

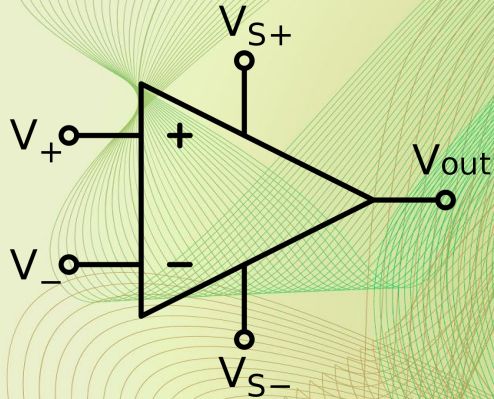


Introduction to Electronics

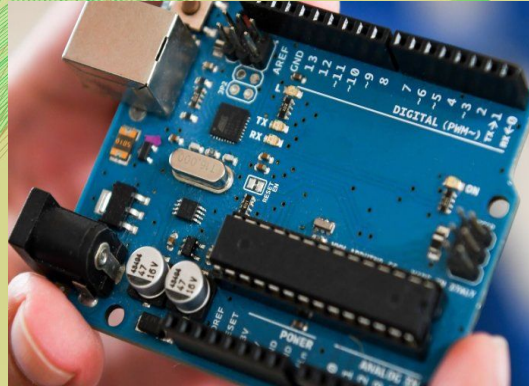
For Robotics

Introduction to Robotics CTE
Lecture #1

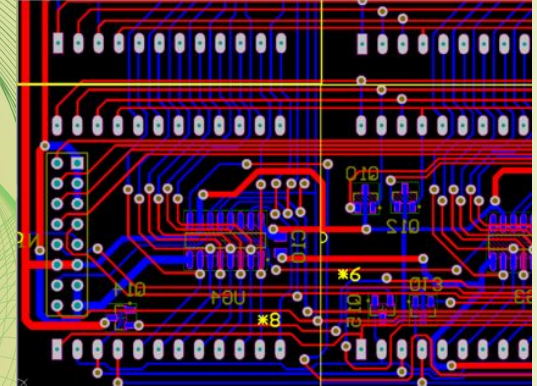
Main Areas



Analog Electronics



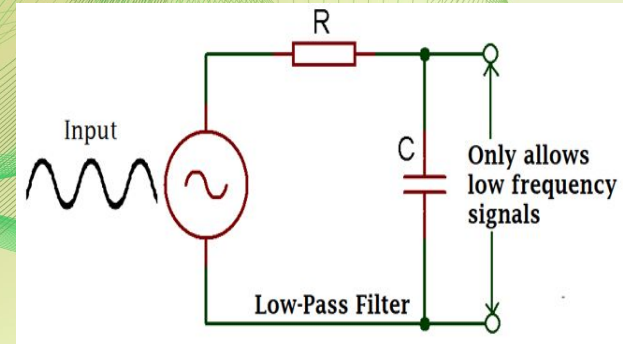
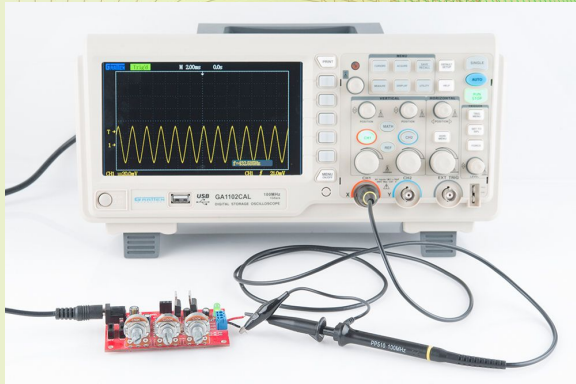
Digital Electronics and
Microcontroller



PCB Design

Analog Electronics

- Electronic systems that involve continuous signals
- Comes up in sensors, audio, and radio applications
- Involves
 - a. Operational Amplifiers
 - b. Filters
 - c. Transforms - Fourier, Laplace, etc.



Analog Electronics

Example: Heart Rate Monitor



Microcontroller Programming

- Computer on a single chip
- Includes CPU, IO pins, program memory, RAM, ADC etc.
- Most well known example:
Arduino



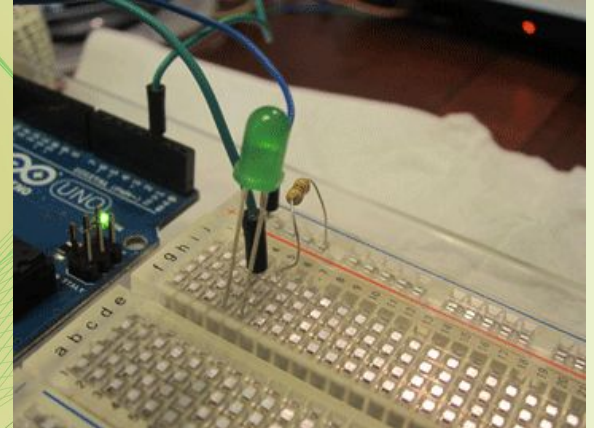
Microcontroller Programming

```
Blink | Arduino 1.8.6
File Edit Sketch Tools Help
Blink $
1 int led = 13;
2
3 // the setup routine runs once when you press reset:
4 void setup() {
5   // initialize the digital pin as an output.
6   pinMode(led, OUTPUT);
7 }
8
9 // the loop routine runs over and over again forever:
10 void loop() {
11   digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)
12   delay(1000); // wait for a second
13   digitalWrite(led, LOW); // turn the LED off by making the voltage LOW
14   delay(1000); // wait for a second
15 }
```

Write code



Compile



Run on microcontroller

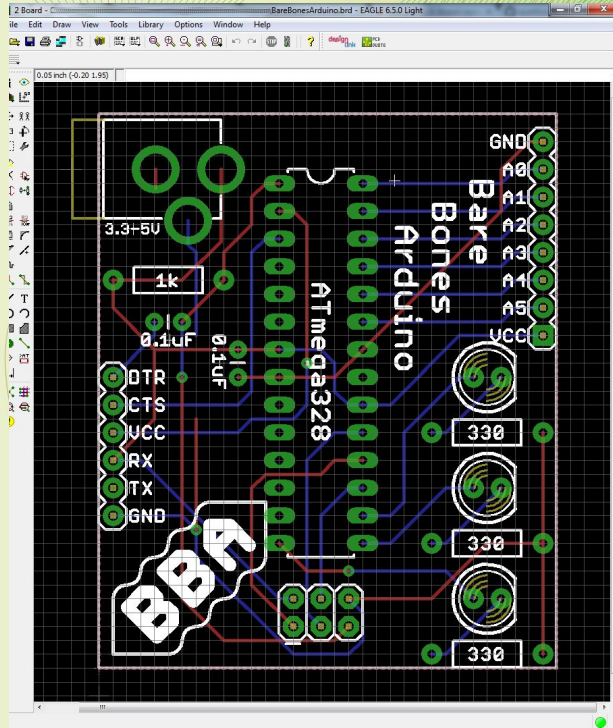
Microcontroller Programming

Example: Heart Rate Monitor



Tools we use

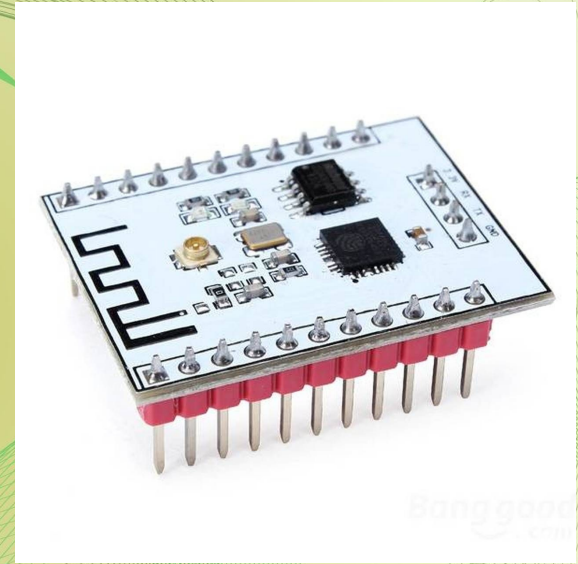
PCB Designing Software



Other Areas



FPGAs



Radio Electronics

Where to start

1. Intro to Robotics CTE
2. ERC Mini Projects
3. ERC Workshops

Resources

1. QSTP Mechatronics 2020 Material
2. Jeremy Blum's Tutorials
3. <https://www.learn-c.org/>

The image features a light green to yellow gradient background. In the center, the word "Questions?" is written in a bold, dark red font. The text is surrounded by a complex, abstract pattern of thin, overlapping lines in various shades of green and yellow, creating a sense of movement and depth. The lines form a central circular void, with the text positioned within it. The overall composition is balanced and visually engaging.

Questions?