



## ENSURING INFORMATION SECURITY USING ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN MANAGING THE INTEGRATION OF DEVICES IN THE ROBOCONTEST SYSTEM

**Zarif Zafarovich Kodirov**

*Doctoral Student, Tashkent University of Information Technologies, qodirov-  
zarif\_1992@mail.ru*

**Sunatullo Nasriddin ogli Hojiyev**

*- Doctoral Student, Tashkent University of Information Technologies, hojiyev-  
sunatullo\_1991@mail.ru*

**Adizbek Kamol ogli Ergashev**

*Master Student, Tashkent University of Information Technologies,  
adizbekergashev98@gmail.com*

**Abstract:** *In the new stage of the development of the Robocontest system, intensive use of device integration is planned. It is aimed to educate the young generation who can perform large-scale projects in the developing Uzbekistan and to develop robotic systems that are convenient and safe for them.*

**Keywords:** *Algorithm; robocontest; algo-expert theory; mathematical modeling; abstraction; formal approaches;*

The increasing complexity of modern practical problems places a great demand on mathematical modeling. Given that different models can be used to model the same physical phenomenon, the role of model comparison and model selection is particularly important. Mathematical models of new systems and data security systems are developing day by day in solving sports programming problems. Currently, models that are widely used in practical applications comparison and model selection methods are computationally intensive and therefore time and computationally expensive. Therefore, it is necessary to develop other methods of working with abstract, that is, mathematical models without calculations. Artificial intelligence technologies are also very useful for this. An abstract description of mathematical models can be achieved using abstract mathematics, which involves formalizing the models and the relationships between them. This paper proposes an approach to mathematical modeling based on the algo-expert(robocontest) theory.

### 1. Introduction

The rapid development of modern technologies naturally creates high demands on the process of mathematical-physical modeling, because today's practical problems require advanced connected models. In addition, usually several models can be used to model a given physical phenomenon, and therefore a model selection

process must be performed. It can be seen that the choice of model affects the quality of the final integrated model. In this regard, one of the most important tasks of the robocontest modeler is to understand the role of individual models in a fully integrated model, as well as the practical meaning of these relationships, as well as to study how different models are related.

In this article, you will learn how to write sketches online using the Robocontest platform and the Arduino web editor, save them in memory , and always work with the latest version of Robocontest and the Arduino IDE.

### **Robocontest system what is the device**

an online tool that allows you to write sketches using your web browser (Chrome, Firefox, Safari and Edge) and upload them to any Robocontest system and Arduino board. The developers of Robocontest and the Arduino platform recommend using the Google Chrome browser ( Figure 1).



Figure 1

This IDE (Integrated Development Environment) is part of the Robocontest system and the Arduino Create project, an online platform that allows developers to write programs, access tutorials, customize boards, and share their projects with other members of the Robocontest system and Arduino. Providing users with a seamless workflow, it provides a connection between the Robocontest system and the entire process of creating a finished product created by Arduino, from the idea to its implementation. That is, with the help of this service, you can manage all aspects of creating a project for the Robocontest system and Arduino ( Figure 2).



Figure 2

The Robocontest system and Arduino web editor is an online service, so it always takes into account all the latest changes in the Robocontest system and the Arduino platform, and all the latest boards that appeared on this platform.

This integrated development environment (IDE) allows you to write application code (sketch) and store it in the cloud, which you can then access from any device with Internet access. It automatically recognizes all Robocontest and Arduino and Genuino boards connected to your computer and makes the necessary adjustments. An account in this system is enough to get started.

#### **a Robocontest system and Arduino account**

create a Robocontest and Arduino account using this link . fill out the registration form , then click the "Create an account" button. An e-mail with a link to activate your account will come to your e-mail (e-mail) - follow it and your account on Robocontest and Arduino will be confirmed ( Fig. 3).



Figure 3

#### **Robocontest and the Arduino Web Editor**

After successfully registering your Robocontest and Arduino account, go to create.Robocontest and Arduino.cc/editor . After accepting the terms of the contract for the use of this service, you will receive an e-mail with a link to the forum , where you can leave comments and bug reports on the project.

Choose a platform: Windows, Mac or Linux

Robocontest and Arduino Web Editor can work with many different platforms. If you're using Windows, Mac, or Linux, you 'll just need to install the Robocontest and Arduino Web Editor plugin , which allows you to upload sketches from your browser to your Robocontest and Arduino boards.

If you have problems installing this plugin, you can always write about the problem in a special forum , where technical support specialists will try to solve your problem.

At the end of the installation process of this plugin, you will be redirected to the Robocontest and Arduino account login page - use your credentials to login.

Robocontest and Arduino web editor build

starting Robocontest and the Arduino web editor, you will see three main columns.

The first column is used to navigate between:

- Your Sketchbook - a collection of all your sketches;
- Examples - sketch samples and examples of working with libraries to demonstrate the capabilities of Robocontest and Arduino's basic commands;
- Libraries - libraries that can be included in your program (sketch) to expand its capabilities;
- Serial monitor - a serial monitor that allows you to receive and transmit data to your Robocontest and Arduino board via a USB cable ;
- Help - useful links and a glossary of Robocontest and Arduino terms;
- Preferences - Your settings (font size, colors, etc.) for the appearance of Robocontest and the Arduino web editor.

When you select one of these menu items, its content is displayed in the second column (sidebar).

And finally, the third column is the field for entering the application code (thumbnail) - you will use it often. In it, you write your sketches, check their work and upload them to Robocontest and Arduino boards, store your sketches in the cloud and give them access to anyone who wants them (you share them).

Robocontest from the browser and flashing the LED on the Arduino board

1. Run Robocontest and configure the appearance of the Arduino web editor to your liking (menu item Preferences).

2. Connect Robocontest and Arduino or Genuino board to your computer. The boards and the serial ports they are connected to are automatically detected by Robocontest and the Arduino web editor and displayed in a special list - select the board you want to work with from this list .

3. Let's start with the simplest example. To do this, select "Examples" from the menu on the left , then "Basic" and "Disable". After that, the code field will display the sketch code to blink the LED.

4. Click "Upload" to upload it to your board. When the sketch code is being checked and uploaded to the board, this button will be replaced by the label BUSY. If the sketch is successfully uploaded to the board, the message "Successful: upload complete" will appear at the bottom of the output window.

5. After uploading the sketch to the board, the LED on the board will start flashing - congratulations, you have successfully loaded the LED flashing program on your board.( Figure 4)

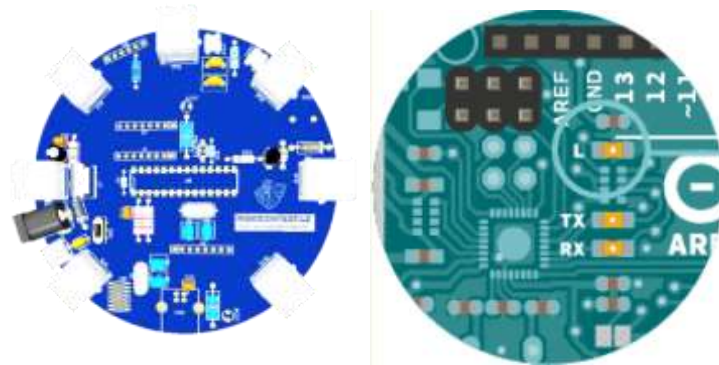


Figure 4

6. Sometimes new Robocontest and Arduino/Genuino boards are programmed with LED flashing software during manufacture. So, in this case, how to understand that you have successfully downloaded the LED flashing program to the board? Yes, very simple. Reduce the delay in the example shown and then upload it to the board - if everything goes well, you will notice that the LED starts blinking faster than it did before.

What types of boards are supported in Robocontest and the Arduino web editor

Robocontest and Arduino Web Editor allow you to automatically determine the type of board and which port of the computer it is connected to. This online editor currently only supports official Robocontest and Arduino/Genuino boards, as well as a small number of other certified boards. You can see the full list of supported boards in the corresponding drop-down list in this editor ("Choose another board and port").

In addition, in a special pop-up window, you can check the compatibility of your program code with any supported board, even if you don't have one. If the

board connected to the computer is not automatically detected by this editor, you can select it manually from the list, but do not forget to select the port to which it is connected.

A complete list of supported hardware can be found in the pop-up command. Robocontest and the Arduino team are constantly working to expand this list.

#### Serial monitor

In Robocontest and Arduino web editor, Serial Monitor is available in the sidebar.

The serial monitor reads data from the card currently selected in the card list. If you want to change the board (for example, you have several boards connected to your computer), then select the required board from the list of boards. When you replace the board, the serial port used is also updated automatically.

If you want to test the operation of the serial monitor, you can open the example . Examples : Analog > AnalogInOutSerial . Upload the code of this example to the board and after that you will see the result of its work.

When the program code is loading, the panel will be grayed out as shown in the image below.

If the board is not connected to the computer at this time, a message will appear that the serial port is not available.

If the same port is being used by other programs (such as processing or desktop applications), a warning message will appear that the port is being used by other software.

If you want to free this port for other applications, click the "Disable" button on the panel.

#### Project documents

It's a good idea to document your projects. To do this, go to the Examples panel and select Delete Thumbnail there .

"layout.png" and "schematic.png" in it. These examples show exactly how to place the necessary explanatory drawings (for example, with a project diagram) in your projects. You can always add the necessary documents to your projects by clicking on the last tab of the code area and choosing there "Import file into sketch" (import file into sketch).

#### Share permissions on your thumbnails

), just like any document in Google Docs . Click the "Share" button and copy the provided URL into a new tab of your browser to check if it works.

If you give this URL to someone else, they can view your code , add a copy to their cloud sketchbook , or download it. If you've written a tutorial on Project Hub

and added a link to the software section, your code will be added and always updated.

We believe that the Robocontest system and Arduino sketch are the building blocks of information that contain everything you need to bring your idea to life. When someone gives you access (shares) to their sketch, you'll have access to its code, project diagram, and even its description (if available) . That is, you get all the information to create a copy of the original project.

You can even embed your thumbnail on a web page by copying the code found in the Share window.

#### Robocontest and Arduino Web Editor

To date, more than 700 libraries have been written by the Robocontest and Arduino community, which you can include in Robocontest and Arduino Web Editor sketches without even installing them. You can view them all in the Library Manager and select the ones you like best. From the library manager, all these libraries are easily (automatically) integrated into your program without installing them.

Since all these libraries are hosted on the servers of Robocontest and Arduino official website, if you give access to your sketch to someone else, he can copy its code in Robocontest and Arduino web editor without bothering with any steps to install and use. can copy. these are libraries.

Although under normal circumstances (in offline Robocontest and Arduino IDE) rendering a sketch with all the libraries it uses can be a tedious task, Robocontest and the Arduino web editor can greatly simplify and speed up the process. For example, you can test the Thermostat Bot sketch with the many libraries it uses.

But what if you want to use a fixed version of the library? To do this, find this library in the library manager and mark it with a star - that is, add it to your favorites. After that, it will appear in the Favorites tab in the Libraries panel. And here you can already specify the desired version of this library and include it in your sketch. Robocontest and Arduino Web Editor add custom metadata to the sketch with the version number of the library, so the compiler ( Robocontest and Arduino Builder ) includes exactly the version of the library you need in your sketch. This online editor considers your own libraries first, then the libraries you have added to your favorites, and then the built-in libraries of Robocontest and Arduino.

If you add a library to your favorites, you can see examples of its use (relevant examples), get more information about it , and also get a link to the GitHub service where you can download it.

If you want to import specific libraries into your sketch package (bundle), you need to archive them all as a single zip file and then import it into the service.

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