МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ
УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
“БРЕСТСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ”
КАФЕДРА ИИТ

ОТЧЁТ

по лабораторной работе №6

«Разработка консольного приложения в Windows»

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Цель работы: отработать навыки по созданию консольных приложений в Windows, используя C++.

Вариант №5

Создать консольную программу для работы с базой данных. Программа должна уметь выводить в консоль данные из БД, записывать новые данные, а также редактировать и удалять уже существующие.

Код программы

main.cpp

```
/*
 * Вариант #5
 * Создать консольную программу для работы с базой данных.
 * Программа должна уметь выводить в консоль данные из БД,
 * записывать новые данные, а также редактировать и удалять уже существующие.
 */

#include "ShellWrapper.h"

int main(int argc, char* argv[])
{
    try {
        std::string dbFilename;

        if (argc > 1) {
            dbFilename = argv[1];
        }
        else {
            cout << "Enter dbFilename as a program argument!\n";
            return 0;
        }

        ShellWrapper sw(dbFilename);
        sw.Run();
    }
    catch (const std::exception& e) {
        std::cerr << "Exception caught: " << e.what() << std::endl;
        return 10;
    }
    catch (...) {
        std::cerr << "Unknown exception caught." << std::endl;
        return 100;
    }

    return 0;
}
```

ShellWrapper.h

```
#pragma once

#include <iostream>
#include <string>

#include "Car.h"

using namespace std;

class ShellWrapper {
public:
    ShellWrapper(const string& dbName);

    void Run();

private:
    Car carTable;
};
```

Car.h

```
#pragma once

#include <iostream>
#include <string>
#include <vector>
#include <sqlite3.h>

using namespace std;

class Car {
public:
    Car(const std::string& dbName);
    ~Car();

    bool CreateTable();
    bool InsertCar(const string& brandModel, int year, const string& color, int mileage);
    bool UpdateCar(int id, const string& brandModel, int year, const string& color, int mileage);
    bool DeleteCar(int id);
    vector<string> GetCars();

private:
    sqlite3* db;
};
```

ShellWrapper.cpp

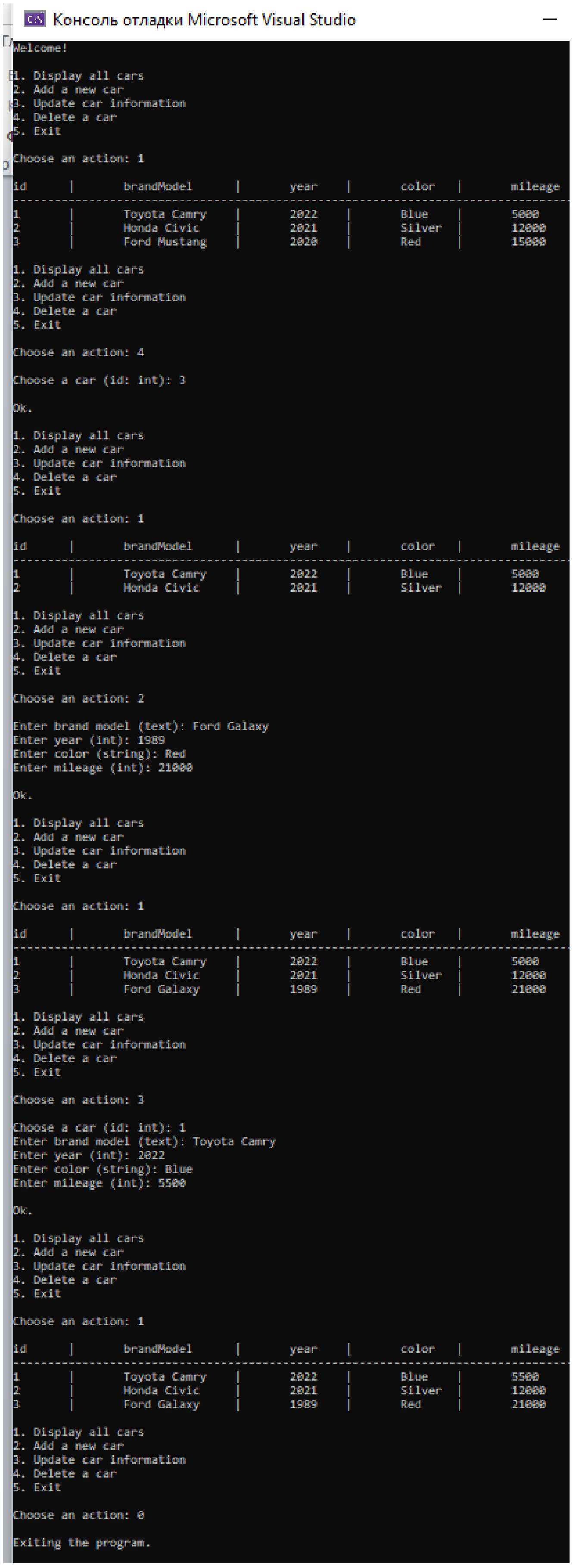
```
#include "ShellWrapper.h"

using namespace std;

ShellWrapper::ShellWrapper(const string& dbName) : carTable(dbName) {}

void ShellWrapper::Run() {

    cout << "Welcome!\n";

    int choice;
    vector<string> cars_list;

    string brandModel, color;
    int id, year, mileage;

    while (true) {
        cout << endl;
        cout << "1. Display all cars\n";
        cout << "2. Add a new car\n";
        cout << "3. Update car information\n";
        cout << "4. Delete a car\n";
        cout << "5. Exit\n";
        cout << endl << "Choose an action: ";
        cin >> choice;
        cout << endl;

        switch (choice) {
        case 1:
            cars_list = carTable.GetCars();
            cout << "id\t|\tbrandModel\t|\tyear\t|\tcolor\t|\tmileage\n";
            cout << "---------------------------------------------------------------------------------\n";
            for (const auto& car : cars_list) {
                cout << car << endl;
            }
            break;
        case 2:
            cout << "Enter brand model (text): ";
            cin.ignore();
            getline(cin, brandModel);

            cout << "Enter year (int): ";
            cin >> year;
            cin.ignore();

            cout << "Enter color (string): ";
            getline(cin, color);

            cout << "Enter mileage (int): ";
            cin >> mileage;

            cout << endl << (carTable.InsertCar(brandModel, year, color, mileage) ? "Ok." : "Error.") <<
endl;

            break;
        case 3:
            cout << "Choose a car (id: int): ";
            cin >> id;

            cin.ignore();

            cout << "Enter brand model (text): ";
            getline(cin, brandModel);

            cout << "Enter year (int): ";
            cin >> year;

            cin.ignore();

            cout << "Enter color (string): ";
            getline(cin, color);

            cout << "Enter mileage (int): ";
            cin >> mileage;

            cout << endl << (carTable.UpdateCar(id, brandModel, year, color, mileage) ? "Ok." : "Error.") <<
endl;

            break;
        case 4:
            cout << "Choose a car (id: int): ";
            cin >> id;

            cout << endl << (carTable.DeleteCar(id) ? "Ok." : "Error.") << endl;

            break;
        case 5:
        case 0:
            cout << "Exiting the program.\n";
            return;
        default:
            cout << "Invalid choice. Please try again.\n";
        }
    }
}
```

Car.cpp

```
#include "Car.h"

using namespace std;

Car::Car(const string& dbName) {
        int rc = sqlite3_open(dbName.c_str(), &db);

        if (rc != SQLITE_OK) {
                throw runtime_error("Cannot open database: " + string(sqlite3_errmsg(db)));
        }

        this->CreateTable();
}

Car::~Car() {
        sqlite3_close(db);
}
```

```
bool Car::CreateTable() {
        string checkQuery = "SELECT id FROM cars;";
        int checkResult = sqlite3_exec(db, checkQuery.c_str(), nullptr, nullptr, nullptr);

        if (checkResult == SQLITE_OK) {
                return true;
        }

        string createQuery = "CREATE TABLE IF NOT EXISTS cars (id INTEGER PRIMARY KEY, brandModel TEXT, year
INTEGER, color TEXT, mileage INTEGER);";
        int createResult = sqlite3_exec(db, createQuery.c_str(), nullptr, nullptr, nullptr);

        if (createResult == SQLITE_OK) {
                InsertCar("Toyota Camry", 2022, "Blue", 5000);
                InsertCar("Honda Civic", 2021, "Silver", 12000);
                InsertCar("Ford Mustang", 2020, "Red", 15000);
        }

        return createResult == SQLITE_OK;
}

bool Car::InsertCar(const string& brandModel, int year, const string& color, int mileage) {
        string query = "INSERT INTO cars (brandModel, year, color, mileage) VALUES ('" + brandModel + "', " +
to_string(year) + ", '" + color + "', " + to_string(mileage) + ");";

        int rc = sqlite3_exec(db, query.c_str(), nullptr, nullptr, nullptr);

        return rc == SQLITE_OK;
}

bool Car::UpdateCar(int id, const string& brandModel, int year, const string& color, int mileage) {
        string query = "UPDATE cars SET brandModel='" + brandModel + "', year=" + to_string(year) + ",
color='" + color + "', mileage=" + to_string(mileage) + " WHERE id=" + to_string(id) + ";";

        int rc = sqlite3_exec(db, query.c_str(), nullptr, nullptr, nullptr);

        return rc == SQLITE_OK;
}

bool Car::DeleteCar(int id) {
        string query = "DELETE FROM cars WHERE id=" + to_string(id) + ";";

        int rc = sqlite3_exec(db, query.c_str(), nullptr, nullptr, nullptr);

        return rc == SQLITE_OK;
}

vector<string> Car::GetCars() {
        vector<string> result;
        string query = "SELECT * FROM cars;";

        sqlite3_exec(db, query.c_str(), [](void* data, int argc, char** argv, char** /*azColName*/) -> int {
                string rowData;
                for (int i = 0; i < argc; ++i) {
                        rowData += argv[i];
                        if (i+1 < argc) rowData += "\t|\t";
                }
                reinterpret_cast<vector<string>*>(data)->emplace_back(rowData);
                return 0;
        }, &result, nullptr);

        return result;
}
```

Пример работы:



Консоль отладки Microsoft Visual Studio

```
Welcome!

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 1

id      |       brandModel      |       year    |       color   |       mileage
--------------------------------------------------------------------------------
1       |       Toyota Camry    |       2022    |       Blue    |       5000
2       |       Honda Civic     |       2021    |       Silver  |       12000
3       |       Ford Mustang    |       2020    |       Red     |       15000

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 4

Choose a car (id: int): 3

Ok.

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 1

id      |       brandModel      |       year    |       color   |       mileage
--------------------------------------------------------------------------------
1       |       Toyota Camry    |       2022    |       Blue    |       5000
2       |       Honda Civic     |       2021    |       Silver  |       12000

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 2

Enter brand model (text): Ford Galaxy
Enter year (int): 1989
Enter color (string): Red
Enter mileage (int): 21000

Ok.

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 1

id      |       brandModel      |       year    |       color   |       mileage
--------------------------------------------------------------------------------
1       |       Toyota Camry    |       2022    |       Blue    |       5000
2       |       Honda Civic     |       2021    |       Silver  |       12000
3       |       Ford Galaxy     |       1989    |       Red     |       21000

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 3

Choose a car (id: int): 1
Enter brand model (text): Toyota Camry
Enter year (int): 2022
Enter color (string): Blue
Enter mileage (int): 5500

Ok.

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 1

id      |       brandModel      |       year    |       color   |       mileage
--------------------------------------------------------------------------------
1       |       Toyota Camry    |       2022    |       Blue    |       5500
2       |       Honda Civic     |       2021    |       Silver  |       12000
3       |       Ford Galaxy     |       1989    |       Red     |       21000

1. Display all cars
2. Add a new car
3. Update car information
4. Delete a car
5. Exit

Choose an action: 0

Exiting the program.
```