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«Национальный исследовательский университет ИТМО»

Факультет инфокоммуникационных технологий

**Лабораторная работа № 1 «Создание таблицы
базы данных PostgreSQL. Заполнение таблицы
рабочими данными»**

по дисциплине «Проектирование и реализация баз данных»

Выполнила: студентка III курса ИКТ

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Цель работы: овладеть практическими навыками создания таблиц базы данных PostgreSQL 1X, заполнения их рабочими данными, резервного копирования и восстановления БД.

Практическое задание:

1. Создать базу данных с использованием pgAdmin 4 (согласно индивидуальному заданию).
2. Создать схему в составе базы данных.
3. Создать таблицы базы данных.
4. Установить ограничения на данные: *Primary Key, Unique, Check, Foreign Key*.
5. Заполнить таблицы БД рабочими данными.
6. Создать резервную копию БД.

Указание:

Создать две резервные копии:

- с расширением *CUSTOM* для восстановления БД;
 - с расширением *PLAIN* для листинга (в отчете);
 - при создании резервных копий БД настроить параметры *Dump options* для *Type of objects* и *Queries*.
7. Восстановить БД.

Индивидуальное задание: («Сессия»)

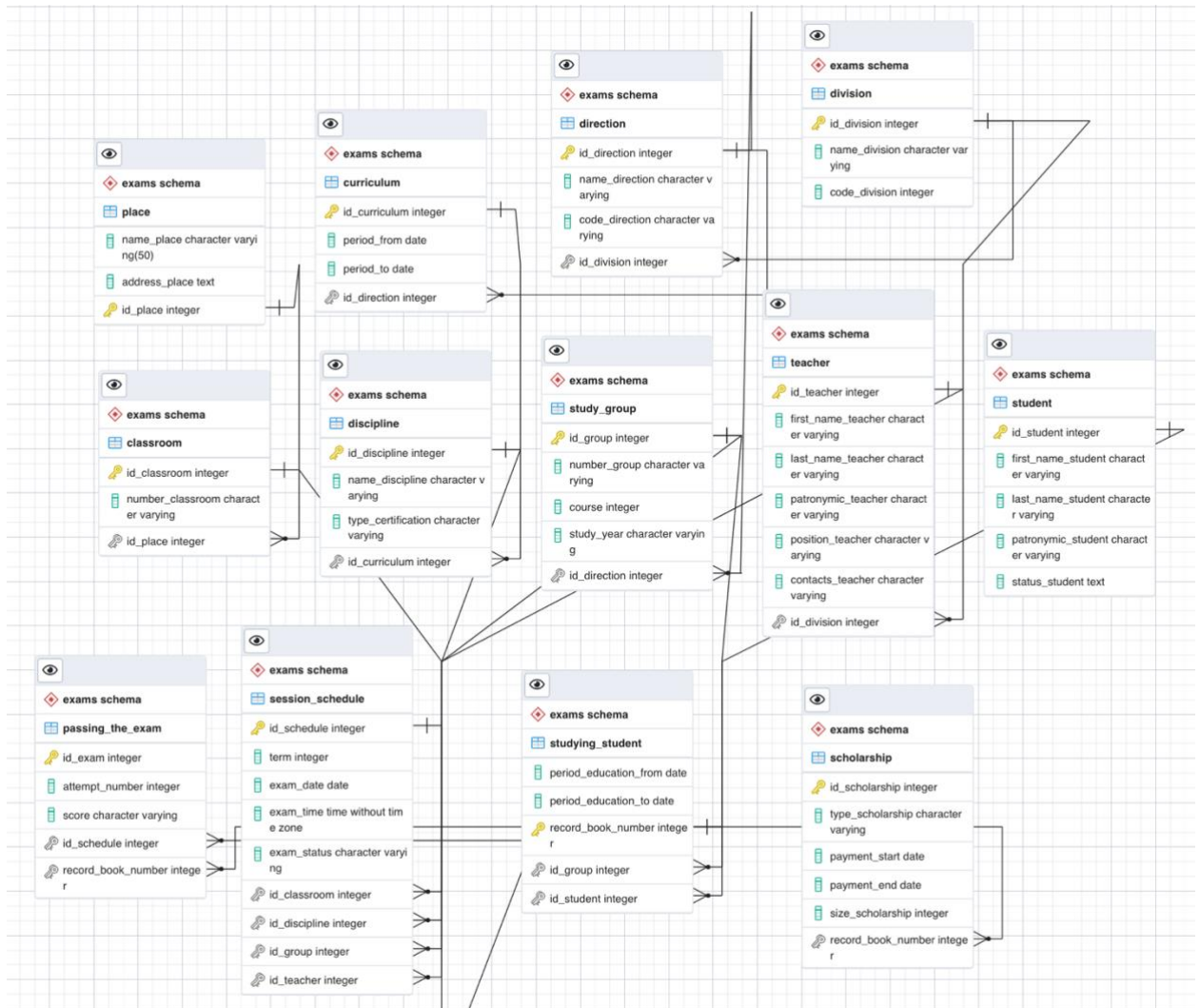
Описание предметной области: БД содержит сведения о сдаче сессии студентами. Номер зачетной книжки однозначно идентифицирует студента.

БД должна содержать следующий минимальный набор сведений: Номер зачетной книжки. Фамилия студента. Имя студента. Отчество студента. Курс. Группа. Учебный год. Семестр. Код дисциплины/практики. Название дисциплины/практики. Код направления. Название направления. Оценка. Фамилия преподавателя. Имя преподавателя. Отчество преподавателя. Должность. Код подразделения. Подразделение. Дата сдачи экзамена/зачета/дифзачета. Аудитория. Площадка (адрес). Номер попытки (максимально 3).

Дополните исходные данные информацией: по расписанию сессии, по назначению базовой и повышенной стипендии.

Ход работы:

1. Наименование базы данных: exams
2. Схема логической модели базы данных, сгенерированная в Generate ERD



3. Dump, содержащий скрипты работы

```
CREATE SCHEMA "exams schema";
```

```
ALTER SCHEMA "exams schema" OWNER TO postgres;
```

```
CREATE TABLE "exams schema".classroom (  
    id_classroom integer NOT NULL,  
    number_classroom character varying NOT NULL,  
    id_place integer NOT NULL  
);
```

```
CREATE TABLE "exams schema".curriculum (  
    id_curriculum integer NOT NULL,  
    name_curriculum character varying NOT NULL,  
    period_from date NOT NULL,  
    period_to date NOT NULL,  
    id_direction integer NOT NULL
```

```

        id_curriculum integer NOT NULL,
        period_from date NOT NULL,
        period_to date NOT NULL,
        id_direction integer NOT NULL
    );

CREATE TABLE "exams schema".direction (
    id_direction integer NOT NULL,
    name_direction character varying NOT NULL,
    code_direction character varying NOT NULL,
    id_division integer NOT NULL
);

CREATE TABLE "exams schema".discipline (
    id_discipline integer NOT NULL,
    name_discipline character varying NOT NULL,
    type_certification character varying NOT NULL,
    id_curriculum integer NOT NULL
);

CREATE TABLE "exams schema".division (
    id_division integer NOT NULL,
    name_division character varying NOT NULL,
    code_division integer NOT NULL
);

CREATE TABLE "exams schema".passing_the_exam (
    id_exam integer NOT NULL,
    attempt_number integer NOT NULL,
    score character varying NOT NULL,
    id_schedule integer NOT NULL,
    record_book_number integer NOT NULL
);

CREATE TABLE "exams schema".place (
    name_place character varying(50) NOT NULL,
    address_place text NOT NULL,
    id_place integer NOT NULL
);

CREATE TABLE "exams schema".scholarship (
    id_scholarship integer NOT NULL,
    type_scholarship character varying NOT NULL,
    payment_start date NOT NULL,
    payment_end date NOT NULL,

```

```
size_scholarship integer NOT NULL,  
record_book_number integer NOT NULL  
);
```

```
CREATE TABLE "exams schema".session_schedule (  
id_schedule integer NOT NULL,  
term integer NOT NULL,  
exam_date date NOT NULL,  
exam_time time without time zone NOT NULL,  
exam_status character varying NOT NULL,  
id_classroom integer NOT NULL,  
id_discipline integer NOT NULL,  
id_group integer NOT NULL,  
id_teacher integer NOT NULL  
);
```

```
CREATE TABLE "exams schema".student (  
id_student integer NOT NULL,  
first_name_student character varying NOT NULL,  
last_name_student character varying NOT NULL,  
patronymic_student character varying,  
status_student text NOT NULL  
);
```

```
CREATE TABLE "exams schema".study_group (  
id_group integer NOT NULL,  
number_group character varying NOT NULL,  
course integer NOT NULL,  
study_year character varying NOT NULL,  
id_direction integer NOT NULL  
);
```

```
CREATE TABLE "exams schema".studying_student (  
period_education_from date NOT NULL,  
period_education_to date NOT NULL,  
record_book_number integer NOT NULL,  
id_group integer NOT NULL,  
id_student integer NOT NULL  
);
```

```
CREATE TABLE "exams schema".teacher (  
id_teacher integer NOT NULL,  
first_name_teacher character varying NOT NULL,  
last_name_teacher character varying NOT NULL,  
patronymic_teacher character varying,
```

```
position_teacher character varying NOT NULL,  
contacts_teacher character varying,  
id_division integer NOT NULL  
);
```

```
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (1, '100', 1);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (2, '101', 1);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (3, '102', 1);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (4, '100', 2);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (5, '101', 2);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (6, '102', 2);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (7, '100', 3);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (8, '101', 3);  
INSERT INTO "exams schema".classroom (id_classroom, number_classroom,  
id_place) VALUES (9, '102', 3);
```

```
INSERT INTO "exams schema".curriculum (id_curriculum, period_from,  
period_to, id_direction) VALUES (1, '2022-01-01', '2022-07-01', 1);  
INSERT INTO "exams schema".curriculum (id_curriculum, period_from,  
period_to, id_direction) VALUES (2, '2022-01-01', '2022-07-01', 2);  
INSERT INTO "exams schema".curriculum (id_curriculum, period_from,  
period_to, id_direction) VALUES (3, '2022-01-01', '2022-07-01', 3);  
INSERT INTO "exams schema".curriculum (id_curriculum, period_from,  
period_to, id_direction) VALUES (4, '2022-01-01', '2022-07-01', 4);
```

```
INSERT INTO "exams schema".direction (id_direction, name_direction,  
code_direction, id_division) VALUES (1, 'Мобильные и сетевые технологии',  
'09.03.03', 1);  
INSERT INTO "exams schema".direction (id_direction, name_direction,  
code_direction, id_division) VALUES (2, 'ИТГС', '45.03.04', 1);  
INSERT INTO "exams schema".direction (id_direction, name_direction,  
code_direction, id_division) VALUES (3, 'ИС', '09.03.02', 2);  
INSERT INTO "exams schema".direction (id_direction, name_direction,  
code_direction, id_division) VALUES (4, 'Компьютерные технологии в  
дизайне', '09.03.01', 3);
```

```
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (1, 'Проектирование баз данных',
'Экзамен', 1);
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (2, 'Физика', 'Экзамен', 4);
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (3, 'Иностранный язык', 'Зачет', 2);
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (4, 'ООП', 'Экзамен', 3);
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (5, 'Управление проектами', 'Зачет',
1);
INSERT INTO "exams schema".discipline (id_discipline, name_discipline,
type_certification, id_curriculum) VALUES (6, 'Экология', 'Зачет', 4);
```

```
INSERT INTO "exams schema".division (id_division, name_division,
code_division) VALUES (1, 'ФИКТ', 1);
INSERT INTO "exams schema".division (id_division, name_division,
code_division) VALUES (2, 'ФИТИП', 2);
INSERT INTO "exams schema".division (id_division, name_division,
code_division) VALUES (3, 'ПИИКТ', 3);
```

```
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (1, 1, '20', 1, 313264);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (2, 1, '16', 2, 309670);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (3, 1, '20', 4, 313264);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (4, 2, '12', 3, 282928);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (5, 1, '20', 5, 264920);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (6, 1, '20', 6, 247891);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (7, 1, '20', 4, 313264);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (8, 1, '19', 2, 313264);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (9, 1, '14', 3, 264920);
INSERT INTO "exams schema".passing_the_exam (id_exam, attempt_number,
score, id_schedule, record_book_number) VALUES (10, 1, '17', 1, 309670);
```

```
INSERT INTO "exams schema".place (name_place, address_place, id_place)
VALUES ('Ломоносова', 'ул. Ломоносова, д,9', 2);
```

```
INSERT INTO "exams schema".place (name_place, address_place, id_place)
VALUES ('Главный корпус', 'Кронверский пр-кт, д.49 ', 1);
INSERT INTO "exams schema".place (name_place, address_place, id_place)
VALUES ('Биржа', 'Биржевая линия, д.14', 3);
```

```
INSERT INTO "exams schema".scholarship (id_scholarship, type_scholarship,
payment_start, payment_end, size_scholarship, record_book_number) VALUES
(1, 'Повышенная', '2022-01-01', '2022-07-01', 4100, 313264);
INSERT INTO "exams schema".scholarship (id_scholarship, type_scholarship,
payment_start, payment_end, size_scholarship, record_book_number) VALUES
(2, 'Базовая', '2022-01-01', '2022-07-01', 2000, 309670);
INSERT INTO "exams schema".scholarship (id_scholarship, type_scholarship,
payment_start, payment_end, size_scholarship, record_book_number) VALUES
(3, 'Повышенная', '2022-01-01', '2022-07-01', 10000, 264920);
INSERT INTO "exams schema".scholarship (id_scholarship, type_scholarship,
payment_start, payment_end, size_scholarship, record_book_number) VALUES
(4, 'Социальная', '2022-01-01', '2022-07-01', 3000, 308535);
```

```
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (1, 1, '2022-06-30', '11:40:00', 'Дистанционно', 1, 1, 1, 105760);
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (2, 1, '2022-06-20', '10:00:00', 'Очно', 2, 2, 2, 159535);
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (3, 1, '2022-05-30', '15:20:00', 'Дистанционно', 3, 3, 3, 115801);
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (4, 1, '2022-06-25', '11:40:00', 'Очно', 4, 4, 4, 173155);
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (5, 1, '2022-05-27', '17:00:00', 'Дистанционно', 5, 5, 5, 105760);
INSERT INTO "exams schema".session_schedule (id_schedule, term, exam_date,
exam_time, exam_status, id_classroom, id_discipline, id_group, id_teacher)
VALUES (6, 1, '2022-07-15', '10:00:00', 'Дистанционно', 6, 6, 1, 173155);
```

```
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (1, 'Анита',
'Самчук', 'Алексеевна', 'Обучается');
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (2, 'Рената',
'Кукрякова ', 'Радиковна', 'Обучается');
```



```
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (3, 'Андрей',
'Береснев', 'Сергеевич', 'Обучается');
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (4, 'Степан',
'Казанский', 'Дмитриевич', 'Отчислен');
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (5, 'Даниил',
'Казанцев', 'Владимирович', 'Обучается');
INSERT INTO "exams schema".student (id_student, first_name_student,
last_name_student, patronymic_student, status_student) VALUES (6, 'Мария',
'Вдовенко', 'Сергеевна', 'Обучается');
```

```
INSERT INTO "exams schema".study_group (id_group, number_group, course,
study_year, id_direction) VALUES (1, 'K33401', 3, '2023', 1);
INSERT INTO "exams schema".study_group (id_group, number_group, course,
study_year, id_direction) VALUES (2, 'K3243', 2, '2022', 2);
INSERT INTO "exams schema".study_group (id_group, number_group, course,
study_year, id_direction) VALUES (4, 'P34684', 4, '2023', 4);
INSERT INTO "exams schema".study_group (id_group, number_group, course,
study_year, id_direction) VALUES (5, 'K4142', 1, '2023', 1);
INSERT INTO "exams schema".study_group (id_group, number_group, course,
study_year, id_direction) VALUES (3, 'M3112', 1, '2022', 3);
```

```
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 313264, 1, 1);
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 309670, 2, 2);
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 264920, 5, 3);
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 282928, 3, 4);
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 308535, 3, 5);
INSERT INTO "exams schema".studying_student (period_education_from,
period_education_to, record_book_number, id_group, id_student) VALUES
('2022-01-01', '2022-07-01', 247891, 4, 6);
```

```
INSERT INTO "exams schema".teacher (id_teacher, first_name_teacher,
last_name_teacher, patronymic_teacher, position_teacher, contacts_teacher,
```

```

id_division) VALUES (159535, 'Иван', 'Шишкин', 'Иванович', 'научный
сотрудник', 'i.shishkin@metalab.ifmo.ru
+79219786257', 3);
INSERT INTO "exams schema".teacher (id_teacher, first_name_teacher,
last_name_teacher, patronymic_teacher, position_teacher, contacts_teacher,
id_division) VALUES (105760, 'Марина', 'Говорова', 'Михайловна', 'инженер
преподаватель (квалификационная категория "преподаватель практики")',
'mmgovorova@itmo.ru
maran77@mail.ru
+7(950)0210173
+7(812)2342201', 1);
INSERT INTO "exams schema".teacher (id_teacher, first_name_teacher,
last_name_teacher, patronymic_teacher, position_teacher, contacts_teacher,
id_division) VALUES (173155, 'Александра', 'Ватьян', 'Сергеевна', 'доцент
(квалификационная категория "ординарный доцент")
старший научный сотрудник', 'asvatian@itmo.ru
alexvatyan@gmail.com
+7(921)4176596', 1);
INSERT INTO "exams schema".teacher (id_teacher, first_name_teacher,
last_name_teacher, patronymic_teacher, position_teacher, contacts_teacher,
id_division) VALUES (115801, 'Максим', 'Хлопотов', 'Валерьевич',
'заместитель декана
доцент (квалификационная категория "ординарный доцент")',
'khlopotov@itmo.ru
hlopotov', 2);

```

```

ALTER TABLE "exams schema".passing_the_exam
ADD CONSTRAINT chk_attempt_number CHECK ((attempt_number < 3))
NOT VALID;

```

```

ALTER TABLE "exams schema".study_group
ADD CONSTRAINT chk_course CHECK ((course < 5)) NOT VALID;

```

```

ALTER TABLE "exams schema".curriculum
ADD CONSTRAINT chk_period CHECK ((period_from <= period_to)) NOT
VALID;

```

```

ALTER TABLE "exams schema".studying_student
ADD CONSTRAINT chk_period CHECK ((period_education_from <=
period_education_to)) NOT VALID;

```

```

ALTER TABLE "exams schema".discipline
ADD CONSTRAINT chk_type CHECK (((type_certification)::text =
'Экзамен'::text) OR ((type_certification)::text = 'Зачет'::text) OR
((type_certification)::text = 'Дифференцированный зачет'::text))) NOT VALID;

```

```
ALTER TABLE ONLY "exams schema".classroom
  ADD CONSTRAINT classroom_pkey PRIMARY KEY (id_classroom);

ALTER TABLE ONLY "exams schema".curriculum
  ADD CONSTRAINT curriculum_pkey PRIMARY KEY (id_curriculum);

ALTER TABLE ONLY "exams schema".direction
  ADD CONSTRAINT direction_pkey PRIMARY KEY (id_direction);

ALTER TABLE ONLY "exams schema".discipline
  ADD CONSTRAINT discipline_pkey PRIMARY KEY (id_discipline);

ALTER TABLE ONLY "exams schema".division
  ADD CONSTRAINT division_pkey PRIMARY KEY (id_division);

ALTER TABLE ONLY "exams schema".passing_the_exam
  ADD CONSTRAINT passing_the_exam_pkey PRIMARY KEY (id_exam);

ALTER TABLE ONLY "exams schema".place
  ADD CONSTRAINT place_pkey PRIMARY KEY (id_place);

ALTER TABLE ONLY "exams schema".scholarship
  ADD CONSTRAINT scholarship_pkey PRIMARY KEY (id_scholarship);

ALTER TABLE ONLY "exams schema".session_schedule
  ADD CONSTRAINT session_schedule_pkey PRIMARY KEY (id_schedule);

ALTER TABLE ONLY "exams schema".student
  ADD CONSTRAINT student_pkey PRIMARY KEY (id_student);

ALTER TABLE ONLY "exams schema".study_group
  ADD CONSTRAINT "study group_pkey" PRIMARY KEY (id_group);

ALTER TABLE ONLY "exams schema".studying_student
  ADD CONSTRAINT studying_student_pkey PRIMARY KEY
(record_book_number);

ALTER TABLE ONLY "exams schema".teacher
  ADD CONSTRAINT teacher_pkey PRIMARY KEY (id_teacher);

ALTER TABLE ONLY "exams schema".session_schedule
  ADD CONSTRAINT id_classroom FOREIGN KEY (id_classroom)
REFERENCES "exams schema".classroom(id_classroom) NOT VALID;

ALTER TABLE ONLY "exams schema".discipline
```

```
ADD CONSTRAINT id_curriculum FOREIGN KEY (id_curriculum)
REFERENCES "exams schema".curriculum(id_curriculum) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".curriculum
ADD CONSTRAINT id_direction FOREIGN KEY (id_direction)
REFERENCES "exams schema".direction(id_direction) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".study_group
ADD CONSTRAINT id_direction FOREIGN KEY (id_direction)
REFERENCES "exams schema".direction(id_direction) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".session_schedule
ADD CONSTRAINT id_discipline FOREIGN KEY (id_discipline)
REFERENCES "exams schema".discipline(id_discipline) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".direction
ADD CONSTRAINT id_division FOREIGN KEY (id_division) REFERENCES
"exams schema".division(id_division) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".teacher
ADD CONSTRAINT id_division FOREIGN KEY (id_division) REFERENCES
"exams schema".division(id_division) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".session_schedule
ADD CONSTRAINT id_group FOREIGN KEY (id_group) REFERENCES
"exams schema".study_group(id_group) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".studying_student
ADD CONSTRAINT id_group FOREIGN KEY (id_group) REFERENCES
"exams schema".study_group(id_group) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".classroom
ADD CONSTRAINT id_place FOREIGN KEY (id_place) REFERENCES
"exams schema".place(id_place) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".passing_the_exam
ADD CONSTRAINT id_schedule FOREIGN KEY (id_schedule)
REFERENCES "exams schema".session_schedule(id_schedule) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".studying_student
ADD CONSTRAINT id_student FOREIGN KEY (id_student) REFERENCES
"exams schema".student(id_student) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".session_schedule
```

```
ADD CONSTRAINT id_teacher FOREIGN KEY (id_teacher) REFERENCES  
"exams schema".teacher(id_teacher) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".scholarship  
ADD CONSTRAINT record_book_number FOREIGN KEY  
(record_book_number) REFERENCES "exams  
schema".studying_student(record_book_number) NOT VALID;
```

```
ALTER TABLE ONLY "exams schema".passing_the_exam  
ADD CONSTRAINT record_book_number FOREIGN KEY  
(record_book_number) REFERENCES "exams  
schema".studying_student(record_book_number) NOT VALID;
```

Вывод: Я овладела практическими навыками создания таблиц базы данных PostgreSQL 1X, заполнения их рабочими данными, резервного копирования и восстановления БД.