

# Домашнее задание 6

Владислав Сазанович М3439

## Задача 1

### 1.1 Кортежи

S where  $\exists M \exists C$   
(S.SId = M.SId  $\wedge$  C.CId = M.CId  $\wedge$  C.CN = "Databases"  $\wedge$  M.M = PARAM)

### 1.2 Datalog

StudentsWithMark(SId, SN, GId) :-  
S(SId, SN, GId),  
M(SId, CId, PARAM)  
C(CId, "Databases")

### 1.3 SQL

```
select * from S
where S.SId in (
    select M.SId from M where M.M = PARAM
    and M.CId in (select C.CId from C where C.CN = "Databases"));
```

## Задача 2

### 2.1 Кортежи

S where  
 $\neg \exists M (M.SId = S.SId \wedge (\exists C (M.CId = C.CId \wedge C.CN = "Databases")))$

S where  
 $\exists P \exists C (S.GId = P.GId \wedge P.CId = C.CId \wedge C.CN = "Databases")$   
 $\wedge \neg \exists M (M.SId = S.SId \wedge (\exists C (M.CId = C.CId \wedge C.CN = "Databases")))$

### 2.2 Datalog

StudentsWithoutMarkAll(SId, SN, GId) :-  
S(SId, SN, GId),  
C(CId, "Databases"),

$\neg M(SId, CId, \_);$

StudentsWithoutMarkPlanned(SId, SN, GId) :-  
S(SId, SN, GId),  
P(GId, CId, LId),  
C(CId, "Databases"),  
 $\neg M(SId, CId, \_);$

## 2.3 SQL

```
select * from S
where
    S.SId not in (
        select M.SId from M
        where M.CId in (select C.CId from C where C.CN = "Databases"));

select * from S
where
    S.GId in (
        select P.GId from P
        where P.CId in (select C.CId from C where C.CN = "Databases"))
and S.SId not in (
    select M.SId from M
    where M.CId in (select C.CId from C where C.CN = "Databases"));
```

## Задача 3

### 3.1 Кортежи

S where  
 $\exists M \exists P (S.SId = M.SId \wedge M.CId = P.CId \wedge P.LId = PARAM)$

### 3.2 Datalog

StudentsWithLecturerMark(SId, SN, GId) :-  
S(SId, SN, GId),  
P(GId, CId, PARAM),  
M(SId, CId, \\_)

### 3.3 SQL

```
select * from S
where S.SId in
    (select M.SId from M
     where M.CId in (select P.CId from P where P.LId = PARAM))
```

## Задача 4

### 4.1 Кортежи

```
select S.SId from S
where
     $\neg \exists M (\exists P (S.SId = M.SId \wedge P.LId = PARAM \wedge M.CId = P.CId))$ 
```

### 4.2 Datalog

```
StudentsWithoutLecturerMark(SId) :-
    S(SId, SN, GId),
    P(GId, CId, PARAM),
     $\neg M(SId, CId, PARAM)$ 
```

### 4.3 SQL

```
select S.SId from S
where S.SId not in
    (select M.SId from M
     where M.CId in (select P.CId from P where P.LId = PARAM));
```

## Задача 5

### 5.1 Кортежи

```
S where
     $\forall CL :: (C \text{ where } (\exists P (P.CId = C.CId \wedge P.LId = PARAM)))$ 
     $(\exists M (M.SId = S.SId \wedge M.CId = CL.CId));$ 
```

### 5.2 Datalog

```
ExistsNotPassed(SId, LId) :-
    S(SId, SN, GId),
    P(GId, CId, LId),
     $\neg M(SId, CId, \_)$ 
```

```
CertifiedStudents(SId, SN, GId) :-
    S(SId, SN, GId),
    P(_, CId, PARAM),
     $\neg \text{ExistsNotPassed}(SId, PARAM)$ 
```

### 5.3 SQL

```
select * from S
where not exists
    (select * from C
```

```

where
  C.CId in (select P.CId from P where P.LId = PARAM)
and not exists
  (select * from M where M.SId = S.SId and M.CId = C.CId));

```

## Задача 6

### 6.1 Кортежи

```

select S.SId, S.SName, P.CId from S, P
where (P.GId = S.GId);

```

### 6.2 Datalog

```

StudentCourses(SId, SN, CId) :-
  S(SId, SN, GId),
  P(GId, CId, _)

```

### 6.3 SQL

```

select S.SId, S.SName, P.CId from S, P
where S.GId = P.GId;

```

## Задача 7

### 7.1 Кортежи

```

S where  $\exists P$  (P.GId = S.GId  $\wedge$  P.LId = PARAM)

```

### 7.2 Datalog

```

StudentsOfLecturer(SId, SN, GId) :-
  S(SId, SN, GId),
  P(GId, _, PARAM)

```

### 7.3 SQL

```

select * from S
where S.GId in (select P.GId from P where P.LId = PARAM);

```

## Задача 8

### 8.1 Кортежи

```

select * from S1 :: S, S2 :: S
where
   $\forall$  PASS_S1 ::

```

```

      (select M.CId from M where M.SId = S1.SId ∧ M.M >= 60)
  ∃ M (M.SId = S2.SId ∧ M.CId = PASS_S1.CId ∧ M.M >= 60)

```

## 8.2 Datalog

```

Passed(SId, CId) :-
  S(SId, _, _),
  C(CId, _),
  M(SId, CId, M),
  M >= 60

```

```

FirstPassedSecondNot(SId1, SId2, CId) :-
  S(SId1, _, _),
  S(SId2, _, _),
  C(CId, _),
  Passed(SId1, CId),
  ¬Passed(SId2, CId)

```

```

SecondPassedNotLess(SId1, SN1, GId1, SId2, SN2, GId2) :-
  S(SId1, SN1, GId1),
  S(SId2, SN2, GId2),
  C(CId, _),
  ¬FirstPassedSecondNot(SId1, SId2, CId)

```

## 8.3 SQL

```

select * from S as S1, S as S2
where not exists
  (select M.CId from M
   where
     M.SId = S1.SId
     and M.M >= 60
     and M.CId not in
       (select M.CId from M where M.SId = S2.SId and M.M >= 60));

```

# Задача 9

## 9.1 Кортежи

```

select P.GId, P.CId from P
where
  ∀ GS :: (select * from S where S.GId = P.GId)
  ∃ M (M.SId = GS.SId ∧ M.CId = P.CId ∧ M.M >= 60)

```

## 9.2 Datalog

```

Passed(SId, CId) :-
    S(SId, _, _)
    C(CId, _),
    M(SId, CId, M),
    M >= 60

```

```

ExistsNotPasses(GId, CId) :-
    S(SId, _, GId),
    P(GId, CId, _),
    ¬Passed(SId, CId)

```

```

GroupPassed(GId, CId) :-
    S(SId, _, GId),
    P(GId, CId, _),
    ¬ExistsNotPasses(GId, CId)

```

### 9.3 SQL

```

select P.GId, P.CId from P
where not exists
    (select * from S
     where S.GId = P.GId
     and not exists
         (select * from M
          where M.SId = S.SId and M.CId = P.CId and M.M >= 60));

```