

electronic periodical

# YOUTH SCIENTIFIC AND TECHNICAL BULLETIN

Bauman MSTU Publ

EL № FS-77-51038,

ISSN 2307-0609

---

UDK 004.62

## THE PROGRAM FOR TEMPLATES FORMING OF VISUAL DISPLAY OF STATE LICENSE PLATES

*E.D. Kuznetsov, student*

*Russia, 105005, Moscow, BMSTU*

*cathedra «Information Processing and Management»*

*Scientific advisor: G. I. Revunkov, phd.*

*Russia, 105005, Moscow, BMSTU*

[generalfn6@bmstu.ru](mailto:generalfn6@bmstu.ru)

Today there are over 1 billion cars worldwide. Each car requires registration number plate to identify the owner of it. At the moment, it's known about 400 types of number plates all over the world. In Russia there are 33mln. cars and 22 types of number plates. Since 2013 it will be possible to put into practice new ten-digit number plates or ones without mentioning regions. In the current system of information display of moving cars, the number plate is displayed, in the text form. To improve the readability, the plates are desirable to display in the graphical form according to the state standards.

Each country has different types of plates and uses its state standards to them, providing information on: the size, shape, color, font, layout of the sign and the distance between the elements. The elements of a number plate are: numbers, letters, a separator and a flag. As an example the standards of the Russian Federation have been analyzed. All vehicles, are divided into the following groups depending on the number plate used:

1. Vehicles used by legal entities and citizens of the Russian Federation, legal entities and citizens of foreign countries excluding group num. 3 and stateless persons;
2. Vehicles used by military units under the jurisdiction of the Russian Federation according with the applicable legislation;
3. Vehicles used by diplomatic missions, consulates and international organizations;

<http://sntbul.bmstu.ru/doc/649536.html>

4. Vehicles that are temporarily admitted to the traffic.
5. Vehicles owned by the bodies of internal affairs of the Russian Federation.

In turn, the number plates are divided into the following groups depending on the type of the vehicle:

- **Vehicles of the first group**

- **1** - for cars, trucks, commercial vehicles and buses (other than those assigned to type 1 B);
- **1A** - for passenger cars of officials on a list established by the Government of the Russian Federation (the special license plates);
- **1B** - for passenger cars used to carry passengers on a commercial basis, buses and trucks equipped to transport more than 8 people (except if such transportation is carried out for the needs of a legal entity or an individual entrepreneur).
- **2** - for car trailers (including rear trailer for motorcycles and scooters) and semi-trailers;
- **3** - for tractors, tractor trailers and semi-trailers, other agricultural, road-building and self-propelled machinery;
- **4** - for motorcycles, scooters, mopeds and motonart.

- **Vehicles of the second group**

- **5** - cars, trucks, commercial vehicles and buses;
- **6** - for trailers (including rear trailer for motorcycles and scooters) and semi-trailers;
- **7** - for tractors, tractor trailers and semi-trailers, road and other self-propelled machinery;
- **8** - for motorcycles, scooters and motonart.

- **Vehicles of the third group**

- **9** - for passenger cars of diplomatic mission heads;
- **10** - for cars, trucks, commercial vehicles and buses of diplomatic missions, consular posts, international (intergovernmental) organizations and their staff, accredited by the Ministry of Foreign Affairs of the Russian Federation;
- **11** – for cars, trucks, commercial vehicles and buses of foreign press, radio, television, accredited by the Ministry of Foreign Affairs of the Russian Federation, as well as representative offices of foreign banks and firms, their staff accredited to the ministries and departments of the Russian Federation entitled to opening these offices.

- **Vehicles of the forth group**

- **16** - for cars, trucks, commercial vehicles, buses and other vehicles.
- **19** - for cars, trucks, commercial vehicles, buses and other vehicles, finally leaving the territory of the Russian Federation, as well as in other cases determined by the Ministry of Internal Affairs of the Russian Federation
- **Vehicles of the fifth group**
  - **20** - for cars, trucks, commercial vehicles, buses;
  - **21** - for car trailers (including rear trailer for motorcycles and scooters) and semi-trailers.
  - **22** - for motorcycles.

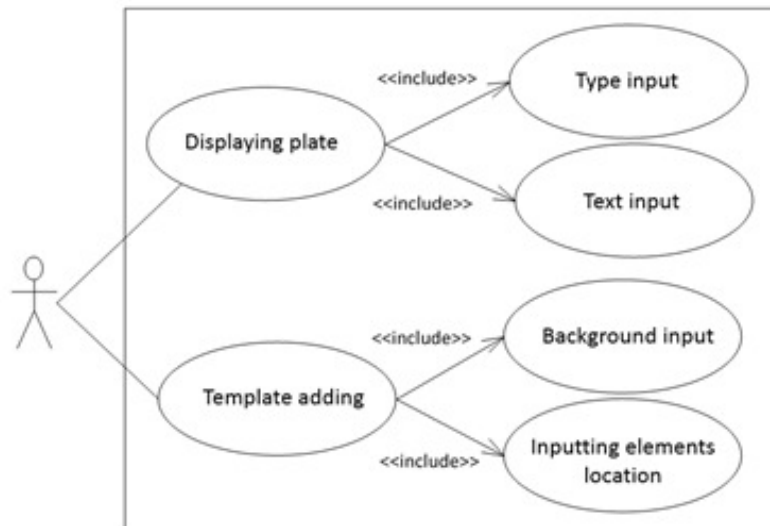
The input data are the type and text of a number plate, and using certain standard we get a graphical representation of it. While developing the program various technologies of forming user interface such as: WPF (Windows Presentation Foundation), MFC and Windows Forms were considered. And WPF technology was chosen due to such advantages as:

- The ability to bind data
- Styling
- Support and updates
- Availability of XAML

For data storage various database management systems, well known everywhere have been discussed. For example, Oracle Database is not appropriate for this task because of its high price. As a result, Microsoft SQL Server, was chosen due to the convenience of the application .NET. The program developed consists of 6 main modules:

- User interface is responsible for user interaction with the program.
- Control module is responsible for the overall program coordination and transfers the data between modules and records results into the database.
- Pattern generation module provides the internal representation of number plate template.
- Database module realizes the interaction with the database.
- Number plate image forming module realizes it's graphical representation.
- Input processing module is responsible for input data processing.

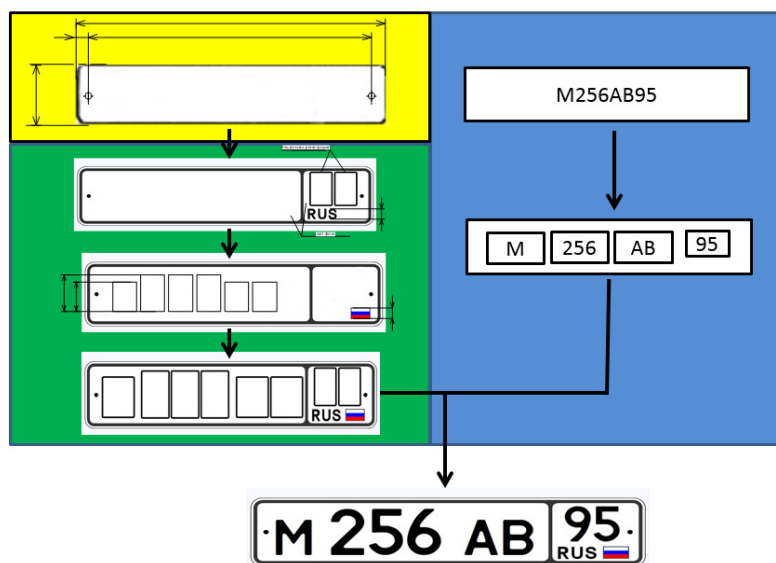
To get the number plate image, a user must choose the type and print the text of the sign. To add a template, the user must set the parameters based on the standard. You can see the use case diagram on the (pic.1).



Pic. 1. Use Case diagram

The program operation can be divided into 3 stages (pic. 2.):

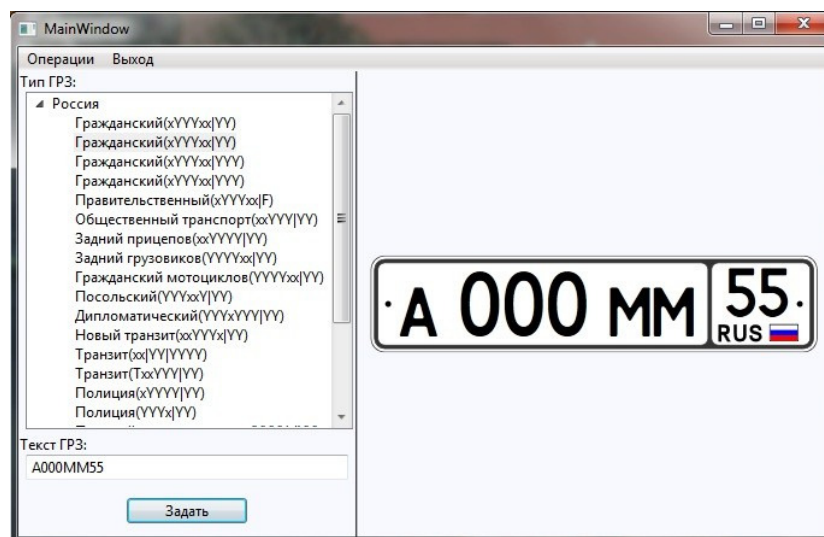
1. On the basis of the type chosen and the Standard the number plate pattern is formed.
2. Next is a static rendering of the number plate, i.e. background, flag and separators.
3. In the end, a dynamic text is imposed and the number plate image is produced.



Pic. 2. The process of license plate image formation

The database developed software consists of three tables, the structure of which is shown in the slide. But in practice the quantity of the registered number plates is large enough. Therefore for storing them extremely databases are required. The name of extreme database is rather relatively. Nowadays extreme database is considered to be the one having a storage volume more than 100Tb. Relational databases are mostly used now. In general extreme databases are under control of distributed or parallel systems of database control. The database information Youth scientific and technical bulletin FS77-51038

operating under such systems is distributed within computer network or on the server. Wherein, users typically don't know anything about the data distribution. These systems provide users with a logically integrated view of physically distributed database. Support for this view - the source of a number of challenges that must be addressed by system functions. The user interface of the developed program is implemented only in Russian (pic. 3).



Pic. 3. User interface of the program

In conclusion, I consider that in view of the lack of any analogous program, the one described here, is the most actual today. In future it is supposed to improve the program:

- To develop additional techniques of number plate imaging
- To Expand the list of number plate types
- To give possibility to work with other operation systems.

## References

1. Library MSDN: site for developers.URL.<http://msdn.microsoft.com> (date of date of circulation: 15.02.2013 )
2. Wikipedia: the free encyclopedia.URL.<http://ru.wikipedia.org> (date of date of circulation: 20.02.2013)
3. Habrahabr: internet resource URL.<http://habrahabr.ru>)
4. Traffic Police of Russia: a site with a description of State Standards URL.<http://www.gibdd.ru/>) (date of date of circulation: 17.02.2013)
5. Norm-load.ru: Base of the documents according to GOST.URL<http://norm-load.ru> (date of date of circulation: 13.02.2013)
6. Adam Nathan. WPF 4 Unleashed, 2010. - 844с.  
<http://sntbul.bmstu.ru/doc/649536.html>

7. Thomas Connolly, Carolyn Begg. Database Systems. A Practical Approach to Design, Implementation, and Management, 2003. - 1436c.