МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ

«ГОМЕЛЬСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ ИМЕНИ П. О. СУХОГО»

Факультет автоматизированных и информационных систем

Кафедра «Информационные технологии»

дисциплина «Разработка приложений баз данных для информационных систем»

ОТЧЕТ ПО ЛАБОРАТОРНОЙ РАБОТЕ

«Разработка серверной части информационной системы

в СУБД MS SQL Server»

Вариант №29

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**1. Цель работы:**

Разработать серверную часть клиент-серверной информационной системы, основанной на базе данных в заданной предметной области средствами СУБД *MS* *SQL Server*.

**2. Ход работы и результаты.**

Листинг кода на языке *Transact SQL* для создания базы данных и всех ее таблиц:

use master

Drop database car\_sharing

go

create database car\_sharing

GO

ALTER DATABASE car\_sharing SET RECOVERY SIMPLE

GO

use car\_sharing

create table Employees

(

EmployeeId INT PRIMARY KEY IDENTITY(1,1),

Post varchar(20),

Name varchar(20),

Surname varchar(20),

Patronymic varchar(20),

EmploymentDate datetime

)

create table CarModels

(

CarModelId INT PRIMARY KEY IDENTITY(1,1),

Name varchar(20),

Description varchar(1000)

)

create table Cars

(

CarId INT PRIMARY KEY IDENTITY(1,1),

CarModelId int references CarModels(CarModelId),

RegNum int,

VINCode varchar(20),

EngineNum int,

Price money,

RentalPrice money,

IssueDate datetime,

Specs varchar(200),

TechnicalMaintenanceDate datetime,

SpecMark bit,

ReturnMark bit,

EmployeeId int references Employees(EmployeeId)

)

create table Customers

(

CustomerId INT PRIMARY KEY IDENTITY(1,1),

Name varchar(20),

Surname varchar(20),

Patronymic varchar(20),

PhoneNum varchar(13),

Address varchar (60),

BirthDate datetime,

PassportInfo varchar(20),

Gender bit

)

create table Rents

(

RentId INT PRIMARY KEY IDENTITY(1,1),

ReturnDate datetime,

DeliveryDate datetime,

CarId int references Cars(CarId),

CustomerId int references Customers(CustomerId),

EmployeeId int references Employees(EmployeeId),

Price money

)

create table Services

(

ServiceId INT PRIMARY KEY IDENTITY(1,1),

Name varchar(20),

Price money,

Description varchar(100)

)

create table AdditionalServices

(

Id INT PRIMARY KEY IDENTITY(1,1),

RentId int references Rents(RentId),

ServiceId int references Services(ServiceId)

)

Код на языке *Transact SQL* для генерации тестового набора данных не менее, чем для трех таблиц:

use car\_sharing

go

DECLARE @Letters CHAR(52) = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz',

@VINLetters char(62) = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz1234567890',

@i int,

@Position int,

@RowCount int,

@RowIndex int,

@MinLetters int,

@MaxLetters int,

@LettersLimit int,

-- Таблица "CarModels".

@CarModelName varchar(20),

@CarModelDescription varchar(1000),

-- Таблица "Cars".

@CarModelId int,

@CarRegNum int,

@CarEngineNum int,

@CarEmployeeId int,

@CarVINCode varchar(20),

@CarPrice money,

@CarRentalPrice money,

@CarIssueDate datetime,

@CarSpecs varchar(200),

@CarTechnicalMaintenanceDate datetime,

@CarSpecMark bit,

@CarReturnMark bit,

-- Таблица "Employees".

@EmployeePost varchar(20),

@EmployeeName varchar(20),

@EmployeeSurname varchar(20),

@EmployeePatronymic varchar(20),

@EmployeeEmploymentDate datetime

SET NOCOUNT ON

-- Таблица "CarModels".

SET @RowCount = 500

SET @RowIndex = 1

WHILE @RowIndex <= @RowCount

BEGIN

-- Название модели авто.

SET @MaxLetters = 20

SET @MinLetters = 4

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @CarModelName = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @CarModelName = @CarModelName + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

-- Описания модели авто

SET @MaxLetters = 1000

SET @MinLetters = 50

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @CarModelDescription = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @CarModelDescription = @CarModelDescription + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Вставка данных в таблицу

INSERT INTO CarModels (Name, Description) VALUES (@CarModelName, @CarModelDescription)

SET @RowIndex += 1

END

-- Таблица "Employees".

SET @RowCount = 500

SET @RowIndex = 1

WHILE @RowIndex <= @RowCount

BEGIN

--Должность сотрудника.

SET @MaxLetters = 20

SET @MinLetters = 2

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @EmployeePost = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @EmployeePost = @EmployeePost + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Имя сотрудника

SET @MaxLetters = 20

SET @MinLetters = 2

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @EmployeeName = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @EmployeeName = @EmployeeName + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Фамилия сотрудника

SET @MaxLetters = 20

SET @MinLetters = 2

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @EmployeeSurname = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @EmployeeSurname = @EmployeeSurname + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Отчество сотрудника

SET @MaxLetters = 20

SET @MinLetters = 2

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @EmployeePatronymic = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*52

SET @EmployeePatronymic = @EmployeePatronymic + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Генерация дат трудоустройства

SET @EmployeeEmploymentDate = dateadd(DAY, -(RAND()\*(1000 - 100)+100), GETDATE())

--Вставка данных в таблицу

INSERT INTO Employees(Post, Name, Surname, Patronymic, EmploymentDate) VALUES (@EmployeePost, @EmployeeName, @EmployeeSurname, @EmployeePatronymic, @EmployeeEmploymentDate)

SET @RowIndex += 1

END

-- Таблица "CarModels".

SET @RowCount = 20000

SET @RowIndex = 1

WHILE @RowIndex <= @RowCount

BEGIN

--ID авто

SET @CarModelId = RAND()\*(501-1)+1

--Регистрационный номер

SET @CarRegNum = RAND()\*(2000000000-1000000000)+1000000000

--VIN-код

SET @MaxLetters = 20

SET @MinLetters = 4

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @CarVINCode = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*62

SET @CarVINCode = @CarVINCode + SUBSTRING(@VINLetters, @Position, 1)

SET @i += 1

END

--Номер двигателя

SET @CarEngineNum = RAND()\*(100000000-10000000)+10000000

--Цена

SET @CarPrice=CONVERT(MONEY,RAND()\*(2000000 - 150000)+150000)

--Цена аренды

SET @CarRentalPrice=CONVERT(MONEY,RAND()\*(10000 - 1500)+1500)

--Год выпуска(Issue date)

SET @CarIssueDate = dateadd(DAY, -(RAND()\*(10000 - 200)+200), GETDATE())

--Характеристики

SET @MaxLetters = 200

SET @MinLetters = 21

SET @LettersLimit = @MinLetters + RAND()\*(@MaxLetters - @MinLetters)

SET @i = 1

SET @CarSpecs = ''

WHILE @i <= @LettersLimit

BEGIN

SET @Position = RAND()\*62

SET @CarSpecs = @CarSpecs + SUBSTRING(@Letters, @Position, 1)

SET @i += 1

END

--Дата последнего ТО

SET @CarTechnicalMaintenanceDate = dateadd(DAY, -(RAND()\*(1000 - 100)+100), GETDATE())

--Специальная метка

SET @CarSpecMark=CONVERT(bit,round(1\*rand(),0))

--Метка о возвзрате

SET @CarReturnMark=CONVERT(bit,round(1\*rand(),0))

--ID сотрудника

SET @CarEmployeeId = RAND()\*(501-1)+1

INSERT INTO Cars (CarModelId, RegNum, VINCode, EngineNum, Price, RentalPrice, IssueDate, Specs, TechnicalMaintenanceDate, SpecMark, ReturnMark, EmployeeId) VALUES (@CarModelId, @CarRegNum, @CarVINCode, @CarEngineNum, @CarPrice, @CarRentalPrice, @CarIssueDate, @CarSpecs, @CarTechnicalMaintenanceDate, @CarSpecMark, @CarReturnMark, @CarEmployeeId)

SET @RowIndex += 1

END

Листинг кода на языке *Transact SQL* не менее трех представлений:

use car\_sharing

go

CREATE VIEW [dbo].[View\_Cars]

AS

select

Name,

Description,

RegNum,

VINCode,

EngineNum,

Specs,

TechnicalMaintenanceDate,

IssueDate

from CarModels join Cars on Cars.CarModelId = CarModels.CarModelId

GO

CREATE VIEW [dbo].[View\_Employees\_Cars\_CarModels]

AS

select

Post,

Employees.Name as EmployeesName,

Surname,

Patronymic,

CarModels.Name as CarModelName,

Description,

RegNum,

VINCode,

EngineNum,

Specs,

TechnicalMaintenanceDate,

IssueDate

from Employees join Cars on Employees.EmployeeId = Cars.EmployeeId join CarModels on Cars.CarModelId = CarModels.CarModelId

go

create view [dbo].[View\_Rents\_Services]

AS

select

Rents.Price as RentsPrice,

Services.Price as ServicePrice,

ReturnDate ,

DeliveryDate,

Description,

Name

from Rents inner join AdditionalServices on Rents.RentId = AdditionalServices.RentId inner join Services on AdditionalServices.ServiceId = Services.ServiceId

go

Листинг кода на языке *Transact SQL* не менее трех хранимых процедур:

use car\_sharing

go

create procedure sp\_InsertCars

@CarModelId int,

@RegNum int,

@EngineNum int,

@EmployeeId int,

@VINCode varchar(20),

@Price money,

@RentalPrice money,

@IssueDate datetime,

@Specs varchar(200),

@TechnicalMaintenanceDate datetime,

@SpecMark bit,

@ReturnMark bit

as

INSERT INTO dbo.Cars (CarModelId, RegNum, VINCode, EngineNum, Price, RentalPrice, IssueDate, Specs, TechnicalMaintenanceDate, SpecMark, ReturnMark, EmployeeId)

select

@CarModelId ,

@RegNum ,

@EngineNum ,

@VINCode ,

@Price ,

@RentalPrice ,

@IssueDate ,

@Specs ,

@TechnicalMaintenanceDate ,

@SpecMark ,

@ReturnMark ,

@EmployeeId

go

create procedure sp\_UpdateCars

@CarModelId int,

@RegNum int,

@EngineNum int,

@EmployeeId int,

@VINCode varchar(20),

@Price money,

@RentalPrice money,

@IssueDate datetime,

@Specs varchar(200),

@TechnicalMaintenanceDate datetime,

@SpecMark bit,

@ReturnMark bit,

@CarId int

as

update dbo.Cars

set

dbo.Cars.CarModelId = @CarModelId,

dbo.Cars.RegNum = @RegNum ,

dbo.Cars.EngineNum = @EngineNum ,

dbo.Cars.EmployeeId = @EmployeeId ,

dbo.Cars.VINCode = @VINCode ,

dbo.Cars.Price = @Price ,

dbo.Cars.RentalPrice = @RentalPrice ,

dbo.Cars.IssueDate = @IssueDate ,

dbo.Cars.Specs = @Specs,

dbo.Cars.TechnicalMaintenanceDate = @TechnicalMaintenanceDate ,

dbo.Cars.SpecMark = @SpecMark ,

dbo.Cars.ReturnMark = @ReturnMark

where dbo.Cars.CarId = @CarId

go

create procedure sp\_InsertCarModels

@CarModelName varchar(20),

@CarModelDescription varchar(1000)

as

INSERT INTO dbo.CarModels(Name,Description)

select

@CarModelName,

@CarModelDescription

go

**3. Вывод:** в результате выполнения данной лабораторной работы были созданы база данных, таблица базы данных, также таблицы были заполнены тестовыми наборами данных, были созданы представления для удобного отображения данных и были написаны хранимые процедуры для вставки данных в три таблицы.