

Laboratory work 2

Please write your answers to the pdf file for defence:

1. Explain the difference between DDL and DML, give the following examples:

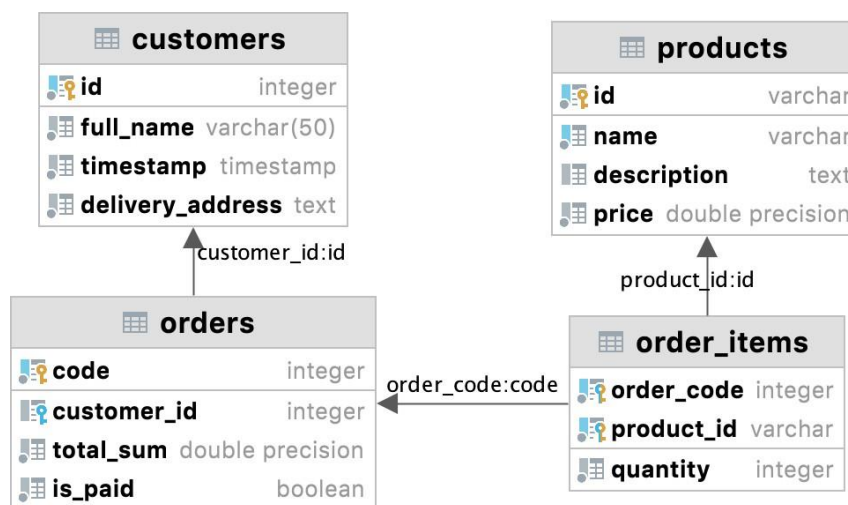
DDL (data-definition language) – provides commands for defining relation schemas, deleting relations, and modifying relations. DDL statements create, modify, and remove database objects such as tables, indexes, and users.

- a. at least 3 DDL commands: CREATE; ALTER; DROP.

DML (data-manipulation language) – provides the ability to query information from the database and insert tuples into, delete tuples from, and modify schemas.

- b. at least 4 DML commands: SELECT; INSERT; UPDATE; DELETE.

2. Write SQL statements to create tables in the figure below:



grey circle - not null, blue column - unique; quantity, total_sum, price > 0

```
create table products (
  id varchar(6) unique not null primary key,
  name varchar(20) unique not null,
  description text,
  price double precision not null check(price > 0)
);

create table costumers (
  id integer unique not null primary key,
  full_name varchar(50) not null,
  timestamp timestamp(10) not null,
  delivery_address text not null
);

create table orders (
  code integer unique not null primary key,
  costumer_id int references costumers(id),
  total_sum double precision not null check(total_sum > 0),
  is_paid boolean not null
);

create table order_items (
  order_code integer not null,
  product_id varchar(6) not null,
  quantity integer not null
```

```

order_code integer references orders(code),
product_id varchar(6) references products(id),
quantity integer not null check(quantity > 0),
primary key(order_code, product_id)
);

```

3. Write SQL statements describing tables with appropriate **data types** and **constraints** satisfying the following conditions (*maybe you need additional tables to store data **atomically** and **efficiently***):
 - a. a students table storing data such as full name, age, birth date, gender, average grade, information about yourself, the need for a dormitory, additional info.
 - b. an instructors table storing data such as full name, speaking languages, work experience, the possibility of having remote lessons.
 - c. a lesson participants table storing data such as lesson title, teaching instructor, studying students, room number.

```

create table students(
  full_name varchar(50) unique primary key,
  age int not null,
  birth_date date not null,
  gender varchar(6) not null,
  average_grade double precision not null,
  info_about_student text not null,
  dormitory_is_needed boolean not null,
  add_info text
);

create table instructors(
  full_name varchar(50) unique primary key not null,
  speaks_on_eng boolean not null,
  speaks_on_rus boolean not null,
  work_experience text,
  possibility_having_remote_lessons text
);

create table course(
  room_number int unique not null primary key,
  lesson_title varchar(10) unique not null,
  teaching_instructor varchar(50) references instructors(full_name),
  students_in_this_course int not null check(students_in_this_course > 0)
);

create table attendance(
  room_num int references course(room_number),
  students_full_name varchar(50) references students(full_name),
  lesson_title varchar(10) references course(lesson_title),
  instructor varchar(50) references instructors(full_name),
  attendance boolean not null,
  primary key(room_num, lesson_title, instructor)
);

```

4. Give examples of insertion, update and deletion of data on tables from exercise 2.

```
insert into products values(222, 'apple', null, 62.11);
insert into products values(555, 'oranges', null, 40.34);
insert into products values(123, 'milk', null, 35.05);
insert into products values(738, 'yogurt', null, 10.78);

insert into costumers values(12, 'Anna Gluck', '1970-01-01 00:00:01',
'Annas_adress');
insert into costumers values(13, 'William Georges', '1970-01-01 00:00:02',
'Liams_adress');
insert into costumers values(14, 'Teresa Poretsky', '1970-01-01 00:00:03',
'Olivers_adress');
insert into costumers values(15, 'James Condon', '1970-01-01 00:00:04',
'Emmas_adress');

insert into orders values(1, 12, 4, false);
insert into orders values(2, 13, 345, true);
insert into orders values(3, 14, 100, true);
insert into orders values(4, 15, 1, true);

update orders
set is_paid=true
where code=1;

insert into order_items values(2, 555, 9);
insert into order_items values(3, 555, 3);
insert into order_items values(1, 738, 4);
insert into order_items values(3, 123, 5);
insert into order_items values(4, 222, 2);

delete from order_items where order_code=3;
```

Note: you can test your queries in datagrip