Университет ИТМО

Факультет ФПИ и КТ

Отчёт

по лабораторной работе 1

«Информационная система и база данных»

Вариант 185

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Текст задачи:

Грант не промолвил в ответ ни слова. Они с Элли начали доставать снаряжение. Вскоре Грант присоединил к портативному монитору маленькую видеокамеру. Он привязал к ней веревку, включил камеру и спустил ее вниз, в нору.

Описание предметной области:

Сушность	**Классификация**
Person	Стержневая
Event	Стержневая
Instrument	Стержневая
Instrument_relationship	Стержневая
Person_Status	Характеристика
Instrument_Status	Характеристика
Event_List	Ассоциативная
Instrument_List	Ассоциативная
Instrument_relationship_list	Ассоциативная

Стрежневая:

1. **Person**

   Person_ID

   Name

   Age

   Gender

Location

2. **Instrument**

   Instrument_ID

   Location
   Type
   Value

3. **Event**

   Event_ID

   Description

   Start_Time

   Last_Time

   Location

   Is_finished

4. **Instrument_Relationship**

   Id
   Description

Характеристика

1. **Person_Status**

   Person_ID

   Is_Working

   Mood

Body_Status

2. **Instrument_Status**

   Instrument_ID

   Is_Used

   Avaliable

Ассоциативная

1. **Event_List**

   ID

   Person_ID

   Event_ID

2. **Instruement_List**

   ID
   Person_ID
   Instrument_ID

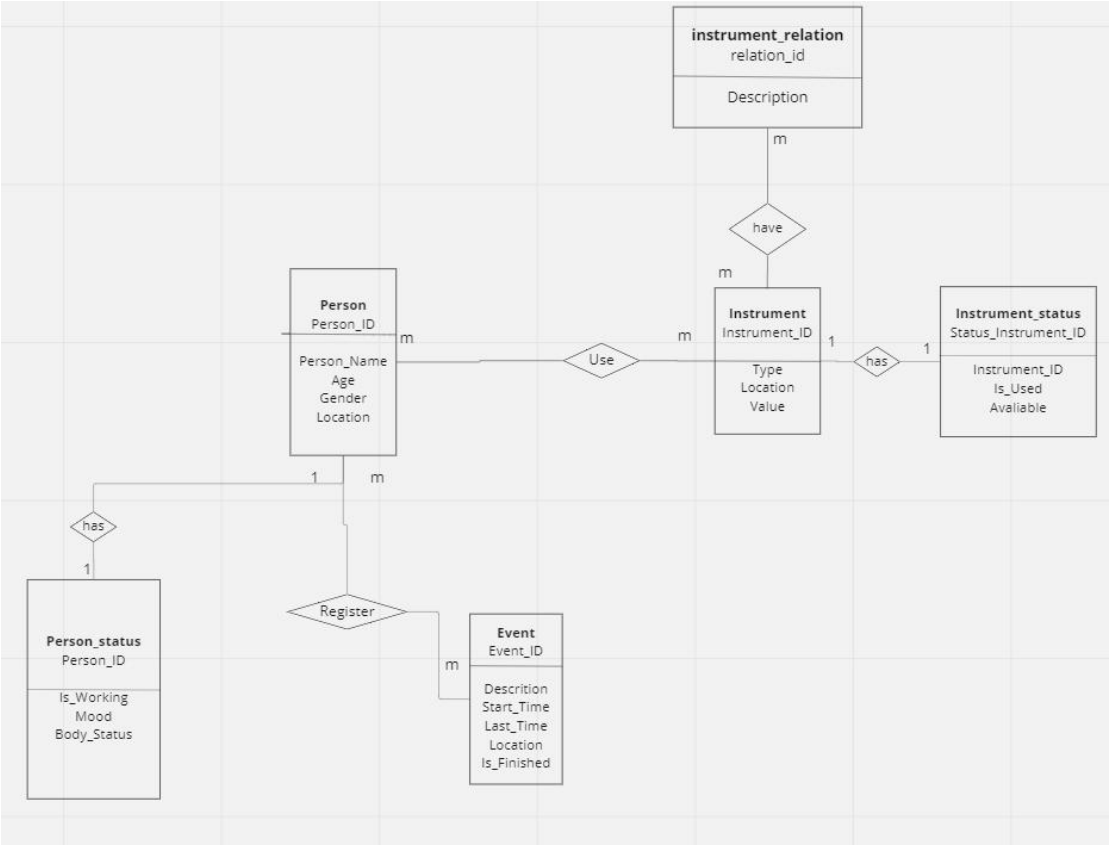
3. **Instruement_List**

   Id

   Instrument_list

Relation_list

Инфологическая модель



https://miro.com/app/board/uXjVPX6vKjM=/?share_link_id=555962515751

Даталогическую модель.

https://miro.com/app/board/uXjVPX6vKjM=/?share_link_id=555962515751

Реализация даталогической модели

Создание

1.Person

```
studs=> CREATE Type Gender As enum('man','woman')
studs-> ;
ERROR:  type "gender" already exists
```

```
studs=> Create Table Person(
Person_ID serial PRIMARY KEY,
Person_Name varchar(64) NOT NULL,
Age smallint NOT NULL,
Gender gender NOT NULL,
Location text);
CREATE TABLE
```

2.Instrument

```
studs=> create Type instrument_type As enum('Rope','Camera','Falshlight','Computer','Mobile phone','Monitor','Pen','G
un','Rubbish','Stick','Paper','Bag','Alcohol','Bandages');
CREATE TYPE
```

```
studs=> Create Table instrument(
instrument_id serial primary key,
type instrument_type not null,
location text not null,
value_$ int Check(value_$ > 0) not null);
CREATE TABLE
```

3.Event

```
studs=> create Table event(
Event_ID serial Primary KEY,
Description text NOT NULL,
Start_Time Date Not Null,
Last_Time text Not Null,
Location Text NOT NULL,
Is_Finished boolean NOT NULL);
CREATE TABLE
```

4.Event_list

```
studs=> create Table event_list(
studs(> id serial PRIMARY KEY,
studs(> Person_id int NOT NULL REFERENCES person(Person_id),
studs(> Event_id int NOT NULL REFERENCES event(event_id));
CREATE TABLE
```

5.Instrument_list

```
studs=> Create Table instrument_list(
studs(> id serial PRIMARY KEY,
studs(> Person_id int NOT NULL REFERENCES person(Person_id),
studs(> Instrument_id int NOT NULL REFERENCES instrument(Instrument_id));
CREATE TABLE
```

6.Person_status

```
studs=> create Table Person_status(
studs(> Person_id int NOT NULL REFERENCES Person(person_id) UNIQUE,
studs(> Mood mood NOT NULL,
studs(> Body_status body_status NOT NULL,
studs(> Is_Working Boolean NOT NULL);
CREATE TABLE
```

7. Instrument_status

```
studs=> create Table instrument_status(
instrument_id int not null unique references instrument(instrument_id),
is_used boolean not null,
available boolean not null);
CREATE TABLE
```

8. Instrument_relation

```
studs=> create TABLE  instrument_relation(
    id serial,
    description text
);
CREATE TABLE
```

9.Instrument_relation_list

```
studs=> create TABLE instrument_relation_list(
    id serial,
    instrument_id int not null references  instrument(instrument_id),
    relation_id int not null references instrument(instrument_id)
);
CREATE TABLE
```

Заполнение

1.Person

```
studs=> INSERT INTO Person(Person_Name, Age, Gender, Location)
studs-> Values ('Liao Yihong', '18', 'man', 'Russia-Saint.Petersburg'),
studs-> ('Tom', '14', 'man', 'US'),
studs-> ('Claire Redfield', '29', 'woman', 'Raccoon City');
INSERT 0 3
```

```
studs=> select * from person;
 person_id |   person_name   | age | gender |        location
-----------+-----------------+-----+--------+-------------------------
         1 | Liao Yihong     |  18 | man    | Russia-Saint.Petersburg
         2 | Tom             |  14 | man    | US
         3 | Claire Redfield |  29 | woman  | Raccoon City
(3 строки)
```

2.Instrument

```
studs=> Select * from instrument;
 instrument_id |  type   | location | value_$
---------------+---------+----------+---------
             1 | Camera  | In cave  |     599
             2 | Monitor | In cave  |    1999
             3 | Rope    | In cave  |      19
(3 строки)
```

```
studs=> Insert into instrument(Type,Location,value_$) values
('Camera','In cave', 599),
('Monitor','In cave',1999),
studs-> ('Rope','In cave',19);
INSERT 0 3
```

3.Event

```
studs=> Insert into Event(Description, Start_Time, Last_Time, Location, is_Finished) values
('Homework','2022-09-025','1 hour','Room','False'),
('Observed what kind of animals in cave', '2022-09-25','45 min','in cave','true'),
('Save Shelly from school','1988-10-08','1 Day', 'In Raccoon City', 'True'),
('Cook dinner', '2022-09-24','1 hour','Kitchen','True');
INSERT 0 4
studs=> select * from event
studs-> ;
 event_id |              description              | start_time | last_time |    location     | is_finished
----------+---------------------------------------+------------+-----------+-----------------+-------------
        1 | Homework                              | 2022-09-25 | 1 hour    | Room            | f
        2 | Observed what kind of animals in cave | 2022-09-25 | 45 min    | in cave         | t
        3 | Save Shelly from school               | 1988-10-08 | 1 Day     | In Raccoon City | t
        4 | Cook dinner                           | 2022-09-24 | 1 hour    | Kitchen         | t
(4 строки)
```

4.Event_list

```
studs=> Insert Into event_list(Person_id,Event_id) Values
(1,1),
(2,2),
(3,3),
(1,4),
(1,2);
INSERT 0 5
studs=> select * from event_list
studs-> ;
 id | person_id | event_id
----+-----------+----------
  1 |         1 |        1
  2 |         2 |        2
  3 |         3 |        3
  4 |         1 |        4
  5 |         1 |        2
(5 строк)
```

5.Instrument_list

```
studs=> Insert into instrument_list(Person_id,instrument_id) values
studs-> (1,1),
studs-> (1,3),
studs-> (2,2),
studs-> (2,3);
INSERT 0 4
studs=> select * from Instrument_list
studs-> ;
 id | person_id | instrument_id
----+-----------+---------------
  1 |         1 |             1
  2 |         1 |             3
  3 |         2 |             2
  4 |         2 |             3
(4 строки)
```

6.Person_status

```
studs=> select * from person_status;
 person_id |  mood   | body_status | is_working
-----------+---------+-------------+------------
         1 | anxious | sick        | t
         2 | happy   | healthy     | t
         3 | sad     | injured     | f
(3 строки)
```

```
studs=> Insert into person_status(person_id,is_working,mood,body_status) Values
(1,'True','anxious','sick'),
(2,'True','happy','healthy'),
(3,'False','sad','injured');
INSERT 0 3
```

```
studs=> insert into person_status(person_id,mood,body_status,is_working) values
(1,'happy','sick','True');
ERROR:  duplicate key value violates unique constraint "person_status_person_id_
key"
ПОДРОБНОСТИ:  Key (person_id)=(1) already exists.
```

7.Instrument_status

```
studs=> select * from instrument_status
;
 instrument_id | is_used | available
---------------+---------+-----------
             1 | t       | t
             2 | t       | t
             3 | t       | t
(3 строки)
```

```
studs=> Insert into instrument_status(instrument_id,is_used,available) values
studs-> (1,'true','true'),
studs-> (2,'true','true'),
studs-> (3,'true','true');
INSERT 0 3
```

8. Instrument_relation

```
studs=> insert into instrument_relation(description) values ('They are tied toge
ther');
INSERT 0 1
```

9. Instrument_relation_list

```
studs=>
insert into instrument_relation_list(instrument_id, relation_id) values (15,1),
                                                                         (16,1),
                                                                         (17,1);
INSERT 0 3
```

Примеры

1.Найти состояние человеков

```
studs=> select * from person left join person_status on person.person_id = person_status.person_id;
 person_id |   person_name   | gender | age |       location         | person_id |  mood   | body_status | is_working
-----------+-----------------+--------+-----+------------------------+-----------+---------+-------------+------------
         1 | Liao Yihong     | man    |  18 | Russia-Saint.Petersburg |         1 | anxious | sick        | t
         2 | Tom             | man    |  14 | US                     |         2 | happy   | healthy     | t
         3 | Claire Redfield | woman  |  29 | Raccoon City           |         3 | sad     | injured     | f
(3 строки)
```

2.Поиск всех мужчин

```
studs=> select * from person where gender = 'man';
 person_id | person_name | gender | age |        location
-----------+-------------+--------+-----+------------------------
         1 | Liao Yihong | man    |  18 | Russia-Saint.Petersburg
         2 | Tom         | man    |  14 | US
(2 строки)
```

3.Сортировка по возрасту

```
studs=> select * from person order by age;
 person_id |   person_name   | gender | age |        location
-----------+-----------------+--------+-----+------------------------
         2 | Tom             | man    |  14 | US
         1 | Liao Yihong     | man    |  18 | Russia-Saint.Petersburg
         3 | Claire Redfield | woman  |  29 | Raccoon City
(3 строки)
```

4.Найти средние возрасты мужчин и женщин:

```
studs=> select gender, avg(age) as avg from person group by gender;
 gender |         avg
--------+---------------------
 woman  | 29.0000000000000000
 man    | 16.0000000000000000
(2 строки)
```

Вывод:

В ходе лабораторной работы я научился выделять сущности из текста, составлять ER-модель, даталогическую модель и писать sql скрипт.

Дополнительные:

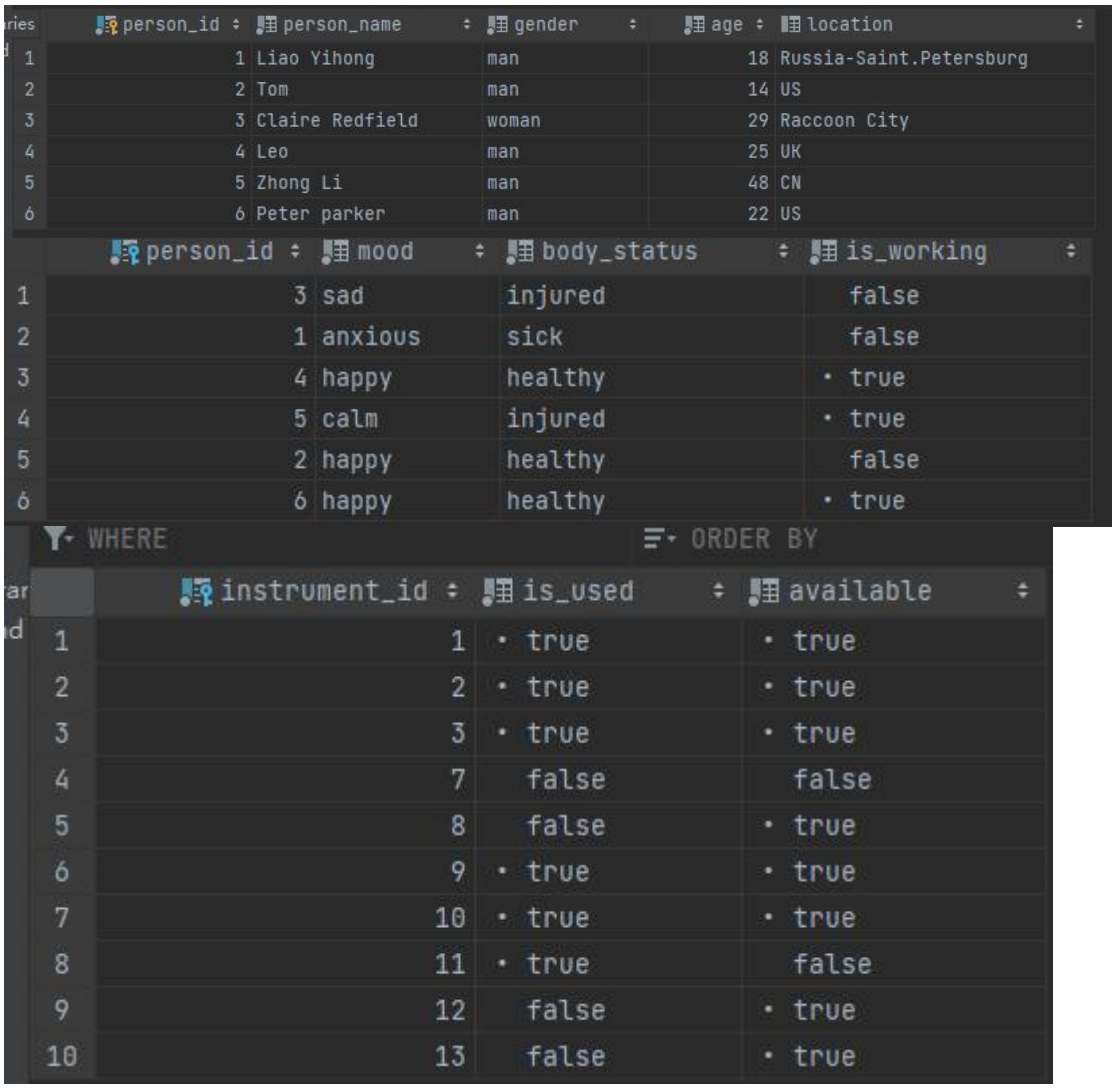
Вывести доступность (эвэйлбл) и тайп инструмента у самого младшего мужчины, с числом событий = 4 и с временем начала на прошлой неделе, при этом, чтобы человек был работающим и счастливым.

```
select instrument_status.available,instrument.type from instrument

inner join instrument_status on instrument.instrument_id = instrument_status.instrument_id

inner join instrument_list on instrument_list.instrument_id = instrument.instrument_id

inner join person on instrument_list.person_id = person.person_id
where (
                    instrument_list.person_id in (select person_id from person where
                        age = (select min(age) from person
                                where person_id in
                                    (select person_status.person_id from person_status where
is_working='true' and mood='happy')
                                and person_id in
                                    (select person_id from event_list where event_id in (select
event_id from event where start_time >= current_date - interval '7 day' )group by
event_list.person_id having count(event_id) = 4)
                    ))
)
;
```

Пример выполнения:

Условия:

Текущая дата: 2022/11/16



	person_id	person_name	gender	age	location
1	1	Liao Yihong	man	18	Russia-Saint.Petersburg
2	2	Tom	man	14	US
3	3	Claire Redfield	woman	29	Raccoon City
4	4	Leo	man	25	UK
5	5	Zhong Li	man	48	CN
6	6	Peter parker	man	22	US

	person_id	mood	body_status	is_working
1	3	sad	injured	false
2	1	anxious	sick	false
3	4	happy	healthy	true
4	5	calm	injured	true
5	2	happy	healthy	false
6	6	happy	healthy	true

WHERE ORDER BY

	instrument_id	is_used	available
1	1	true	true
2	2	true	true
3	3	true	true
4	7	false	false
5	8	false	true
6	9	true	true
7	10	true	true
8	11	true	false
9	12	false	true
10	13	false	true

WHERE ORDER BY

	id	person_id	event_id
1	1	1	1
2	2	2	2
3	3	3	3
4	4	1	4
5	5	1	2
6	6	2	5
7	7	2	6
8	8	2	7
9	9	2	8
10	10	6	9
11	11	4	10
12	12	4	11
13	13	4	12
14	14	4	13

WHERE ORDER BY

	event_id	description	start_time	last_time	location	is_finished
1	1	Homework	2022-09-25	1 hour	Room	false
2	2	Observed what kind of animals in cave	2022-09-25	45 min	in cave	true
3	3	Save Shelly from school	1988-10-08	1 Day	In Raccoon City	true
4	4	Cook dinner	2022-09-24	1 hour	Kitchen	true
5	5	A trip in NewYork	2022-11-06	2 days	New York	true
6	6	Choose some souvenirs	2022-11-07	10 min	New York	true
7	7	Fly back to home in Texas	2022-11-08	2 hour	Plane from NY to Texas	true
8	8	Writing dairy for trip	2022-11-07	15 min	in hotel	true
9	9	An interview for major	2017-11-03	20 min	City Hall	true
10	12	Writing document	2022-11-15	1 h 29 min	In company	true
11	13	Set the plan for next day	2022-11-15	25 min	At home	true
12	10	Driving to company	2022-11-15	17 min	In London	true
13	11	Holding a meeting	2022-11-15	30 min	In company	true

WHERE ORDER BY

	instrument_id	type	location	value_$
1	1	Camera	In cave	599
2	2	Monitor	In cave	1999
3	3	Rope	In cave	19
4	7	Gun	Raccon city	264
5	8	Camera	In bag of Peter	500
6	9	Mobile phone	In bag of Leo	600
7	10	Monitor	On desk in the office of Leo	1000
8	11	Camera	In basement	245
9	12	Camera	In bag of Leo	520
10	13	Paper	In offfice of Leo	10

	id	person_id	instrument_id
1	1	1	1
2	2	1	3
3	3	2	2
4	4	2	3
5	5	3	7
6	6	6	8
7	7	4	9
8	8	4	10
9	9	4	11
10	10	4	12
11	11	4	13

Результат:

	available	type
1	true	Mobile phone
2	true	Monitor
3	false	Camera
4	true	Camera
5	true	Paper