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## ANDIJON MASHINASOZLIK INSTITUTI

**“MEXATRONIKA VA ROBOTOTEXNIKA: MUAMMOLAR VA  
RIVOJLANTIRISH ISTIQBOLLARI” MAVZUSIDA II XALQARO  
ILMIY-AMALIY ANJUMAN**



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## TAXRIR HAYA'TI

1. A.Yusupov - “Mashinasozlik ishlab chiqarishini avtomatlashtirish” kafedra mudiri, t.f.f.d. dotsent, (rais).
2. J.Rahmatullayev - “Mashinasozlik ishlab chiqarishini avtomatlashtirish” kafedrası tayanch doktoranti, (rais o‘rinbosari).
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## **PROBLEMS AND SOLUTIONS IN TEACHING STUDENTS OF MECHATRONICS AND ROBOTICS**

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**Annotation:** This article explains how to use the Arduino board to connect and control mechatronic components used in robotics and mechatronics education. There are suggestions on how robotics devices, which are now being developed on a massive scale, can be used effectively in virtual environments.

**Keywords:** Virtual bread board, Arduino, board, mechatronics, robotics, education, process.

In today's schools, technical institutions, and technical universities, classes on "Mechatronics and robotics" are offered. The thorough and meaningful delivery to students has various drawbacks due to the intricacy of the mechatronics science. Since this subject is directly tied to computer programs, students must first be computer literate. Before teaching science to children, a quick review of science is in order. In 1920, the Czech playwright Karel Chapek used the word "robot" for the first time in his play "RUR" (Rossum's Universal Robots). The term "robot" refers to a wide variety of various systems and apparatus. [1]

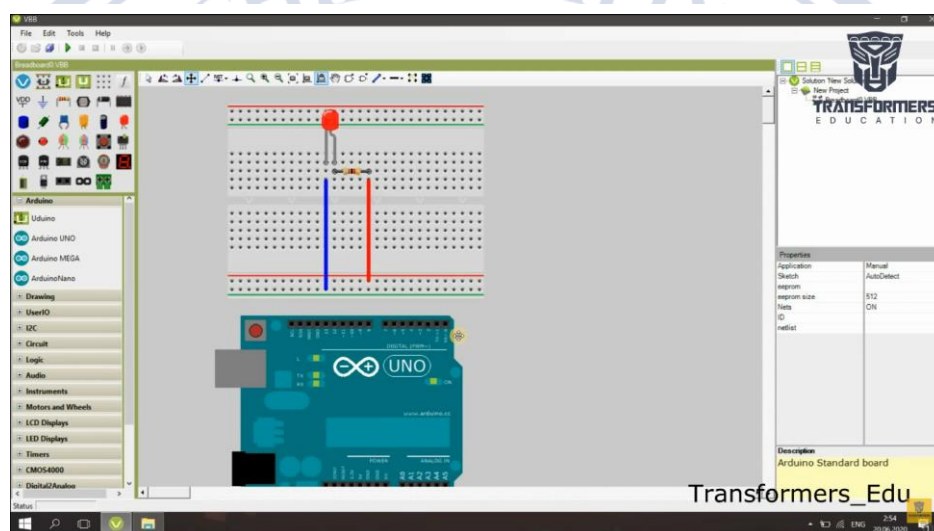
The primary distinction between a robot and numerous automatic systems and gadgets is that a robot contains mechanical arms (manipulators), which may mimic human actions. With the aid of these manipulators, the robot is able to affect the environment around it [2].

The category of machines known as manipulators includes robots. A manipulator is a multi-link mechanism that mimics the motions of a human hand and is operated remotely or through a computer control system.

A robot is a machine that can carry out different manipulations rather than a human. Let's imagine that, although a person's brain and central nervous system are responsible for thought, a robot's "control system" is what causes thought to occur. Humans use their sensory organs to communicate with their environment, while robots use sensors and sensors to carry out their sensing functions. Humans use their hands and feet to do work and move around, but robots use manipulators and other moving parts to accomplish these tasks. Humans depend on their blood flow, digestion, and energy sources for survival [1].

It was feasible to compile a database of software connected to design (simulators, animation, and video clips, enabling the modeling of virtual laboratory activity) as well as linked to other disciplines by analyzing the computer resources used in the teaching of subjects overseas. It was created a software base. Students and teachers will be able to undertake virtual laboratory work immediately online and obtain the electronic version of lectures from this system.

It is feasible to employ the capabilities of contemporary information technologies in the deeper study of "Mechatronics and robotics"—especially for students of the "Virtual bread board" (VBB) curriculum. The VBB program can also be applied in electrical engineering and courses on electric circuit theory.



Picture 1. View of the VBB program

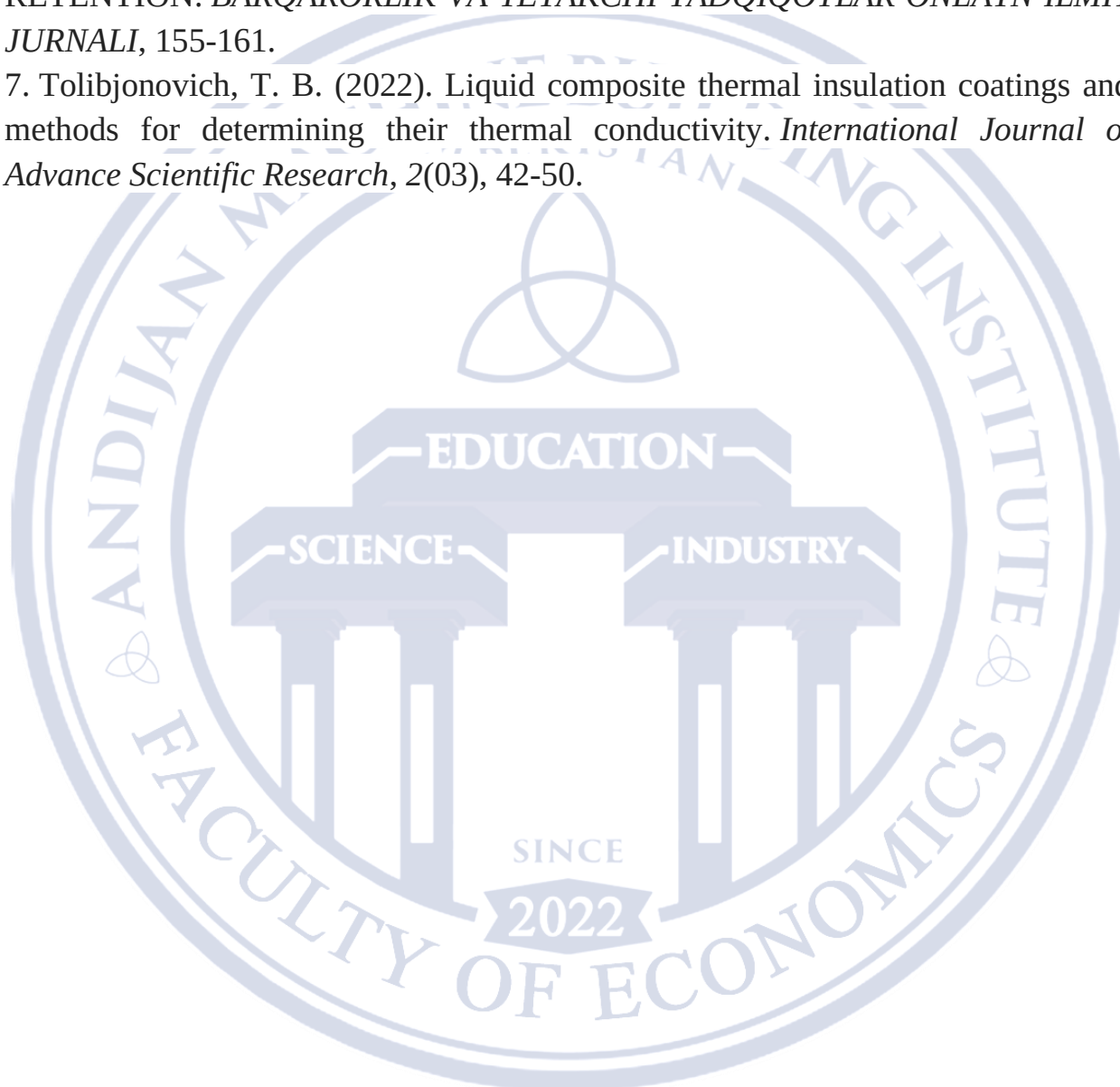
The program, an electronic designer, enables you to mimic the assembly of an Arduino board and the connection of all the necessary equipment on the monitor, just like in a real experiment. For instance, the application allows you to simulate connecting and managing DC motors, LEDs, regulators, and other components on the Arduino board. The following features of this application are available: - It is possible to control the proper execution of the process; - A lot of processes and their outcomes are represented by sound effects. - Details of robotics and measuring devices are shown in a schematic and realistic form.

### References

1. Information from the Internet
2. Husanov, Y. Y., Abdullayev, S. M., & Sattorov, A. M. (2021). Mexatronika va robototexnikada virtual laboratoriyalardan foydalanish. *Scientific progress*, 2(7), 337-342.
3. Xusanov, Y. Y., & Abdullayev, S. M. (2022). ZAMONAVIY MEXATRONIK TIZIMLARNI DIAGNOSTIKA QILISH ALGORITMLARINI ISHLAB CHIQISH. *Scientific progress*, 3(3), 166-171.



4. Tolibjonovich, T. B. (2023). Replace thermal coatings to maintain room temperature. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 3(2), 164-168.
5. Tojiboyev, B. T. (2022). Prospects for the use of Innovative Technologies in the Application of Heat Storage Materials. *Central Asian Journal of Theoretical and Applied Science*, 3(5), 1-9.
6. Tolibjonovich, T. B. (2022). INNOVATIVE MATERIALS WITH HEAT RETENTION. *BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI*, 155-161.
7. Tolibjonovich, T. B. (2022). Liquid composite thermal insulation coatings and methods for determining their thermal conductivity. *International Journal of Advance Scientific Research*, 2(03), 42-50.



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