Tutorial 4: Arduino

Goals

You can write simple programs and upload them to the Arduino. You can use the Arduino to control external components like servos and LEDs.

Documentation

https://www.arduino.cc/en/Reference/HomePage

Exercises

Build following circuits on a breadboard.

1 Blink-Sample

- Plug the Arduino into the breadboard and conncet it with the computer. Start the Arduino IDE and open the *Blink*-Sketch ("File → Examples → 01 Basic → Blink"). What does this program do?
- Select the correct type of Arduino ("Tools → Board") and the correct port ("Tools → Port") and upload the *Blink*-Sketch. What do you see? Try to change the behaviour by "remixing" the sample code.
- Connect an LED with a dropping resistor two a pin of the Arduino and make it blink by changing the code.
- Connect a second LED and let them blink alternately.

2 Arduino Programming Language and Standard Library

- Open the program "File → Examples → 02 Digital → Button" and build the circuit described in the comments.
- Extend the sample code so the Arduino sends the button's current state to the computer over the serial interface
- Build a binary counter with three LEDs that counts from 000 to 111 every second

3 Servo Motor and Potentiometer

- Open the sample "Servo → Knob" and open the tutorial referenced in the comments. Build the corresponding circuit and test it.
- Modify the sample so the potentiometer not only controls the servo, but also the blink frequency of an LED
- Modify the code so instead of the blink frequency, the brightness of the LED is changes (see *AnalogWrite()*)
- Turning the potentiometer changes the resistance between two of its pins. The Arduino's analog pins can not measure resistance, but only voltage. Why does the knob sample work anyways? What did we build here?