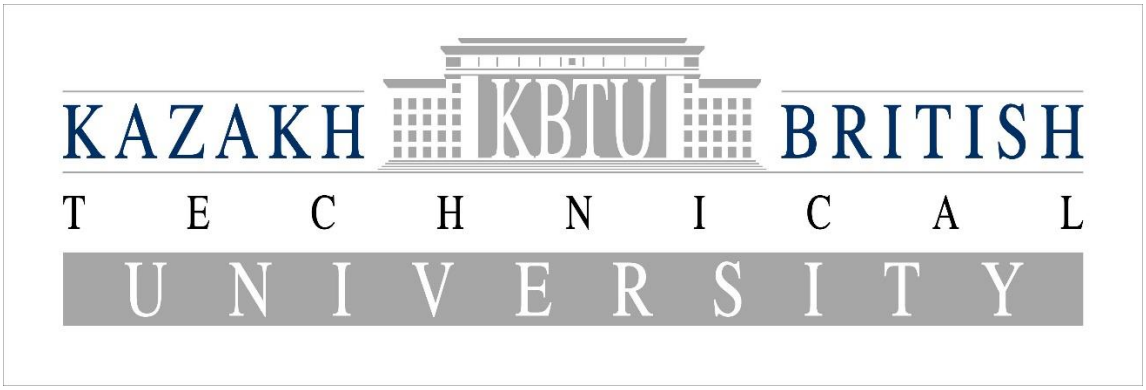

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Laboratory Work №2

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1) DDL or Data Definition Language is used to define data structures, while **DML** or Data Manipulation Language is used to manipulate data itself. It means that **DDL** is used to create database schema and can be used to define constraints, **DML** is used to add, retrieve, or update the data.

a. Basic commands for **DDL** are: CREATE, DROP, ALTER

b. Basic commands for **DML** are: UPDATE, INSERT, SELECT, DELETE

2)

```
CREATE TABLE customers(
    id integer CONSTRAINT mainKey PRIMARY KEY,
    full_name varchar(50) NOT NULL,
    timestamp timestamp NOT NULL,
    delivery_address text NOT NULL
);
```

```
CREATE TABLE products(
    id varchar CONSTRAINT productKey PRIMARY KEY,
    name varchar UNIQUE NOT NULL,
    description text,
    price double precision NOT NULL CHECK (price > 0)
);
```

```
CREATE TABLE orders(
    code integer PRIMARY KEY,
    customer_id integer,
    total_sum double precision NOT NULL,
    is_paid boolean NOT NULL,
    CONSTRAINT  fk_customer FOREIGN KEY(customer_id) REFERENCES
customers(id),
    CONSTRAINT posCondition CHECK (total_sum > 0)
);
```

```
CREATE TABLE order_items(
    order_code integer,
    product_id varchar,
    quantity integer NOT NULL,
    CONSTRAINT fk_order FOREIGN KEY(order_code) REFERENCES orders(code),
    CONSTRAINT fk_product FOREIGN KEY(product_id) REFERENCES products(id),
    CONSTRAINT pk_order_items PRIMARY KEY(order_code,product_id),
    CONSTRAINT pos_quantity CHECK ( quantity > 0 )
);
```

3)

a.

```
CREATE TABLE students(
    id integer PRIMARY KEY,
    full_name varchar(70) NOT NULL,
    age integer NOT NULL,
    birth_date date NOT NULL,
    gender char(1) not null,
    average_grade real NOT NULL,
    self_information varchar,
    dormitory_need boolean NOT NULL,
    additional_info text,
    CONSTRAINT id_pos CHECK ( id > 0 ),
    CONSTRAINT age_limit CHECK ( age >= 1 AND age <= 80 ),
    CONSTRAINT grade_limit CHECK ( average_grade >= 0 AND average_grade <=
4.0 )
);
```

b.

```
CREATE TABLE instructors(
    id integer PRIMARY KEY,
    full_name varchar(70) NOT NULL,
    work_experience integer NOT NULL,
    remote_lessons_possibility real NOT NULL,
    CONSTRAINT id_pos CHECK ( id > 0 ),
    CONSTRAINT experience_min CHECK ( work_experience >= 0 ),
    CONSTRAINT rem_les_pos_lim CHECK ( remote_lessons_possibility >= 0 and
remote_lessons_possibility <= 100.0 )
);
```

```
CREATE TABLE instructor_languages(
    insctructor_id integer NOT NULL,
    speaking_language varchar(15) NOT NULL,
    CONSTRAINT id_pos CHECK ( insctructor_id > 0 ),
    CONSTRAINT fk_instructor_id FOREIGN KEY(insctructor_id) REFERENCES
instructors(id),
    CONSTRAINT pk_instr_language PRIMARY KEY
(insctructor_id,speaking_language)
);
```

c.

```
CREATE TABLE lesson_participants(
  lesson_title varchar NOT NULL,
  instructor_id integer NOT NULL,
  student_id integer NOT NULL,
  room_number integer NOT NULL,
  CONSTRAINT room_pos CHECK ( room_number > 0 ),
  CONSTRAINT id_pos CHECK ( instructor_id > 0 AND student_id > 0 ),
  CONSTRAINT fk_instructor_id FOREIGN KEY (instructor_id) REFERENCES
instructors(id),
  CONSTRAINT fk_student_id FOREIGN KEY (student_id) REFERENCES students(id),
  CONSTRAINT pk_lesson_participants PRIMARY KEY
(lesson_title,instructor_id,student_id)
);
```

4) **INSERT** examples:

```
INSERT INTO customers VALUES (1,'Temirbolat','2001-01-31 04:20:05','Erzhanov
39');
INSERT INTO customers VALUES (2,'Temirlan','2000-02-24 04:20:05','Tole Bi
59');
INSERT INTO customers VALUES (3,'Tamerlan','1999-03-24 04:20:05','Turgut
Ozala 27');
```

```
INSERT INTO products(id,name,description,price) VALUES ('228229','Oil','Good
Light Oil',500);
INSERT INTO products(id,name,description,price) VALUES
('Mf24O','Butter','Yellow butter',800);
INSERT INTO products(id,name,description,price) VALUES
('413ESE','Water','Gassed Water',200);
```

```
INSERT INTO orders(code,customer_id,total_sum,is_paid) VALUES
(1000,1,5000,True);
INSERT INTO orders VALUES (1001,2,4500,False);
INSERT INTO orders VALUES (1002,3,5600,True);
```

```
INSERT INTO order_items VALUES(1001,'228229',50);
INSERT INTO order_items VALUES(1000,'Mf24O',20);
INSERT INTO order_items VALUES(1002,'413ESE',5);
INSERT INTO order_items VALUES(1001,'Mf24O',25);
```

UPDATE examples:

```
UPDATE customers
SET full_name = 'Temirkhan'
WHERE id = 2;
```

```
UPDATE orders
SET is_paid = True
WHERE is_paid = False;
```

```
UPDATE order_items
SET quantity = quantity * 1.5;
```

DELETE examples:

```
DELETE FROM order_items
WHERE order_code = 1000;
```

```
DELETE FROM order_items
WHERE order_code = 1001 AND quantity > 20;
```