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DESIGN AND MANUFACTURE OF ROBOTIC COMPLEX FOR PET CARE

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

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Introduction »

Purpose: to design, manufacture, write a program and test a prototype of a robotic complex that will help in caring for pets.

Main tasks:

1. Study sources of information on design and robotics; get acquainted with the EV3 programming language in more detail.
2. Develop and make drawings of the prototype tray and feeder.
3. Make a robotic complex.
4. Write a program algorithm for the EV3 microcontroller.
5. Step by step explore the use of EV3 software units.
6. Record the full application and download it to the device.

**Object of the research:** a prototype of a robotic complex.

Subject of the research: manufacture and programming of devices for feeding and cleaning pets.
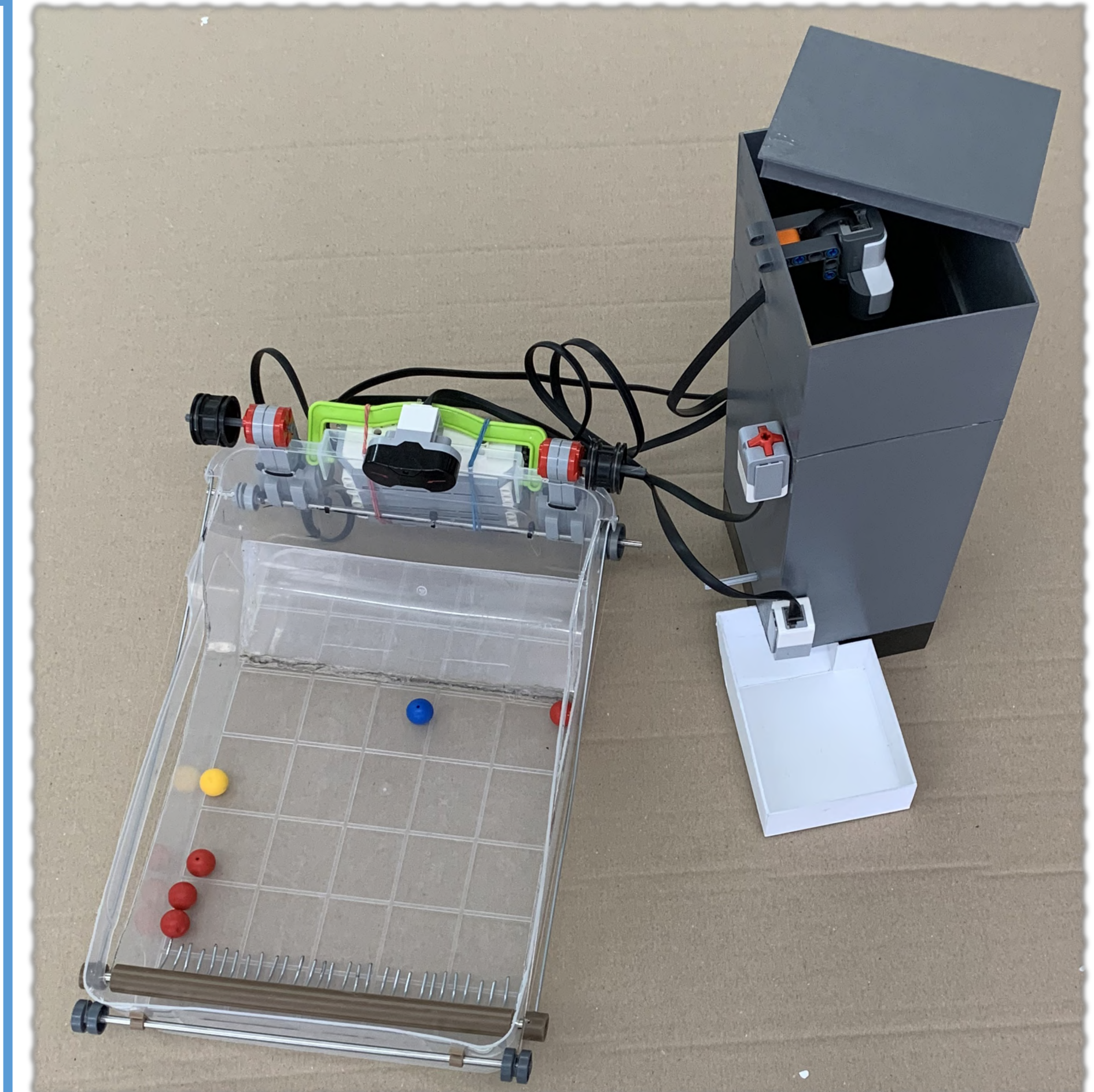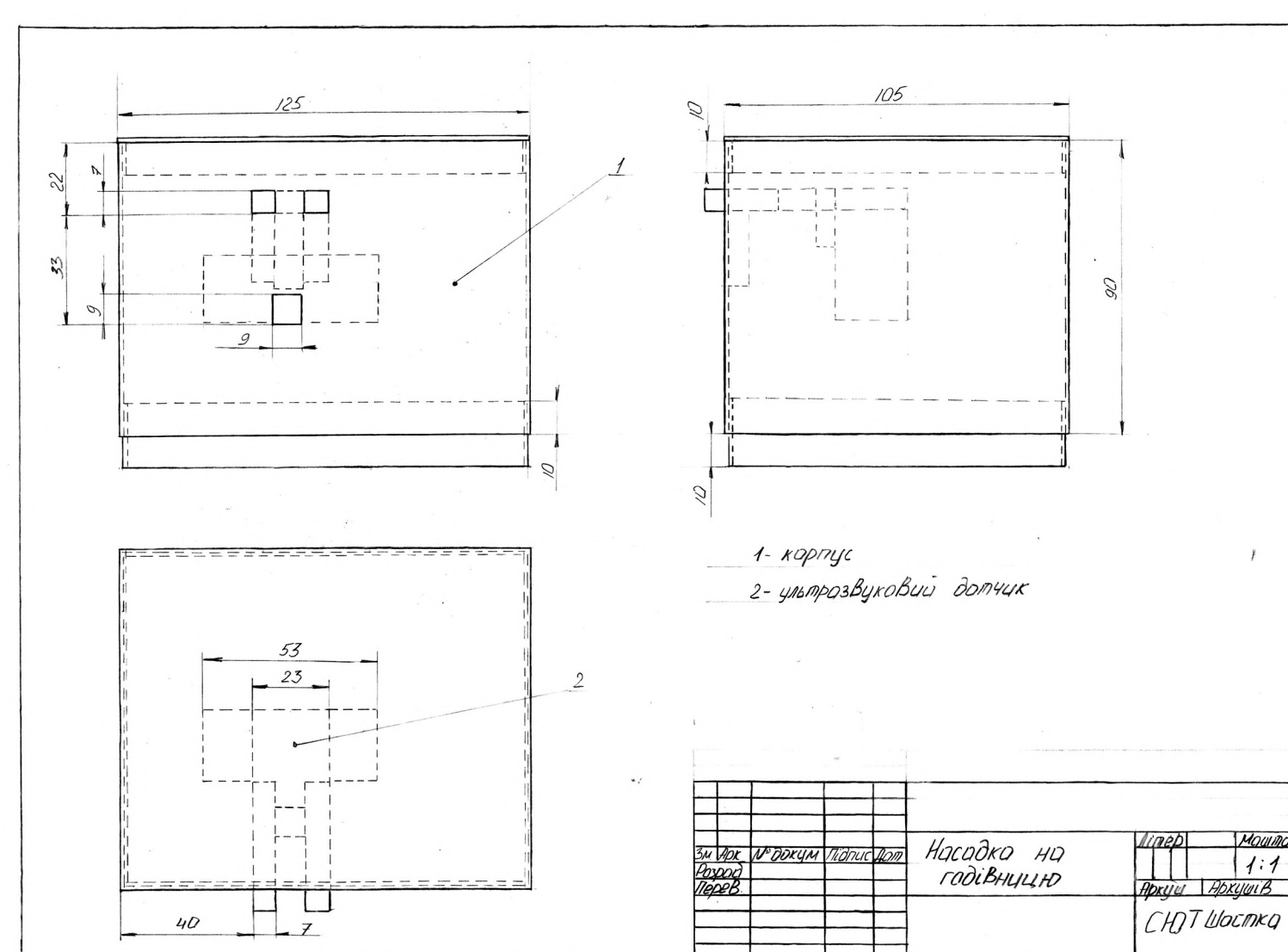

Robotic complex

Novelty »

The scientific novelty is that on the basis of the elements of the LEGO Mindstorms EV3 constructor, which is successfully used in robotics classes, a simple, autonomous device for feeding and cleaning pets will be created. This designer can be used as an element of the latest developments.
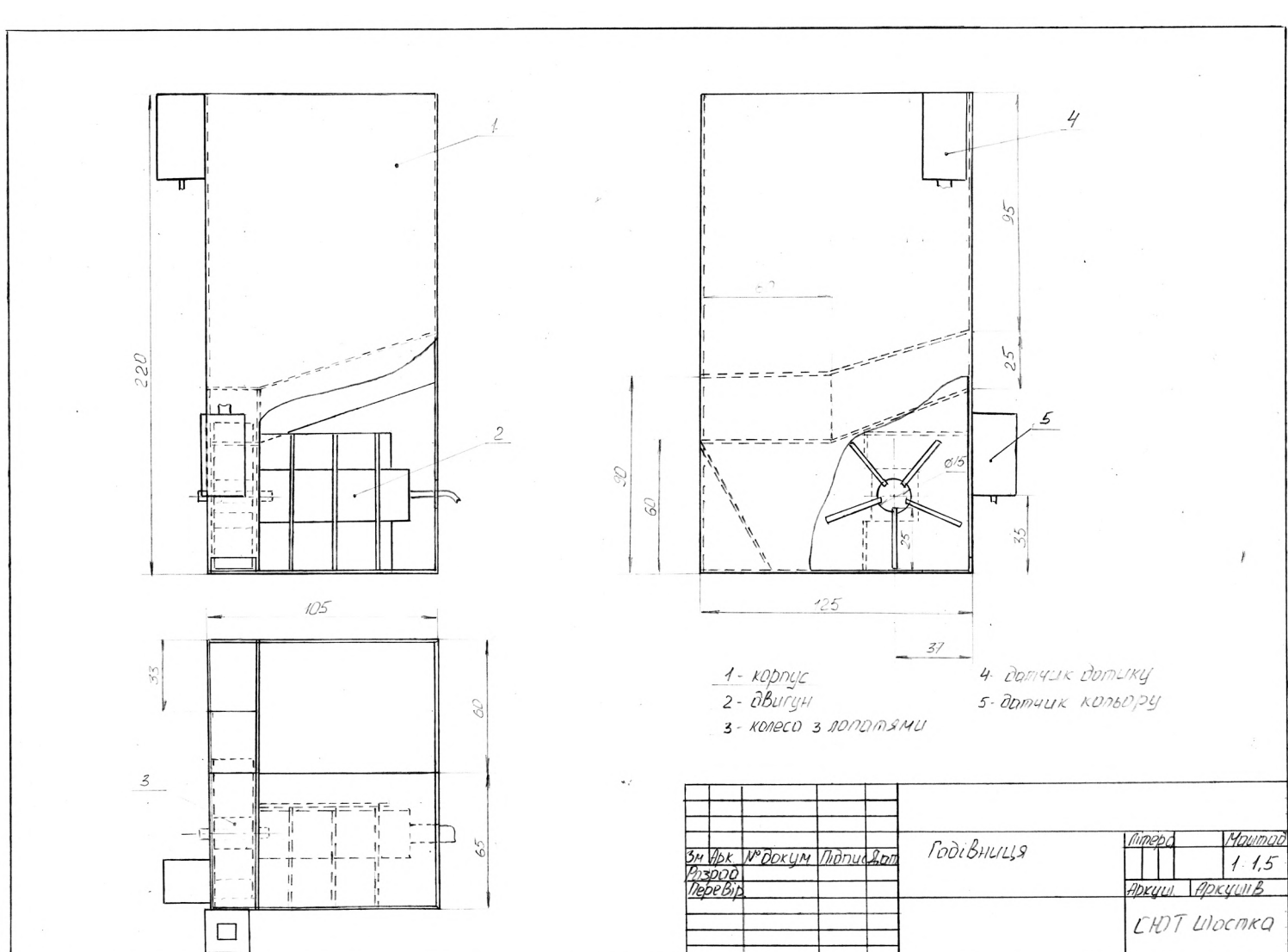
Drawing of the feeder


Drawing of the feeder nozzle
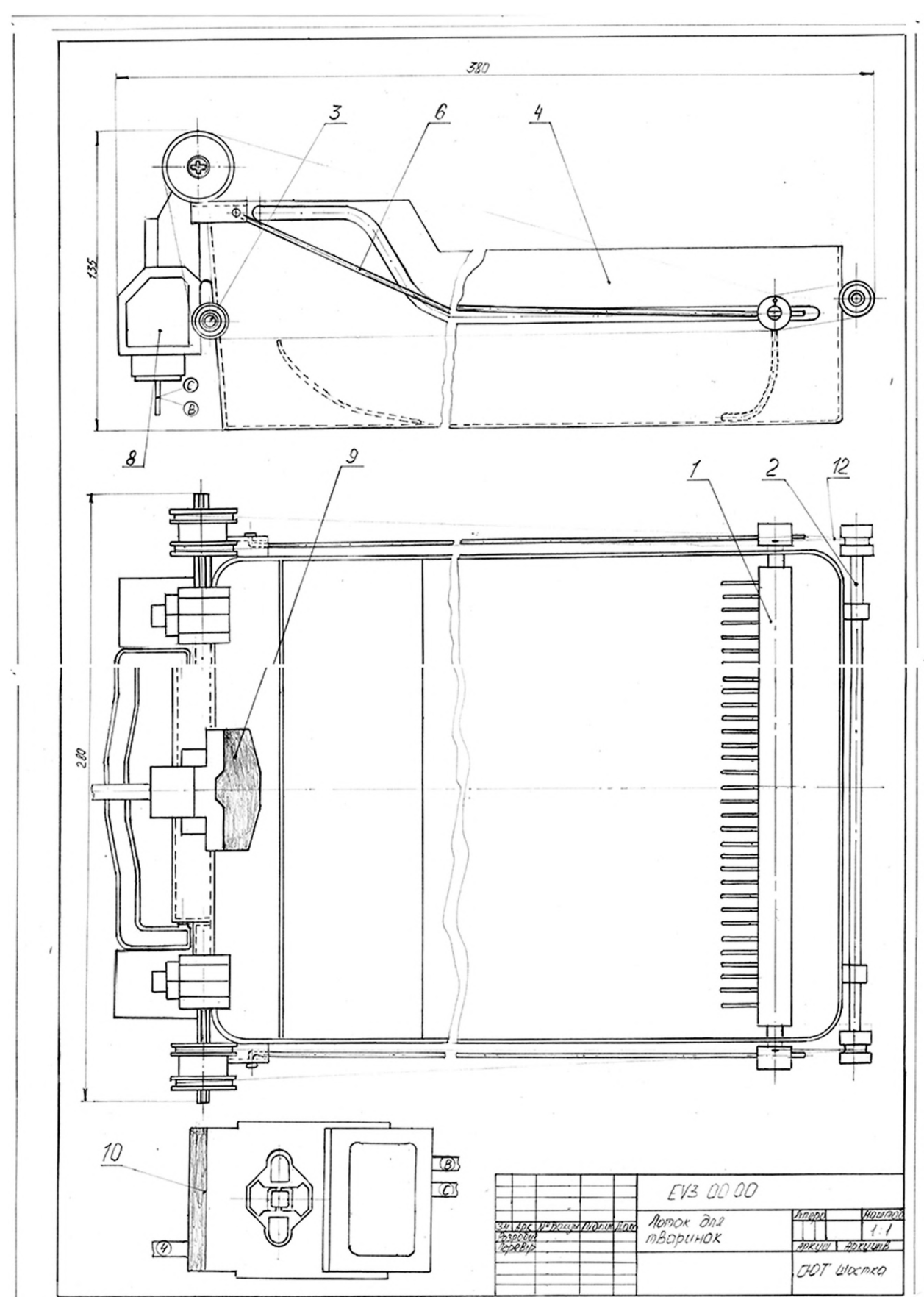
Drawing of the tray
1 - rake; 2 - front axle; 3 - rear axle; 4 - tray; 6 - guides; 8 - the engine with a pulley; 9 - infrared sensor; 10 - microcontroller; 12 - fishing line.

Material and methods »

Algorithm and program for the device

- the microcontroller is waiting until it "sees" the object using an infrared sensor;
- the microcontroller counts the number of visits to the tray by an animal;
- after several visits, the countdown cycle (01) is completed and the servomotors are turned on, rotating in one direction, pulling the rake, then in the other direction, the same number of times;
- the feeder motor is switched on, making a certain number of revolutions, degrees or seconds;
- all these actions are inserted into the main cycle (02);
- in parallel when pressing the touch sensor, the feeder motor rotates (cycle 03);
- in the absence of food in the bin (determined by the ultrasonic sensor), the dynamic emits a warning signal (cycle 05);
- in the absence of food in the bowl, the feeder motor is turned on to fill the portion (cycle 04) (checked every 3 hours).
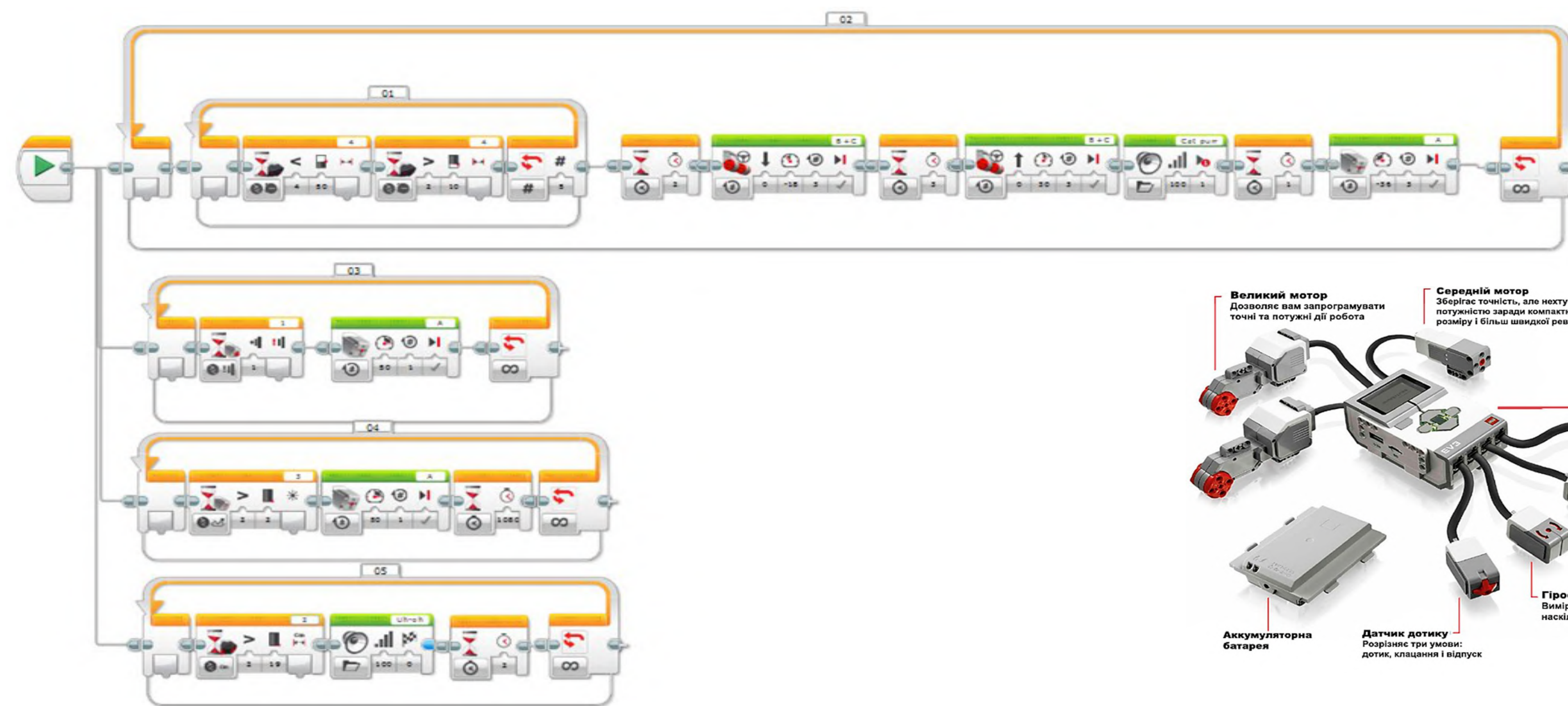
EV3 tray program
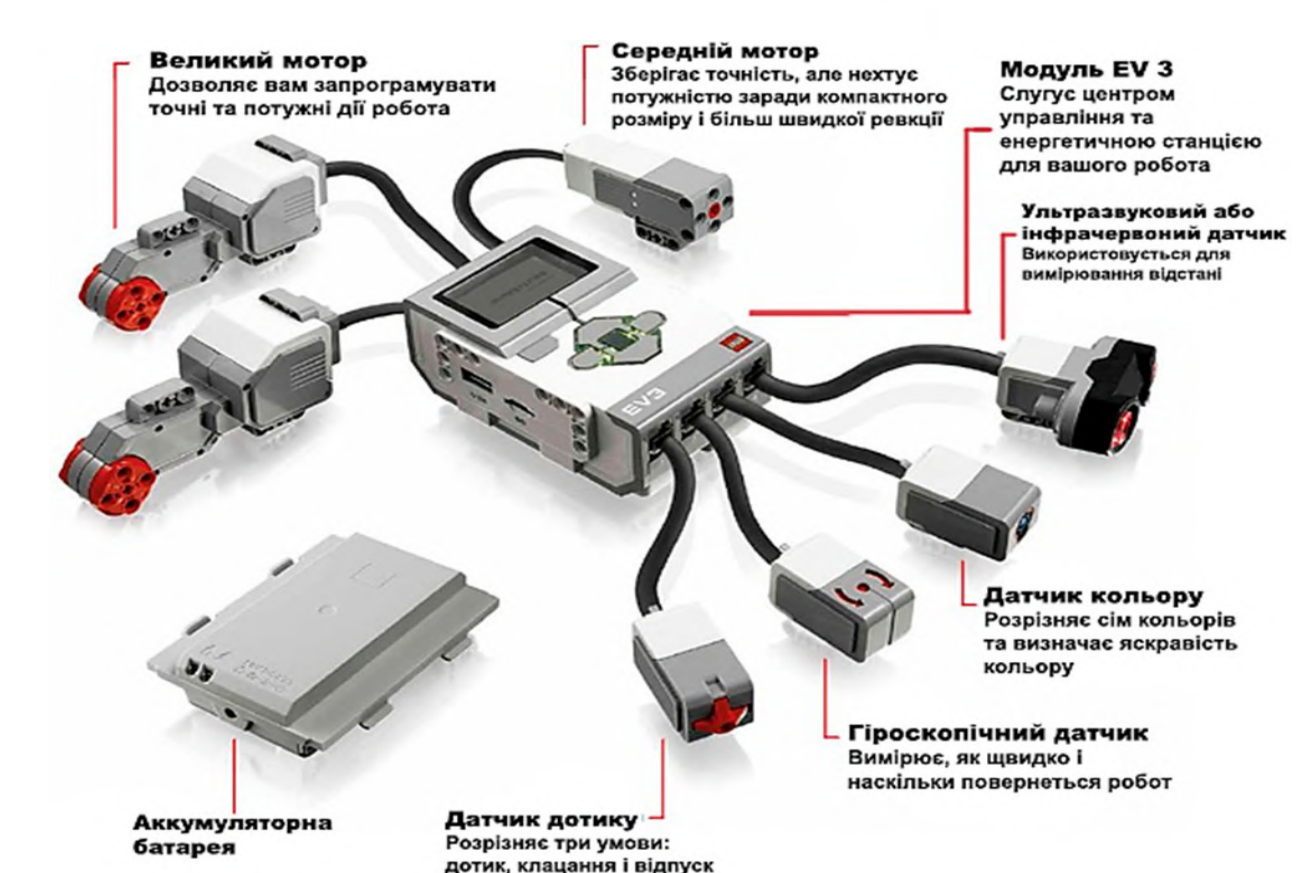
Designer components

Conclusions »

Applying knowledge of robotics, the developed and designed device for pets will help in caring for them. A working model of the complex was created on the basis of a microcontroller, an infrared sensor, a touch sensor, and Lego Mindstorms EV3 engines. This was achieved through the proper construction and design of the product, the selection of materials.

Particular attention is paid to the review of robotics based on Lego Mindstorms.

Such robotic complexes can be made in classes in technical creativity circles.