

Министерство науки и высшего образования Российской Федерации
Федеральное государственное бюджетное образовательное учреждение
высшего образования
«Алтайский государственный технический университет им. И. И. Ползунова»

Факультет информационных технологий
Кафедра прикладной математики

Отчет защищен с оценкой _____

Преподаватель _____ (подпись)
«___» _____ 2023 г.

Отчет
по лабораторной работе № 4
по дисциплине «Базы данных»

Студент гр. ПИ-02
Чередов Р.А.

Преподаватель, к.т.н., доцент,
Ненайденко А.С.

Барнаул 2023

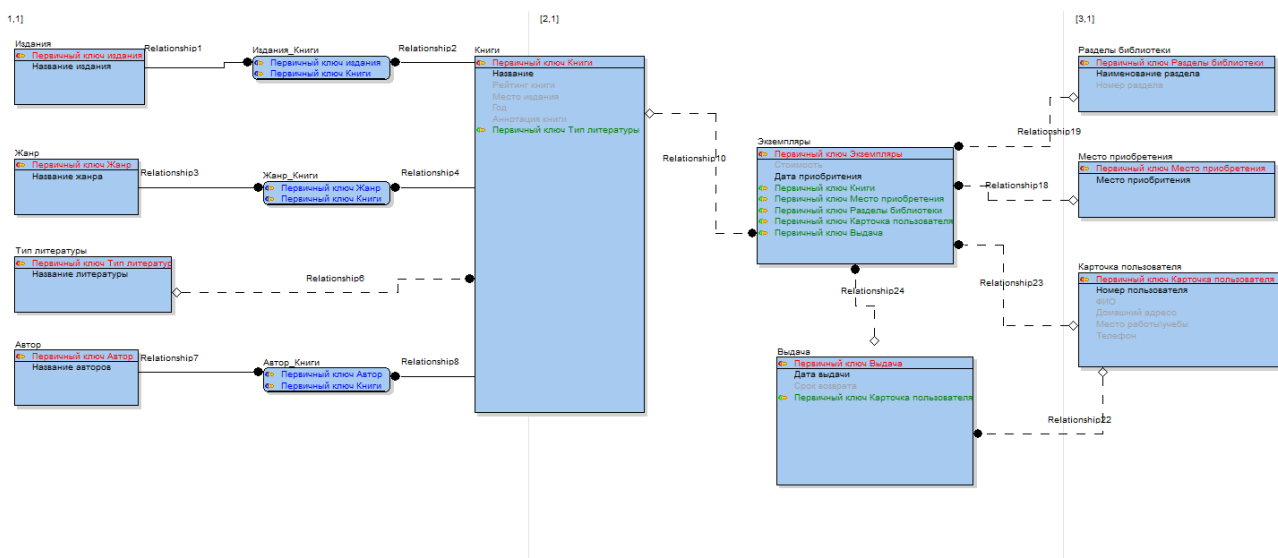
Тема: Разработка логической и физической модели в технологии IDEF1X.

Задание: Используя концептуальную модель из второй лабораторной работы, построить логическую модель в технологии IDEF1X. Предусмотреть поддержание ссылочной целостности. На основании логической модели разработать физическую модель для СУБД PostgreSQL.

Вариант 54. Домашняя библиотека. Автор, название книги, год и место издания, раздел библиотеки (специальная литература, домашнее хозяйство, хобби, беллетристика и так далее), год и место приобретения.

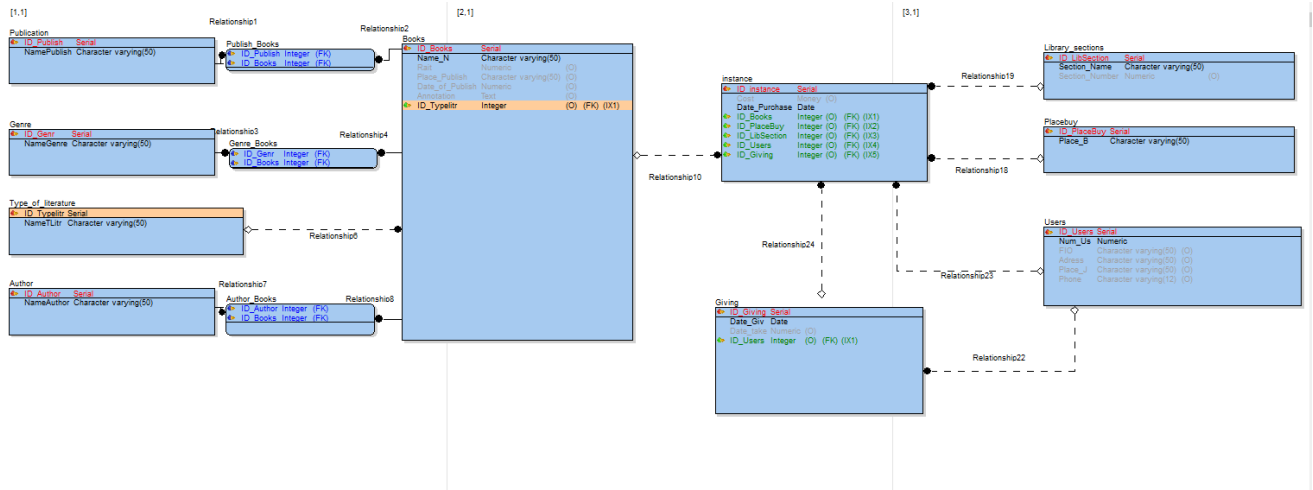
Построена логическая модель данных в технологии IDEF1X на основе концептуальной модели, разработанной во второй лабораторной работе. В логической модели были определены сущности, их атрибуты и связи между ними, а также были установлены правила целостности данных, включая поддержание ссылочной целостности.

Логическая модель представлена на рисунке ниже.



Разработана физическая модель данных для СУБД PostgreSQL на основе логической модели. В физической модели были определены таблицы для каждой сущности, их атрибуты и типы данных, а также были определены связи между таблицами на основе первичных ключей и внешних ключей.

Физическая модель также представлена на рисунке ниже.



Скрипт:

/*

Created: 06.06.2023

Modified: 06.06.2023

Model: PostgreSQL 12

Database: PostgreSQL 12

***/**

-- Create tables section -----

-- Table Publication

CREATE TABLE "Publication"

(

"ID_Publish" Serial NOT NULL,

"NamePublish" Character varying(50) NOT NULL

)

WITH (

autovacuum_enabled=true)

;

ALTER TABLE "Publication" ADD CONSTRAINT "PK_Publication"

PRIMARY KEY ("ID_Publish")

;

-- Table Genre

CREATE TABLE "Genre"

(

"ID_Genr" Serial NOT NULL,

"NameGenre" Character varying(50) NOT NULL

)

WITH (

autovacuum_enabled=true)

;

ALTER TABLE "Genre" ADD CONSTRAINT "PK_Genre" PRIMARY KEY

("ID_Genr")

;

-- Table Type_of_literature

CREATE TABLE "Type_of_literature"

(

"ID_Typelitr" Serial NOT NULL,

```
"NameTLitr" Character varying(50) NOT NULL  
)  
WITH (  
    autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Type_of_literature" ADD CONSTRAINT  
"PK_Type_of_literature" PRIMARY KEY ("ID_Typelitr")  
;
```

-- Table Author

```
CREATE TABLE "Author"  
(  
    "ID_Author" Serial NOT NULL,  
    "NameAuthor" Character varying(50) NOT NULL  
)  
WITH (  
    autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Author" ADD CONSTRAINT "PK_Author" PRIMARY KEY  
("ID_Author")  
;
```

-- Table Books

```
CREATE TABLE "Books"  
(  
    "ID_Books" Serial NOT NULL,  
    "Name_N" Character varying(50) NOT NULL,  
    "Rait" Numeric,  
    "Place_Publish" Character varying(50),  
    "Date_of_Publish" Numeric,  
    "Annotation" Text,  
    "ID_Typelitr" Integer  
)  
WITH (  
    autovacuum_enabled=true)  
;
```

```
CREATE INDEX "IX_Relationship6" ON "Books" ("ID_Typelitr")  
;
```

```
ALTER TABLE "Books" ADD CONSTRAINT "PK_Books" PRIMARY KEY  
("ID_Books")  
;
```

-- Table Publish_Books

```
CREATE TABLE "Publish_Books"  
(  
  "ID_Publish" Integer NOT NULL,  
  "ID_Books" Integer NOT NULL  
)  
WITH (  
  autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Publish_Books" ADD CONSTRAINT "PK_Publish_Books"  
PRIMARY KEY ("ID_Publish","ID_Books")  
;
```

-- Table Genre_Books

```
CREATE TABLE "Genre_Books"  
(  
  "ID_Genr" Integer NOT NULL,  
  "ID_Books" Integer NOT NULL  
)  
WITH (  
  autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Genre_Books" ADD CONSTRAINT "PK_Genre_Books"  
PRIMARY KEY ("ID_Genr","ID_Books")  
;
```

-- Table Author_Books

```
CREATE TABLE "Author_Books"  
(  
  "ID_Author" Integer NOT NULL,  
  "ID_Books" Integer NOT NULL  
)  
WITH (  
  autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Author_Books" ADD CONSTRAINT "PK_Author_Books"  
PRIMARY KEY ("ID_Author","ID_Books")  
;
```

-- Table instance

```

CREATE TABLE "instance"
(
  "ID_instance" Serial NOT NULL,
  "Cost" Money,
  "Date_Purchase" Date NOT NULL,
  "ID_Books" Integer,
  "ID_PlaceBuy" Integer,
  "ID_LibSection" Integer,
  "ID_Users" Integer,
  "ID_Giving" Integer
)
WITH (
  autovacuum_enabled=true)
;

CREATE INDEX "IX_Relationship10" ON "instance" ("ID_Books")
;

CREATE INDEX "IX_Relationship18" ON "instance" ("ID_PlaceBuy")
;

CREATE INDEX "IX_Relationship19" ON "instance" ("ID_LibSection")
;

CREATE INDEX "IX_Relationship23" ON "instance" ("ID_Users")
;

CREATE INDEX "IX_Relationship24" ON "instance" ("ID_Giving")
;

ALTER TABLE "instance" ADD CONSTRAINT "PK_instance" PRIMARY
KEY ("ID_instance")
;

-- Table Giving

CREATE TABLE "Giving"
(
  "ID_Giving" Serial NOT NULL,
  "Date_Giv" Date NOT NULL,
  "Date_take" Numeric,
  "ID_Users" Integer
)
WITH (
  autovacuum_enabled=true)
;

```

```
CREATE INDEX "IX_Relationship22" ON "Giving" ("ID_Users")  
;
```

```
ALTER TABLE "Giving" ADD CONSTRAINT "PK_Giving" PRIMARY KEY  
("ID_Giving")  
;
```

-- Table Library_sections

```
CREATE TABLE "Library_sections"  
(  
  "ID_LibSection" Serial NOT NULL,  
  "Section_Name" Character varying(50) NOT NULL,  
  "Section_Number" Numeric  
)  
WITH (  
  autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Library_sections" ADD CONSTRAINT  
"PK_Library_sections" PRIMARY KEY ("ID_LibSection")  
;
```

-- Table Placebuy

```
CREATE TABLE "Placebuy"  
(  
  "ID_PlaceBuy" Serial NOT NULL,  
  "Place_B" Character varying(50) NOT NULL  
)  
WITH (  
  autovacuum_enabled=true)  
;
```

```
ALTER TABLE "Placebuy" ADD CONSTRAINT "PK_Placebuy" PRIMARY  
KEY ("ID_PlaceBuy")  
;
```

-- Table Users

```
CREATE TABLE "Users"  
(  
  "Num_Us" Numeric NOT NULL,  
  "ID_Users" Serial NOT NULL,  
  "FIO" Character varying(50),  
  "Adress" Character varying(50),
```



```

    "Place_J" Character varying(50),
    "Phone" Character varying(12)
)
WITH (
    autovacuum_enabled=true)
;

ALTER TABLE "Users" ADD CONSTRAINT "PK_Users" PRIMARY KEY
("ID_Users")
;

-- Create foreign keys (relationships) section -----
--

ALTER TABLE "Publish_Books"
ADD CONSTRAINT "Relationship2"
FOREIGN KEY ("ID_Books")
REFERENCES "Books" ("ID_Books")
ON DELETE NO ACTION
ON UPDATE NO ACTION
;

ALTER TABLE "Genre_Books"
ADD CONSTRAINT "Relationship3"
FOREIGN KEY ("ID_Genr")
REFERENCES "Genre" ("ID_Genr")
ON DELETE NO ACTION
ON UPDATE NO ACTION
;

ALTER TABLE "Genre_Books"
ADD CONSTRAINT "Relationship4"
FOREIGN KEY ("ID_Books")
REFERENCES "Books" ("ID_Books")
ON DELETE NO ACTION
ON UPDATE NO ACTION
;

ALTER TABLE "Publish_Books"
ADD CONSTRAINT "Relationship1"
FOREIGN KEY ("ID_Publish")
REFERENCES "Publication" ("ID_Publish")
ON DELETE NO ACTION
ON UPDATE NO ACTION
;

ALTER TABLE "Books"

```

```
ADD CONSTRAINT "Relationship6"  
FOREIGN KEY ("ID_Typelitr")  
REFERENCES "Type_of_literature" ("ID_Typelitr")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "Author_Books"  
ADD CONSTRAINT "Relationship7"  
FOREIGN KEY ("ID_Author")  
REFERENCES "Author" ("ID_Author")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "Author_Books"  
ADD CONSTRAINT "Relationship8"  
FOREIGN KEY ("ID_Books")  
REFERENCES "Books" ("ID_Books")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "instance"  
ADD CONSTRAINT "Relationship10"  
FOREIGN KEY ("ID_Books")  
REFERENCES "Books" ("ID_Books")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "instance"  
ADD CONSTRAINT "Relationship18"  
FOREIGN KEY ("ID_PlaceBuy")  
REFERENCES "Placebuy" ("ID_PlaceBuy")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "instance"  
ADD CONSTRAINT "Relationship19"  
FOREIGN KEY ("ID_LibSection")  
REFERENCES "Library_sections" ("ID_LibSection")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "Giving"  
ADD CONSTRAINT "Relationship22"  
FOREIGN KEY ("ID_Users")  
REFERENCES "Users" ("ID_Users")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "instance"  
ADD CONSTRAINT "Relationship23"  
FOREIGN KEY ("ID_Users")  
REFERENCES "Users" ("ID_Users")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```

```
ALTER TABLE "instance"  
ADD CONSTRAINT "Relationship24"  
FOREIGN KEY ("ID_Giving")  
REFERENCES "Giving" ("ID_Giving")  
ON DELETE NO ACTION  
ON UPDATE NO ACTION  
;
```