Санкт-Петербургский политехнический университет Петра Великого
Институт компьютерных наук и технологий
Кафедра компьютерных систем и программных технологий

Отчёт
По лабораторной работе №3
Дисциплина: базы данных
Тема: язык SQL-DDL

Выполнил студент группы 43501/1: Евсеев Е.П.
Проверил преподаватель: Мяснов А.В.

Санкт-Петербург
2016

Цели работы

Познакомиться с языком описания сущностей и ограничений БД SQL-DDL.

Программа работы

1. Создать скрипт БД в соответствии со схемой из лабораторной работы №2
2. Создать скрипт, заполняющий все таблицы БД данными
3. Продемонстрировать работу SQL-запросы, изменяющие схему БД по заданию
4. Получить ER-диаграмму созданной БД
5. Автоматически сгенерировать данные при помощи IBExpert

Ход работы

Язык SQL (Structured Query Language) - язык структурированных запросов. Он позволяет формировать весьма сложные запросы к базам данных. В SQL определены два подмножества языка:

- SQL-DDL (Data Definition Language) - язык определения структур и ограничений целостности баз данных. Сюда относятся команды создания и удаления баз данных; создания, изменения и удаления таблиц; управления пользователями и т.д.
- SQL-DML (Data Manipulation Language) - язык манипулирования данными: добавление, изменение, удаление и извлечение данных, управления транзакциями

Скрипт БД

```
create database 'D:/DB/SERVICE.FDB' user 'SYSDBA' password 'masterkey';

create table CLIENTS(
    ID_CLIENT  int primary key,
    FULL_NAME varchar(50) not null,
    PHONE varchar(10) not null
);

create table CARS(
    ID_CAR varchar(9) primary key,
    ID_CLIENT  int not null references CLIENTS(ID_CLIENT),
    MARK varchar(30) not null,
    MODEL varchar(30) not null,
    COLOR varchar(20) not null,
    YEAR_OF_ISSUE varchar(4) not null
);

create table ORDERS(
    ID_ORDER int primary key,
    ID_CAR varchar(9) not null references CARS(ID_CAR),
    BEGIN_AT date,
    END_AT date
);

create table TYPES_OF_REPAIR(
    ID_TYPE int primary key,
    NAME varchar(70) not null,
    PRICE decimal(8) not null
);
```

```
create table MANUFACTURERS(
    ID_MANUFACTURER int primary key,
    NAME varchar(20) not null,
    SITE varchar(30) not null,
    PHONE varchar(10) not null
);

create table DETAILS_CATALOG(
    ID_DETAIL int primary key,
    NAME varchar(20) not null,
    COST decimal(8) not null,
    EXISTENCE_Y_or_N char(1) not null,
    AMOUNT int not null,
    ID_MANUFACTURER int not null references MANUFACTURERS(ID_MANUFACTURER)
);

create table ORDERS_SOA(
    ID_ORDER_SOA int primary key,
    ID_DETAIL int not null references DETAILS_CATALOG(ID_DETAIL),
    AMOUNT int not null
);

create table REPAIR(
    ID_REPAIR int primary key,
    ID_TYPE int not null references TYPES_OF_REPAIR(ID_TYPE),
    NAME varchar(50) not null,
    ID_ORDER_SOA int not null references ORDERS_SOA(ID_ORDER_SOA)
);

create table WORKERS(
    ID_WORKER int primary key,
    FULL_NAME varchar(50) not null,
    SPECIALTY varchar(20) not null,
    PHONE varchar(10) not null,
    PASSPORT varchar(11) not null
);

create table REPAIR_ORDERS(
    ID_REPAIR_ORDER int primary key,
    ID_REPAIR int not null references REPAIR(ID_REPAIR),
    ID_ORDER int not null references ORDERS(ID_ORDER),
    ID_WORKER int not null references WORKERS(ID_WORKER)
);

show tables;
```

Результат:

```
ISQL Version: WI-V2.5.6.27020 Firebird 2.5
Use CONNECT or CREATE DATABASE to specify a database
SQL> input D:/DB/dbj.sql;
Server version:
WI-V2.5.6.27020 Firebird 2.5
WI-V2.5.6.27020 Firebird 2.5/XNet (ASUSPC)/P12
WI-V2.5.6.27020 Firebird 2.5/XNet (ASUSPC)/P12
        CARS                                    CLIENTS
        DETAILS_CATALOG                         MANUFACTURERS
        ORDERS                                  ORDERS_SOA
        REPAIR                                  REPAIR_ORDERS
        TYPES_OF_REPAIR                         WORKERS
```

Скрипт, заполняющий таблицы БД данными

```
connect 'D:/DB/SERVICE.FDB' user 'SYSDBA' password 'masterkey';
commit;

-- – TABLE CLIENTS –
insert into CLIENTS values (1, 'TONY STARK', '4024864932');
insert into CLIENTS values (2, 'CAPTAIN AMERICA', '4012863920');
insert into CLIENTS values (3, 'ANT MAN', '4073920184');
insert into CLIENTS values (4, 'SPIDER MAN', '4072849014');
insert into CLIENTS values (5, 'BLACK WIDOW', '4092846710');
insert into CLIENTS values (6, 'INCREDIBLE HULK', '4001468242');
insert into CLIENTS values (7, 'HOWK EYE', '4081947436');
insert into CLIENTS values (8, 'RED WITCH', '4081394302');
insert into CLIENTS values (9, 'WINTER SOLDIER', '4001394824');
insert into CLIENTS values (10, 'THOR THE SON OF ODIN', '4001847334');

-- – TABLE CARS –
insert into CARS values ('nf74n8fnv', 1,'skoda','octavia','grey','2014');
insert into CARS values ('nf7jfsdg9', 2,'toyota','rav4','grey','2006');
insert into CARS values ('nf74n8sdf', 6,'mersedes-benz','maybach','black','2016');
insert into CARS values ('nf74n8fkg', 3,'ford','focus','grey','2008');
insert into CARS values ('nf74ngfsd', 5,'mitsubisi','lancer','red','2009');
insert into CARS values ('3434dfdfg', 7,'mitsubisi','ASX','blue','2011');
insert into CARS values ('nf74ef344', 8,'volkswagen','polo','white','2012');
insert into CARS values ('nf74124df', 9,'volkswagen','golf GTR','mixed','2007');
insert into CARS values ('nf7cvcvbr', 10,'skoda','kodiaq','green','2017');
insert into CARS values ('nf74n8f42', 4,'land rover','range rover sport','white','2013');

-- – TABLE ORDERS –
insert into ORDERS values (1, 'nf74n8fnv', '13.02.2012', '13.03.2012');
insert into ORDERS values (2, 'nf7jfsdg9', '14.04.2012', '16.04.2012');
insert into ORDERS values (3, 'nf74n8sdf', '14.03.2014', '13.03.2014');
insert into ORDERS values (4, 'nf74n8fkg', '18.04.2015', '20.04.2015');
insert into ORDERS values (5, 'nf74ngfsd', '30.05.2016', '31.05.2016');
insert into ORDERS values (6, '3434dfdfg', '15.06.2016', '30.06.2016');
insert into ORDERS values (7, 'nf74ef344', '13.02.2015', '21.02.2015');
insert into ORDERS values (8, 'nf74124df', '11.07.2013', '14.07.2013');
insert into ORDERS values (9, 'nf7cvcvbr', '15.03.2013', '17.03.2013');
insert into ORDERS values (10, 'nf74n8f42', '21.05.2016', '13.06.2016');

-- – TABLE TYPES_OF_REPAIR –
insert into TYPES_OF_REPAIR values (1, 'work', 1500);
insert into TYPES_OF_REPAIR values (2, 'work2', 300);

-- – TABLE MANUFACTURERS –
insert into MANUFACTURERS values (345, 'EUROAUTO','www.euroauto.ru','435456');
insert into MANUFACTURERS values (123, 'BP', 'www.bp.com','56794536');
insert into MANUFACTURERS values (32, 'WAG','www.wag.de','3475897345');

-- – TABLE DETAILS_CATALOG –
insert into DETAILS_CATALOG values (456, 'PRUZG', 1400, 'Y', 1, 345);
insert into DETAILS_CATALOG values (231, 'BAK', 1010, 'Y', 1, 345);
insert into DETAILS_CATALOG values (228, 'FARA', 34400,'N', 4, 345);
insert into DETAILS_CATALOG values (322, 'WINDOW', 32345, 'N', 2, 123);
insert into DETAILS_CATALOG values (567, 'MIRROW', 132, 'Y', 2, 32);
```

```
-- – TABLE ORDERS_SOA –
insert into ORDERS_SOA values (1, 456, 1);
insert into ORDERS_SOA values (2, 231, 1);
insert into ORDERS_SOA values (3, 228, 1);
insert into ORDERS_SOA values (4, 322, 3);
insert into ORDERS_SOA values (5, 567, 1);

-- – TABLE REPAIR –
insert into REPAIR values (1, 1, 'complex', 1);
insert into REPAIR values (2, 2, 'paint', 2);
insert into REPAIR values (3, 2, 'tuning', 3);
insert into REPAIR values (4, 2, 'engine', 4);
insert into REPAIR values (5, 2, 'suspension', 5);
insert into REPAIR values (6, 1, 'cleaning', 5);

-- – TABLE WORKERS –
insert into WORKERS values (1, 'Ivan', 'mech1', '5830495864', '34534634341');
insert into WORKERS values (2, 'Petr', 'mech2', '3468945764', '34543903943');
insert into WORKERS values (3, 'Konstantin', 'paint', '3845769080', '23787563453');
insert into WORKERS values (4, 'Sergey', 'gear', '8908837495', '23489734895');
insert into WORKERS values (5, 'Vladimir', 'assistent', '8349572146', '23849573984');

-- – TABLE REPAIR_ORDERS –
insert into REPAIR_ORDERS values (1, 1, 3, 5);
insert into REPAIR_ORDERS values (2, 2, 1, 1);
insert into REPAIR_ORDERS values (3, 3, 2, 3);
insert into REPAIR_ORDERS values (4, 4, 5, 4);
insert into REPAIR_ORDERS values (5, 5, 4, 2);
insert into REPAIR_ORDERS values (6, 6, 6, 1);
insert into REPAIR_ORDERS values (7, 2, 7, 4);
insert into REPAIR_ORDERS values (8, 3, 8, 5);
insert into REPAIR_ORDERS values (9, 5, 10, 2);
insert into REPAIR_ORDERS values (10, 1, 9, 5);

commit;
select * from CLIENTS;
select * from CARS;
select * from ORDERS;
select * from REPAIR_ORDERS;
select * from WORKERS;
select * from REPAIR;
select * from TYPES_OF_REPAIR;
select * from ORDERS_SOA;
select * from DETAILS_CATALOG;
select * from MANUFACTURERS;
```

Результат:

```
SQL> input D:/DB/dataj.sql;
Rolling back work.
Server version:
WI-V2.5.6.27020 Firebird 2.5
WI-V2.5.6.27020 Firebird 2.5/XNet (ASUSPC)/P12
WI-V2.5.6.27020 Firebird 2.5/XNet (ASUSPC)/P12
Database:  'D:/DB/SERVICE.FDB', User: SYSDBA
```

Таблица CLIENTS

ID_CLIENT	FULL_NAME	PHONE
1	TONY STARK	4024864932
2	CAPTAIN AMERICA	4012863920
3	ANT MAN	4073920184
4	SPIDER MAN	4072849014
5	BLACK WIDOW	4092846710
6	INCREDIBLE HULK	4001468242
7	HOWK EYE	4081947436
8	RED WITCH	4081394302
9	WINTER SOLDIER	4001394824
10	THOR THE SON OF ODIN	4001847334

Таблица CARS

ID_CAR	ID_CLIENT	MARK	MODEL	COLOR	YEAR_OF_ISSUE
nf74n8fnv	1	skoda	octavia	grey	2014
nf7jfsdg9	2	toyota	rav4	grey	2006
nf74n8sdf	6	mersedes-benz	maybach	black	2016
nf74n8fkg	3	ford	focus	grey	2008
nf74ngfsd	5	mitsubisi	lancer	red	2009
3434dfdfg	7	mitsubisi	ASX	blue	2011
nf74ef344	8	volkswagen	polo	white	2012
nf74124df	9	volkswagen	golf GTR	mixed	2007
nf7cvcvbr	10	skoda	kodiaq	green	2017
nf74n8f42	4	land rover	range rover sport	white	2013

Таблица ORDERS

ID_ORDER	ID_CAR	BEGIN_AT	END_AT
1	nf74n8fnv	2012-02-13	2012-03-13
2	nf7jfsdg9	2012-04-14	2012-04-16
3	nf74n8sdf	2014-03-14	2014-03-13
4	nf74n8fkg	2015-04-18	2015-04-20
5	nf74ngfsd	2016-05-30	2016-05-31
6	3434dfdfg	2016-06-15	2016-06-30
7	nf74ef344	2015-02-13	2015-02-21
8	nf74124df	2013-07-11	2013-07-14
9	nf7cvcvbr	2013-03-15	2013-03-17
10	nf74n8f42	2016-05-21	2016-06-13

Таблица REPAIR_ORDERS

ID_REPAIR_ORDER	ID_REPAIR	ID_ORDER	ID_WORKER
1	1	3	5
2	2	1	1
3	3	2	3
4	4	5	4
5	5	4	2
6	6	6	1
7	2	7	4
8	3	8	5
9	5	10	2
10	1	9	5

Таблица REPAIR

ID_REPAIR	ID_TYPE	NAME	ID_ORDER_SOA
1	1	complex	1
2	2	paint	2
3	2	tuning	3
4	2	engine	4
5	2	suspension	5
6	1	cleaning	5

Таблица ORDERS_SOA

ID_ORDER_SOA	ID_DETAIL	AMOUNT
1	456	1
2	231	1
3	228	1
4	322	3
5	567	1

Таблица DETAILS_CATALOG

ID_DETAIL	NAME	COST	EXISTENCE_Y_OR_N	AMOUNT	ID_MANUFACTURER
456	PRUZG	1400	Y	1	345
231	BAK	1010	Y	1	345
228	FARA	34400	N	4	345
322	WINDOW	32345	N	2	123
567	MIRROW	132	Y	2	32

Таблица MANUFACTURERS

ID_MANUFACTURER	NAME	SITE	PHONE
345	EUROAUTO	www.euroauto.ru	435456
123	BP	www.bp.com	56794536
32	WAG	www.wag.de	3475897345

Таблица TYPES_OF_REPAIR

ID_TYPE	NAME	PRICE
1	work	1500
2	work2	300

Таблица WORKERS

ID_WORKER	FULL_NAME	SPECIALTY	PHONE	PASSPORT
1	Ivan	mech1	5830495864	34534634341
2	Petr	mech2	3468945764	34543903943
3	Konstantin	paint	3845769080	23787563453
4	Sergey	gear	8908837495	23489734895
5	Vladimir	assistent	8349572146	23849573984

SQL-запросы, изменяющие схему БД по заданию

1. Реализовать учет аналогов запчастей и возможность выбора их при производстве работ.

Создадим дополнительную таблицу DETAILS, в которой будут пронумерованы обобщенные названия запчастей.

В таблицу DETAILS_CATALOG добавим поле VIN (идентификационный номер ТС) и поле DETAIL_NAME.

В таблицу CARS добавим поле VIN.

Скрипт:

```
   connect 'D:/DB/SERVICE.FDB' user 'SYSDBA' password 'masterkey';
   commit;

   create table DETAILS(
       ID_NAME int PRIMARY KEY,
       DETAIL_NAME varchar(20)
   );

   alter table DETAILS_CATALOG add ID_DETAIL_NAME int;

   alter table DETAILS_CATALOG add ORIGINAL varchar(7);

   alter table DETAILS_CATALOG add VIN varchar(17);

   alter table DETAILS_CATALOG add constraint FK_CONTRACTS_FK1 foreign key (ID_DETAIL_NAME)
references DETAILS(ID_NAME);

   alter table CARS add VIN varchar(17);

   insert into DETAILS values ('1', 'window right');
   insert into DETAILS values ('2', 'window left');
   insert into DETAILS values ('3', 'front spring');
   insert into DETAILS values ('4', 'rear spring');
   insert into DETAILS values ('5', 'bak');
   insert into DETAILS values ('6', 'front damper');
   insert into DETAILS values ('7', 'rear damper');
   insert into DETAILS values ('8', 'front left fara');
   insert into DETAILS values ('9', 'left mirrow');
   insert into DETAILS values ('10', 'oil filter');

   update DETAILS_CATALOG set ID_DETAIL_NAME='3',ORIGINAL='n',VIN='YRIWBFJDISOWTHDIN' where
ID_DETAIL='456';
   update DETAILS_CATALOG set ID_DETAIL_NAME='5',ORIGINAL='y',VIN='QEICJFNYGCNUASDCM' where
ID_DETAIL='231';
   update DETAILS_CATALOG set ID_DETAIL_NAME='8',ORIGINAL='n',VIN='YRIWBFJDISOWTHDIN' where
ID_DETAIL='228';
   update DETAILS_CATALOG set ID_DETAIL_NAME='1',ORIGINAL='n',VIN='EGGNEAVIUERHVNJLI' where
ID_DETAIL='322';
   update DETAILS_CATALOG set ID_DETAIL_NAME='9',ORIGINAL='n',VIN='WRIJVGHUEVCBUECVM' where
ID_DETAIL='567';
   insert into DETAILS_CATALOG values
('232','BAK','500','Y','4','32','5','n','QEICJFNYGCNUASDCM');
```

```
update CARS set VIN='YRIWBFJDISOWTHDIN' where ID_CLIENT='1';
update CARS set VIN='JFCUIEBVCJASKCNDI' where ID_CLIENT='2';
update CARS set VIN='FQIERFHUIADSCFBRF' where ID_CLIENT='3';
update CARS set VIN='QEICJFNYGCNUASDCM' where ID_CLIENT='4';
update CARS set VIN='QEIFUHUWYFGNCUASK' where ID_CLIENT='5';
update CARS set VIN='UXISCNFEYGFCMCOIS' where ID_CLIENT='6';
update CARS set VIN='QWEOFDIHIOOIRGMFC' where ID_CLIENT='7';
update CARS set VIN='PQWJDFUNGCYBDUSCM' where ID_CLIENT='8';
update CARS set VIN='PACEYBXWYCMEWIUFF' where ID_CLIENT='9';
update CARS set VIN='QEFUMQEG3HFYUOQWS' where ID_CLIENT='10';

commit;
select * from DETAILS;
select * from DETAILS_CATALOG;
select * from CARS;
```

Результат:

ID_NAME	DETAIL_NAME
1	window right
2	window left
3	front spring
4	rear spring
5	bak
6	front damper
7	rear damper
8	front left fara
9	left mirrow
10	oil filter

ID_DETAIL	NAME	COST	EXISTIENCE_Y_OR_N	AMOUNT	ID_MANUFACTURER	ID_DETAIL_NAME	ORIGINAL	VIN
456	PRUZG	1400	Y	1	345	3	n	YRIWBFJDISOWTHDIN
231	BAK	1010	Y	1	345	5	y	QEICJFNYGCNUASDCM
228	FARA	34400	N	4	345	8	n	YRIWBFJDISOWTHDIN
322	WINDOW	32345	N	2	123	1	n	EGGNEAVIUERHVNJLI
567	MIRROW	132	Y	2	32	9	n	WRIJVGHUEVCBUECVM
232	BAK	500	Y	4	32	5	n	QEICJFNYGCNUASDCM

ID_CAR	ID_CLIENT	MARK	MODEL	COLOR	YEAR_OF_ISSUE	VIN
nf74n8fnv	1	skoda	octavia	grey	2014	YRIWBFJDISOWTHDIN
nf7jfsdg9	2	toyota	rav4	grey	2006	JFCUIEBVCJASKCNDI
nf74n8sdf	6	mersedes-benz	maybach	black	2016	UXISCNFEYGFCMCOIS
nf74n8fkg	3	ford	focus	grey	2008	FQIERFHUIADSCFBRF
nf74ngfsd	5	mitsubisi	lancer	red	2009	QEIFUHUWYFGNCUASK
3434dfdfg	7	mitsubisi	ASX	blue	2011	QWEOFDIHIOOIRGMFC
nf74ef344	8	volkswagen	polo	white	2012	PQWJDFUNGCYBDUSCM
nf74124df	9	volkswagen	golf GTR	mixed	2007	PACEYBXWYCMEWIUFF
nf7cvcvbr	10	skoda	kodiaq	green	2017	QEFUMQEG3HFYUOQWS
nf74n8f42	4	land rover	range rover sport	white	2013	QEICJFNYGCNUASDCM

Для того, чтобы определить аналоги, необходимо сделать поиск деталей в таблице DETAILS_CATALOG с фильтром (вид детали и VIN ТС) при помощи следующей команды:

```
select * from DETAILS_CATALOG where ID_DETAIL_NAME=’3’ and VIN='YRIWBFJDISOWTHDIN';
```

2. Реализовать учет обращений по гарантии.

Создадим таблицу WARRANTYS, в которой будет содержаться номер запроса по гарантии, дата обращения и номер гарантийного заказа.

В таблице REPAIR_ORDERS добавим графу ID_WARRANTY, в которой будет указан либо <null> (обычный заказ), либо номер запроса по гарантии.

В таблице TYPES_OF_REPAIR добавим графу WARRANTY, где будет содержаться количество дней, в течении которых можно обратиться по гарантии в сервис.

Скрипт:

```
connect 'D:/DB/SERVICE.FDB' user 'SYSDBA' password 'masterkey';
commit;

create table WARRANTYS(
    ID_WARRANTY int PRIMARY KEY,
    DATE_APP date,
    ID_ORDER int not null references ORDERS(ID_ORDER)
);

alter table REPAIR_ORDERS add ID_WARRANTY int;

alter table REPAIR_ORDERS add constraint FK_REPAIR_ORDERS_FK5 foreign key (ID_WARRANTY)
references WARRANTYS(ID_WARRANTY);

alter table TYPES_OF_REPAIR add WARRANTY varchar(10);

insert into WARRANTYS values ('1','2013-03-25','9');
insert into WARRANTYS values ('2','2016-06-12','5');
insert into WARRANTYS values ('3','2016-06-30','10');

insert into ORDERS values ('12','nf7cvcvbr','2013-03-25','2013-03-29');
insert into ORDERS values ('13','nf74n8fkg','2016-06-12','2016-06-16');
insert into ORDERS values ('14','nf74n8f42','2016-06-30','2016-07-03');

insert into REPAIR_ORDERS values ('12','5','12','2','1');
insert into REPAIR_ORDERS values ('13','5','13','2','2');
insert into REPAIR_ORDERS values ('14','1','14','5','3');

update TYPES_OF_REPAIR set WARRANTY='2 weeks' where ID_TYPE='2';

commit;
select * from ORDERS;
select * from REPAIR_ORDERS;
select * from TYPES_OF_REPAIR;
select * from WARRANTYS;
```

Результат:

ID_ORDER	ID_CAR	BEGIN_AT	END_AT
1	nf74n8fnv	2012-02-13	2012-03-13
2	nf7jfsdg9	2012-04-14	2012-04-16
3	nf74n8sdf	2014-03-14	2015-03-13
4	nf74n8fkg	2015-04-18	2015-04-20
5	nf74ngfsd	2016-05-30	2016-05-31
6	3434dfdfg	2016-06-15	2016-06-30
7	nf74ef344	2015-02-13	2015-02-21
8	nf74124df	2013-07-11	2013-07-14
9	nf7cvcvbr	2013-03-15	2013-03-17
10	nf74n8f42	2016-05-21	2016-06-13
11	er342rw	2012-09-25	2012-10-13
12	nf7cvcvbr	2013-03-25	2013-03-29
13	nf74n8fkg	2016-06-12	2016-06-16
14	nf74n8f42	2016-06-30	2016-07-03

ID_REPAIR_ORDER	ID_REPAIR	ID_ORDER	ID_WORKER	ID_WARRANTY
1	1	3	5	<null>
2	2	1	1	<null>
3	3	2	3	<null>
4	4	5	4	<null>
5	5	4	2	<null>
6	6	6	1	<null>
7	2	7	4	<null>
8	3	8	5	<null>
9	5	10	2	<null>
10	1	9	5	<null>
11	7	11	6	<null>
12	5	12	2	1
13	5	13	2	2
14	1	14	5	3

ID_TYPE	NAME	PRICE	WARRANTY
1	work	1500	<null>
2	work2	300	2 weeks
3	INPUT DETAILS	2500	3 week

ID_WARRANTY	DATE_APP	ID_ORDER
1	2013-03-25	9
2	2016-06-12	5
3	2016-06-30	10

3. Реализовать учет стоимости закупки и продажи запчастей.

Создадим таблицу PURCHASE, в которой будет содержаться информация о закупках деталей.

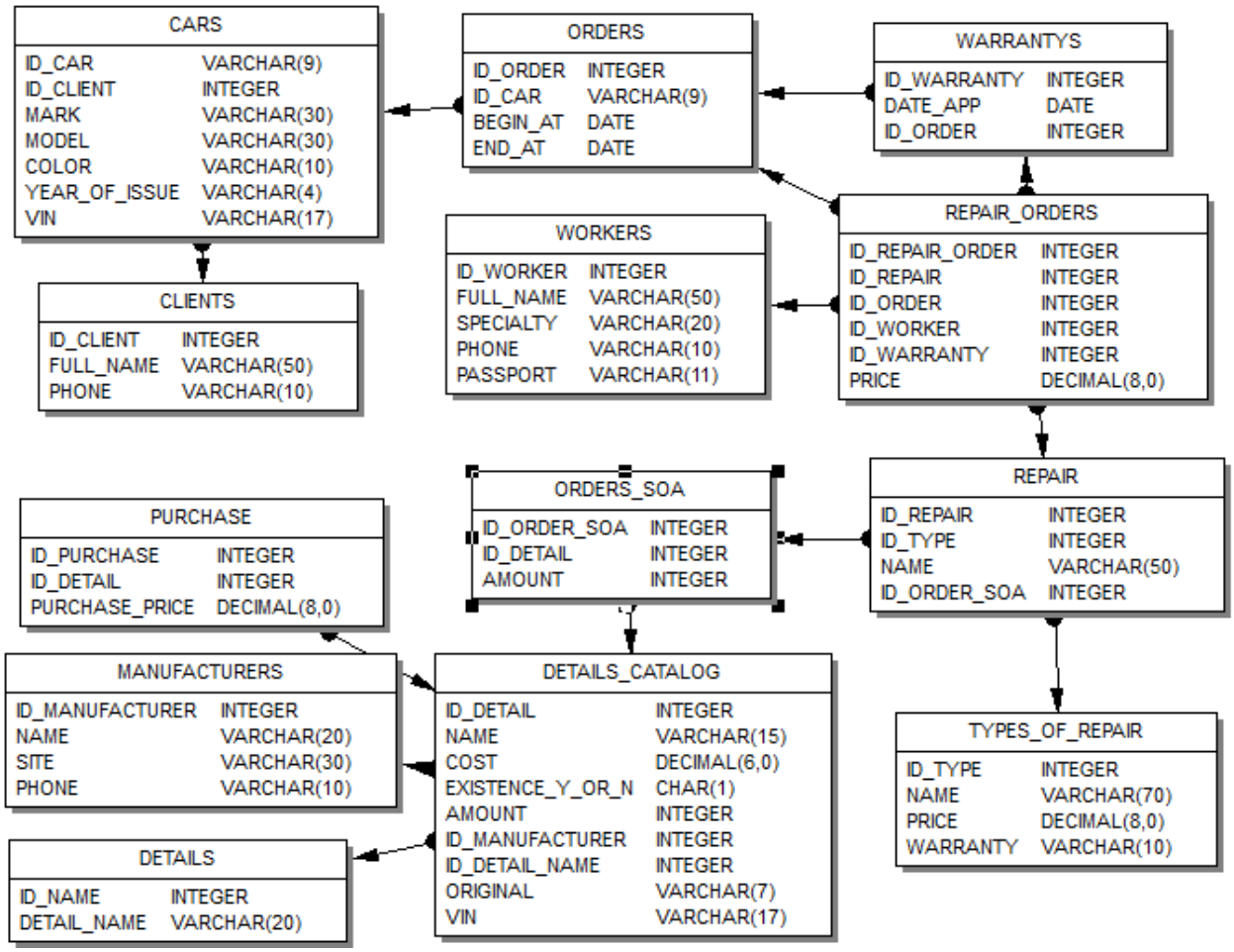
Скрипт:

```
connect 'D:/DB/SERVICE.FDB' user 'SYSDBA' password 'masterkey';
commit;

create table PURCHASE(
    ID_PURCHASE int PRIMARY KEY,
    ID_DETAIL int not null references DETAILS_CATALOG(ID_DETAIL),
    PURCHASE_PRICE decimal(8) not null
);

insert into PURCHASE values ('1','456','1300');
insert into PURCHASE values ('2','231','1000');
insert into PURCHASE values ('3','228','34000');
insert into PURCHASE values ('4','322','32000');
insert into PURCHASE values ('5','567','100');
insert into PURCHASE values ('6','232','400');

commit;
select * from PURCHASE;
```

Результат:

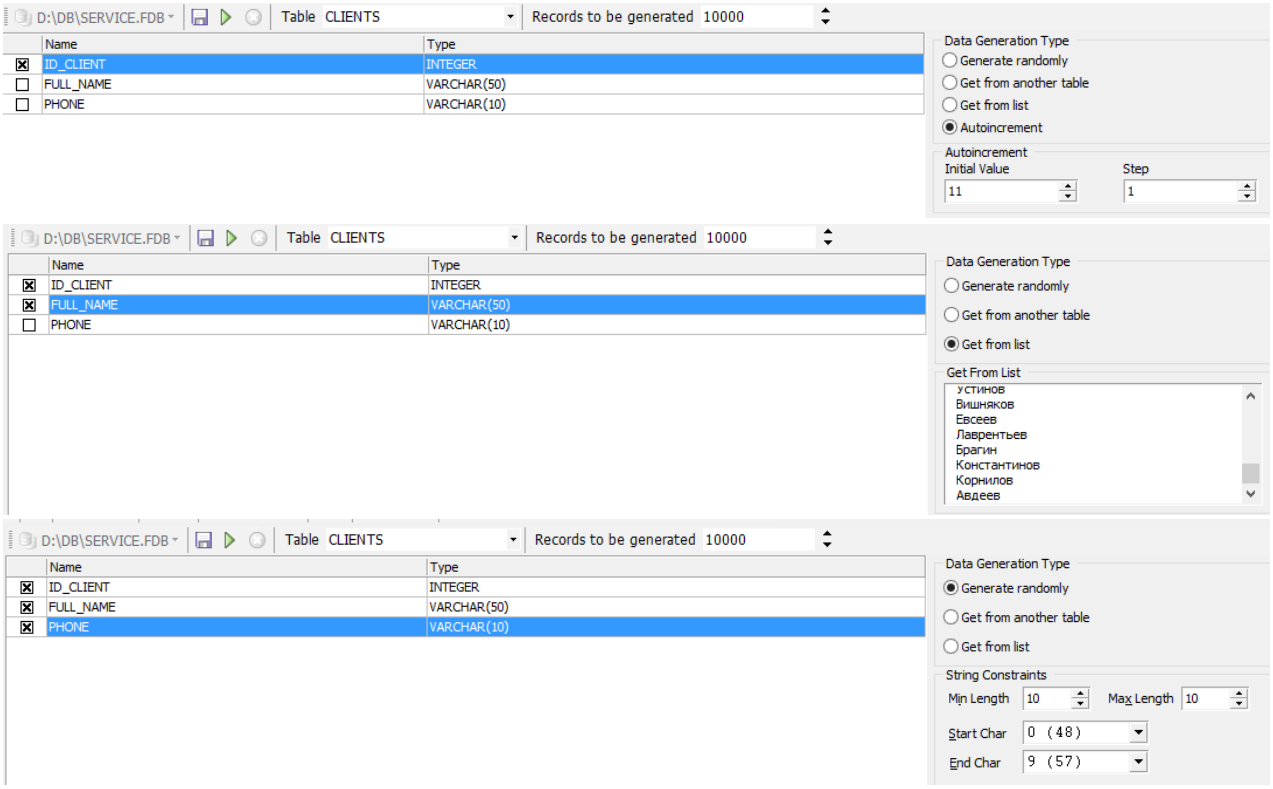
ID_PURCHASE	ID_DETAIL	PURCHASE_PRICE
1	456	1300
2	231	1000
3	228	34000
4	322	32000
5	567	100
6	232	400

ER-диаграмма БД

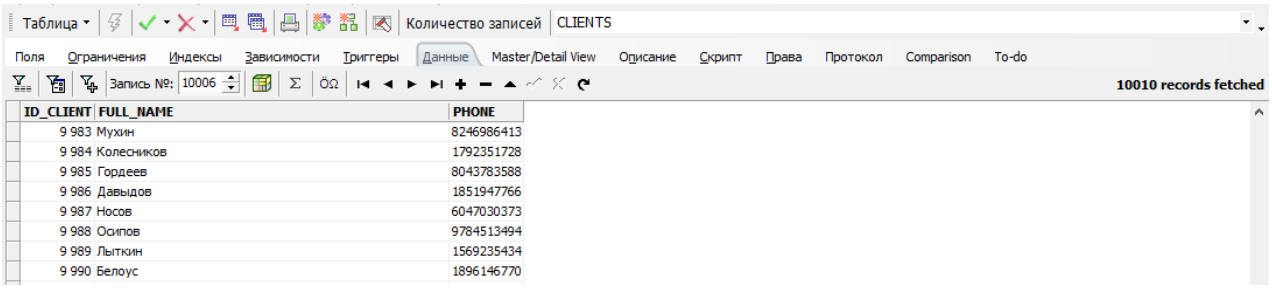


Автоматически сгенерировать данные при помощи IBExpert

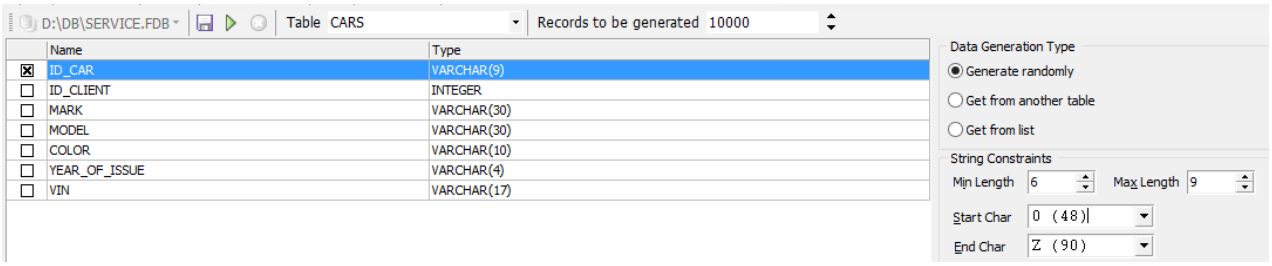
1. Для таблицы CLIENTS

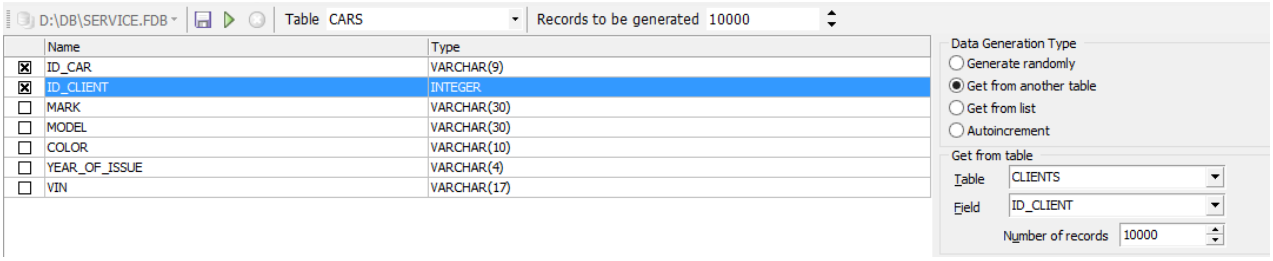


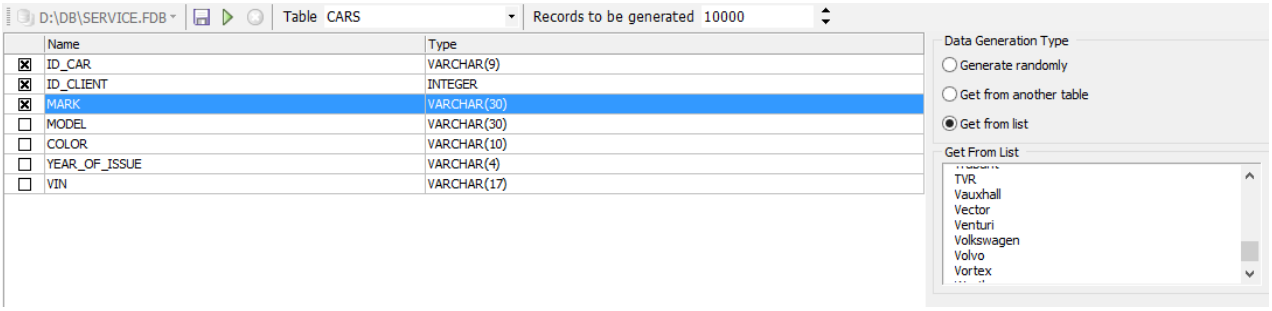
Результат:

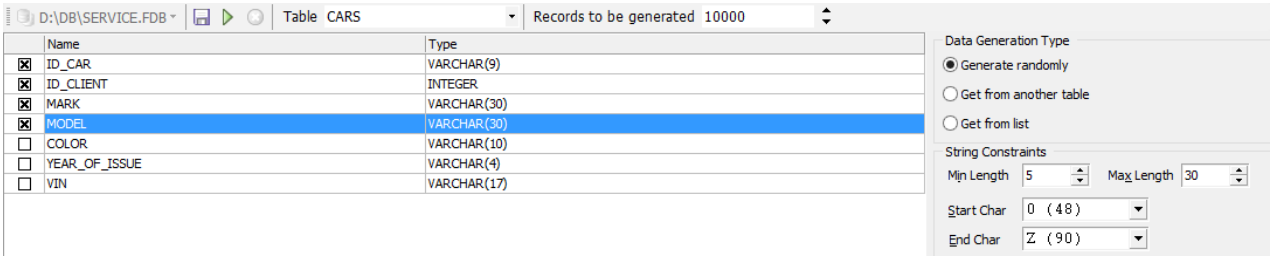


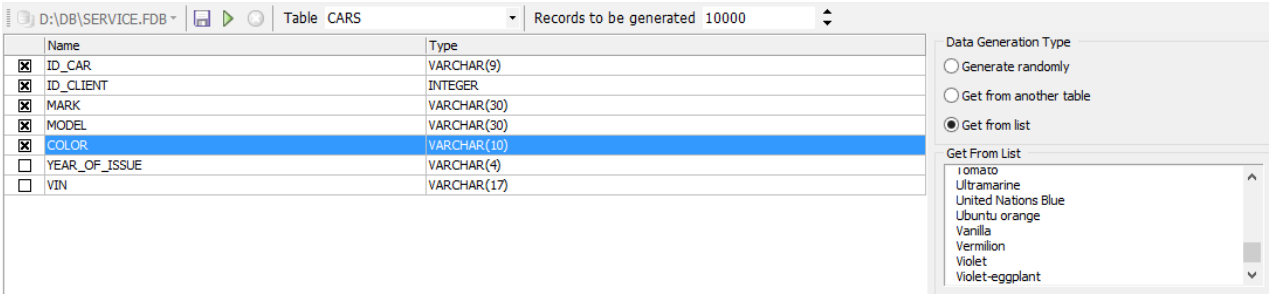
2. Для таблицы CARS

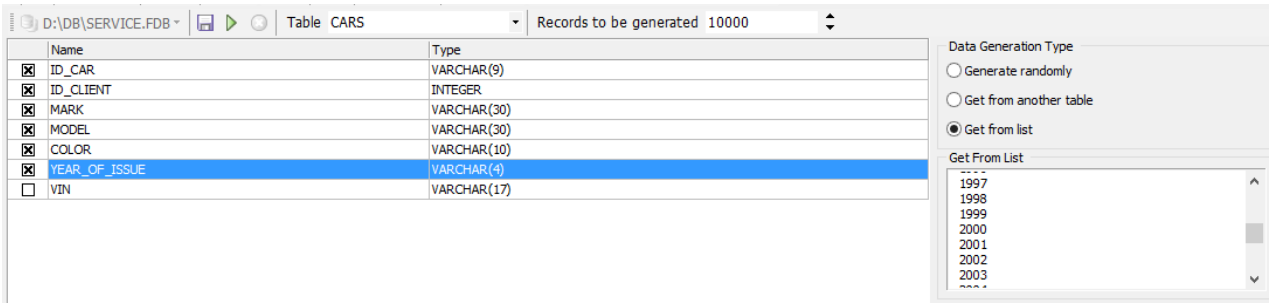


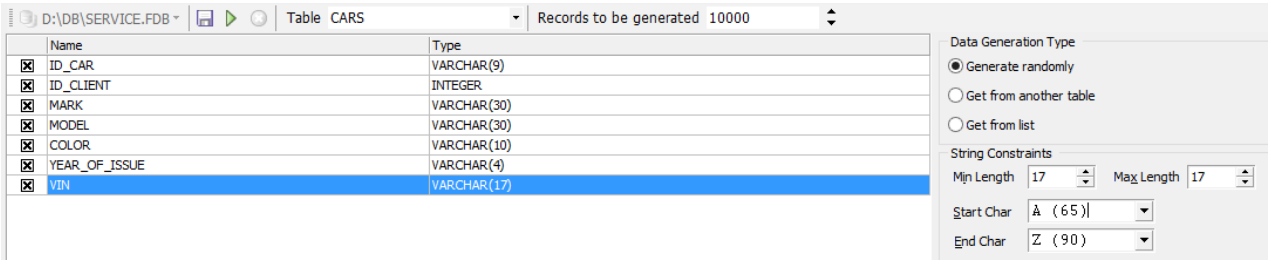











D:\DB\SERVICE.FDB
Table CARS
Records to be generated 10000
Name
Type
ID_CAR
VARCHAR(9)
ID_CLIENT
INTEGER
MARK
VARCHAR(30)
MODEL
VARCHAR(30)
COLOR
VARCHAR(10)
YEAR_OF_ISSUE
VARCHAR(4)
VIN
VARCHAR(17)
Data Generation Type
Generate randomly
Get from another table
Get from list
String Constraints
Min Length
17
Max Length
17
Start Char
A (65)
End Char
Z (90)

Результат:

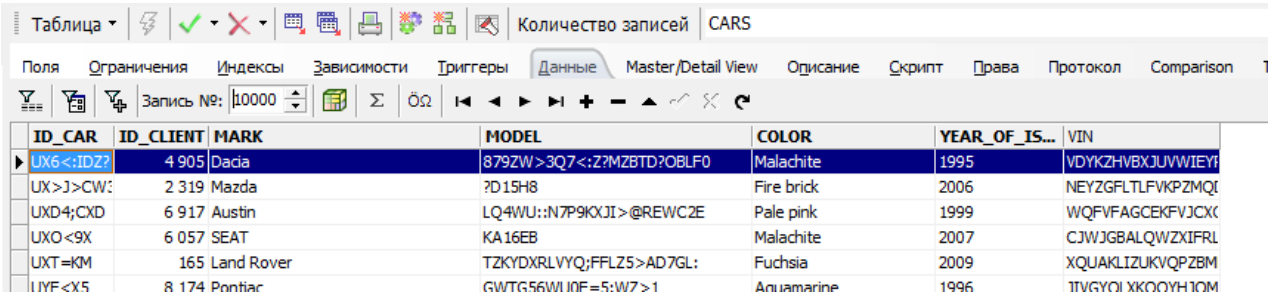
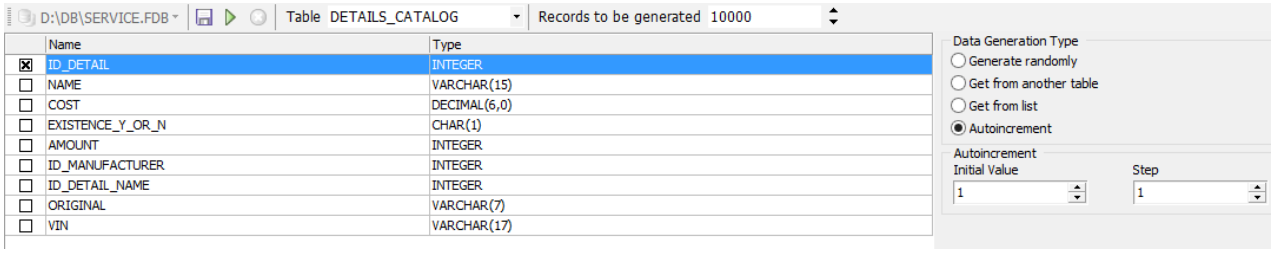
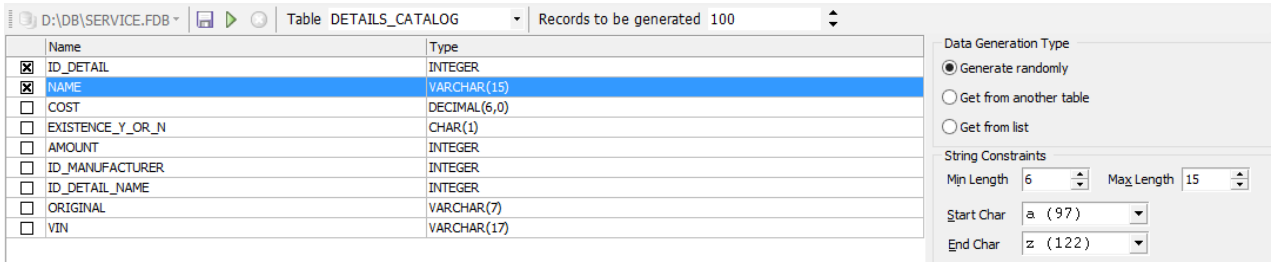
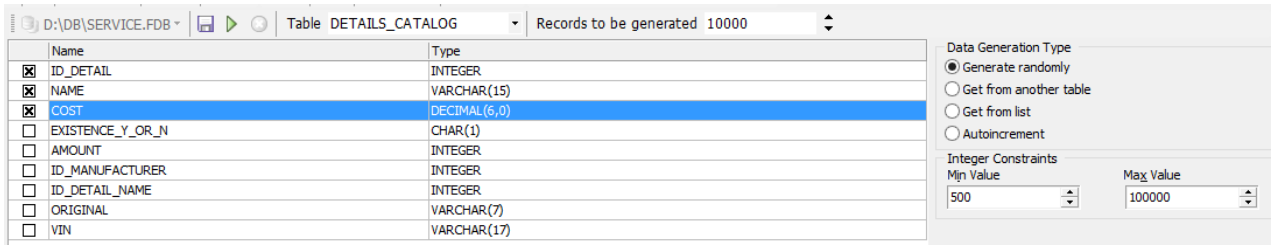


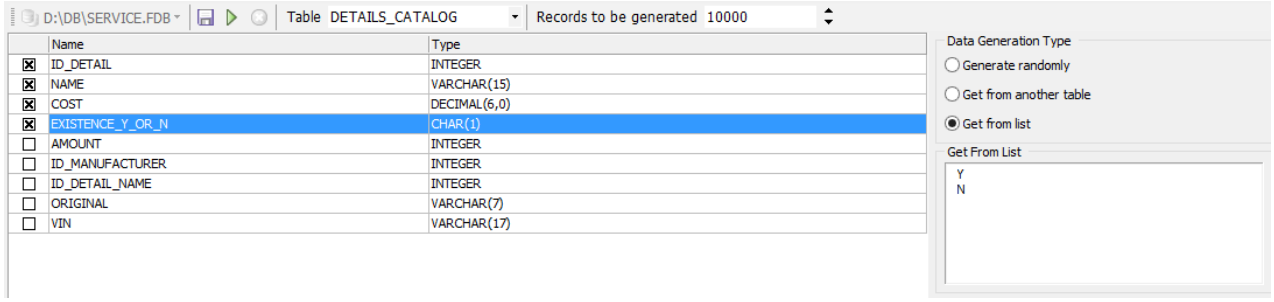
Таблица
Количество записей
CARS
Поля
Ограничения
Индексы
Зависимости
Триггеры
Данные
Master/Detail View
Описание
Скрипт
Права
Протокол
Comparison
Запись №:
10000
ID_CAR
ID_CLIENT
MARK
MODEL
COLOR
YEAR_OF_IS...
VIN
UX6<:IDZ?
4 905
Dacia
879ZW>3Q7<:Z?MZBTD?OBLF0
Malachite
1995
VDYKZHVBXJUVWIEYI
UX>J>CW:
2 319
Mazda
?D15H8
Fire brick
2006
NEYZGFLTLFVKPZMQI
UXD4;CXD
6 917
Austin
LQ4WU::N7P9KXJI>@REWC2E
Pale pink
1999
WQFVFAGCEKFVJCXC
UXO<9X
6 057
SEAT
KA16EB
Malachite
2007
CJWJGBALQWZXIFRL
UXT=KM
165
Land Rover
TZKYDXRLVYQ;FFLZ5>AD7GL:
Fuchsia
2009
XQUAKLIZUKVQPZBM
UYF<X5
8 174
Pontiac
GWTG56WUI0F=5:W7>1
Aquamarine
1996
JIVGYOLXKOOYHJOM

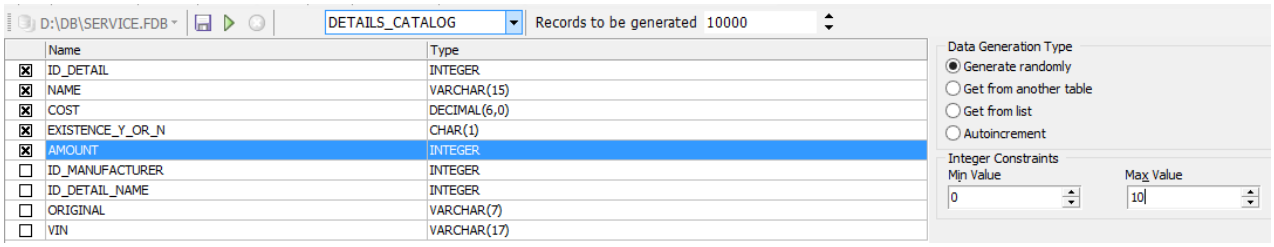
3. Для таблицы DETAILS_CATALOG

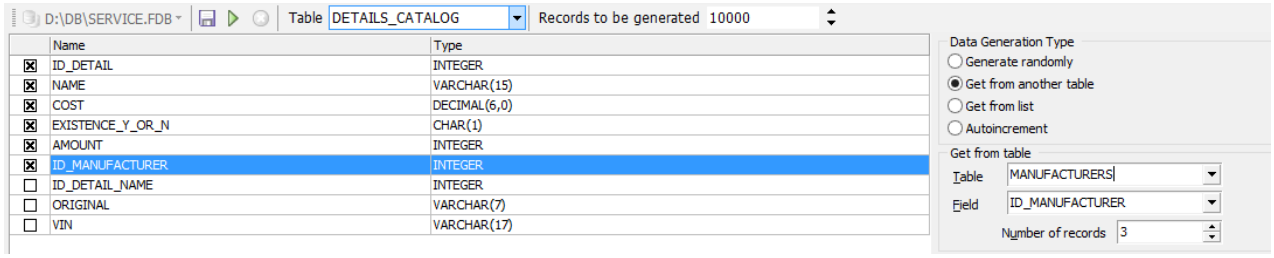


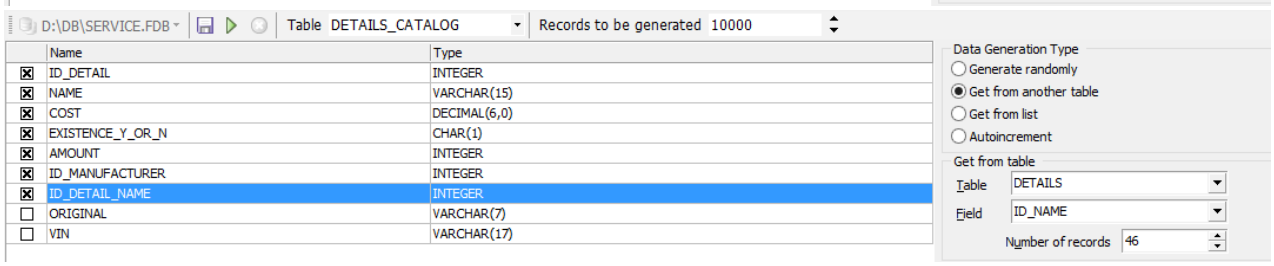


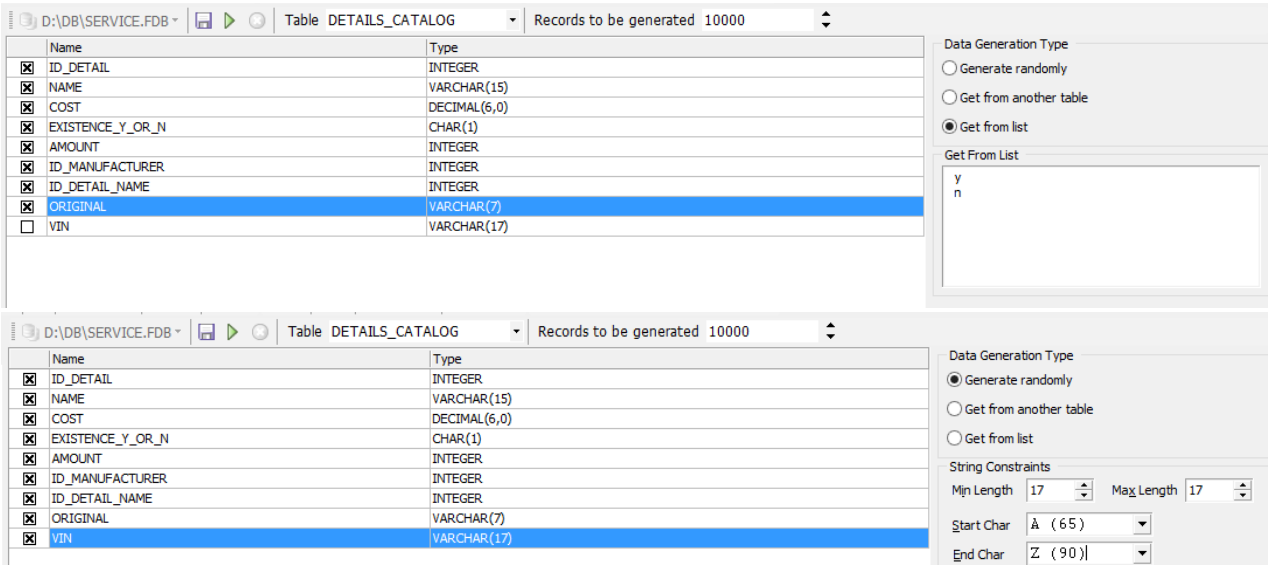




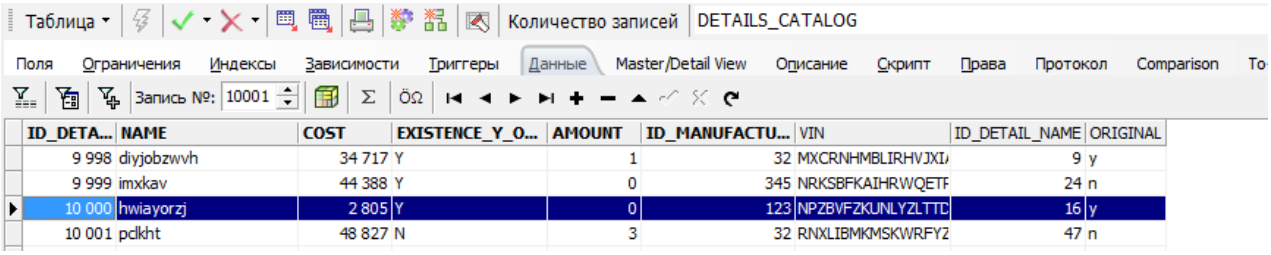








Результат:



Выводы

В ходе данной работы были разработаны коды, которые создают определенную базу данных, заполняют ее данными, а также вносят дополнительные изменения в структуру БД.

Так же ознакомились с программой IBExpert, с ее возможностями автоматического генерирования схемы программы и автогенерируемыми данными с заданными параметрами.

Таким образом, мы ознакомились с языком описания сущностей и ограничений БД SQL-DDL.