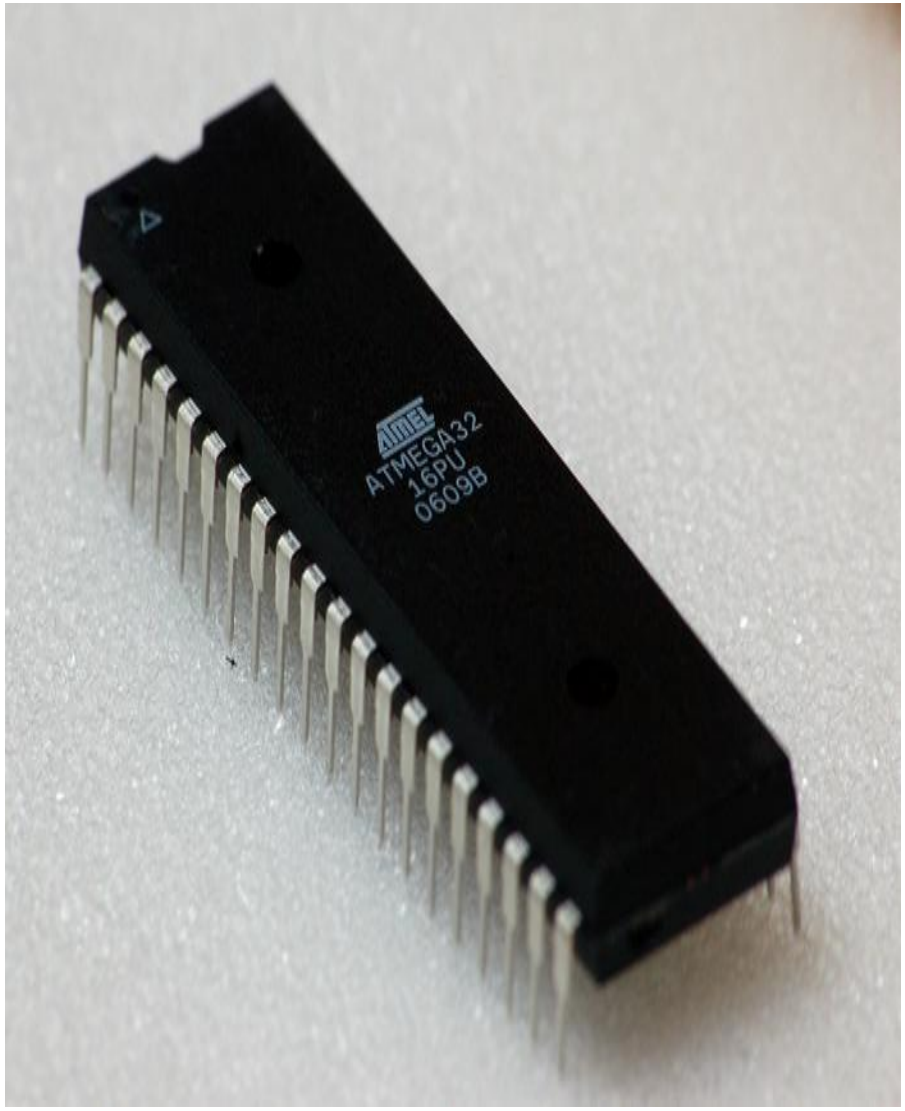
- Types of Microcontroller: Embedded Microcontrollers –



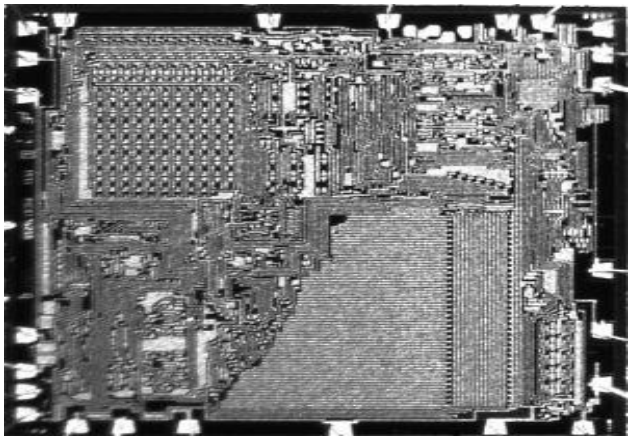
* A small computer

* A single IC

*processor core, memory and input output peripherals

History of microcontroller

In 1971 – *Gary Boone, *Michal Cochran



TMS 1000

In 1993 - Atmel

Microcontroller- Featus of computer

Computer

no ‘windows’

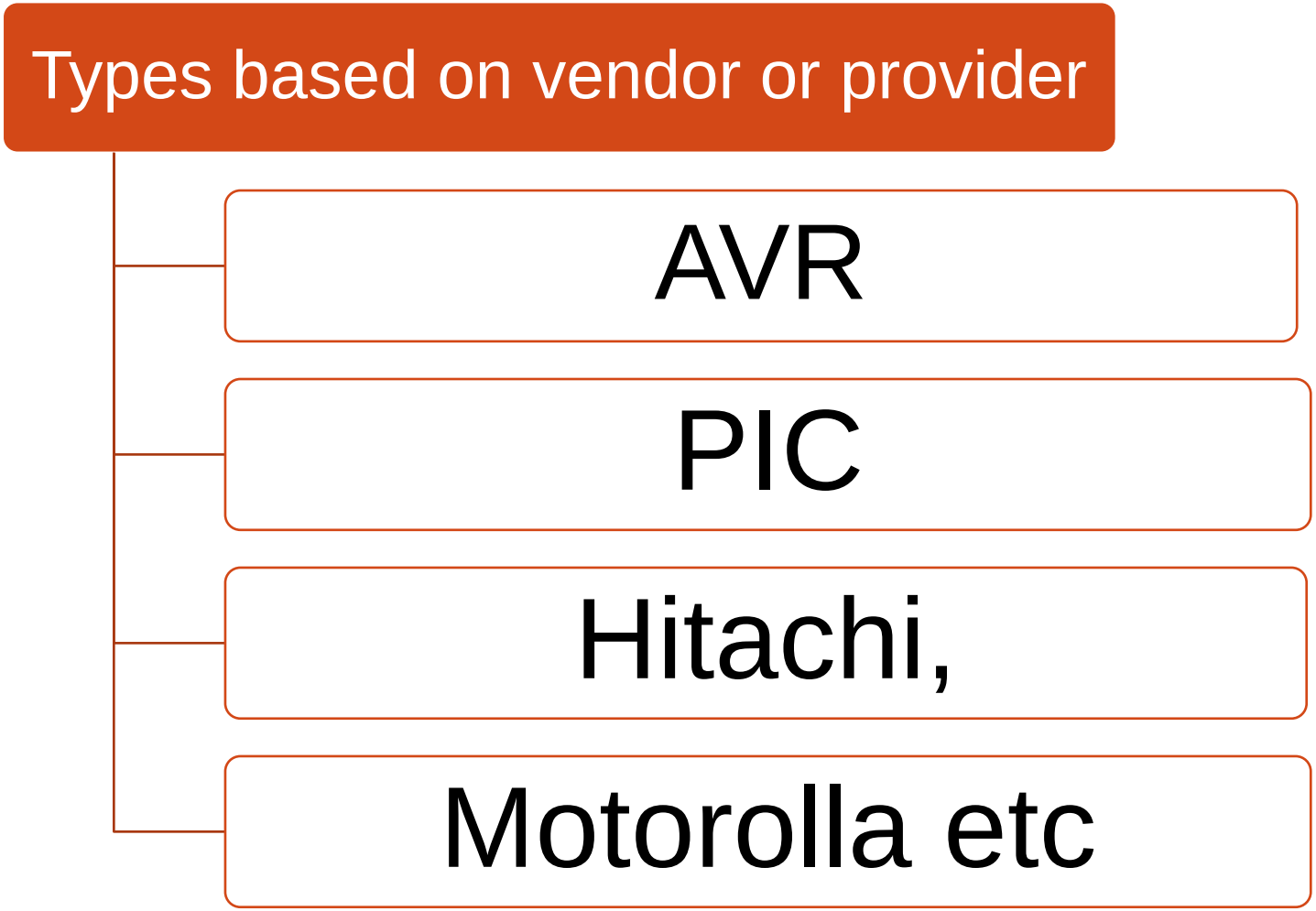
```
int main(void)
{
    DDRA=255;
    while(1)
    {
     PORTA=0b00000010;
     _delay_ms(1000);
    }
    ;
```

User program

Types based on architecture

1. Havard architecture
2. Von Neuman architecture

TYPES OF MICROCONTROLLER



Working with microcontroller

Working with microcontroller can be divided into three steps:-

1. programming the microcontroller
2. Burning it inside the IC.
3. Connect to the external network

Microcontroller programming

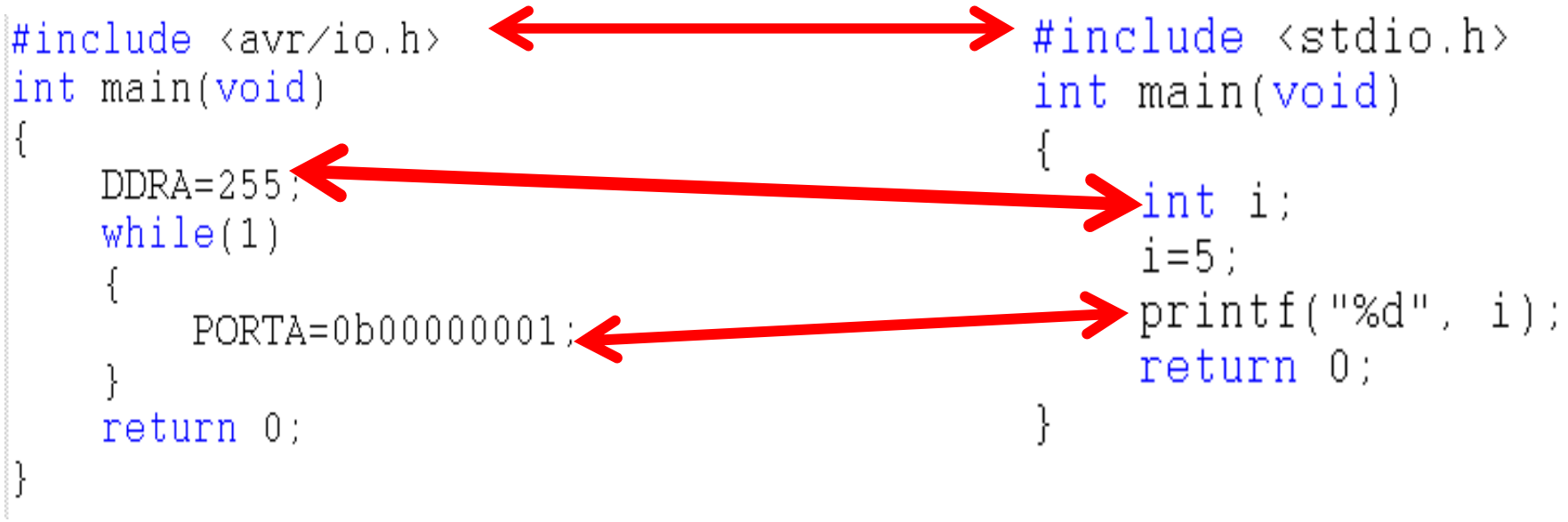
```
#include <util/delay.h>

int main(void)
{
    DDRA=255;
    while(1)
    {
     PORTA=0b00000010;
     _delay_ms(1000);
    }
    ;

    return 0;
```

A simple microcontroller program

Microcontroller programming

Microcontroller programming is very much similar to the programming language ‘C’.

Microcontroller programming



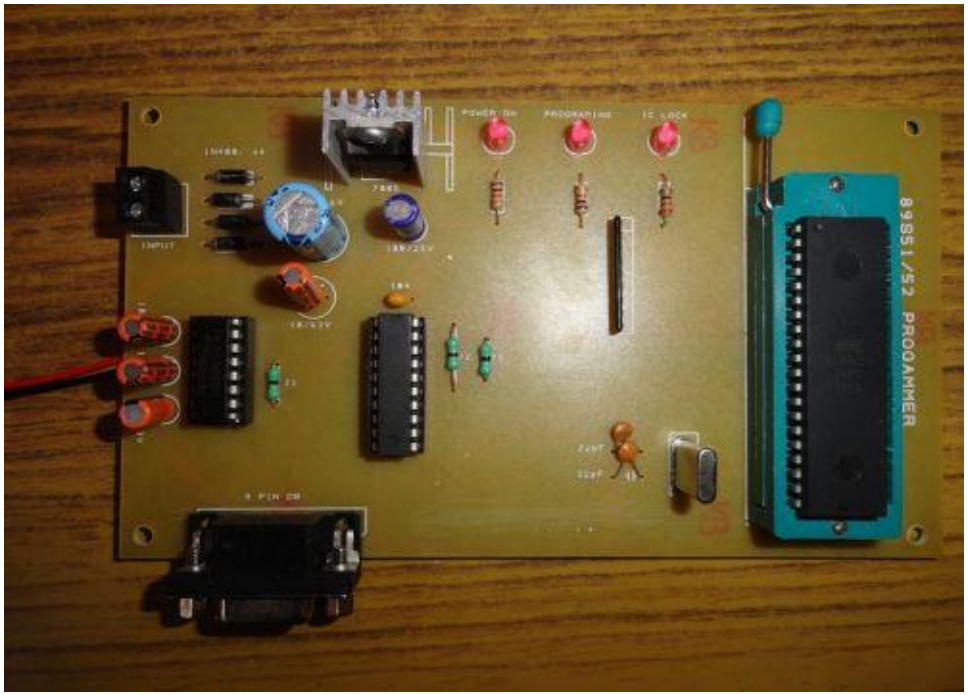
```
#include <avr/io.h>
int main(void)
{
    DDRA=255;
    while(1)
    {
        PORTA=0b00000001;
    }
    return 0;
}
```

```
#include <stdio.h>
int main(void)
{
    int i;
    i=5;
    printf("%d", i);
    return 0;
}
```

Microcontroller program

C program

Burning the program in a Microcontroller

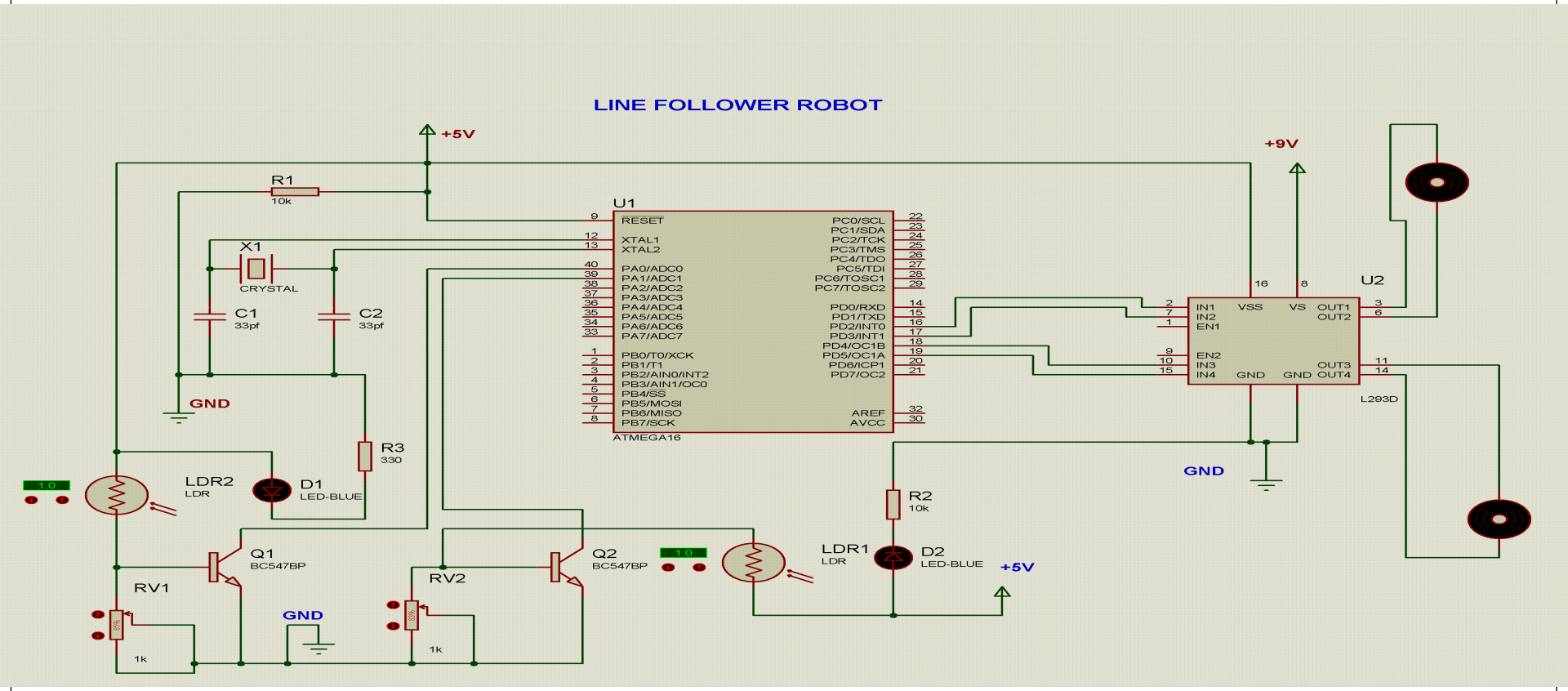


Programmer tool

AVR Studio 4

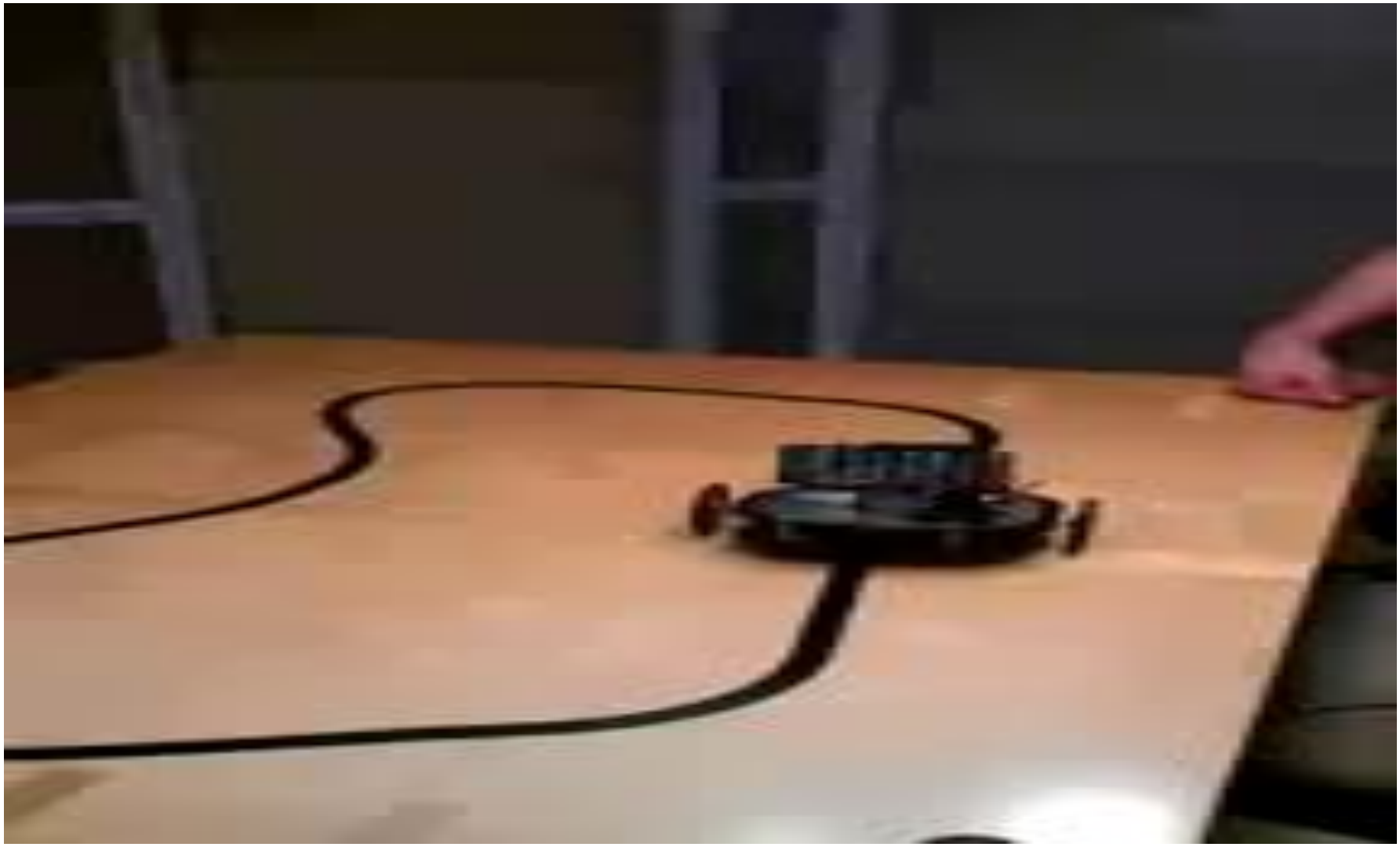
A microcontroller programming software

Connect to the world

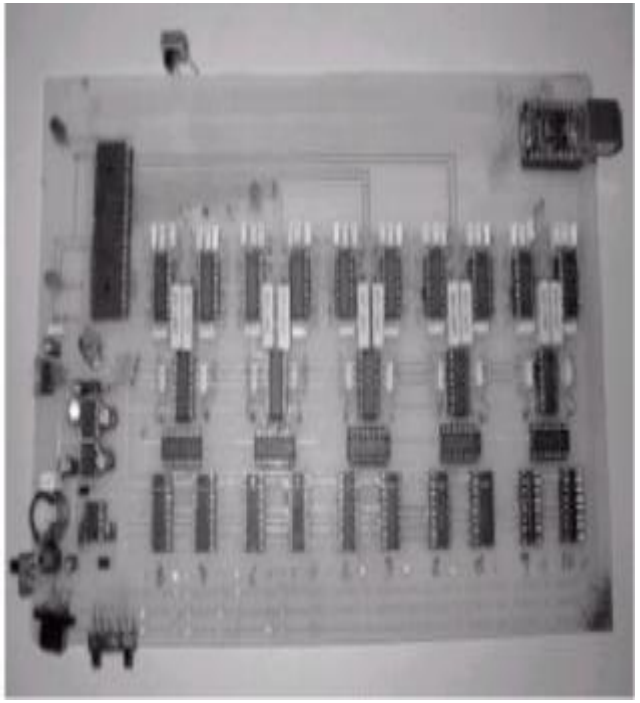


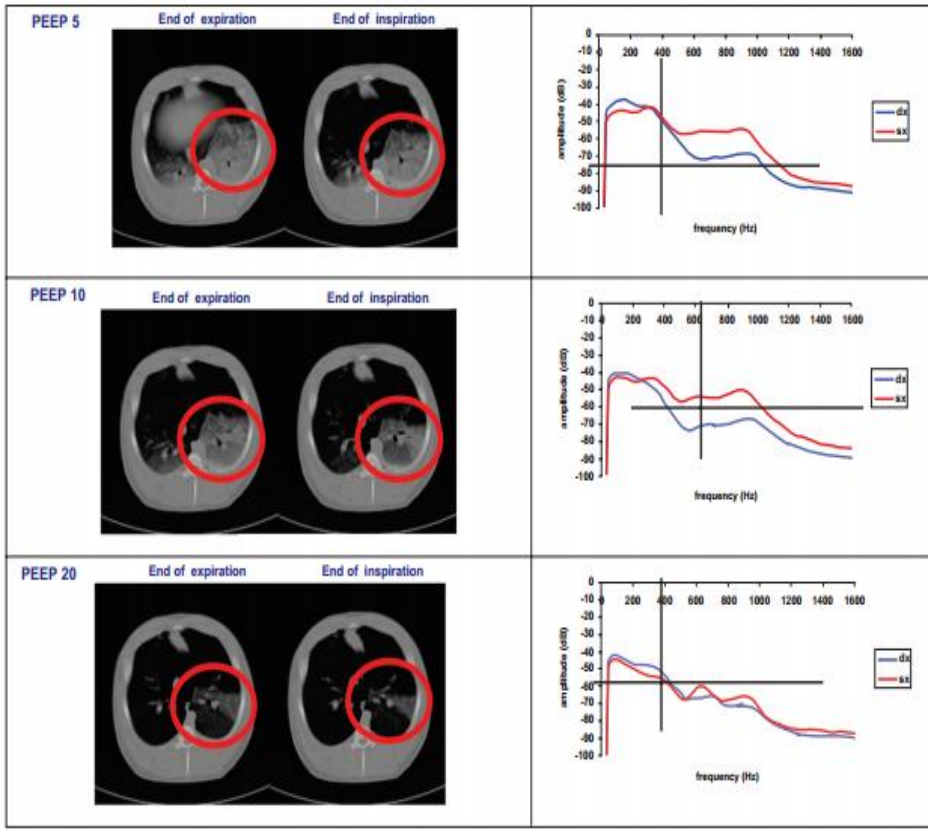
Microcontroller – part and parcel of AI

Part and parcel of robotic projects

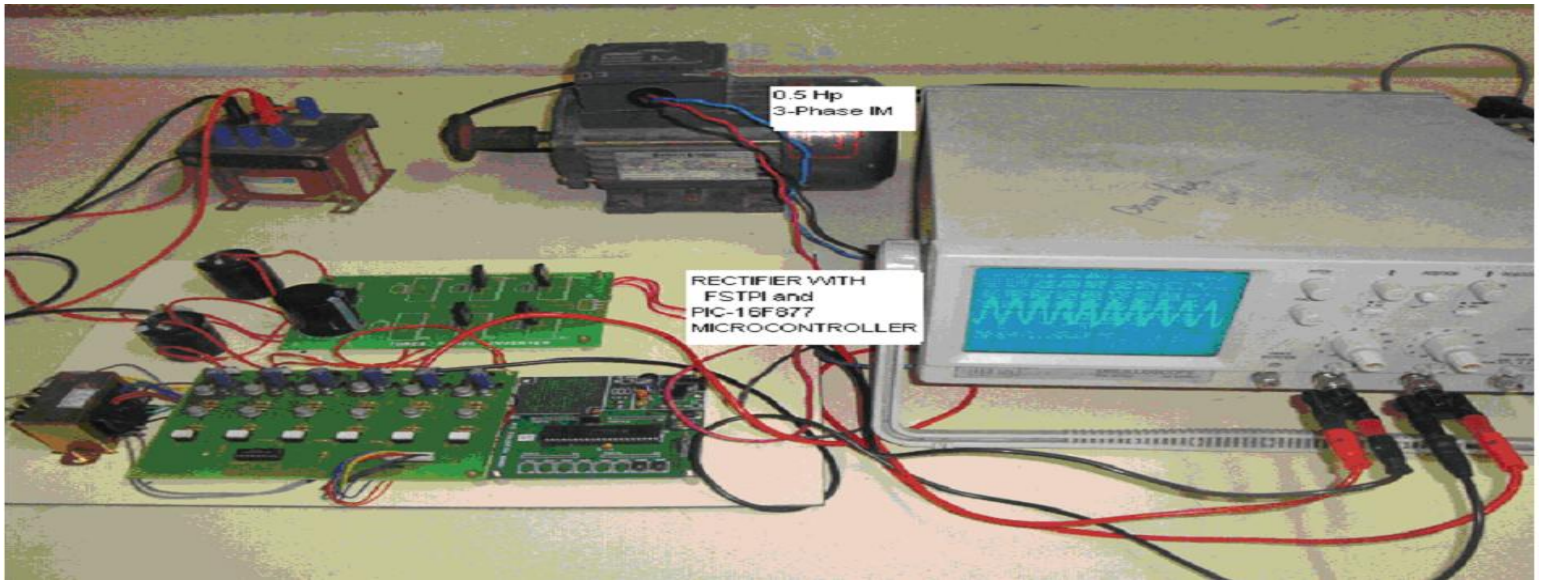


Microcontrollers in medical devices





Microcontrollers in power systrem



Other applications of microcontroller

- Remote controls
- Office machines
- Embedded systems