT WHERE STUDENT_NUMBER = "+str(number))
gpa = 0.0
for i in grades:
    grade = i[0]
    if grade=='A':
        gpa+=4
    elif grade=='B':
        gpa+=3
    elif grade=='C':
        gpa+=2
    else:
        gpa+=1
print("GPA:", gpa/4)
```

Output:

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

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C:\Users\Aditeya\Desktop\Aditeya\PES University\2nd Year\DBMS\Assignments\Assignment 3>python SQL1.py
ENTER STUDENT NAME TO PRINT GPA: Brown
GPA: 3.75

C:\Users\Aditeya\Desktop\Aditeya\PES University\2nd Year\DBMS\Assignments\Assignment 3>
```

Database Contents:

	STUDENT_NUMBER	SECTION_IDENTIFIER	GRADE
1	8	85	A
2	8	92	A
3	8	102	B
4	8	135	A
5	17	112	B
6	17	119	C

Assignment-3_1.sql

RESULTS

	NAME	STUDENT_NUMBER	CLASS	MAJOR
1	Brown	8	2	CS
2	Smith	17	1	CS

	COURSE_NAME	COURSE_NUMBER	CREDIT_HOURS	DEPARTMENT
1	Intro to Compu...	CS1310	4	CS
2	Data Structures	CS3320	3	CS
3	Database	CS3380	3	CS
4	Discrete Mathe...	MATH2410	3	MATH

	COURSE_NUMBER	PREREQUISITE_NUMBER
1	CS3320	CS1310
2	CS3380	CS3320
3	CS3380	MATH2410

	SECTION_IDENTIFIER	COURSE_NUMBER	SEMESTER	YEAR	INSTRUCTOR
1	85	MATH2410	Fall	7	King
2	92	CS1310	Fall	7	Anderson
3	102	CS3320	Spring	8	Knuth
4	112	MATH2410	Fall	8	Chang
5	119	CS1310	Fall	8	Anderson
6	135	CS3380	Fall	8	Stone

Part 2 – Library Database

SQL File: Assignment-3_2.sql

SQL2.py Assignment-3_2.sql

Assignment-3_2.sql

```sql
USE DBMS;

CREATE TABLE PUBLISHER(
    NAME VARCHAR(20) NOT NULL PRIMARY KEY,
    ADDRESS VARCHAR(30) NOT NULL,
    PHONE VARCHAR(10) NOT NULL
);

CREATE TABLE BOOK(
    BOOK_ID INT NOT NULL PRIMARY KEY,
    TITLE VARCHAR(20) NOT NULL,
    PUBLISHER_NAME VARCHAR(20) NOT NULL FOREIGN KEY REFERENCES PUBLISHER(NAME)
);

CREATE TABLE BORROWER(
    CARD_NO INT NOT NULL PRIMARY KEY,
    NAME VARCHAR(20) NOT NULL,
    ADDRESS VARCHAR(30) NOT NULL,
    PHONE VARCHAR(10) NOT NULL
);

CREATE TABLE LIBRARY_BRANCH(
    BRANCH_ID INT NOT NULL PRIMARY KEY,
    BRANCH_NAME VARCHAR(20) NOT NULL,
    ADDRESS VARCHAR(30) NOT NULL
);

CREATE TABLE BOOK_AUTHORS(
    BOOK_ID INT NOT NULL FOREIGN KEY REFERENCES BOOK(BOOK_ID),
    AUTHOR_NAME VARCHAR(20) NOT NULL,
    PRIMARY KEY(BOOK_ID, AUTHOR_NAME)
);

CREATE TABLE BOOK_COPIES(
    BOOK_ID INT NOT NULL FOREIGN KEY REFERENCES BOOK(BOOK_ID),
    BRANCH_ID INT NOT NULL FOREIGN KEY REFERENCES LIBRARY_BRANCH(BRANCH_ID),
    NO_OF_COPIES INT NOT NULL,
    PRIMARY KEY(BOOK_ID, BRANCH_ID)
);
```

SQL2.py Assignment-3_2.sql

Assignment-3_2.sql

```sql
CREATE TABLE BOOK_LOANS(
    BOOK_ID INT NOT NULL FOREIGN KEY REFERENCES BOOK(BOOK_ID),
    BRANCH_ID INT NOT NULL FOREIGN KEY REFERENCES LIBRARY_BRANCH(BRANCH_ID),
    CARD_NO INT NOT NULL FOREIGN KEY REFERENCES BORROWER(CARD_NO),
    DATE_OUT DATE NOT NULL,
    DUE_DATE DATE NOT NULL,
    PRIMARY KEY(BOOK_ID, BRANCH_ID, CARD_NO)
);

INSERT INTO PUBLISHER VALUES
    ('Penguin India','Bangalore',9993042367),
    ('Macmillan Publishers','New Delhi',9745623412),
    ('Arihant Books','Mumbai',8763457891),
    ('Rupa Publications','New Delhi',9611067125),
    ('Scholastic India','Mumbai',7806041205);


INSERT INTO BOOK VALUES
    (1,'Data Structures','Penguin India'),
    (2,'Algorithms','Penguin India'),
    (3,'Discrete Mathematics','Macmillan Publishers'),
    (4,'DBMS','Arihant Books'),
    (5,'Linear Algebra','Rupa Publications');

INSERT INTO BOOK_AUTHORS VALUES
    (1,'Dinesh Singh'),
    (2,'Thomas Cormen'),
    (3,'Kenneth Rosen'),
    (4,'Ramez Elmasri'),
    (5,'Gilbert Strang');

INSERT INTO BORROWER VALUES
    (1,'Aditeya Baral','Bangalore',9686041205),
    (2,'Vishesh P','Bangalore',9679823452),
    (3,'Vinay Kirpalani','New Delhi',9357635468),
    (4,'Aronya Baksy','Kolkata',9757964523),
    (5,'Ansh Sarkar','Mumbai',9753456876);

INSERT INTO LIBRARY_BRANCH VALUES
    (1,'Central Branch','New Delhi')
```

SQL2.py Assignment-3_2.sql

Assignment-3_2.sql

```
    (5,'Ansh Sarkar','Mumbai',9753456876);

INSERT INTO LIBRARY_BRANCH VALUES
    (1,'Central Branch','New Delhi'),
    (2,'South Branch','Bangalore'),
    (3,'Global Branch','Mumbai'),
    (4,'East Branch','Kolkata');

INSERT INTO BOOK_COPIES VALUES
    (1,1,100),
    (1,4,150),
    (1,2,150),
    (2,1,10),
    (2,3,200),
    (3,1,350),
    (3,2,400),
    (4,3,50),
    (4,1,120),
    (5,4,10),
    (5,2,300);

INSERT INTO BOOK_LOANS VALUES
    (2,1,1,'2020-02-15',GETDATE()-1),
    (1,2,2,'2020-01-02','2020-02-15'),
    (3,3,3,'2020-03-05',GETDATE()-1),
    (4,4,4,'2020-02-10','2020-04-15'),
    (5,1,5,'2020-01-29','2020-02-28'),
    (1,2,3,'2020-03-01','2020-03-30'),
    (2,3,4,'2020-02-23',GETDATE()-1),
    (2,3,1,'2020-03-02','2020-04-02'),
    (5,1,2,'2020-03-06','2020-03-30');

SELECT * FROM BOOK;
SELECT * FROM PUBLISHER;
SELECT * FROM BOOK_AUTHORS;
SELECT * FROM BOOK_COPIES;
SELECT * FROM BOOK_LOANS;
SELECT * FROM LIBRARY_BRANCH;
SELECT * FROM BORROWER;
```

Python File: SQL2.py

SQL2.py Assignment-3_2.sql

SQL2.py > ...

```
import pyodbc
connection = pyodbc.connect('Driver={SQL Server};'
                            'Server=LAPTOP-HOLIG319;'
                            'Database=DBMS;'
                            'Trusted_Connection=yes;')
cursor = connection.cursor()
cursor.execute("SELECT B.TITLE, BW.NAME FROM BOOK_LOANS BL, BORROWER BW, BOOK B WHERE BL.DUE_DATE = CONVERT(DATE,GETDATE()-1,120) AND \
    BL.CARD_NO = BW.CARD_NO AND B.BOOK_ID = BL.BOOK_ID")
for i in cursor:
    print(i)
```

Output:

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

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C:\Users\Aditeya\Desktop\Aditeya\PES University\2nd Year\DBMS\Assignments\Assignment 3>python SQL2.py
('Algorithms', 'Aditeya Baral')
('Algorithms', 'Aronya Baksy')
('Discrete Mathematics', 'Vinay Kirpalani')

C:\Users\Aditeya\Desktop\Aditeya\PES University\2nd Year\DBMS\Assignments\Assignment 3>
```

Database Contents:

Assignment-3_2.sql

RESULTS

	BOOK_ID	TITLE	PUBLISHER_NA...
1	1	Data Structures	Penguin India
2	2	Algorithms	Penguin India
3	3	Discrete Mathe...	Macmillan Publ...
4	4	DBMS	Arihant Books
5	5	Linear Algebra	Rupa Publicati...

	NAME	ADDRESS	PHONE
1	Arihant Books	Mumbai	8763457891
2	Macmillan Publ...	New Delhi	9745623412
3	Penguin India	Bangalore	9993042367
4	Rupa Publicati...	New Delhi	9611067125
5	Scholastic India	Mumbai	7806041205

	BOOK_ID	AUTHOR_NAME
1	1	Dinesh Singh
2	2	Thomas Cormen
3	3	Kenneth Rosen
4	4	Ramez Elmasri
5	5	Gilbert Strang

Assignment-3_2.sql

RESULTS

	BOOK_ID	BRANCH_ID	NO_OF_COPIES
1	1	1	100
2	1	2	150
3	1	4	150
4	2	1	10
5	2	3	200
6	3	1	350
7	3	2	400
8	4	1	120

	BOOK_ID	BRANCH_ID	CARD_NO	DATE_OUT	DUE_DATE
1	1	2	2	2020-01-02	2020-02-15
2	1	2	3	2020-03-01	2020-03-30
3	2	1	1	2020-02-15	2020-03-10
4	2	3	1	2020-03-02	2020-04-02
5	2	3	4	2020-02-23	2020-03-10
6	3	3	3	2020-03-05	2020-03-10
7	4	4	4	2020-02-10	2020-04-15
8	5	1	2	2020-03-06	2020-03-30

	BRANCH_ID	BRANCH_NAME	ADDRESS
1	1	Central Branch	New Delhi
2	2	South Branch	Bangalore
3	3	Global Branch	Mumbai
4	4	East Branch	Kolkata

	CARD_NO	NAME	ADDRESS	PHONE
1	1	Aditeya Baral	Bangalore	9686041205
2	2	Vishesh P	Bangalore	9679823452
3	3	Vinay Kirpalani	New Delhi	9357635468
4	4	Aronya Baksy	Kolkata	9757964523
5	5	Ansh Sarkar	Mumbai	9753456876