**Theme**

Hello, I'm Victor Pyshnogub and today I would like to tell you about "building and programming a microcontroller".

**Contents**

And so the presentation answers the following questions.

1. Why did I choose this topic?

2. Why do we need microcontrollers?

2.1 What are microcontrollers made of?

2.2 What programming languages are used for microcontrollers?

3. Conclusion.

Sources of information.

A microcontroller is a microcircuit designed to control electronic devices.

Now in the video you can see one implementation of microcontrollers

**Why did I choose this topic?**

I got interested in microcontrollers during an extra class at university. And as it turns out, it's a very interesting thing. What is a microcontroller anyway?

A microcontroller is a microcircuit designed to control electronic devices.  
A typical microcontroller combines the functions of a processor and peripheral devices on one chip and contains a RAM and/or ROM. It is essentially a single-chip computer capable of performing relatively simple tasks.  
It differs from a microprocessor in that it includes on-chip I/O, timers and other peripheral devices.  
  
**Why do we need microcontrollers?**

Almost all devices today contain microcontrollers.

Microcontrollers are needed to programmatically control electronic circuits.

Microcontrollers are used in automatically controlled products and devices such as car engine control systems, implantable medical devices, remote controls, office machines, household appliances, power tools, toys and other embedded systems.

**What are microcontrollers made of?**

When designing microcontrollers, there is a trade-off between size and cost on the one hand and flexibility and performance on the other. The optimum ratio of these and other parameters can vary greatly from application to application. This is why there are so many types of microcontrollers, differing in processor architecture, size and type of embedded memory, peripherals, packaging, etc.  
  
Unlike conventional computer microprocessors, microcontrollers often use a Harvard memory architecture, storing data separately in RAM and instructions separately in ROM.  
  
In addition to ROM, the microcontroller may have built-in non-volatile memory for program and data storage. Many models do not have a bus to connect external memory at all.  
  
The cheapest memory types allow only a single write, or the stored program is written into the chip at the manufacturing stage (by configuring a set of process masks). Such devices are suitable for mass production when the controller program will not be updated. Other versions of controllers have the ability to write the programme repeatedly to non-volatile memory.

**What programming languages are used for microcontrollers?**

The main languages for programming microcontrollers are C. In some cases where the power of the microcontroller is low, assembly language is used for programming.

C is still a popular microcontroller language today, although it was developed in the early 1970s. For use with microcontrollers C works well because it can handle memory allocations as well as relatively complex functions such as if statements, loops and mathematical expressions.

Assembler offers an alternative to C with several advantages. Assembler is an older language which often uses device-specific code that is converted by a utility program. By using this language, the developer has direct access to the CPU where procedures can be fine tuned for precise timing. Assembler offers better use of the processor as well as additional instruction sets that C does not support, such as bit manipulation of specific instructions.

Also some modern microcontrollers support java and javascript programming.  
  
**Conclusion**

Working with microcontrollers at all stages has been fascinating, and I started to think about how much they help us to simplify our lives. Perhaps, in the future, I will link my work to microcontroller software development.

**Thank you very much for your attention! Do you have any questions?**