Research Topic Version (D)

Title: Traffic Control System

تحذير هام: علي الطالب عدم كتابة اسمه أو كتابة اي شيء يدل علي شخصيته

1. Data Model

1.1

1-#define street_speed 15 →define it constant because I make the speed of truck is constant in all program &define it locally because it is only used in one function.

2- **struct**→ Date ,Fines ,Trucks ,Driver

→**I define it as a struct because it has different data types.**

3-**int** →day ,month,year, num_of_cars, model , year_of_pro, fin(number of fines that user select),

carrr (number of cars that user select),

enter(value of new entered violation saved in it),

car_actual_speed,

a (fine that driver select to pay)

value(value of new entered violation),

d, m ,y(day ,month ,year)

M→(index of name of driver saved in it)

num_o_drivers(number of drivers user select)

start(start index in i)

→**they aren't decimal numbers its size is suitable**

4-**float**→ money , sum→**they are decimal numbers** and summation any money may be not integer

5-**string**→ name_of_street(name of street in which violation recorded),

status(paid/unpaid),

name_of_driver,

n_o_st (name of street)

chose (name chosen to know its violations)

→ **They are considered char array-it has words or characters**

6- **string**→ plate_num, plate, p(plate number)

Last(plate number saved in it to use it in different function)

→it has 2differrnt date types int and char.

7- **bool** →ex(return true if plate number that the user search for exist

And false if not)

d(return true if driver name is exist false if not)

Because it return it has true or false and useful to search if plate number or name exist or doesn't exist

8- **char**→ c →it has one number 1,2,3 **it can read numbers**

9-array of struct →user[4]→number of users of example 4,t[3]→number of cars every user have max 3 cars

10-struct of struct→ Date date, TRUCK t[3].→because every driver has birth of date and every date has 3 different data types day ,month and year.

11-Date →date (it has different 3 variables)

12-Fines fines[5] = {} →has different data type for each fine

13-TRUCK t[3]→has different date types for each car

14-driver user[10], use

9-**long long**→licence_num→it can store -9,223,372,036,854,775,808 to +9,223,372,036,854,775,807 and this suitable to store license number

1.2

-Define struct→ because it has different data types

-Sting →it can read array of characters and numbers and it very suitable for

plate number that contain char and numbers

-bool →it return true or false and it is suitable in case of test if name or plate number that the user search for exist

-long long→it can store -9,223,372,036,854,775,808to+9,223,372,036,854,775,807

1.3

validate the user input :-

1- violation_calculation (string plate)→if user enter wrong plate number to record its violation →cout<< invalid

2-And if officer enter violation less than 15 km/hour

→cout<< "you don't have violation" << endl;

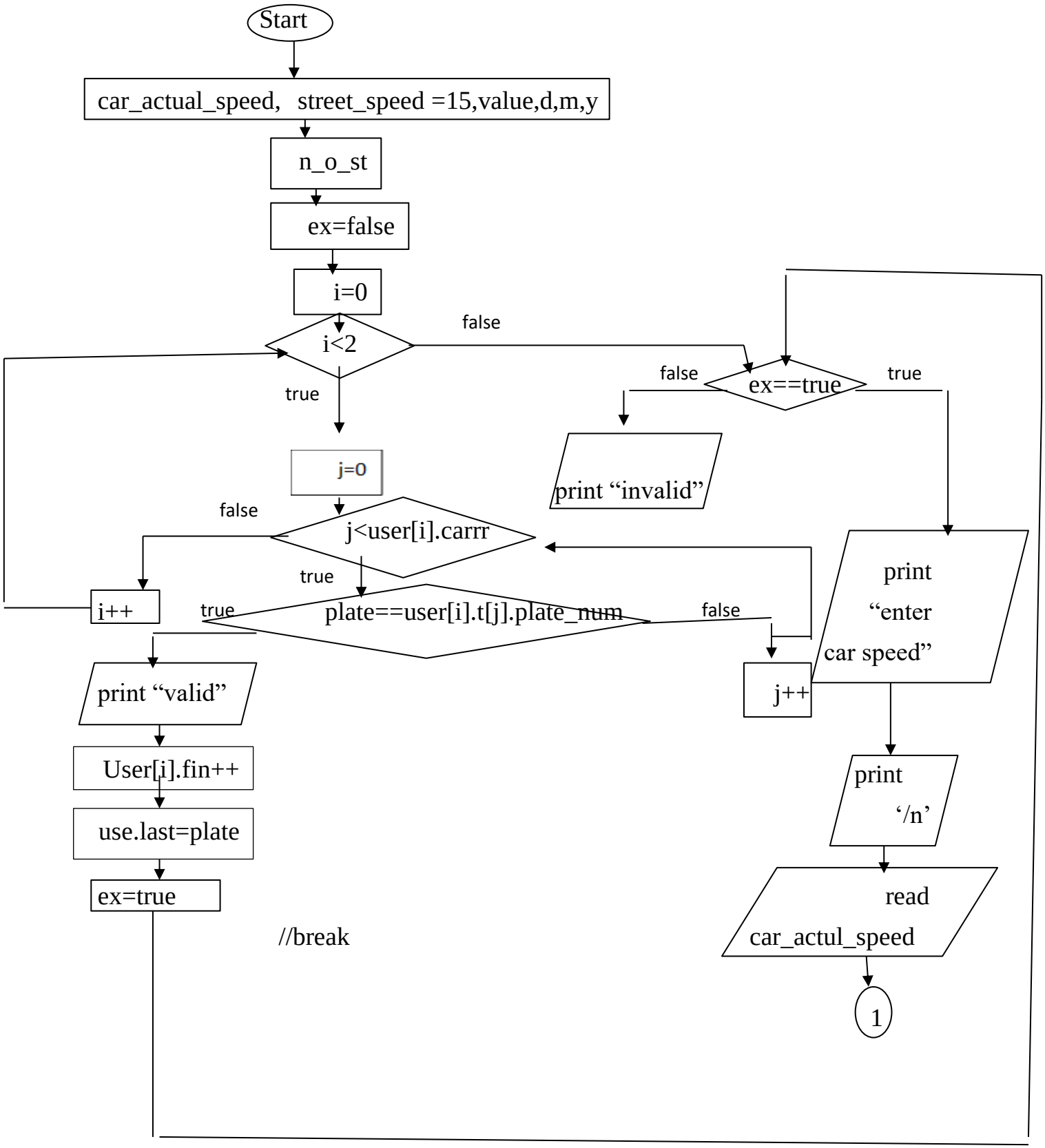
3- void which (string p)→if user want to pay violation by his plate number and want to search for it and search for wrong one cout<<invalid

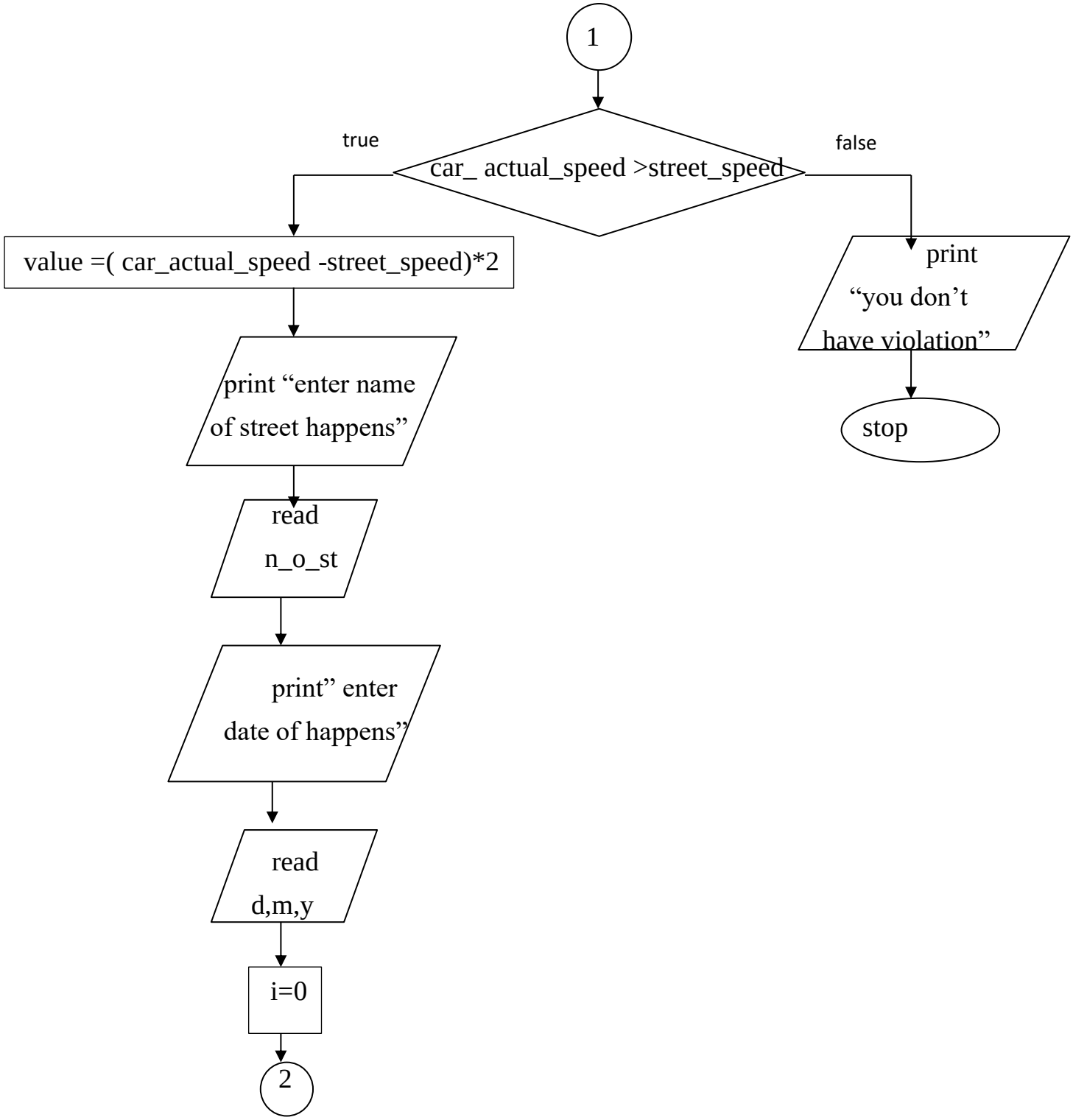
4- name_of_driver (string chose)→ if user want to pay violation by his name and want to search for it and search for wrong one cout<< cout << “invalid name this user is not exist”

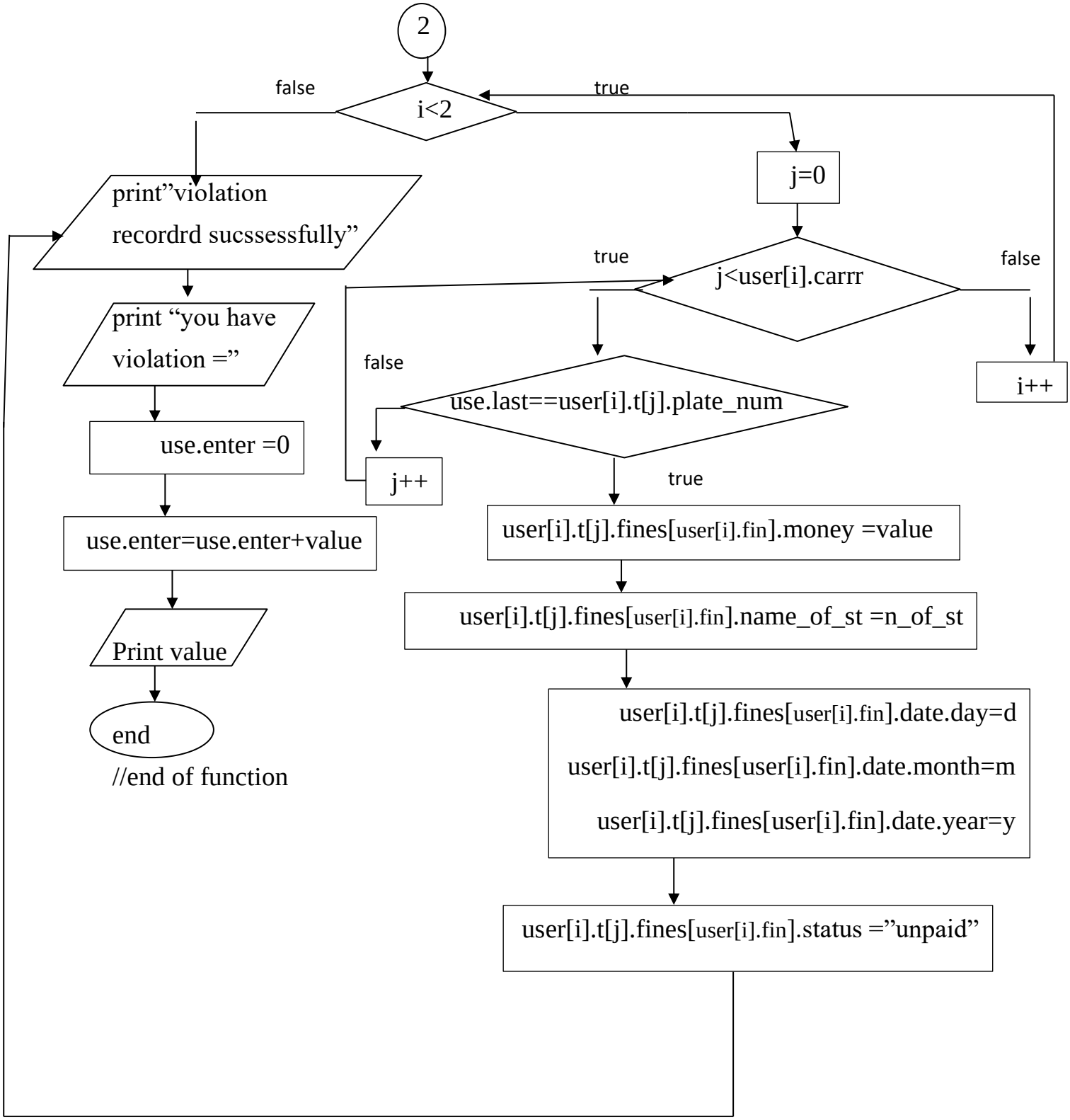
5-cout << "status of fines:(paid/unpaid) "→if user enter fines I tell him/her to enter paid or unpaid only

6-cout << "Enter car speed in Km/h >15 km/h "→when enter speed of car I tell him/her to enter it bigger than 15 km/h or program will print error message (cout << "you don't have violation" << endl;)

2. Logical Model (Algorithm)




1
true
car_ actual_speed >street_speed
false
value =(car_actual_speed -street_speed)*2
print
“you don’t
have violation”
print “enter name
of street happens”
stop
read
n_o_st
print” enter
date of happens”
read
d,m,y
i=0
2


2
false
i<2
true
print”violation recordrd sucssessfully”
j=0
true
j<user[i].carrr
false
print “you have violation =”
false
use.last==user[i].t[j].plate_num
i++
use.enter =0
j++
true
use.enter=use.enter+value
user[i].t[j].fines[user[i].fin].money =value
Print value
user[i].t[j].fines[user[i].fin].name_of_st =n_of_st
end
//end of function
user[i].t[j].fines[user[i].fin].date.day=d
user[i].t[j].fines[user[i].fin].date.month=m
user[i].t[j].fines[user[i].fin].date.year=y
user[i].t[j].fines[user[i].fin].status =”unpaid”

3. Process Model (Functions)

Declarations :-

1- **intro();**

2- **void entr_user_information(int st);**

3- void violation_calculation(string plate);

4- void record_first_time();

5- void which(string p);

6- void name_of_driver(string chose);

1- **intro();**→It appears only the first time you enter the program and it only show system name .

-Input :-don't take any thing

-Output :- void→ it don't return any thing it only show

2- **void entr_user_information(int st)**→take all information needed about driver and store it as long as the program is running information such as :- name-license number-driver date of birth -number of cars he own-

for car:-plat number-fines-model-year of production –

for each fine:-date -value-street -status.

-Input:-it take (integer st) first index for i and in the first run st =1

-Output:-it don't return any thing it only made to take information from (officer)

3- **void violation_calculation(string plate)** →calculate violation and record new violation and it has some information about violation that officer enter such as:-name of street-speed -plate number -date of violation.

-Input:-(string plate) takes plate number of car from user to calculate violation.

-Output:-void it has no output.

4- **void record_first_time()**→if driver record all his information for the first time during the program is running

-input:-no input

-Output:-no output it only record information

5- **void which(string p)**→ if user choose to search with plate number it show all information entered by user about the car that user enter its plate number

-Input:-it take plate number to search for its recorded information

-output:-void it don't return any thing

6- **void name_of_driver(string chose)**→ if user choose to search with driver name program show all information about the driver and if he/she have more than 1 car tell him which car plate number he want to pay to implement this function

void which(string p)

-input:-name of driver chosen to search for its information

-output:- void () it don't return any thing

Coding Style

1- **don't use curly braces_ in case if _if there is one line**

Lines 172,177,251,343

2- **The use of separate functions for separate actions**

lines 51→ entr_user_information(),

91→ void record_first_time(),

98(void intro(),

106 violation_calculation(string plate) ,

184→void which(string p)

257→ name_of_driver(string chose)

3- **Point attention to the important parts of your code(comment)**

Use comment to explain

17-18-38-39-40-41-42-43-44-45-51-91-98-106-109-110-111-112-114-183-184-(256-259)-(351-354)-375-379

4- **Meaningful Names ||-Use intention-revealing Names**

11-12-13-(18-21)-(25-30)-(34-37)-107-109-185-354

5- **Constants should generally be all capitalized, and variables should generally be all lower case**

(11-13),(18-21),(26-30),(35-46)107,(109-112),184,185

,(257-259),(350-354),358-379

6- **Whitespace Is Nice Space(space in particular parts such as)**

6.1- Conventional operators should be surrounded by a space character.

29-118-124-127-137-149-166-167-176-185-190-193-223-259-264-263-268-271-316 325-342-351-354-383-388

6.2-C++ reserved words should be followed by a white space.

51-91-98-106-183-256-349-392

6.3-Commas should be followed by a white space.

48-111-391

6.4-Colons should be surrounded by white space.

373-378-398-402

6.5-Semicolons in for statements should be followed by a space character.

53-69-76-114-115-145-146-186-188-218-232-260-284-308-211

7- **Be very careful about putting the body of a compound statement on the same line as the conditional part** →(it is better to but body of for loop and if condition in a single line even it is one line)

53-69-76-114-115-145-146-186-188-218-232-260-284-308-211-118-137-149-171-176-191-221-233-262-268-250-314-296-342-383

8-1-Avoid changing the control variable inside of a for loop(for example it is best to make i++ in the same line of for loop not inside it)

53-69-76-114-115-145-146-186-188-218-232-260-284-308-211

4. Implementation

[Copy the code from IDE, make sure to choose 'keep the source formatting' when you paste it here]

```
#include<iostream>

#include <string>

#include <stdio.h>

using namespace std;
struct Date
{

	int day;
	int month;
	int year;

};

struct Fines { //fines for each driver
	float money;//value of fine
	string name_of_street;
	Date date;
	string status;

};

struct TRUCK {
	int num_of_cars;
	string plate_num;
	int  model;
	Fines fines[5] = {};
	int year_of_pro;

} ;

struct driver {
	long long licence_num;
	string name_of_driver;
	Date date;
	TRUCK t[3]; //max 3 cars
	int carrr;//number of cars user select
	int enter;//value of new entered violation saved in it
	string last;//plate number  saved in it
	float sum;//sum of all unpaid violations
	int fin; //num of fines that user select
	int num_o_drivers;//number of drivers user select
	int M;//index of name of driver saved in it
	string num;

}user[10], use;


void entr_user_information (int st) {//function to enter all users information
```

```
	for (int i = st; i <=use.num_o_drivers; i++)
	{
		cout <<
"*****************************************************************************
*****************************" << endl;

		cout << "enter user information of" << i << endl;
		cin.ignore();
		cout << "Enter user name" << endl; getline(cin,user[i].name_of_driver);

		cout << "enter licen num" << endl; cin >> user[i].licence_num;
		cout << "enter driver dob   d/m/y" << endl; cin >> user[i].date.day >>
user[i].date.month >> user[i].date.year;

		cout << "enter num of cars you own _max 3" << endl; cin >> user[i].carrr;
		if (user[i].carrr > 3) {
			cout << "invalid" << endl;
			break;
		}
		for (int j = 0; j < user[i].carrr; j++)
		{
			cout << "enter car platte num" << j + 1 << endl; cin >>
user[i].t[j].plate_num;
			cout << "enter  car model" << j + 1 << endl; cin >>
user[i].t[j].model;
		cout << "enter car year of production" << j + 1 << endl; cin >>
user[i].t[j].year_of_pro;
		cout << "enter no of fines recorded" << j + 1 << endl; cin >>
user[i].fin;

		for (int k = 1; k <= user[i].fin; k++) {
				cout << "enter fines on car " << j + 1 << endl; cin >>
user[i].t[j].fines[k].money;
				cout << "name of street happend " << j + 1 << endl; cin >>
user[i].t[j].fines[k].name_of_street;
				cout << "status of fines:(paid/unpaid) " << k << endl; cin
>> user[i].t[j].fines[k].status;
				cout << "date of fines " << k<< endl; cin >>
user[i].t[j].fines[k].date.day>> user[i].t[j].fines[k].date.month>>
user[i].t[j].fines[k].date.year;

			}

		}

	}

}
void record_first_time (){//function to record for the first time

	use.num_o_drivers++;
	entr_user_information (use.num_o_drivers);

}

void intro ()//apperar only in the first time
{
	cout << "\n\n\n\t  TRAFFIC";
	cout << "\n\n\tCONTROL";
	cout << "\n\n\t  SYSTEM";
	cin.get();
}
```

```
void violation_calculation (string plate) {//calculate violation
	int car_actual_speed;
  #define street_speed 15//in km/s
	int value;//value of  new entered violation
	string n_o_st;//name of street
	int d, m, y;//day&month&year
	bool ex = false;//return true if plate number exsist

	for (int i = 1; i <= use.num_o_drivers; i++)//fi hena 7aga m4 mazbota
		for (int j = 0; j < user[i].carrr; j++)
		{
			{
				if (plate == user[i].t[j].plate_num) {

					cout << "valid" << endl;
					user[i].fin++;


					use.last = plate;


					ex = true;
					break;

				}


			}
		}


	if (ex == true) {

		cout << "Enter car speed in Km/h   >15 km/h " << endl; cin >>
car_actual_speed;
		if (car_actual_speed > street_speed) {
			value = abs(street_speed - car_actual_speed) * 2;
			cout << "name of street happend" << endl; cin >> n_o_st;
			cout << "date of happen" << endl; cin >> d >> m >> y;

			for (int i = 1; i <= use.num_o_drivers; i++) {
				for (int j = 0; j < user[i].carrr; j++)
				{

					if (use.last == user[i].t[j].plate_num) {

						user[i].t[j].fines[user[i].fin].money
= value;

	user[i].t[j].fines[user[i].fin].name_of_street = n_o_st;

	user[i].t[j].fines[user[i].fin].date.day = d;

	user[i].t[j].fines[user[i].fin].date.month = m;

	user[i].t[j].fines[user[i].fin].date.year = y;
						user[i].t[j].fines[user[i].fin].status
= "unpaid";

					}
```

```
                        }
                }

                cout << "violation recorded successfully" << endl;
                cout << " you have valuation =" << " " << value << endl;

                use.enter = 0;
                use.enter = use.enter + value;


        }
        else
                cout << "you don't have violation" << endl;

    }

    else if (ex == false)
            cout << "invalid" << endl;



}


void which (string p) {//if user choose to search with plate number
    int  a;//fine that driver select to pay
    bool true_plate = false;
    for (int i = 1; i <= use.num_o_drivers; i++) {

            for (int j = 0; j < user[i].carrr; j++)
            {
                use.sum = 0;
                if (p == user[i].t[j].plate_num)
                {
                        use.num = p;



                        cout << "_____________________________________________" <<
endl;

                        cout << "driver name:" << i << ": " <<
user[i].name_of_driver << endl;
                        cout << "licence_num:" << user[i].licence_num << endl;
                        cout << "driver_date:" << user[i].date.day << "/" <<
user[i].date.month << "/" << user[i].date.year << endl;//here
                        cout << " number of cars" << ":" << user[i].carrr << endl;
                        cout << "_____________________________________________" <<
endl;
                        cout << " car model" << j + 1 << ":" << user[i].t[j].model
<< endl;
                        cout << "plate number" << j + 1 << ":" <<
user[i].t[j].plate_num << endl;
                        cout << " car yofp" << j + 1 << ":" <<
user[i].t[j].year_of_pro << endl;

                        cout << "_____________________________________________" <<
endl;
                        for (int k = 1; k <= user[i].fin; k++)
                            {
                                cout << " fines on car " << j + 1 << ":" <<
user[i].t[j].fines[k].money << " " << "|";
```

```
                                    cout << "name of st happend :" << j + 1 <<
user[i].t[j].fines[k].name_of_street << " " << "|";
                                    cout << "status of fines " << j + 1 <<
user[i].t[j].fines[k].status << " " << "|";
                                    cout << "date of fines " << j + 1 <<
user[i].t[j].fines[k].date.day << "/" << user[i].t[j].fines[k].date.month << "/" <<
user[i].t[j].fines[k].date.year << endl;

                                }

                                for (int k = 1; k <= user[i].fin; k++)
                                 {
                                       if (user[i].t[j].fines[k].status == "unpaid")
                                         {

                                           use.sum = use.sum +
user[i].t[j].fines[k].money;

                                       }
                                }

                            cout << "total unpaid=" << " " << use.sum << endl;
                            cout << "whih violation do you want to pay" << endl;

                            cin >> a;
                            for (int k = 1; k <= user[i].fin; k++) {
                                  if (a == user[i].t[j].fines[k].money) {
                                        user[i].t[j].fines[k].status = "paid";
                                        use.sum = use.sum -
user[i].t[j].fines[k].money;
                                        cout << "total unpaid=" << use.sum << endl;
                                        cout << " fines on car " << j+1 << ":" <<
user[i].t[j].fines[k].money;
                                        cout << "status of fines " << k + 1 << ":" <<
user[i].t[j].fines[k].status << endl;

                                    }
                            }

                    }


            }


      }
      if (p != use.num)
            cout << "invalid";

}
void name_of_driver (string chose) {//if user choose to search with driver name
      int A;//fines intered
      string pl;//plate number do you want to pay
      bool d = false;//return true if driver name is exsist
      for (int i = 1; i <= use.num_o_drivers; i++)
      {
            if (chose == user[i].name_of_driver) {
                  use.M = i;
                  d = true;
                  break;
            }
      }
```

```
	if (d == true)
	{

		int i = use.M;

				cout << "_________________" << endl;

				cout << "driver name:" << " " << i << " " <<
user[i].name_of_driver << endl;
				cout << "licence_num:" << user[i].licence_num << endl;
				cout << "driver_date:" << user[i].date.day << "/" <<
user[i].date.month << "/" << user[i].date.year << endl;//here
				for (int j = 0; j < user[i].carrr; j++) {
					cout << "_________________" << endl;
					cout << " car model" << " " << j + 1 << ":" <<
user[i].t[j].model << endl;
					cout << "plate number" << " " << j + 1 << ":" <<
user[i].t[j].plate_num << endl;
					cout << " car yofp" << " " << j + 1 << ":" <<
user[i].t[j].year_of_pro << endl;

					for (int k = 1; k <= user[i].fin; k++)
					{
						cout << " fines on car " << " " << j + 1 <<
":" << user[i].t[j].fines[k].money << " " << "|";
						cout << "name of st happend " << k << ":" <<
user[i].t[j].fines[k].name_of_street << " " << "|";
						cout << "status of fines " << k << ":" <<
user[i].t[j].fines[k].status << " " << "|";
						cout << "date of fines " << k << ":" <<
user[i].t[j].fines[k].date.day << "/" << user[i].t[j].fines[k].date.month << "/" <<
user[i].t[j].fines[k].date.year << endl;

					}


				}

				if (user[i].carrr > 1)
				{

					cout << "which plate num do you want to pay" <<
endl;
					cin >> pl;
					cout << "_________________" << endl;
					which(pl);

				}
				else if (user[i].carrr == 1)
				{

					for (int j = 0; j < user[i].carrr; j++){


					   for (int k = 1; k <= user[i].fin; k++)
				    {
							if (user[i].t[j].fines[k].status ==
"unpaid")
							 {

								use.sum = use.sum +
user[i].t[j].fines[k].money;
```

```
                                        }
                                    }

                                    cout << "total unpaid=" << " " << use.sum << endl;
                                       cout << "whih violation do you want to pay" <<
endl;
                                      cin >> A;
                                      for (int k = 1; k <= user[i].fin ; k++) {
                                           if (A == user[i].t[j].fines[k].money) {
                                                  user[i].t[j].fines[k].status = "paid";
                                                  use.sum = use.sum -
user[i].t[j].fines[k].money;
                                                  cout << "total unpaid=" << use.sum <<
endl;
                                                  cout << " fines on car " << j+1 << ":"
<< user[i].t[j].fines[k].money;
                                                  cout << "status of fines " << k  <<
":" << user[i].t[j].fines[k].status << endl;

                                           }

                                    }


                            }

                    }
            }

            else if (d == false)
            cout << "invalid name this user is not exist " << endl;



                    }


int main () {
                    string p;
                    use.sum = 0;//sum of all unpaid fines
                    string chose;//name chosen to know its violations
                    char c;//chose from menue
                    int start = 1;//start index in i
                    intro();
                    cout << "enter num of drivers do you want to record " << endl; cin >>
use.num_o_drivers;
                    entr_user_information(start);
                    string plate;
                    do
                    {
                           cout << "\n\n\n\tMAIN MENU";
                           cout << "\n\n\t01. RECORD VIOLATION";//POLICE
                           cout << "\n\n\t02. PAY VIOLATION";//USER
                           cout << "\n\n\t03. FIRST RECORDED";//USER
                           cout << "\n\n\t04. EXIT";
                           cout << "\n\n\tSelect Your Option (1-3) ";
                           cin >> c;

                    string ch;
                    switch (c)
                    {
```

```
		case '1' :
			 cout << "enter plate num" << endl; cin >> plate;
			violation_calculation(plate); //record violation

			break;
		case '2' :
			int che;//plate num or username
			cout << "enter driver name or truck plate num to know your
violations" << endl;
			cout << "chosse 1 for plate num &2 for name of driver" << endl;
			cin >> che;
			if (che == 1) {
				cout << "enter plate num" << endl;
				cin >> p;
				which (p);
			}
			else if (che ==2) {
				cout << "enter yourname" << endl;
				cin.ignore();
				getline (cin, chose);			//cin >> chose;
				name_of_driver (chose);

			}

			break;

		case'3' :
			record_first_time();
				break;

		case '4' :
			break;
			break;

		default:cout << "\a";

	}
		cin.ignore();
		cin.get();


	    }while (c!= '4');

		return 0;
	}
```

5. Testing

Figure(1)

kindly set the background colour to white and text colour to black.

```
:\Users\DELL\source\repos\Project26\Debug\Project26.exe

     TRAFFIC

  CONTROL

     SYSTEM
```

figure(2)

```
C:\Users\DELL\source\repos\Project26\Debug\Project26.exe
enter num of drivers do you want to record
2
*****************************************************************************************************************
enter user information of1
Enter user name
ahmed ali
enter licen num
28761937653219
enter driver dob   d/m/y
2 3 1995
enter num of cars you own _max 3
2
enter car platte num1
555ttt
enter  car model1
2005
enter car year of production1
2003
enter no of fines recorded1
1
enter fines on car 1
55
name of street happend 1
street1
status of fines:(paid/unpaid) 1
unpaid
date of fines 1
2 2 2006
enter car platte num2
666rrr
```

```
enter car platte num2
666rrr
enter  car model2
2007
enter car year of production2
2005
enter no of fines recorded2
1
enter fines on car 2
22
name of street happend 2
street2
status of fines:(paid/unpaid) 1
paid
date of fines 1
11 6 2008
************************************************************
enter user information of2
Enter user name
adam waleed
enter licen num
70943217653297
enter driver dob   d/m/y
22 6 2000
enter num of cars you own _max 3
1
enter car platte num1
999www
enter  car model1
2014
```

Figure (3)

12252] Project26.exe Lifecycle Events Thread: Stack Frame:

C:\Users\DELL\source\repos\Project26\Debug\Project26.exe

```
11 6 2008
************************************************************
enter user information of2
Enter user name
adam waleed
enter licen num
70943217653297
enter driver dob   d/m/y
22 6 2000
enter num of cars you own _max 3
1
enter car platte num1
999www
enter  car model1
2014
enter car year of production1
2012
enter no of fines recorded1
1
enter fines on car 1
44
name of street happend 1
orabii
status of fines:(paid/unpaid) 1
unpaid
date of fines 1
2 2 2015
```

Figure (4)

```
enter fines on car 1
44
name of street happend 1
orabii
status of fines:(paid/unpaid) 1
unpaid
date of fines 1
2 2 2015



        MAIN MENU

        01. RECORD VIOLATION

        02. PAY VIOLATION

        03. FIRST RECORDED

        04. EXIT

        Select Your Option (1-3) 1
```

Figure(5)

```
          04. EXIT

          Select Your Option (1-3) 1
enter plate num
999www
valid
Enter car speed in Km/h   >15 km/h
50
name of street happend
street5
date of happen
2 10 2016
violation recorded successfully
 you have valuation = 70



          MAIN MENU

          01. RECORD VIOLATION
```

Figure(6)

```
        MAIN MENU

        01. RECORD VIOLATION

        02. PAY VIOLATION

        03. FIRST RECORDED

        04. EXIT

        Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
1
enter plate num
999www
_____________________________________________
driver name:2: adam waleed
licence_num:70943217653297
driver_date:22/6/2000
 number of cars:1
_____________________________________________
 car model1:2014
plate number1:999www
 car yofp1:2012
_____________________________________________
 fines on car 1:44 |name of st happend :1orabii |status of fines 1unpaid |date of fines 12/2/2015
 fines on car 1:70 |name of st happend :1street5 |status of fines 1unpaid |date of fines 12/10/2016
```

Figure(7)

```
chosse 1 for plate num &2 for name of driver
1
enter plate num
999www
_____________________________________________
driver name:2: adam waleed
licence_num:70943217653297
driver_date:22/6/2000
 number of cars:1
_____________________________________________
 car model1:2014
plate number1:999www
 car yofp1:2012
_____________________________________________
 fines on car 1:44 |name of st happend :1orabii |status of fines 1unpaid |date of fines 12/2/2015
 fines on car 1:70 |name of st happend :1street5 |status of fines 1unpaid |date of fines 12/10/2016
total unpaid= 114
whih violation do you want to pay
44
total unpaid=70
 fines on car 1:44status of fines 2:paid




        MAIN MENU

        01. RECORD VIOLATION

        02. PAY VIOLATION
```

Figure(8)

```
       03. FIRST RECORDED

       04. EXIT

       Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
2
enter yourname
ahmed ali
_____
driver name: 1 ahmed ali
licence_num:28761937653219
driver_date:2/3/1995
_____
 car model 1:2005
plate number 1:555ttt
 car yofp 1:2003
 fines on car  1:55 |name of st happend 1:street1 |status of fines 1:unpaid |date of fines 1:2/2/2006
```

Figure(9)

```
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
2
enter yourname
ahmed ali
_____
driver name: 1 ahmed ali
licence_num:28761937653219
driver_date:2/3/1995
_____
 car model 1:2005
plate number 1:555ttt
 car yofp 1:2003
 fines on car  1:55 |name of st happend 1:street1 |status of fines 1:unpaid |date of fines 1:2/2/2006
_____
 car model 2:2007
plate number 2:666rrr
 car yofp 2:2005
 fines on car  2:22 |name of st happend 1:street2 |status of fines 1:paid |date of fines 1:11/6/2008
which plate num do you want to pay
555ttt
_____
```

Figure(10)

```
Select C:\Users\DELL\source\repos\Project26\Debug\Project26.exe
which plate num do you want to pay
555ttt
_____
_____
driver name:1: ahmed ali
licence_num:28761937653219
driver_date:2/3/1995
 number of cars:2
_____
 car model1:2005
plate number1:555ttt
 car yofp1:2003
_____
 fines on car 1:55 |name of st happend :1street1 |status of fines 1unpaid |date of fines 12/2/2006
total unpaid= 55
whih violation do you want to pay
55
total unpaid=0
 fines on car 1:55status of fines 2:paid
```

Figure(11)

```
       04. EXIT

       Select Your Option (1-3) 1
enter plate num
3333
invalid
```

figure(12)

```
        04. EXIT

        Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
1
enter plate num
5559
invalid
```

figure(13)

```
       03. FIRST RECORDED

       04. EXIT

       Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
2
enter yourname
mohammed
invalid name this user is not exist
```

figure(14)

```
        04. EXIT

        Select Your Option (1-3) 3
**********************************************************************************************
enter user information of3
Enter user name
fady
enter licen num
29710384742317
enter driver dob   d/m/y
3 6 2001
enter num of cars you own _max 3
1
enter car platte num1
777hhh
enter  car model1
2018
enter car year of production1
2015
enter no of fines recorded1
1
enter fines on car 1
47
name of street happend 1
street606
status of fines:(paid/unpaid) 1
unpaid
date of fines 1
22 5 2020
```

Figure(15)

```
       04. EXIT

       Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
1
enter plate num
777hhh
_____________________________________________
driver name:3: fady
licence_num:29710384742317
driver_date:3/6/2001
 number of cars:1
_____________________________________________
 car model1:2018
plate number1:777hhh
 car yofp1:2015
_____________________________________________
 fines on car 1:47 |name of st happend :1street606 |status of fines 1unpaid |date of fines 122/5/2020
total unpaid= 47
whih violation do you want to pay
47
total unpaid=0
 fines on car 1:47status of fines 2:paid
```

Figure(16)

```
       MAIN MENU

       01. RECORD VIOLATION

       02. PAY VIOLATION

       03. FIRST RECORDED

       04. EXIT

       Select Your Option (1-3) 1
enter plate num
777hhh
valid
Enter car speed in Km/h   >15 km/h
10
you don't have violation
```

Figure(17)

```
       04. EXIT

       Select Your Option (1-3) 1
enter plate num
555ttt
valid
Enter car speed in Km/h   >15 km/h
33
name of street happend
st18
date of happen
5 5 2010
violation recorded successfully
 you have valuation = 36
```

Figure(18)

```
       Select Your Option (1-3) 2
enter driver name or truck plate num to know your violations
chosse 1 for plate num &2 for name of driver
1
enter plate num
555ttt
_____________________________________________
driver name:1: ahmed ali
licence_num:28761937653219
driver_date:2/3/1995
 number of cars:2
_____________________________________________
 car model1:2005
plate number1:555ttt
 car yofp1:2003
_____________________________________________
 fines on car 1:55 |name of st happend :1street1 |status of fines 1paid |date of fines 12/2/2006
 fines on car 1:36 |name of st happend :1st18 |status of fines 1unpaid |date of fines 15/5/2010
total unpaid= 36
whih violation do you want to pay
36
total unpaid=0
 fines on car 1:36status of fines 3:paid
```

Figure(19)

figures

- 1→**intro()**→appear only in the first time
- **2,3,4→void entr_user_information(int st)**→ enter information about number of driver user select
- 5→Return to main menu to
- 6→ chose choice number 1 chose what officer want to make **and** The officer chose to record violation **void violation_calculation(string plate)**
- **7,8**→return to main menu and chose choice number 2

Pay violation and chose to pay it with plate number **void which(string p)**

- **9,10,11**→ return to main menu and chose choice number 2

Pay violation and chose to pay it with name of driver **void name_of_driver(string chose)** and return to function **void which(stringp)** if there are more than one car

- **12-13,14**→if user inter plate number when he pay or when he record and when he search or pay with his /her name
- **15**→ implement function **void record_first_time();**
- **16**→test for function **void record_first_time()** if he want to know or pay its violation
- **17**→test for function void record_first_time() if he/she enter speed <15
  Error message
- **18**→ test for function **void record_first_time()** if he want to record violation to it
- **19**→another test for choice 2 function **void which(stringp)**to first entered user car1

References:

[1] https://www.freecodecamp.org/news/how-to-write-clean-code-in-c/

1-Avoid changing the control variable inside of a for loop

2- don't use curly braces_ in case if _if there is one line

[2] https://riptutorial.com/cplusplus/example/30220/clean-code

1-The use of separate functions for separate actions

2-Point attention to the important parts of your code(comment)

[3] https://hackernoon.com/how-to-write-clean-code-d557d998bb08

1-Meaningful Names ||-Use intention-revealing Names

2- Avoid using the same word for two purposes. Using the same term for two different ideas is essentially a pun.

[4] https://sites.harding.edu/fmccown/WritingCleanCode.pdf

Constants should generally be all capitalized, and variables should generally be all lower case

[5] https://www.pluralsight.com/blog/software-development/10-ways-to-write-cleaner-code Whitespace Is Nice Space

[6] https://www.cs.hmc.edu/~geoff/classes/hmc.cs070.200401/c++-style.html

Be very careful about putting the body of a compound statement on the same line as the conditional part

[7] https://dzone.com/articles/clean-code-summary-and-key-points

1-Create messages with information about the error.

2-It is important to recognize and separate responsibilities of a system.

[at least 5 references]