МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ

Национальный исследовательский ядерный университет «МИФИ»

Институт интеллектуальных кибернетических систем

Кафедра кибернетики (№ 22)

Направление подготовки 09.04.04 Программная инженерия

Лабораторная работа на тему

«Нормализация: контрольная по курсу лекций» по дисциплине «Проектирование баз данных кибернетических систем»

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Группа: М20-504

Москва 2021

На входе документ «Контрольная по курсу лекций».

Строка шапки:

A1	нВ	Номер ведомости
A2	нзК	Название курса лекций
A3	идК	Идентификатор курса лекций
A4	нГ	Номер группы
A5	фиоП	ФИО преподавателя по курсу лекций
A6	нП.Ч	Табельный номер преподавателя
A7	дт	Дата контрольной

Детальные строки:

A8	фиоС	ФИО студента
A9	нЗ	Номер зачетки
A10	оЦ	Оценка
A11	фиоП	Фио преподавателя, проверяющего контрольную
A12	нП.П	Табельный номер преподавателя, проверяющего контрольную

1. Зафиксировать функциональные связи атрибутов

Приводим эту структуру к 1НФ:

R0(A1,A2,A3,A4, A5,A6,A7, A8.A9,A10,A11,A12)
A1,A9 → A2,A3,A4, A5,A6,A7, A8.A10,A11,A12
Выделяем, что зависит от части ключа. Получаем отношения в 2NF

A1 → A2,A3,A4,A5,A6,A7
A9 → A8
A1,A9 → A10,A11,A12
Удаляем связи между неосновными атрибутами

R1(A1,A2,A3,A4,A5,A6,A7)
A3 → A2
A6 → A5
A9 → A8
R3(A1,A9,A10,A11,A12)
A12 → A11

Получаем отношения в 3NF

R11(A1,A3,A4,A6,A7)	Кр(нВ, идК, нГ, нП.Ч, дт)
R12(A2,A3)	Курс(нзК, идК)
R13(A5,A6)	Преп(фиоП, нП.Ч)

~~R2(A9,A8)~~	~~Студ(фиоС, нЗ)~~
~~R31(A1,A9,A10,A12)~~	~~Оц(нВ, нЗ, оЦ, нП.П)~~
~~R32(A11,A12)~~	~~ПрепПр(фиоП, нП.П)~~

~~2.~~1. Создать ненормализованную таблицу «Контрольные» с помощью INSERT. Каждая запись – один документ «Контрольная по курсу лекций»

```
CREATE TABLE public.nenormalizirovannaya
(
    nomer_vedomosti integer NOT NULL DEFAULT nextval('nenormalizirovannaya_nomer_vedomosti_seq'::regclass),
    nazvanie_kursa_lekciy character varying(100) COLLATE pg_catalog."default" NOT NULL,
    identifikator_kursa_lekciy integer NOT NULL,
    nomer_gruppi character varying(10) COLLATE pg_catalog."default" NOT NULL,
    fio_prepodavatelya character varying(150) COLLATE pg_catalog."default" NOT NULL,
    tabelniy_nomer_prepodavatelya integer NOT NULL,
    data_kr date NOT NULL,
    svod json,
    CONSTRAINT nenormalizirovannaya_pkey PRIMARY KEY (nomer_vedomosti)
)

TABLESPACE pg_default;

ALTER TABLE public.nenormalizirovannaya
    OWNER to postgres;
```

```
create table unnormalize (
  "message number" SERIAL NOT null PRIMARY key,
  "название coursea лекций" varchar(100) NOT NULL,
  "lecture course identifier" int4 NOT NULL,
  "group number" varchar(10) NOT NULL,
  "teacher name" varchar(150) NOT NULL,
  "teacher name number" int4 NOT NULL,
  "date cr" date NOT NULL,
  "summary" json
);
```

Далее в таблице снизу будет показан пример заполнения данных ~~на примере двух групп и двух предметов, остальная часть базы данных представлена в~~ *приложении 1*.

```
insert into unnormalize (
  "message number", "название coursea лекций",
  "lecture course identifier", "group number",
  "teacher name", "teacher name number",
  "date cr", "summary"
)
values
  (
    111, 'Методология программной инженерии',
    3141, 'М20-504', 'Иващенко М.Г.',
    0, '2021-11-28', '[ {"student name":"Додонов
Додон","student number":"m2050401","grade":"3","teacher name":"Иващенко
М.Г.","teacher book number":0}, {"student name":"Майская
С.","student number":"m2050402","grade":"3","teacher name":"Иващенко
М.Г.","teacher book number":0}, {"student name":"Феруза
И.","student number":"m2051414","grade":"3","teacher name":"Никифоров
А.Ю.","teacher book number":1} ]'
```

```sql
    );
insert into unnormalize (
   "message number", "название coursea лекций",
   "lecture course identifier", "group number",
   "teacher name", "teacher name number",
   "date cr", "summary"
)
values
   (
     112, 'Методология программной инженерии',
     3141, 'М20-514', 'Иващенко М.Г.',
     0, '2021-11-28', '[ {"student name":"Бильбо
Б","student number":"m2051403","grade":"3","teacher name":"Иващенко
М.Г.","teacher book number":0}, {"student name":"Фродо
Б.","student number":"m2050404","grade":"3","teacher name":"Иващенко
М.Г.","teacher book number":0}, {"student name":"Роки
Б.","student number":"m2051405","grade":"3","teacher name":"Иващенко
М.Г.","teacher book number":0}, {"student name":"Бебра
Н.","student number":"m2051413","grade":"2","teacher name":"Никифоров
А.Ю.","teacher book number":1} ]'
   );
insert into unnormalize (
   "message number", "название coursea лекций",
   "lecture course identifier", "group number",
   "teacher name", "teacher name number",
   "date cr", "summary"
)
values
   (
     100, 'Взаимосвязь открытых систем',
     11092001, 'М20-504', 'Никифоров А.Ю.',
     1, '2021-10-23', '[ {"student name":"Стетхем
Д.","student number":"m2051406","grade":"5","teacher name":"Никифоров
А.Ю.","teacher book number":1}, {"student name":"Сталоне
С.","student number":"m2051407","grade":"4","teacher name":"Никифоров
А.Ю.","teacher book number":1}, {"student name":"Гришин
И.","student number":"m2051408","grade":"3","teacher name":"Никифоров
А.Ю.","teacher book number":1} ]'
   );
insert into unnormalize (
   "message number", "название coursea лекций",
   "lecture course identifier", "group number",
   "teacher name", "teacher name number",
   "date cr", "summary"
)
values
   (
     101, 'Взаимосвязь открытых систем',
     11092001, 'М20-504', 'Никифоров А.Ю.',
     1, '2021-11-20', '[ {"student name":"Трейсер
О.","student number":"m2050409","grade":"4","teacher name":"Никифоров
А.Ю.","teacher book number":1}, {"student name":"Ветрокрылая
С.","student number":"m2050410","grade":"5","teacher name":"Никифоров
А.Ю.","teacher book number":1}, {"student name":"Додонов
Додон","student number":"m2050401","grade":"3","teacher name":"Никифоров
А.Ю.","teacher book number":1}, {"student name":"Лц
Ш.","student number":"m2050411","grade":"2","teacher name":"Никифоров
А.Ю.","teacher book number":1} ]'
   );
```

```sql
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (1, 'Взаимосвязь открытых систем', 777, 'M20-504', 'Никифоров А.Ю.', 5, '2021-
11-28', '[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Моргунов
Е.П.","nomer_zachetki":"m2050414","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Новиков
Б.А.","nomer_zachetki":"m2050415","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Лузанов
В.П.","nomer_zachetki":"m2050416","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Буданицкий
А.В.","nomer_zachetki":"m20504113","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Клычков
М.Д.","nomer_zachetki":"m2050413","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Авраменко
А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Мусаева
Я.","nomer_zachetki":"m20504111","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Чигур
А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Сан-Сан
К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Дебюсси
К.","nomer_zachetki":"m20504112","ocenka":"3","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Равель
М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
```
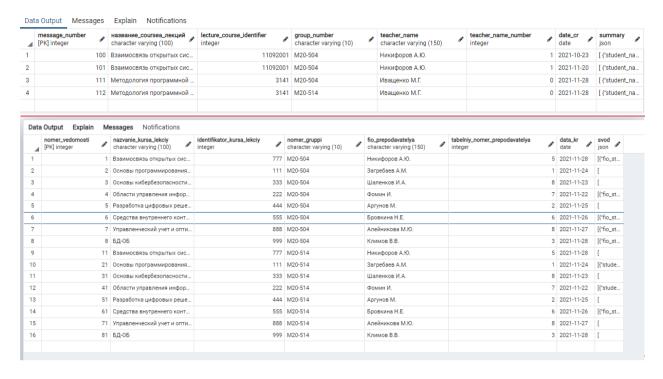
```
{"fio_studenta":"Дворжак
А.","nomer_zachetki":"m20504115","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Лозница
С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Хржановский
И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Клёнский
Ю.Г.","nomer_zachetki":"m20504118","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Герман
А.Ю.","nomer_zachetki":"m20504119","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Корнилов
Л.Г.","nomer_zachetki":"m20504120","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5}
]');

insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (21, 'Основы программирования в ядерной отрасли', 111, 'М20-514', 'Загребаев
А.М.', 1, '2021-11-24', '[{"student_name":"Старостин
С.Н.","student_number":"m2051422","grade":"4","teacher_name":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Старостин
С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"2","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
```

```
{"fio_studenta":"Фолкнер
В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"2","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1}
]'
);
```

Результат заполнения можете увидеть ниже:

message_number [PK] integer	название_coursea лекций character varying (100)	lecture_course_identifier integer	group_number character varying (10)	teacher_name character varying (150)	teacher_name_number integer	date_cr date	summary json
100	Взаимосвязь открытых сис…	11092001	M20-504	Никифоров А.Ю.	1	2021-10-23	[{"student_na…
101	Взаимосвязь открытых сис…	11092001	M20-504	Никифоров А.Ю.	1	2021-11-20	[{"student_na…
111	Методология программной …	3141	M20-504	Иващенко М.Г.	0	2021-11-28	[{"student_na…
112	Методология программной …	3141	M20-514	Иващенко М.Г.	0	2021-11-28	[{"student_na…

nomer_vedomosti [PK] integer	nazvanie_kursa_lekciy character varying (100)	identifikator_kursa_lekciy integer	nomer_gruppi character varying (10)	fio_prepodavatelya character varying (150)	tabelniy_nomer_prepodavatelya integer	data_kr date	svod json
1	Взаимосвязь открытых сис…	777	M20-504	Никифоров А.Ю.	5	2021-11-28	[{"fio_st…
2	Основы программирования…	111	M20-504	Загребаев А.М.	1	2021-11-24	[
3	Основы кибербезопасности…	333	M20-504	Шаленков И.А.	8	2021-11-23	[
4	Области управления информ…	222	M20-504	Фомин И.	7	2021-11-22	[{"fio_st…
5	Разработка цифровых реше…	444	M20-504	Аргунов М.	2	2021-11-25	[
6	Средства внутреннего конт…	555	M20-504	Бровкина Н.Е.	6	2021-11-26	[{"fio_st…
7	Управленческий учет и опти…	888	M20-504	Алейникова М.Ю.	8	2021-11-27	[{"fio_st…
8	БД-ОБ	999	M20-504	Климов В.В.	3	2021-11-28	[{"fio_st…
11	Взаимосвязь открытых сис…	777	M20-514	Никифоров А.Ю.	5	2021-11-28	[
21	Основы программирования…	111	M20-514	Загребаев А.М.	1	2021-11-24	[{"stude…
31	Основы кибербезопасности…	333	M20-514	Шаленков И.А.	8	2021-11-23	[
41	Области управления информ…	222	M20-514	Фомин И.	7	2021-11-22	[{"stude…
51	Разработка цифровых реше…	444	M20-514	Аргунов М.	2	2021-11-25	[
61	Средства внутреннего конт…	555	M20-514	Бровкина Н.Е.	6	2021-11-26	[{"fio_st…
71	Управленческий учет и опти…	888	M20-514	Алейникова М.Ю.	8	2021-11-27	[
81	БД-ОБ	999	M20-514	Климов В.В.	3	2021-11-28	[

Ниже показано создание ненормализованной таблицы из исходной через ARRAY (продолжение в *приложении 2*):

```
create type st_gr as (
  "student_name" text, "student_number" text,
  "grade" int4, "teacher_name" text,
  "teacher_book_number" int4
);
create table unnormalize_arr as (
 select
   "message_number",
   "название_coursea_лекций",
   "lecture_course_identifier",
   "group_number",
   "teacher_name",
   "teacher_name_number",
   "date_cr",
   array_agg(
     array[(
       arr ->> 'student_name', arr ->> 'student_number',
       arr ->> 'grade', arr ->> 'teacher_name',
       arr ->> 'teacher_book_number'
     ):: st_gr]
   ) as "summary"
 from
   unnormalize cross
   join lateral json_array_elements("summary") as arr
 group by
   "message_number",
   "название_coursea_лекций",
   "lecture_course_identifier",
   "group_number",
   "teacher_name",
```

```
    "teacher_name_number",
    "date_cr"
);
```

```
create type stud__ocenka as (



    "fio_studenta" text, "nomer_zachetki" text,



"ocenka" int4, "fio_prepodavatelya" text,
"nomer_tabelya_prepodavatelya" int4
);
create table nenormalizirovannaya_arr as (
select
    "nomer_vedomosti",
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy",
    "nomer_gruppi",
    "fio_prepodavatelya",
    "tabelniy_nomer_prepodavatelya",
    "data_kr",
    array_agg(
        array[(
            arr ->> 'fio_studenta', arr ->> 'nomer_zachetki',
            arr ->> 'ocenka', arr ->> 'fio_prepodavatelya',
            arr ->> 'nomer_tabelya_prepodavatelya'
        ):: stud__ocenka]
    ) as "svod"
from
    nenormalizirovannaya cross
    join lateral json_array_elements("svod") as arr
group by
    "nomer_vedomosti",
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy",
    "nomer_gruppi",
    "fio_prepodavatelya",
    "tabelniy_nomer_prepodavatelya",
    "data_kr"
);
```

Что получилось:

	nomer_vedo integer	nazvanie_kursa_lekciy character varying (100)	identifikato integer	nomer_gruppi character vary	fio_prepodavatelya character varying (190)	tabeln integer	data_kr date	svod stud__ocenka[]
1	71	Управленческий уч...	888	M20-514	Алейникова М.Ю.	8	2021-11-27	{{"(\"Старостин С.Н.\",m2051422,4,\"Алейникова М.Ю.\",8)"},{"(\"Алперин М.Е.\",m2051423,4,\"Алейникова М.Ю.\",8)"},{"(\"Додон Д.Д.\",m2051424,3,\"Але...
2	51	Разработка цифро...	444	M20-514	Аргунов М.	2	2021-11-25	{{"(\"Старостин С.Н.\",m2051422,4,\"Аргунов М.\",2)"},{"(\"Алперин М.Е.\",m2051423,5,\"Аргунов М.\",2)"},{"(\"Додон Д.Д.\",m2051424,3,\"Аргунов М.\",2)"},{...
3	11	Взаимосвязь откр...	777	M20-514	Никифоров А.Ю.	5	2021-11-28	{{"(\"Старостин С.Н.\",m2051422,4,\"Никифоров А.Ю.\",5)"},{"(\"Алперин М.Е.\",m2051423,4,\"Никифоров А.Ю.\",5)"},{"(\"Додон Д.Д.\",m2051424,3,\"Никиф...
4	81	БД-ОБ	999	M20-514	Климов В.В.	3	2021-11-28	{{"(\"Старостин С.Н.\",m2051422,4,\"Климов В.В.\",3)"},{"(\"Алперин М.Е.\",m2051423,5,\"Климов В.В.\",3)"},{"(\"Додон Д.Д.\",m2051424,3,\"Климов В.В.\",3...
5	61	Средства внутренн...	555	M20-514	Бровкина Н.Е.	6	2021-11-26	{{"(\"Старостин С.Н.\",m2051422,4,\"Бровкина Н.Е.\",6)"},{"(\"Алперин М.Е.\",m2051423,4,\"Бровкина Н.Е.\",6)"},{"(\"Додон Д.Д.\",m2051424,3,\"Бровкина...
6	21	Основы программ...	111	M20-514	Загребаев А.М.	1	2021-11-24	{{"(,,,1)"},{"(\"Старостин С.Н.\",m2051422,4,\"Загребаев А.М.\",1)"},{"(\"Алперин М.Е.\",m2051423,3,\"Загребаев А.М.\",1)"},{"(\"Додон Д.Д.\",m2051424,3,\"З...
7	3	Основы кибербезо...	333	M20-504	Шаленков И.А.	8	2021-11-23	{{"(\"Линч Д.Э.\",m2050412,3,\"Шаленков И.А.\",8)"},{"(\"Светширт Э.Т.\",m2050417,3,\"Шаленков И.А.\",8)"},{"(\"Моррисон Д.\",m2050411,3,\"Шаленков И...
8	5	Разработка цифро...	444	M20-504	Аргунов М.	2	2021-11-25	{{"(\"Линч Д.Э.\",m2050412,3,\"Аргунов М.\",2)"},{"(\"Светширт Э.Т.\",m2050417,4,\"Аргунов М.\",2)"},{"(\"Моррисон Д.\",m2050411,4,\"Аргунов М.\",2)"},{"(\"...
9	4	Области управлени...	222	M20-504	Фомин И.	7	2021-11-22	{{"(\"Линч Д.Э.\",m2050412,2,\"Фомин И.\",7)"},{"(\"Светширт Э.Т.\",m2050417,5,\"Климов В.В.\",3)"},{"(\"Моррисон Д.\",m2050411,2,\"Фомин И.\",7)"},{"(\"М...
10	6	Средства внутренн...	555	M20-504	Бровкина Н.Е.	6	2021-11-26	{{"(\"Линч Д.Э.\",m2050412,2,\"Бровкина Н.Е.\",6)"},{"(\"Светширт Э.Т.\",m2050417,3,\"Бровкина Н.Е.\",6)"},{"(\"Моррисон Д.\",m2050411,5,\"Бровкина Н.Е...
11	31	Основы программ...	333	M20-504	Шаленков И.А.	8	2021-11-23	{{"(\"Линч Д.Э.\",m2050412,2,\"Шаленков И.А.\",8)"},{"(\"Алперин М.Е.\",m2051423,3,\"Шаленков И.А.\",8)"},{"(\"Додон Д.Д.\",m2051424,3,\"Шаленко...
12	2	Основы программ...	111	M20-504	Загребаев А.М.	1	2021-11-24	{{"(\"Линч Д.Э.\",m2050412,2,\"Загребаев А.М.\",1)"},{"(\"Светширт Э.Т.\",m2050417,2,\"Загребаев А.М.\",1)"},{"(\"Моррисон Д.\",m2050411,4,\"Загребаев А...
13	41	Области управлени...	222	M20-514	Фомин И.	7	2021-11-22	{{"(,,,7)"},{"(\"Старостин С.Н.\",m2051422,4,\"Фомин И.\",7)"},{"(\"Алперин М.Е.\",m2051423,4,\"Фомин И.\",7)"},{"(\"Додон Д.Д.\",m2051424,3,\"Горденко Ю...
14	7	Управленческий уч...	888	M20-504	Алейникова М.Ю.	8	2021-11-27	{{"(\"Линч Д.Э.\",m2050412,2,\"Алейникова М.Ю.\",8)"},{"(\"Светширт Э.Т.\",m2050417,3,\"Алейникова М.Ю.\",8)"},{"(\"Моррисон Д.\",m2050411,2,\"Алейни...
15	1	Взаимосвязь откр...	777	M20-504	Никифоров А.Ю.	5	2021-11-28	{{"(\"Линч Д.Э.\",m2050412,2,\"Никифоров А.Ю.\",5)"},{"(\"Светширт Э.Т.\",m2050417,3,\"Никифоров А.Ю.\",5)"},{"(\"Моррисон Д.\",m2050411,4,\"Никифор...
16	8	БД-ОБ	999	M20-504	Климов В.В.	3	2021-11-28	{{"(\"Линч Д.Э.\",m2050412,2,\"Климов В.В.\",3)"},{"(\"Светширт Э.Т.\",m2050417,3,\"Климов В.В.\",3)"},{"(\"Моррисон Д.\",m2050411,3,\"Климов В.В.\",3)"},...

Выводим в виде плоской таблице, то есть приводим к 1НФ:

Для типа JSON:

```
select
  tmp."message number",
  tmp."название coursea лекций",
  tmp."lecture course identifier",
  tmp."group number",
  tmp."teacher name",
  tmp."teacher name number",
  tmp."date cr",
  tmp.arr ->> 'student name' as "student name",
  tmp.arr ->> 'student number' as "student number",
  tmp.arr ->> 'grade' as "grade",
  tmp.arr ->> 'teacher name' as "teacher name",
  tmp.arr ->> 'teacher book number' as "teacher book number"
from
  (
    select
      "message number",
      "название coursea лекций",
      "lecture course identifier",
      "group number",
      "teacher name",
      "teacher name number",
      "date cr",
      json array elements("summary") as arr
    from
      unnormalize
  ) as tmp;
```

```
select
  tmp."nomer_vedomosti",
  tmp."nazvanie_kursa_lekciy",
  tmp."identifikator_kursa_lekciy",
  tmp."nomer_gruppi",
  tmp."fio_prepodavatelya",
  tmp."tabelniy_nomer_prepodavatelya",
  tmp."data_kr",
  tmp.arr ->> 'fio_studenta' as "fio_studenta",
  tmp.arr ->> 'nomer_zachetki' as "nomer_zachetki",
  tmp.arr ->> 'ocenka' as "ocenka",
  tmp.arr ->> 'fio_prepodavatelya' as "fio_prepodavatelya",
  tmp.arr ->> 'nomer_tabelya_prepodavatelya' as "nomer_tabelya_prepodavatelya"
from
```

```sql
    (
    select
      "nomer_vedomosti",
      "nazvanie_kursa_lekciy",
      "identifikator_kursa_lekciy",
      "nomer_gruppi",
      "fio_prepodavatelya",
      "tabelniy_nomer_prepodavatelya",
      "data_kr",
      json_array_elements("svod") as arr
    from
      nenormalizirovannaya
    ) as tmp;
```

Для типа ARRAY:

```sql
select
  "message number",
  "название coursea лекций",
  "lecture course identifier",
  "group number",
  "teacher name",
  "teacher name number",
  "date cr",
  (
    unnest("summary")
  ).student name,
  (
    unnest("summary")
  ).student number,
  (
    unnest("summary")
  ).grade,
  (
    unnest("summary")
  ).teacher name,
  (
    unnest("summary")
  )."teacher book number"
from
  unnormalize arr;
```

Перейдем к 3НФ и создам таблицы из таблицы `nonnormalize` (тип JSON)

```
create table summary as (
  select
    tmp."message_number",
    tmp.arr ->> 'student_number' as "student_number",
    tmp.arr ->> 'grade' as "grade",
    tmp.arr ->> 'teacher_book_number' as "teacher_book_number"
  from
    (
      select
        "message_number",
        json_array_elements("summary") as arr
      from
        unnormalize
    ) as tmp
);
create table teacher_table as (
  select
    tmp.arr ->> 'teacher_name' as "teacher_name",
    tmp.arr ->> 'teacher_book_number' as "teacher_book_number"
  from
    (
      select
        json_array_elements("summary") as arr
      from
        unnormalize
    ) as tmp
  group by
```

```
create table kontrolnie as (
  select
    "nomer_vedomosti",
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy",
    "nomer_gruppi",
    "fio_prepodavatelya",
    "tabelniy_nomer_prepodavatelya",
    "data_kr"
  from
    nenormalizirovannaya
);
create table napravlenie as (
  select
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy"
  from
    nenormalizirovannaya
  group by
    "identifikator_kursa_lekciy",
    "nazvanie_kursa_lekciy"
);
```

Перейдем к 3НФ и создам таблицы из таблицы nonnormalize_arr (тип ARRAY)

```
create table control as (
  select
    "message_number",
    "название_coursea_лекций",
    "lecture_course_identifier",
    "group_number",
    "teacher_name",
    "teacher_name_number",
    "date_cr"
  from
    unnormalize
);
create table course as (
  select
    "название_coursea_лекций",
    "lecture_course_identifier"
  from
    unnormalize
  group by
    "lecture_course_identifier",
    "название_coursea_лекций"
)
```

```
create table kontrolnie as (
  select
```

```
    "nomer_vedomosti",
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy",
    "nomer_gruppi",
    "fio_prepodavatelya",
    "tabelniy_nomer_prepodavatelya",
    "data_kr"
  from
    nenormalizirovannaya
);
create table napravlenie as (
  select
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy"
  from
    nenormalizirovannaya
  group by
    "identifikator_kursa_lekciy",
    "nazvanie_kursa_lekciy"
);
```

Перейдем обратно к ненормализованной таблице, которую получим из таблиц в 3НФ (для JSON)

```
select
  control."message number",
  control."lecture course identifier",
  course."название coursea лекций",
  control."group number",
  control."teacher name number",
  teacher."teacher name",
  control."date cr",
  json agg(
    json build object(
      'student number', summary."student number",
      'student name', students."student name",
      'grade', summary."grade", 'teacher book number',
      teacher table."teacher book number",
      'teacher name', teacher."teacher name"
    )
  )
from
  control,
  course,
  teacher,
  summary,
  students,
  teacher table
where
  cast(
    teacher table."teacher book number" as INTEGER
  ) = control."teacher name number"
  and course."lecture course identifier" =
control."lecture course identifier"
  and students."student number" = summary."student number"
```

```sql
    and teacher_table."teacher_book_number" = summary."teacher_book_number"
    and summary."message_number" = control."message_number"
group by
    control."message_number",
    control."lecture_course_identifier",
    course."название coursea лекций",
    control."group_number",
    control."teacher_name_number",
    teacher."teacher_name",
    control."date_cr";
```

```sql
select
    kontrolnie."nomer_vedomosti",
    kontrolnie."identifikator_kursa_lekciy",
    napravlenie."nazvanie_kursa_lekciy",
    kontrolnie."nomer_gruppi",
    kontrolnie."tabelniy_nomer_prepodavatelya",
    prepodavatel."fio_prepodavatelya",
    kontrolnie."data_kr",
    json_agg(
        json_build_object(
            'nomer_zachetki', svod."nomer_zachetki",
            'fio_studenta', studenti."fio_studenta",
            'ocenka', svod."ocenka", 'nomer_tabelya_prepodavatelya',
            prepodavatel_tabel."nomer_tabelya_prepodavatelya",
            'fio_prepodavatelya', prepodavatel."fio_prepodavatelya"
        )
    )
from
    kontrolnie,
    napravlenie,
    prepodavatel,
    svod,
    studenti,
    prepodavatel_tabel
where
    cast(
        prepodavatel_tabel."nomer_tabelya_prepodavatelya" as INTEGER
    ) = kontrolnie."tabelniy_nomer_prepodavatelya"
    and napravlenie."identifikator_kursa_lekciy" =
kontrolnie."identifikator_kursa_lekciy"
    and studenti."nomer_zachetki" = svod."nomer_zachetki"
    and prepodavatel_tabel."nomer_tabelya_prepodavatelya" =
svod."nomer_tabelya_prepodavatelya"
    and svod."nomer_vedomosti" = kontrolnie."nomer_vedomosti"
group by
    kontrolnie."nomer_vedomosti",
    kontrolnie."identifikator_kursa_lekciy",
    napravlenie."nazvanie_kursa_lekciy",
    kontrolnie."nomer_gruppi",
    kontrolnie."tabelniy_nomer_prepodavatelya",
    prepodavatel."fio_prepodavatelya",
    kontrolnie."data_kr";
```

Запросы на алгебре:

1. Студенты, сдавшие только контрольную по одному курсу (понимаю как хотя бы одну контрольную по одному курсу).

Подзапрос:

Типы переменных: public_summary AS X, public_control AS Y ~~kontrolnie AS Y~~

Целевой список: X.*,Y.*

Тело запроса: (X[X.report_number=Y.report_number]Y)[Y.report_number] ~~(X[x.nomer_vedomosti=Y.nomer_vedomosti]Y)[Y.nomer_vedomosti]<><><>(1)~~

Алгебра   Описание запроса: Группа:504   Фамилия: Буданицкий   Запрос:1   Типы переменных: ○ LocLink

kontrolnie AS Y

Целевой список:

X.*, Y.*

Тело запроса:

(X[X.nomer_vedomosti=Y.nomer_vedomosti]Y)[Y.nomer_vedomosti] <><><>(1)

Запрос на SQL:

SELECT DISTINCT X.*, Y.*
FROM public_svod AS X, public_kontrolnie AS Y
WHERE X.nomer_vedomosti=Y.nomer_vedomosti

Результат выполнения:

X.nomer_vedomosti	nomer_zachetki	ocenka	nomer_tabelya_prep	Y.nomer_vedomosti	nazvanie_kursa_lekci	identifikator_kursa_l	nomer_gruppi	fio_prepodavatelya	tabelniy_nomer_prep	data_kr
4	m2050416	4	4	4	Области управления	222	M20-504	Фомин И.	7	22.11.2021
2	m2050413	3	2	2	Основы программир	111	M20-504	Загребаев А.М.	1	24.11.2021
61	m2050414	3	6	61	Средства внутренне	555	M20-514	Бровкина Н.Е.	6	26.11.2021
2	m2050419	3	2	2	Основы программир	111	M20-504	Загребаев А.М.	1	24.11.2021
61	m2050417	3	6	61	Средства внутренне	555	M20-514	Бровкина Н.Е.	6	26.11.2021
3	m2050416	3	3	3	Основы кибербезоп	333	M20-504	Шаленков И.А.	8	23.11.2021
7	m2050417	3	7	7	Управленческий уче	888	M20-504	Алейникова М.Ю.	8	27.11.2021
5	m2050412	4	5	5	Разработка цифровь	444	M20-504	Аргунов М.	2	25.11.2021
5	m2050413	4	5	5	Разработка цифровь	444	M20-504	Аргунов М.	2	25.11.2021
8	m2050419	4	8	8	БД-ОБ	999	M20-504	Климов В.В.	3	28.11.2021
8	m2050418	5	8	8	БД-ОБ	999	M20-504	Климов В.В.	3	28.11.2021
2	m2050420	5	2	2	Основы программир	111	M20-504	Загребаев А.М.	1	24.11.2021
7	m2050412	2	7	7	Управленческий уче	888	M20-504	Алейникова М.Ю.	8	27.11.2021
2	m2050411	4	2	2	Основы программир	111	M20-504	Загребаев А.М.	1	24.11.2021
3	m2050415	3	3	3	Основы кибербезоп	333	M20-504	Шаленков И.А.	8	23.11.2021
8	m2050413	5	8	8	БД-ОБ	999	M20-504	Климов В.В.	3	28.11.2021
4	m2050411	3	4	4	Области управления	222	M20-504	Фомин И.	7	22.11.2021
3	m2050414	3	3	3	Основы кибербезоп	333	M20-504	Шаленков И.А.	8	23.11.2021
3	m2050412	3	3	3	Основы кибербезоп	333	M20-504	Шаленков И.А.	8	23.11.2021
1	m2050416	5	1	1	Взаимосвязь открыт	777	M20-504	Никифоров А.Ю.	5	28.11.2021
8	m2050419	3	1	1	Взаимосвязь открыт	777	M20-504	Никифоров А.Ю.	5	28.11.2021
8	m2050420	4	1	8	БД-ОБ	999	M20-504	Климов В.В.	3	28.11.2021

Алгебра   Описание запроса: Группа:504   Фамилия: Клычков   Запрос:1   Типы переменных: ○ LocLink

public_summary AS X, public_control AS Y

Целевой список:

X.*, Y.*

Тело запроса:

(X[X.report_number=Y.report_number]Y)[Y.report_number]

Запрос на SQL:

SELECT DISTINCT X.*, Y.*
FROM public_summary AS X, public_control AS Y
WHERE X.report_number=Y.report_number

Результат выполнения:

X.report_number	student_number	grade	teacher_book_numbe	Y.report_number	lecture_course_name	lecture_course_ident	group_number	teacher_name	teacher_number	date_cr
122	m2051414	5	2	122	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
131	m2050401	3	333	131	Проектирование баз	777	M20-504	Щукин Б.А.	333	20.11.2021
112	m2051405	3	0	112	machine learning	3141	M20-514	Мага М.	0	28.11.2021
100	m2050411	2	1	100	Взаимосвязь открыт	1759	M20-504	Никифоров А.Ю.	1	20.11.2021
112	m2051413	2	1	112	machine learning	3141	M20-514	Мага М.	0	28.11.2021
111	m2050404	3	0	111	machine learning	3141	M20-504	Мага М.	0	28.11.2021
122	m2051413	2	1	122	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
112	m2051414	5	1	112	machine learning	3141	M20-514	Мага М.	0	28.11.2021
121	m2050411	2	2	121	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
131	m2050409	4	333	131	Проектирование баз	777	M20-504	Щукин Б.А.	333	20.11.2021
121	m2050401	3	2	121	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
100	m2050409	4	1	100	Взаимосвязь открыт	1759	M20-504	Никифоров А.Ю.	1	20.11.2021
100	m2050410	5	4	100	Взаимосвязь открыт	1759	M20-504	Никифоров А.Ю.	1	20.11.2021
111	m2050402	3	0	111	machine learning	3141	M20-504	Мага М.	0	28.11.2021
101	m2051414	4	1	101	Взаимосвязь открыт	1759	M20-514	Никифоров А.Ю.	1	23.10.2021
131	m2050401	4	1	131	Проектирование баз	777	M20-504	Щукин Б.А.	333	20.11.2021
121	m2050404	3	2	121	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
131	m2050402	3	333	131	Проектирование баз	777	M20-504	Щукин Б.А.	333	20.11.2021
101	m2051407	3	1	101	Взаимосвязь открыт	1759	M20-514	Никифоров А.Ю.	1	23.10.2021
101	m2051408	3	1	101	Взаимосвязь открыт	1759	M20-514	Никифоров А.Ю.	1	23.10.2021
122	m2051405	3	0	122	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021
121	m2050409	4	2	121	Автотестирование	8686	M20-504	Хазбик К.	2	20.11.2021

Типы переменных: tab_1 AS X, tab_1 AS Z ~~tab_1 AS X, tab_1 AS Z~~
Целевой список: X.student_number ~~X.nomer_zachetki~~
Тело запроса: ((X[X.student_number]) EXCEPT ((X[X.student_number=Z.student_number AND X.report_number<>Z.report_number]Z)[Z.student_number])) ~~((X[X.nomer_zachetki])EXCEPT((X[X.nomer_zachetki=Z.nomer_zachetki AND x.nomer_vedomosti<>Z.nomer_vedomosti]Z)[Z.nomer_zachetki]))~~

○ **Алгебра** **Описание запроса:** **Группа:** 504 **Фамилия:** Буданицкий **Запрос:** 2 **Типы переменных:** ○ LocLink

tab_1 AS X, tab_1 AS Z

Целевой список:
X.nomer_zachetki

Тело запроса:	**Запрос на SQL:**
((X[X.nomer_zachetki]) EXCEPT ((X[X.nomer_zachetki=Z.nomer_zachetki AND X.nomer_vedomosti<>Z.nomer_vedomosti]Z)[Z.nomer_zachetki]))	SELECT DISTINCT X.nomer_zachetki FROM tab_1 AS X WHERE NOT EXISTS (SELECT * FROM tab_1 AS Z WHERE X.nomer_zachetki=Z.nomer_zachetki AND X.nomer_vedomosti<>Z.nomer_vedomosti)

Результат выполнения:
nomer_zachetki

○ **Алгебра** **Описание запроса:** **Группа:** 504 **Фамилия:** Клычков **Запрос:** 2 **Типы переменных:** ○ LocLink

tab_1 AS X, tab_1 AS Z

Целевой список:
X.student_number

Тело запроса:	**Запрос на SQL:**
((X[X.student_number]) EXCEPT ((X[X.student_number=Z.student_number AND X.report_number<>Z.report_number]Z)[Z.student_number]))	SELECT DISTINCT X.student_number FROM tab_1 AS X WHERE NOT EXISTS (SELECT * FROM tab_1 AS Z WHERE X.student_number=Z.student_number AND X.report_number<>Z.report_number)

Результат выполнения:
student_number
m2051406
m2051407
m2051408

Типы переменных: tab_2 AS X, public_students AS Y
Целевой список: Y.*
Тело запроса: (X[X.student_number=Y.student_number]Y)

tab_2 AS X, public_students AS Y

Целевой список:

Y.*

Тело запроса:	Запрос на SQL:
(X[X.student_number=Y.student_number]Y)	SELECT DISTINCT Y.* FROM public_students AS Y WHERE EXISTS (SELECT * FROM tab_2 AS X WHERE X.student_number=Y.student_number)

Результат выполнения:

student_name	student_number
Макбук М.	m2051407
Сэбэк И.	m2051408
Швартсниггер А.	m2051406

2. Преподаватели, которые ставят одни «тройки»
   Типы переменных: tab 1 AS X, tab 1 AS Z ~~tab_1 AS X, tab_1 AS Z (таблица получена в 1 задании)~~
   Целевой список: Z.teacher_book_number ~~Z.nomer_tabelya_prepodovatelya~~
   Тело запроса: ((Z[Z.teacher book number]) EXCEPT ((X[X.teacher book number=Z.teacher book number AND (X.grade="4" OR X.grade="5")])[X.teacher book number])) ~~((Z[Z.nomer_tabelya_prepodovatelya])Except ((X[X.nomer_tabelya_prepodovatelya=Z.nomer_tabelya_prepodovatelya AND (X.ocenka="4" OR X.ocenka="5")])[X.nomer_tabelya_prepodovatelya]))~~

Алгебра   Описание запроса: Группа: 504   Фамилия: Буданицкий   Запрос: 5   Типы переменных: ○ LocLink

, tab_1 AS Z

Целевой список:

Z.nomer_tabelya_prepodavatelya

Тело запроса:

((Z[Z.nomer_tabelya_prepodavatelya]) EXCEPT
((X[X.nomer_tabelya_prepodavatelya=Z.nomer_tabelya_prepodavatelya AND (X.ocenka="4" OR
X.ocenka="5")])[X.nomer_tabelya_prepodavatelya]))

Запрос на SQL:

STINCT Z.nomer_tabelya_prepodavatelya
_1 AS Z
OT EXISTS

_1 AS X
nomer_tabelya_prepodavatelya=Z.nomer_tabelya_prepodavatelya AND (X.ocenka='2' OR X.ocenka='4'
ka='5'))

Результат выполнения:

Алгебра   Описание запроса: Группа: 504   Фамилия: Клычков   Запрос: 5   Типы переменных: ○ LocLink

tab_1 AS X, tab_1 AS Z

Целевой список:

Z.teacher_book_number

Тело запроса:

((Z[Z.teacher_book_number]) EXCEPT ((X[X.teacher_book_number=Z.teacher_book_number AND (X.grade="4" OR
X.grade="5")])[X.teacher_book_number]))

Запрос на SQL:

SELECT DISTINCT Z.teacher_book_number
FROM tab_1 AS Z
WHERE NOT EXISTS
(SELECT *
FROM tab_1 AS X
WHERE X.teacher_book_number=Z.teacher_book_number AND (X.grade='4' OR X.grade='5'))

Результат выполнения:

teacher_book_number

0

Преподаватели, которые ставят одни «тройки»

Т и п ы п е р е м е н н ы х: tab 3 AS X, public teacher book AS Y

Целевой список: Y.*

Т е л о з а п р о с а: (X[X.teacher book number=Y.teacher book number]Y)

tab_3 AS X, public_teacher_book AS Y

Целевой список:

Y.*

Тело запроса:	**Запрос на SQL:**
(X[X.teacher_book_number=Y.teacher_book_number]Y)	SELECT DISTINCT Y.* FROM public_teacher_book AS Y WHERE EXISTS (SELECT * FROM tab_3 AS X WHERE X.teacher_book_number=Y.teacher_book_number)

Результат выполнения:

teacher_name	teacher_book_number
Maga M.	0

Преподаватели, которые ставят одни «тройки»
Типы переменных: public_students AS X, tab_1 AS Y
Целевой список: Y.student_number, Y.group_number, X.student_name
Тело запроса: (X[X.student_number=Y.student_number]Y)

public_students AS X, tab_1 AS Y

Целевой список:

Y.student_number, Y.group_number, X.student_name

Тело запроса:	**Запрос на SQL:**
(X[X.student_number=Y.student_number]Y)	SELECT DISTINCT Y.student_number, Y.group_number, X.student_name FROM public_students AS X, tab_1 AS Y WHERE X.student_number=Y.student_number

Результат выполнения:

student_number	group_number	student_name
m2050401	M20-504	Додонов Додон
m2050402	M20-504	Круиза С.
m2050404	M20-504	Шрек Б.
m2050409	M20-504	Кэш О.
m2050410	M20-504	Рокет И.
m2050411	M20-504	Лц Ш.
m2051403	M20-514	Бибиб Н.
m2051405	M20-514	Биба Б
m2051406	M20-514	Швартсниггер А.
m2051407	M20-514	Макбук М.
m2051408	M20-514	Сэбэк И.
m2051413	M20-514	Боба Н.
m2051414	M20-514	Вандальский И.
m2051414	M20-514	Великий Гэтсби.

3. Студенты, сдавшие контрольные по всем курсам
Типы переменных: public summary AS X, public control AS Y ~~student AS X, tab_1 AS Y~~
Целевой список: X.*, Y.lecture course identifier ~~Y.nomer_zachetki, Y.nomer_gruppi, X.fio_studenta~~

Тело запроса: ~~(X[X.report_number=Y.report_number]Y)~~ (X[X.nomer_zachetki=Y.nomer_zachetki]Y)

Типы переменных: tab_4 AS X, tab_5 AS Y, public_control AS Z ~~publick_svod AS X, publick_kintrolnie AS Y~~

Целевой список: X.student_number, Z.lecture_course_identifier ~~X.*, Y.identifikator_kursa_lekciy~~

Тело запроса: ((((Z[Z.group_number=X.group_number]X)[X.student_number, Z.lecture_course_identifier]) EXCEPT (Y[Y.student_number, Y.lecture_course_identifier])) ~~(X[X.nomer_vedomosti=Y.nomer_vedomosti]Y)~~

...d AS X, public_kontrolnie AS Y

Целевой список:

X.*, Y.identifikator_kursa_lekciy

Тело запроса:	Запрос на SQL:
(X[X.nomer_vedomosti=Y.nomer_vedomosti]Y)	SELECT DISTINCT X.*, Y.identifikator_kursa_lekciy FROM public_svod AS X, public_kontrolnie AS Y WHERE X.nomer_vedomosti=Y.nomer_vedomosti

Результат выполнения:

nomer_vedomosti	nomer_zachetki	ocenka	nomer_tabelya_prepodavatelya	identifikator_kursa_lekciy
4	m20504117	5	7	222
1	m20504110	5	5	777
5	m20504117	4	2	444
21	m2051434	2	1	111
81	m2051426	3	3	999
11	m2051431	5	5	777
81	m2051428	2	3	999
4	m20504114	3	7	222
7	m2050419	2	8	888
51	m2051426	2	2	444
21	m2051422	4	1	111
41	m2051422	4	7	222
51	m2051429	2	3	444
4	m2050416	4	7	222
71	m2051421	5	8	888
31	m2051434	3	8	333
61	m2051421	4	6	555
8	m20504113	5	3	999
21	m2051421	4	1	111
11	m2051424	5	5	777
61	m2051434	3	3	555
8	m2050411	3	3	999

tab_4 AS X, tab_5 AS Y, public_control AS Z

Целевой список:

X.student_number, Z.lecture_course_identifier

Тело запроса:	Запрос на SQL:
(((Z[Z.group_number=X.group_number]X)[X.student_number, Z.lecture_course_identifier]) EXCEPT (Y[Y.student_number, Y.lecture_course_identifier]))	SELECT DISTINCT X.student_number, Z.lecture_course_identifier FROM tab_4 AS X, public_control AS Z WHERE Z.group_number=X.group_number AND NOT EXISTS (SELECT * FROM tab_5 AS Y WHERE Y.student_number=X.student_number AND Y.lecture_course_identifier=Z.lecture_course_identifier)

Результат выполнения:

student_number	lecture_course_identifier
m2050402	1759
m2050402	8686
m2050404	777
m2050404	1759
m2050409	3141
m2050410	3141
m2050411	3141
m2051403	1759
m2051405	1759
m2051406	3141
m2051406	8686
m2051407	3141
m2051407	8686
m2051408	3141
m2051408	8686
m2051413	1759

Типы переменных: Tab 1 AS X, public summary AS Y, tab 6 AS Z ~~publick_svod AS X, tab_5 AS Y, public_kontrolnie AS Z~~

Целевой список: X.student_number, X.group_number ~~X.nomer_zachetki, Z.identificator_kursa_lekciy~~

Тело запроса: (((Y[Y.student_number=X.student_number]X)[Y.student_number]) EXCEPT (Z[Z.student_number])) ~~(((Z[Z.nomer_gruppi=X.nomer_gruppi]X)[X.nomer_zachetki, Z.identifikator_kursa_lekciy]) EXCEPT (Y[Y.nomer_zachetki, Y.identifikator_kursa_lekciy])))~~

Алгебра

○ Алгебра Описание запроса: Группа: 504 Фамилия: Клычков Запрос: 10 Типы переменных: ○ LocLink

tab_1 AS X, public_summary AS Y, tab_6 AS Z

Целевой список:

X.student_number, X.group_number

Тело запроса:	Запрос на SQL:
(((Y[Y.student_number=X.student_number]X)[Y.student_number]) EXCEPT (Z[Z.student_number]))	SELECT DISTINCT X.student_number, X.group_number FROM tab_1 AS X WHERE EXISTS (SELECT * FROM public_summary AS Y WHERE Y.student_number=X.student_number AND NOT EXISTS (SELECT * FROM tab_6 AS Z WHERE Z.student_number=Y.student_number))

Результат выполнения:

student_number	group_number
m2050401	M20-504
m2051414	M20-514

Алгебра

○ Алгебра Описание запроса: Группа: 504 Фамилия: Буданицкий Запрос: 8 Типы переменных: ○ LocLink

, tab_5 AS Y, public_kontrolnie AS Z

Целевой список:

X.nomer_zachetki, Z.identifikator_kursa_lekciy

Тело запроса:	Запрос на SQL:
(((Z[Z.nomer_gruppi=X.nomer_gruppi]X)[X.nomer_zachetki, Z.identifikator_kursa_lekciy]) EXCEPT (Y[Y.nomer_zachetki, Y.identifikator_kursa_lekciy]))	SELECT DISTINCT X.nomer_zachetki, Z.identifikator_kursa_lekciy FROM tab_4 AS X, public_kontrolnie AS Z WHERE Z.nomer_gruppi=X.nomer_gruppi AND NOT EXISTS (SELECT * FROM tab_5 AS Y WHERE Y.nomer_zachetki=X.nomer_zachetki AND Y.identifikator_kursa_lekciy=Z.identifikator_kursa_lekciy)

Результат выполнения:

nomer_zachetki	identifikator_kursa_lekciy
	111
	222
	333
	444
	555
	777
	888
	999
m2051428	999

Типы переменных: tab 7 AS X, public students AS Y ~~tab_1 AS X, public_svod AS Y, tab_6 AS Z~~

Целевой список: X.student number, X.group number, Y.student name ~~X.X.nomer_zachetki, X.nomer_gruppi~~

Тело запроса: (X[X.student number=Y.student number]Y) ~~(((Y[Y.nomer_zachetki=X.nomer_zachetki]X)[Y.nomer_zachetki]) EXCEPT (Z[Z.nomer_zachetki])) <><>(10)~~

4. Преподаватели, которые проверяли контрольные по всем курсам.

Типы переменных: public_teacher_book AS X, tab_1 AS Y, public_course AS Z
~~publick_prepodovatel_tabel AS X, tab_1 AS Y, publick_napravlenie AS Z~~
Целевой список: X.*
Тело запроса:
(((X[X.teacher_book_number=Y.teacher_book_number]Y)[Y.lecture_course_identifier])

~~DELETE (Z[Z.lecture_course_identifier]))~~
~~(((X[X.nomer_tabelya_prepodovatelya=Y.nomer_tabelya_prepodovatelya]Y)[Y.identific~~
~~ator_kursa_lekciy]) DISTINCT~~
~~(Z[Z.identifikator_kursa_lekciy]))<><><>(12)~~

○ **Алгебра**   Описание запроса: **Группа:** 504   **Фамилия:** Буданицкий   **Запрос:** 11   **Типы переменных:** ○ LocLink

epodavatel_tabel AS X, tab_1 AS Y, public_napravlenie AS Z

Целевой список:
X.*

Тело запроса:
(((X[X.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya]Y)[Y.identifikator_kursa_lekciy]) DISTINCT
(Z[Z.identifikator_kursa_lekciy]) <><><>(12)

Запрос на SQL:
DELETE DISTINCT X.*
FROM public_prepodavatel_tabel AS X
WHERE NOT EXISTS
(SELECT *
FROM public_napravlenie AS Z
WHERE NOT EXISTS
(SELECT *
FROM tab_1 AS Y
WHERE X.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya AND
Z.identifikator_kursa_lekciy=Y.identifikator_kursa_lekciy))

Результат выполнения:

fio_prepodavatelya	nomer_tabelya_prepodavatelya
Климов В.В.	3

○ **Алгебра**   Описание запроса: **Группа:** 504   **Фамилия:** Клычков   **Запрос:** 12   **Типы переменных:** ○ LocLink

, tab_1 AS Y, public_course AS Z

Целевой список:
X.*

Тело запроса:
(((X[X.teacher_book_number=Y.teacher_book_number]Y)[Y.lecture_course_identifier]) DELETE (Z[Z.lecture_course_identifier])

Запрос на SQL:
SELECT DISTINCT X.*
FROM public_teacher_book AS X
WHERE NOT EXISTS
(SELECT *
FROM public_course AS Z
WHERE NOT EXISTS
(SELECT *
FROM tab_1 AS Y
WHERE X.teacher_book_number=Y.teacher_book_number AND Z.lecture_course_identifier=Y.lecture_course_identifier))

Результат выполнения:

teacher_name	teacher_book_number
Никифоров А.Ю.	1

5. Преподаватели, которые проверяли контрольные только у одной группы

Типы переменных: public teacher table AS X, tab 1 AS Y, tab 1 AS Z
~~prepodavatel_tabel AS X, tab_1 AS Y, tab_1 AS Z~~
Целевой список: X.*
Тело запроса:
(((X[X.teacher_book_number=Y.teacher_book_number]Y)[X.teacher_book_number])

Алгебра

Описание запроса: | Группа: 504 | Фамилия: Буданицкий | Запрос: 11 | Типы переменных: ○ LocLink

...epodavatel_tabel AS X, tab_1 AS Y, tab_1 AS Z

Целевой список:

X.*

Тело запроса:

(((X[X.nomer_tabelya_prepodovatelya=Y.nomer_tabelya_prepodovatelya]Y)[X.nomer_tabelya_prepodovatelya]
EXCEPT ((Z[Z.nomer_tabelya_prepodovatelya=Y.nomer_tabelya_prepodovatelya AND
Z.nomer_gruppi<>Y.nomer_gruppi]Y)[Z.nomer_tabelya_prepodovatelya])) <><><>(13)

Запрос на SQL:

SELECT DISTINCT X.*
FROM public_prepodavatel_tabel AS X
WHERE EXISTS
(SELECT * FROM tab_1 AS Y
WHERE X.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya AND NOT EXISTS
(SELECT *
FROM tab_1 AS Z
WHERE Z.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya AND
Z.nomer_gruppi<>Y.nomer_gruppi AND Z.nomer_tabelya_prepodavatelya=X.nomer_tabelya_prepodavatelya))

Результат выполнения:

fio_prepodavatelya	nomer_tabelya_prepodavatelya
Горденко Ю.В.	4

Алгебра

Описание запроса: | Группа: 504 | Фамилия: Клычков | Запрос: 13 | Типы переменных: ○ LocLink

public_teacher_book AS X, tab_1 AS Y, tab_1 AS Z

Целевой список:

X.*

Тело запроса:

(((X[X.teacher_book_number=Y.teacher_book_number]Y)[X.teacher_book_number]) EXCEPT
((Z[Z.teacher_book_number=Y.teacher_book_number AND Z.group_number<>Y.group_number]Y)[Z.teacher...

Запрос на SQL:

SELECT DISTINCT X.*
FROM public_teacher_book AS X
WHERE EXISTS
(SELECT * FROM tab_1 AS Y
WHERE X.teacher_book_number=Y.teacher_book_number AND NOT EXISTS
(SELECT *
FROM tab_1 AS Z
WHERE Z.teacher_book_number=Y.teacher_book_number AND Z.group_number<>Y.group_number AND
Z.teacher_book_number=X.teacher_book_number))

Результат выполнения:

teacher_name	teacher_book_number
Абдурозик К.	3
Джо Джо	4
Щукин Б.А.	333

6. Преподаватели, которые проверяли контрольные по двум курсам (= проверяли не более чем у 2 курсов – проверяли у одного курса)

Типы переменных: <u>tab 1 as X, tab 1 as Y, tab 1 as Z</u> ~~tab_1 as X, tab_1 AS Y, tab_1 AS Z~~

Целевой список: <u>Y.teacher book number</u> ~~Y.nomer_tabelya_prepodovatelya~~

Тело запроса: [ДБЗ] <u>((Y[Y.teacher book number]) EXCEPT (((X[X.teacher book number=Y.teacher book number AND X.teacher book number=Z.teacher book number AND Y.group number<>Z.group number AND X.group number<>Y.group number]Y) [X.group number<>Z.group number]Z)[X.group number]))</u>
~~((Y[Y.nomer_tabelya_prepodovatelya]) EXCEPT (((X[X.nomer_tabelya_prepodovatelya=Y.nomer_tabelya_prepodovatelya AND X.nomer_tabelya_prepodovatelya=Z.nomer_tabelya_prepodovatelya AND Y.nomer_gruppi<>z.nomer_gruppi AND X.nomer_gruppi<>Y,nomer_gruppi]Y) [X.nomer_gruppi<>Z.nomer_gruppi]Z)[X.nomer_gruppi]))<><><>(14)~~

Screenshot 1

○ **Алгебра** Описание запроса: **Группа:** 504 **Фамилия:** Буданицкий **Запрос:** 14 **Типы переменных:** ○ LocLink

tab_1 as X, tab_1 as Y, tab_1 as Z

Целевой список:

Y.nomer_tabelya_prepodavatelya

Тело запроса:	**Запрос на SQL:**
((Y[Y.nomer_tabelya_prepodavatelya]) EXCEPT ((((X[X.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya AND X.nomer_tabelya_prepodavatelya=Z.nomer_tabelya_prepodavatelya AND Y.nomer_gruppi<>Z.nomer_gruppi AND X.nomer_gruppi<>Y.nomer_gruppi]Y) [X.nomer_gruppi<>Z.nomer_gruppi]Z)[X.nomer_gruppi])) <><>(14)	SELECT DISTINCT Y.nomer_tabelya_prepodavatelya FROM tab_1 AS Y WHERE NOT EXISTS (SELECT * FROM tab_1 AS X WHERE EXISTS (SELECT * FROM tab_1 AS Z WHERE X.nomer_tabelya_prepodavatelya=Y.nomer_tabelya_prepodavatelya AND X.nomer_tabelya_prepodavatelya=Z.nomer_tabelya_prepodavatelya AND Y.nomer_gruppi<>Z.nomer_gruppi AND X.nomer_gruppi<>Y.nomer_gruppi AND X.nomer_gruppi<>Z.nomer_gruppi))

Результат выполнения:

nomer_tabelya_prepodavatelya
1
2
3
4
5
6
7
8

Screenshot 2

○ **Алгебра** Описание запроса: **Группа:** 504 **Фамилия:** Клычков **Запрос:** 14 **Типы переменных:** ○ LocLink

tab_1 as X, tab_1 as Y, tab_1 as Z

Целевой список:

Y.teacher_book_number

Тело запроса:	**Запрос на SQL:**
((Y[Y.teacher_book_number]) EXCEPT ((((X[X.teacher_book_number=Y.teacher_book_number AND X.teacher_book_number=Z.teacher_book_number AND Y.group_number<>Z.group_number AND X.group_number<>Y.group_number]Y) [X.group_number<>Z.group_number]Z)[X.group_number]))	SELECT DISTINCT Y.teacher_book_number FROM tab_1 AS Y WHERE NOT EXISTS (SELECT * FROM tab_1 AS X WHERE EXISTS (SELECT * FROM tab_1 AS Z WHERE X.teacher_book_number=Y.teacher_book_number AND X.teacher_book_number=Z.teacher_book_number AND Y.group_number<>Z.group_number AND X.group_number<>Y.group_number AND X.group_number<>Z.group_number))

Результат выполнения:

teacher_book_number
0
1
2
3
333
4

Типы переменных: tab 1 as X, tab 1 as Y ~~tab_1 AS X, tab_1 AS Y~~

Целевой список: X.teacher book number ~~X.nomer_tabelya_prepodovatelya~~

Тело запроса: ((X[X.teacher book number]) EXCEPT ((X[X.teacher book number=Y.teacher book number AND X.lecture course identifier<>Y.lecture course identifier]Y)[Y.teacher book number])) ~~((X[X.nomer_tabelya_prepodovatelya]) EXCEPT ((X[X.nomer_tabelya_prepodovatelya=Y.nomer_tabelya_prepodovatelya AND X.identifikator_kursa_lekciy<>Y.identifikator_kursa_lekciy]Y)[Y.nomer_tabelya_ prepodovatelya])) <><><>(15)~~

Типы переменных: tab 8 as X, tab 9 as Y ~~tab_8 AS X, tab_9 AS Y~~
Целевой список: X.teacher book number ~~X.nomer_tabelya_prepodovatelya~~

Тело запроса: ((X[X.teacher book number]) EXCEPT (Y[Y.teacher book number])) ~~((X[X.nomer_tabelya_prepodovatelya]) EXCEPT (Y[Y.nomer_tabelya_prepodovatelya])) <><><>(16)~~

, tab_9 as Y

Целевой список:

X.nomer_tabelya_prepodavatelya

Тело запроса:	Запрос на SQL:
((X[X.nomer_tabelya_prepodavatelya]) EXCEPT (Y[Y.nomer_tabelya_prepodavatelya])) <><><>(16)	SELECT DISTINCT X.nomer_tabelya_prepodavatelya FROM tab_8 AS X WHERE NOT EXISTS (SELECT * FROM tab_9 AS Y WHERE Y.nomer_tabelya_prepodavatelya=X.nomer_tabelya_prepodavatelya)

Результат выполнения:

nomer_tabelya_prepodavatelya
3
6
8

tab_8 as X, tab_9 as Y

Целевой список:

X.teacher_book_number

Тело запроса:	Запрос на SQL:
((X[X.teacher_book_number]) EXCEPT (Y[Y.teacher_book_number]))	SELECT DISTINCT X.teacher_book_number FROM tab_8 AS X WHERE NOT EXISTS (SELECT * FROM tab_9 AS Y WHERE Y.teacher_book_number=X.teacher_book_number)

Результат выполнения:

teacher_book_number
0
1

7. Курсы лекций средние оценки по контрольным

```sql
1  select kontrolnie."identifikator_kursa_lekciy", avg(cast(svod."ocenka" as int))
2  from svod, kontrolnie
3  where svod."nomer_vedomosti" = kontrolnie."nomer_vedomosti"
4  group by kontrolnie.identifikator_kursa_lekciy
5
```

Data Output   Explain   Messages   Notifications

	identifikator_kursa_lekciy integer	avg numeric
1	999	3.9333333333333333
2	888	3.4666666666666667
3	555	3.8333333333333333
4	333	3.0333333333333333
5	444	3.7333333333333333
6	111	3.4333333333333333
7	222	3.9333333333333333
8	777	3.9000000000000000

```sql
1  select control.lecture_course_identifier, avg(cast(summary.grade as int))
2  from   summary, control
3  where summary.message_number = control.message_number
4  group by control.lecture_course_identifier
```

Data Output   Messages   Explain   Notifications

	lecture_course_identifier integer	avg numeric
1	3141	428571428571
2	11092001	857142857143

8. Курсы лекций, по которым нет студентов, написавших все контрольные на «отлично»

Типы переменных: tab 5 AS X, tab 5 AS Y, tab 5 AS Z ~~tab_5 AS Y, tab_5 AS Z~~
Целевой список: X.lecture course identifier, X.student number ~~X.identifikator_kursa_lekciy, X.nomer_zachetki~~
Тело запроса: ((X[X.lecture course identifier, X.student number]) EXCEPT ((Y[Y.student_number=Z.student_number AND Y.lecture course identifier=Z.lecture course identifier AND (Y.grade="4" OR Y.grade="3" or Y.grade="2")]Z)[Y.lecture course identifier, Y.student number])) ~~((X[X.identifikator_kursa_lekciy]) EXCEPT ((Y[Y.nomer_zachetki=Z.nomer_zachetki AND Y.identifikator_kursa_lekciy=Z.identifikator_kursa_lekciy AND (Y.ocenka="4" OR Y.ocenka="3" OR Y.ocenka="2")]Z)[Y.identifikator_kursa_lekciy, Y.nomer_zachetki]))<><><>(17)~~

, tab_5 AS Y, tab_5 AS Z

Целевой список:

X.identifikator_kursa_lekciy, X.nomer_zachetki

Тело запроса:

((X[X.identifikator_kursa_lekciy, X.nomer_zachetki]) EXCEPT ((Y[Y.nomer_zachetki=Z.nomer_zachetki AND Y.identifikator_kursa_lekciy=Z.identifikator_kursa_lekciy AND (Y.ocenka="4" OR Y.ocenka="3" or Y.ocenka="2")]Z)[Y.identifikator_kursa_lekciy, Y.nomer_zachetki])) <><><>(17)|

Запрос на SQL:

STINCT X.identifikator_kursa_lekciy, X.nomer_zachetki
_5 AS X
OT EXISTS

_5 AS Y
XISTS
FROM tab_5 AS Z
nomer_zachetki=Z.nomer_zachetki AND Y.identifikator_kursa_lekciy=Z.identifikator_kursa_lekciy AND
='4' OR Y.ocenka='3' or Y.ocenka='2') AND Y.identifikator_kursa_lekciy=X.identifikator_kursa_lekciy AND
zachetki=X.nomer_zachetki))

Результат выполнения:

identifikator_kursa_lekciy	nomer_zachetki
444	m20504110
444	m20504114
444	m2050413
444	m2050416
444	m2050418
444	m2051423
555	m2050411
555	m20504110
555	m20504113
555	m20504115
555	m2050415
555	m2050418
555	m2051431
777	m20504110
777	m20504111
777	m20504113
777	m20504116
777	m2050413
777	m2050414
777	m2050415
777	m2050416
777	m2050418

_5 AS Z

Целевой список:

X.lecture_course_identifier, X.student_number

Тело запроса:

((X[X.lecture_course_identifier, X.student_number]) EXCEPT ((Y[Y.student_number=Z.student_number AND Y.lecture_course_identifier=Z.lecture_course_identifier AND (Y.grade="4" OR Y.grade="3" or Y.grade="2")]Z)[Y.lecture_course_identifier, Y.student_number]))

Запрос на SQL:

SELECT DISTINCT X.lecture_course_identifier, X.student_number
FROM tab_5 AS X
WHERE NOT EXISTS
(SELECT *
FROM tab_5 AS Y
WHERE EXISTS
(SELECT * FROM tab_5 AS Z
WHERE Y.student_number=Z.student_number AND Y.lecture_course_identifier=Z.lecture_course_identifier AND (Y.grade='4' OR Y.grade='3' or Y.grade='2') AND Y.lecture_course_identifier=X.lecture_course_identifier AND Y.student_number=X.student_number))

Результат выполнения:

lecture_course_identifier	student_number
777	m2050410
1759	m2050410
1759	m2051406
8686	m2050410
8686	m2051414

Типы переменных: tab 5 as X, tab 10 as Y ~~tab_5 AS X, tab_10 AS Y~~

Целевой список: X.lecture course identifier ~~X.identifikator_kursa_lekciy~~

Тело запроса: ((X[X.lecture course identifier, X.student number]) EXCEPT (Y[Y.lecture course identifier, Y.student number])) ~~((X[X.identifikator_kursa_lekciy, X.nomer_zachetki])) EXCEPT (Y[Y.identifikator_kursa_lekciy, Y.nomer_zachetki]))~~ <><><>(18)

[ДБ4]

○ **Алгебра**   Описание запроса: **Группа:** 504   **Фамилия:** Клычков   **Запрос:** 18   **Типы переменных:** ○ LocLink

Целевой список:

X.lecture_course_identifier

Тело запроса:	**Запрос на SQL:**
((X[X.lecture_course_identifier, X.student_number]) EXCEPT (Y[Y.lecture_course_identifier, Y.student_number]) SELECT DISTINCT X.lecture_course_identifier	SELECT DISTINCT X.lecture_course_identifier
	FROM tab_5 AS X
	WHERE NOT EXISTS
	(SELECT *
	FROM tab_10 AS Y
	WHERE Y.lecture_course_identifier=X.lecture_course_identifier AND Y.student_number=X.student_number)

Результат выполнения:

lecture_course_identifier
777
1759
3141
8686

Типы переменных: public_course AS X, tab_11 AS Y ~~public_napravlenie AS X, tab_11 AS Y~~

Целевой список: X.*

Тело запроса: (
(Y[Y.lecture_course_identifier=X.lecture_course_identifier]X))[Y.lecture_course_id

Алгебра

Описание запроса: Группа: 504   Фамилия: Буданицкий   Запрос: 19   Типы переменных: ○ LocLink

pravlenie AS X, tab_11 AS Y

Целевой список:

X.*

Тело запроса:	Запрос на SQL:
((Y[Y.identifikator_kursa_lekciy=X.identifikator_kursa_lekciy]X)[Y.identifikator_kursa_lekciy]) <><>()	SELECT DISTINCT X.* FROM public_napravlenie AS X WHERE EXISTS (SELECT * FROM tab_11 AS Y WHERE Y.identifikator_kursa_lekciy=X.identifikator_kursa_lekciy)

Результат выполнения:

nazvanie_kursa_lekciy	identifikator_kursa_lekciy
БД-ОБ	999
Взаимосвязь открытых систем	777
Области управления информационными рисками	222
Основы кибербезопасности в частном секторе	333
Основы программирования в ядерной отрасли	111
Разработка цифровых решений для частного сектора	444
Средства внутреннего контроля	555
Управленческий учет и оптимизация процессов	888

Алгебра

Описание запроса: Группа: 504   Фамилия: Клычков   Запрос: 19   Типы переменных: ○ LocLink

L AS Y

Целевой список:

X.*

Тело запроса:	Запрос на SQL:
((Y[Y.lecture_course_identifier=X.lecture_course_identifier]X)[Y.lecture_course_identifier]) <><>(19)	SELECT DISTINCT X.* FROM public_course AS X WHERE EXISTS (SELECT * FROM tab_11 AS Y WHERE Y.lecture_course_identifier=X.lecture_course_identifier)

Результат выполнения:

название_coursea_лекций	lecture_course_identifier
Методология программной инженерии	3141

Приложение 1

```sql
insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (1, 'Взаимосвязь открытых систем', 777, 'М20-504', 'Никифоров А.Ю.', 5, '2021-
11-28', '[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"4","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Моргунов
Е.П.","nomer_zachetki":"m2050414","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Новиков
Б.А.","nomer_zachetki":"m2050415","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Лузанов
В.П.","nomer_zachetki":"m2050416","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Буданицкий
А.В.","nomer_zachetki":"m20504113","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Клычков
М.Д.","nomer_zachetki":"m2050413","ocenka":"5","fio_prepodavatelya":"Никифоров
А.Ю.","nomer_tabelya_prepodavatelya": 5},
```

{"fio_studenta":"Авраменко А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Мусаева Я.","nomer_zachetki":"m20504111","ocenka":"5","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Чигур А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Сан-Сан К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Дебюсси К.","nomer_zachetki":"m20504112","ocenka":"3","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Клёнский Ю.Г.","nomer_zachetki":"m20504118","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Герман А.Ю.","nomer_zachetki":"m20504119","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Корнилов Л.Г.","nomer_zachetki":"m20504120","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5}

]');

```sql
insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (11, 'Взаимосвязь открытых систем', 777, 'М20-514', 'Никифоров А.Ю.', 5, '2021-11-28', '[
```

{"fio_studenta":"Старостин С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},

{"fio_studenta":"Алперин М.Е.","nomer_zachetki":"m2051423","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Додон Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Ростропович М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Конрад Д.","nomer_zachetki":"m2051426","ocenka":"2","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Тягунов Н.Г.","nomer_zachetki":"m2051428","ocenka":"2","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Фолкнер В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Азимов А.","nomer_zachetki":"m2051431","ocenka":"5","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Дик Ф.К.","nomer_zachetki":"m2051433","ocenka":"4","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5},
{"fio_studenta":"Декард Р.","nomer_zachetki":"m2051434","ocenka":"2","fio_prepodavatelya":"Никифоров А.Ю.","nomer_tabelya_prepodavatelya": 5}

]');

```
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (2, 'Основы программирования в ядерной отрасли', 111, 'М20-504', 'Загребаев А.М.', 1, '2021-11-24', '[
```

{"fio_studenta":"Линч Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Светширт Э.Т.","nomer_zachetki":"m2050417","ocenka":"2","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Моррисон Д.","nomer_zachetki":"m2050411","ocenka":"4","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Моргунов Е.П.","nomer_zachetki":"m2050414","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},

{"fio_studenta":"Новиков Б.А.","nomer_zachetki":"m2050415","ocenka":"4","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Лузанов В.П.","nomer_zachetki":"m2050416","ocenka":"5","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Буданицкий А.В.","nomer_zachetki":"m20504113","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Клычков М.Д.","nomer_zachetki":"m2050413","ocenka":"4","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Авраменко А.Д.","nomer_zachetki":"m20504110","ocenka":"4","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Мусаева Я.","nomer_zachetki":"m20504111","ocenka":"4","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Чигур А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Сан Сан К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Дебюсси К.","nomer_zachetki":"m20504112","ocenka":"2","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"2","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Клёнский Ю.Г.","nomer_zachetki":"m20504118","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Герман А.Ю.","nomer_zachetki":"m20504119","ocenka":"3","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Корнилов Л.Г.","nomer_zachetki":"m20504120","ocenka":"5","fio_prepodavatelya":"Загребаев А.М.","nomer_tabelya_prepodavatelya": 1}

]');
insert into nenormalizirovannaya (

```sql
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (21, 'Основы программирования в ядерной отрасли', 111, 'M20-514', 'Загребаев
А.М.', 1, '2021-11-24', '[{"student_name":"Старостин
С.Н.","student_number":"m2051422","grade":"4","teacher_name":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Старостин
С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Конрад
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А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"2","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Фолкнер
В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"4","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"3","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1},
{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"2","fio_prepodavatelya":"Загребаев
А.М.","nomer_tabelya_prepodavatelya": 1}
]'
);
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (3, 'Основы кибербезопасности в частном секторе', 333, 'M20-504', 'Шаленков
И.А.', 8, '2021-11-23', '[
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{"fio_studenta":"Линч Д.Э.","nomer_zachetki":"m2050412","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Светширт Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Моррисон Д.","nomer_zachetki":"m2050411","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
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{"fio_studenta":"Новиков Б.А.","nomer_zachetki":"m2050415","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
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{"fio_studenta":"Клычков М.Д.","nomer_zachetki":"m2050413","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
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{"fio_studenta":"Мусаева Я.","nomer_zachetki":"m20504111","ocenka":"4","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Чигур А.","nomer_zachetki":"m2050418","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Сан-Сан К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Дебюсси К.","nomer_zachetki":"m20504112","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"3","fio_prepodavatelya":"Шаленков И.А.","nomer_tabelya_prepodavatelya": 8},

{"fio_studenta":"Клёнский
Ю.Г.","nomer_zachetki":"m20504118","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
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А.Ю.","nomer_zachetki":"m20504119","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Корнилов
Л.Г.","nomer_zachetki":"m20504120","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8}
]');

insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (31, 'Основы кибербезопасности в частном секторе', 333, 'M20-514', 'Шаленков
И.А.', 8, '2021-11-23', '[
        {"fio_studenta":"Старостин
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И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
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В.К.","nomer_zachetki":"m2051429","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"3","fio_prepodavatelya":"Шаленков
И.А.","nomer_tabelya_prepodavatelya": 8}

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]');

insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (4, 'Области управления информационными рисками', 222, 'М20-504', 'Фомин И.',
7, '2021-11-22', '[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"3","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
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И.","nomer_tabelya_prepodavatelya": 7},
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Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Лузанов
В.П.","nomer_zachetki":"m2050416","ocenka":"4","fio_prepodavatelya":"Фомин
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{"fio_studenta":"Буданицкий
А.В.","nomer_zachetki":"m20504113","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Клычков
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И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Авраменко
А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
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Я.","nomer_zachetki":"m20504111","ocenka":"3","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Чигур
А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Сан Сан
К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Дебюсси
К.","nomer_zachetki":"m20504112","ocenka":"4","fio_prepodavatelya":"Фомин
И.","nomer_tabelya_prepodavatelya": 7},
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{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"5","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"5","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
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{"fio_studenta":"Корнилов Л.Г.","nomer_zachetki":"m20504120","ocenka":"4","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7}

]');
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insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (41, 'Области управления информационными рисками', 222, 'М20-514', 'Фомин И.',
7, '2021-11-22', '[{"student_name":"Старостин
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С.Н.","student_number":"m2051422","grade":"4","teacher_name":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Старостин С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Алперин М.Е.","nomer_zachetki":"m2051423","ocenka":"4","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Додон Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Горденко Ю.В.","nomer_tabelya_prepodavatelya": 4},
{"fio_studenta":"Ростропович М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Конрад Д.","nomer_zachetki":"m2051426","ocenka":"5","fio_prepodavatelya":"Горденко Ю.В.","nomer_tabelya_prepodavatelya": 4},

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{"fio_studenta":"Тягунов Н.Г.","nomer_zachetki":"m2051428","ocenka":"4","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Фолкнер В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Горденко Ю.В.","nomer_tabelya_prepodavatelya": 4},
{"fio_studenta":"Азимов А.","nomer_zachetki":"m2051431","ocenka":"5","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Дик Ф.К.","nomer_zachetki":"m2051433","ocenka":"2","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7},
{"fio_studenta":"Декард Р.","nomer_zachetki":"m2051434","ocenka":"5","fio_prepodavatelya":"Фомин И.","nomer_tabelya_prepodavatelya": 7}


]');

insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (5, 'Разработка цифровых решений для частного сектора', 444, 'М20-504', 'Аргунов М.', 2, '2021-11-25', '[
{"fio_studenta":"Линч Д.Э.","nomer_zachetki":"m2050412","ocenka":"3","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Светширт Э.Т.","nomer_zachetki":"m2050417","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Моррисон Д.","nomer_zachetki":"m2050411","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Моргунов Е.П.","nomer_zachetki":"m2050414","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Новиков Б.А.","nomer_zachetki":"m2050415","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Лузанов В.П.","nomer_zachetki":"m2050416","ocenka":"5","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Буданицкий А.В.","nomer_zachetki":"m20504113","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
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{"fio_studenta":"Клычков М.Д.","nomer_zachetki":"m2050413","ocenka":"5","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Авраменко А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Мусаева Я.","nomer_zachetki":"m20504111","ocenka":"3","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Чигур А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Сан-Сан К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Дебюсси К.","nomer_zachetki":"m20504112","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"5","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Клёнский Ю.Г.","nomer_zachetki":"m20504118","ocenka":"4","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Герман А.Ю.","nomer_zachetki":"m20504119","ocenka":"3","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Корнилов Л.Г.","nomer_zachetki":"m20504120","ocenka":"2","fio_prepodavatelya":"Аргунов М.","nomer_tabelya_prepodavatelya": 2}

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]');
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (51, 'Разработка цифровых решений для частного сектора', 444, 'М20-514',
'Аргунов М.', 2, '2021-11-25', '[
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М.","nomer_tabelya_prepodavatelya": 2},
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М.Е.","nomer_zachetki":"m2051423","ocenka":"5","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"3","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"2","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"4","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Фолкнер
В.К.","nomer_zachetki":"m2051429","ocenka":"2","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"4","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"4","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2},
{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"2","fio_prepodavatelya":"Аргунов
М.","nomer_tabelya_prepodavatelya": 2}

]');
insert into nenormalizirovannaya (
   "nomer_vedomosti", "nazvanie_kursa_lekciy",
   "identifikator_kursa_lekciy", "nomer_gruppi",
   "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
   "data_kr", "svod"
)
values
   (6, 'Средства внутреннего контроля', 555, 'М20-504', 'Бровкина Н.Е.', 6, '2021-
11-26', '[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"5","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
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{"fio_studenta":"Моргунов Е.П.","nomer_zachetki":"m2050414","ocenka":"3","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Новиков Б.А.","nomer_zachetki":"m2050415","ocenka":"5","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Лузанов В.П.","nomer_zachetki":"m2050416","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Буданицкий А.В.","nomer_zachetki":"m20504113","ocenka":"5","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Клычков М.Д.","nomer_zachetki":"m2050413","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Авраменко А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Мусаева Я.","nomer_zachetki":"m20504111","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Чигур А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Сан-Сан К.","nomer_zachetki":"m2050419","ocenka":"2","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Дебюсси К.","nomer_zachetki":"m20504112","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Равель М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Дворжак А.","nomer_zachetki":"m20504115","ocenka":"5","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Лозница С.В.","nomer_zachetki":"m20504116","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Хржановский И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Клёнский Ю.Г.","nomer_zachetki":"m20504118","ocenka":"3","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Герман А.Ю.","nomer_zachetki":"m20504119","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Корнилов Л.Г.","nomer_zachetki":"m20504120","ocenka":"4","fio_prepodavatelya":"Бровкина Н.Е.","nomer_tabelya_prepodavatelya": 6}

```sql
]');

insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (61, 'Средства внутреннего контроля', 555, 'М20-514', 'Бровкина Н.Е.', 6,
'2021-11-26', '[{"fio_studenta":"Старостин
С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"3","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"3","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Фолкнер
В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"5","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"4","fio_prepodavatelya":"Бровкина
Н.Е.","nomer_tabelya_prepodavatelya": 6},
{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3}
]');

insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
```

```
values
    (7, 'Управленческий учет и оптимизация процессов', 888, 'М20-504', 'Алейникова
М.Ю.', 8, '2021-11-27', '[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Моргунов
Е.П.","nomer_zachetki":"m2050414","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Новиков
Б.А.","nomer_zachetki":"m2050415","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Лузанов
В.П.","nomer_zachetki":"m2050416","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Буданицкий
А.В.","nomer_zachetki":"m20504113","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Клычков
М.Д.","nomer_zachetki":"m2050413","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Авраменко
А.Д.","nomer_zachetki":"m20504110","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Мусаева
Я.","nomer_zachetki":"m20504111","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Чигур
А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Сан-Сан
К.","nomer_zachetki":"m2050419","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Дебюсси
К.","nomer_zachetki":"m20504112","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Равель
М.","nomer_zachetki":"m20504114","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Дворжак
А.","nomer_zachetki":"m20504115","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Лозница
С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
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{"fio_studenta":"Хржановский
И.А.","nomer_zachetki":"m20504117","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Клёнский
Ю.Г.","nomer_zachetki":"m20504118","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Герман
А.Ю.","nomer_zachetki":"m20504119","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Корнилов
Л.Г.","nomer_zachetki":"m20504120","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8}

]');
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (71, 'Управленческий учет и оптимизация процессов', 888, 'М20-514', 'Алейникова
М.Ю.', 8, '2021-11-27', '[
{"fio_studenta":"Старостин
С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Тягунов
Н.Г.","nomer_zachetki":"m2051428","ocenka":"2","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Фолкнер
В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Азимов
А.","nomer_zachetki":"m2051431","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},
{"fio_studenta":"Дик
Ф.К.","nomer_zachetki":"m2051433","ocenka":"5","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8},

{"fio_studenta":"Декард
Р.","nomer_zachetki":"m2051434","ocenka":"3","fio_prepodavatelya":"Алейникова
М.Ю.","nomer_tabelya_prepodavatelya": 8}

]');
insert into nenormalizirovannaya (
  "nomer_vedomosti", "nazvanie_kursa_lekciy",
  "identifikator_kursa_lekciy", "nomer_gruppi",
  "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
  "data_kr", "svod"
)
values
  (8, 'БД-ОБ', 999, 'М20-504', 'Климов В.В.', 3, '2021-11-28',
'[{"fio_studenta":"Линч
Д.Э.","nomer_zachetki":"m2050412","ocenka":"2","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Светширт
Э.Т.","nomer_zachetki":"m2050417","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Моррисон
Д.","nomer_zachetki":"m2050411","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Моргунов
Е.П.","nomer_zachetki":"m2050414","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Новиков
Б.А.","nomer_zachetki":"m2050415","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Лузанов
В.П.","nomer_zachetki":"m2050416","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Буданицкий
А.В.","nomer_zachetki":"m20504113","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Клычков
М.Д.","nomer_zachetki":"m2050413","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Авраменко
А.Д.","nomer_zachetki":"m20504110","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Мусаева
Я.","nomer_zachetki":"m20504111","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Чигур
А.","nomer_zachetki":"m2050418","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Сан-Сан
К.","nomer_zachetki":"m2050419","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},

{"fio_studenta":"Дебюсси
К.","nomer_zachetki":"m20504112","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Равель
М.","nomer_zachetki":"m20504114","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Дворжак
А.","nomer_zachetki":"m20504115","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Лозница
С.В.","nomer_zachetki":"m20504116","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Хржановский
И.А.","nomer_zachetki":"m20504117","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
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В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Герман
А.Ю.","nomer_zachetki":"m20504119","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Корнилов
Л.Г.","nomer_zachetki":"m20504120","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3}

]');

```sql
insert into nenormalizirovannaya (
    "nomer_vedomosti", "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy", "nomer_gruppi",
    "fio_prepodavatelya", "tabelniy_nomer_prepodavatelya",
    "data_kr", "svod"
)
values
    (81, 'БД-ОБ', 999, 'М20-514', 'Климов В.В.', 3, '2021-11-28', '[
```

{"fio_studenta":"Старостин
С.Н.","nomer_zachetki":"m2051422","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Алперин
М.Е.","nomer_zachetki":"m2051423","ocenka":"5","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Додон
Д.Д.","nomer_zachetki":"m2051424","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Ростропович
М.Л.","nomer_zachetki":"m2051421","ocenka":"4","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Конрад
Д.","nomer_zachetki":"m2051426","ocenka":"3","fio_prepodavatelya":"Климов
В.В.","nomer_tabelya_prepodavatelya": 3},

{"fio_studenta":"Тягунов Н.Г.","nomer_zachetki":"m2051428","ocenka":"2","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Фолкнер В.К.","nomer_zachetki":"m2051429","ocenka":"4","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Азимов А.","nomer_zachetki":"m2051431","ocenka":"5","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Дик Ф.К.","nomer_zachetki":"m2051433","ocenka":"4","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3},
{"fio_studenta":"Декард Р.","nomer_zachetki":"m2051434","ocenka":"3","fio_prepodavatelya":"Климов В.В.","nomer_tabelya_prepodavatelya": 3}
]');

Приложение 2

```
create type stud_ocenka as (
    "fio_studenta" text, "nomer_zachetki" text,
    "ocenka" int4, "fio_prepodavatelya" text,
    "nomer_tabelya_prepodavatelya" int4
);
create table nenormalizirovannaya_arr as (
    select
        "nomer_vedomosti",
        "nazvanie_kursa_lekciy",
        "identifikator_kursa_lekciy",
        "nomer_gruppi",
        "fio_prepodavatelya",
        "tabelniy_nomer_prepodavatelya",
        "data_kr",
        array_agg(
            array[(
                arr ->> 'fio_studenta', arr ->> 'nomer_zachetki',
                arr ->> 'ocenka', arr ->> 'fio_prepodavatelya',
                arr ->> 'nomer_tabelya_prepodavatelya'
            ):: stud_ocenka]
        ) as "svod"
    from
        nenormalizirovannaya cross
        join lateral json_array_elements("svod") as arr
    group by
        "nomer_vedomosti",
        "nazvanie_kursa_lekciy",
        "identifikator_kursa_lekciy",
        "nomer_gruppi",
        "fio_prepodavatelya",
        "tabelniy_nomer_prepodavatelya",
        "data_kr"
);
select
    tmp."nomer_vedomosti",
    tmp."nazvanie_kursa_lekciy",
```

```sql
    tmp."identifikator_kursa_lekciy",
    tmp."nomer_gruppi",
    tmp."fio_prepodavatelya",
    tmp."tabelniy_nomer_prepodavatelya",
    tmp."data_kr",
    tmp.arr ->> 'fio_studenta' as "fio_studenta",
    tmp.arr ->> 'nomer_zachetki' as "nomer_zachetki",
    tmp.arr ->> 'ocenka' as "ocenka",
    tmp.arr ->> 'fio_prepodavatelya' as "fio_prepodavatelya",
    tmp.arr ->> 'nomer_tabelya_prepodavatelya' as "nomer_tabelya_prepodavatelya"
from
    (
    select
        "nomer_vedomosti",
        "nazvanie_kursa_lekciy",
        "identifikator_kursa_lekciy",
        "nomer_gruppi",
        "fio_prepodavatelya",
        "tabelniy_nomer_prepodavatelya",
        "data_kr",
        json_array_elements("svod") as arr
    from
        nenormalizirovannaya
    ) as tmp;
select
    "nomer_vedomosti",
    "nazvanie_kursa_lekciy",
    "identifikator_kursa_lekciy",
    "nomer_gruppi",
    "fio_prepodavatelya",
    "tabelniy_nomer_prepodavatelya",
    "data_kr",
    (
    unnest("svod")
    ).fio_studenta,
    (
    unnest("svod")
    ).nomer_zachetki,
    (
    unnest("svod")
    ).ocenka,
    (
    unnest("svod")
    ).fio_prepodavatelya,
    (
    unnest("svod")
    )."nomer_tabelya_prepodavatelya"
from
    nenormalizirovannaya_arr;
```

```sql
create table kontrolnie as (
  select
      "nomer_vedomosti",
      "nazvanie_kursa_lekciy",
      "identifikator_kursa_lekciy",
      "nomer_gruppi",
      "fio_prepodavatelya",
      "tabelniy_nomer_prepodavatelya",
      "data_kr"
  from
      nenormalizirovannaya
);
create table napravlenie as (
  select
      "nazvanie_kursa_lekciy",
      "identifikator_kursa_lekciy"
  from
      nenormalizirovannaya
  group by
      "identifikator_kursa_lekciy",
      "nazvanie_kursa_lekciy"
);
create table prepodavatel as (
  select
      "fio_prepodavatelya",
      "tabelniy_nomer_prepodavatelya"
  from
      nenormalizirovannaya
  group by
      "fio_prepodavatelya",
      "tabelniy_nomer_prepodavatelya"
);
create table studenti as (
  select
      tmp.arr ->> 'fio_studenta' as "fio_studenta",
      tmp.arr ->> 'nomer_zachetki' as "nomer_zachetki"
  from
```

```sql
    (
      select
        json_array_elements("svod") as arr
      from
        nenormalizirovannaya
    ) as tmp
  group by
    "fio_studenta",
    "nomer_zachetki"
);
create table svod as (
  select
    tmp."nomer_vedomosti",
    tmp.arr ->> 'nomer_zachetki' as "nomer_zachetki",
    tmp.arr ->> 'ocenka' as "ocenka",
    tmp.arr ->> 'nomer_tabelya_prepodavatelya' as "nomer_tabelya_prepodavatelya"
  from
    (
      select
        "nomer_vedomosti",
        json_array_elements("svod") as arr
      from
        nenormalizirovannaya
    ) as tmp
);
create table prepodavatel_tabel as (
  select
    tmp.arr ->> 'fio_prepodavatelya' as "fio_prepodavatelya",
    tmp.arr ->> 'nomer_tabelya_prepodavatelya' as "nomer_tabelya_prepodavatelya"
  from
    (
      select
        json_array_elements("svod") as arr
      from
        nenormalizirovannaya
    ) as tmp
  group by
    "fio_prepodavatelya",
    "nomer_tabelya_prepodavatelya"
);
select
  kontrolnie."nomer_vedomosti",
  kontrolnie."identifikator_kursa_lekciy",
  napravlenie."nazvanie_kursa_lekciy",
  kontrolnie."nomer_gruppi",
  kontrolnie."tabelniy_nomer_prepodavatelya",
  prepodavatel."fio_prepodavatelya",
  kontrolnie."data_kr",
  json_agg(
    json_build_object(
      'nomer_zachetki', svod."nomer_zachetki",
```

```sql
            'fio_studenta', studenti."fio_studenta",
            'ocenka', svod."ocenka", 'nomer_tabelya_prepodavatelya',
            prepodavatel_tabel."nomer_tabelya_prepodavatelya",
            'fio_prepodavatelya', prepodavatel."fio_prepodavatelya"
        )
    )
from
    kontrolnie,
    napravlenie,
    prepodavatel,
    svod,
    studenti,
    prepodavatel_tabel
where
    cast(
        prepodavatel_tabel."nomer_tabelya_prepodavatelya" as INTEGER
    ) = kontrolnie."tabelniy_nomer_prepodavatelya"
    and napravlenie."identifikator_kursa_lekciy" =
kontrolnie."identifikator_kursa_lekciy"
    and studenti."nomer_zachetki" = svod."nomer_zachetki"
    and prepodavatel_tabel."nomer_tabelya_prepodavatelya" =
svod."nomer_tabelya_prepodavatelya"
    and svod."nomer_vedomosti" = kontrolnie."nomer_vedomosti"
group by
    kontrolnie."nomer_vedomosti",
    kontrolnie."identifikator_kursa_lekciy",
    napravlenie."nazvanie_kursa_lekciy",
    kontrolnie."nomer_gruppi",
    kontrolnie."tabelniy_nomer_prepodavatelya",
    prepodavatel."fio_prepodavatelya",
    kontrolnie."data_kr";
```