

Instituto Superior Técnico
Master's Degree in Information Systems and Computer Engineering
Software for Embedded Systems
2017-2018

1st Lab work: Building an embedded system ¹

Group:		
Student 1:		
Student 2:		

Goal:

The goal of this work is to put students for the first time in touch with the Arduino environment to drive simple actuators (in the case LEDs).

Description:

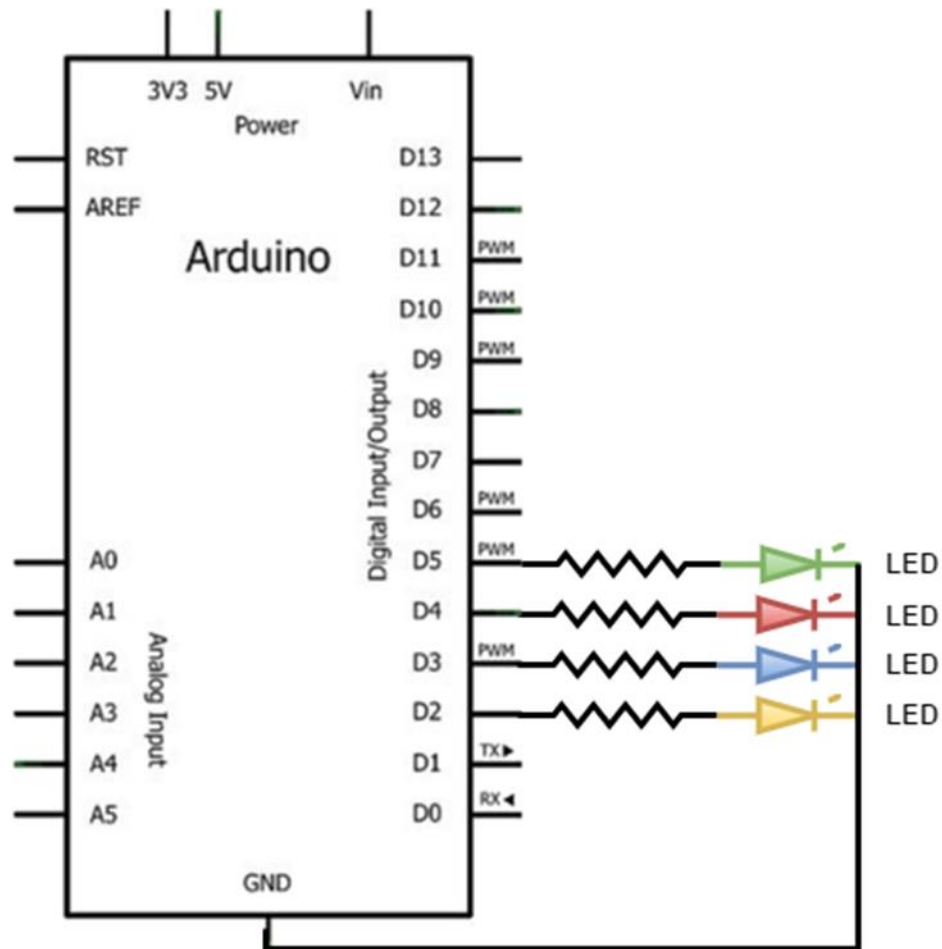
Build an embedded system using the Arduino UNO board to control 4 LEDs with different colors. In normal operation, in each 5 seconds period with the following pattern of activity, only one LED shall be active at a time (1 second slots):

- 1 – Red LED ON
- 2 – Green LED ON
- 3 – Blue LED ON
- 4 – Yellow LED ON
- 5 – All LEDs OFF

This behavior is then repeated.

The figure represents the circuit to drive the LEDs to be assembled.

¹ V1.1, Oct. 2017.



References:

1. <https://www.arduino.cc/en/Reference/digitalWrite>
2. <https://www.arduino.cc/en/Reference/Delay>

Recommendations:

In order to develop your work with security, and to avoid damaging the hardware involved, remember to carry out the recommendations below. As you are working fill the boxes to be certain that you fulfill all security measures.

Always work with the circuit disconnect from the source.	
Call the teacher, or the responsible for the laboratory, before you connect the circuit to the source.	
Make sure the circuit is well connected (resistors, capacitors, etc.) to prevent a short circuit, or damage the hardware.	

Design the interface:

R_red

R_green

R_blue

R_yellow

Interface the circuit to a press button.

Whenever the button is pressed the activated LED must remain ON making it easier to read the voltage drop on the LED. When the button is depressed the system continues its normal operation sequence.

Draw and design the press button interface to the controller.

Measure the voltage drops of the LEDs:

V_red

V_green

V_blue

V_yellow

Estimate the power consumption of the interface (the circuit with resistors and LEDs in the figure) in normal operation.

Program the application:

- Code:

```
void setup() {
```

```
}
```

```
void loop() {
```

```
}
```