1. Give the definitions of the followings:
   a. Relation
   b. Schema
   c. Foreign key
   d. Entity
2. The following question considers a company which is selling some products to its customers.
   a. Write SQL queries to create tables for customers and products of the company. The
      customer table should have ID, name, address, phone fields. The product table should
      include ProductID, name, type, and price fields. Your tables should have primary keys.
      For each field determine the “null” constraint too.
   b. Assume orders from customers for different products are received by the company.
      Besides, assume each order can include several items of only one product type. The
      number of items ordered and the order date should also be stored. Explain how the
      order can be added to your database. Write necessary SQL commands.

CREATE TABLE Product

(  ProductID Integer PRIMARY KEY,
  PName varchar NOT NULL,
  PType varchar NOT NULL,
  Price real
)

CREATE TABLE customer

(  CID Integer PRIMARY KEY,
  CName varchar NOT NULL,
  CAddress varchar,
  CPhone varchar
)

Order will be a table with two foreign keys referring to customer and product tables. The number of items ordered
and the date of order is also given in the order table.

CREATE TABLE Order

(  OID Integer PRIMARY KEY,
  ODate DATE NOT NULL,
  Customer Integer REFERENCES customer.CID ,
  Product Integer REFERENCES Product.ProductID,
  Items Integer NOT NULL
)
3. Write a relation algebra expression to find the names and surnames of employees who work in ‘Administration’ department. Assume Employee relation is defined as below:

\[ \text{Employee} \langle \text{name, surname, department, city, salary} \rangle \]

\[ \pi \text{Name, Surname} \left( \sigma \text{department} = 'Administration' \right) \]

4. The following relations are available. Write a relational algebra expression to give the Student name, and the name of the courses he/she took in year 2012 if his/her Student ID is ‘12345’

Student : \langle \text{StudentID, Student Name, Department} \rangle

Course : \langle \text{CourseCode, CourseName, Credit} \rangle

TakenCourses : \langle \text{CourseCode, StudentID, year, Grade} \rangle

\[ \pi \text{StudentName, CourseName} \left( \sigma \text{StudentID} = '12345' \right) \left( \text{Student} \right) \bowtie \left( \text{TakenCourses} \right) \bowtie \left( \text{Course} \right) \]

Note (|><| represents join operation)

5. Write a SQL query to

a. Create a table Student<name, surname, dept>

```
CREATE TABLE Student
( name char(30),
  Surname char(30),
  Dept Integer
Primary Key (name,surname)
)
```

b. Create a table Department<DeptID, DeptName, Location>

```
CREATE TABLE Department
( DeptID Integer PRIMARY KEY,
  DeptName char(30),
  Location char(30)
)
```

c. Insert one record into each table

```
INSERT INTO Student values ('Hasan', 'Alioglu', 11)
INSERT INTO Department values ( 11, 'CENG', 'Balgat')
```

d. Find and print the name of all students who study in a department located in ‘Ankara’
(In creating the tables, consider all necessary constraints)

```
SELECT Name, Surname
FROM Student
WHERE Dept = Department.DeptID AND Department.Location = 'Ankara'
```