· U C · FCTUC FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE DE COIMBRA

Licenciatura em Engenharia Informática

TECNOLOGIA DOS COMPUTADORES Year 2018/2019

Laboratorial assignment # 3

Interactive Traffic Lights

Components list:

- Arduino UNO
- 1 USB cable
- 1 white breadboard
- 5 LEDs: 2 red, 2 green, 1 yellow
- 7 220 Ohm resistors
- 2 Push buttons
- Wires
- Software: Arduino IDE

1. Interactive Traffic Light

Observe the circuit in figure 1. Implement this circuit and write a program for your UNO that is able to control the traffic lights for cars and pedestrians. Notice that the circuit has a push button. The operating cycle should be as follows:

- The idle mode is with car lights on green and pedestrian lights on red.
- When a pedestrian presses the push button, car lights should change for 2 seconds to yellow and then to red. After 1 second, the pedestrian lights change to green and stay green for 5 seconds. Then the green light for pedestrians should start blinking (½ second cycle; duty cycle 50%) for at most 5 seconds. Then they change to red and after half a second car lights should change to yellow during 1 second and finally to green, reaching the idle mode again.

Hint: study the function **`millis()`** to use in your program.

Upload and test your program.

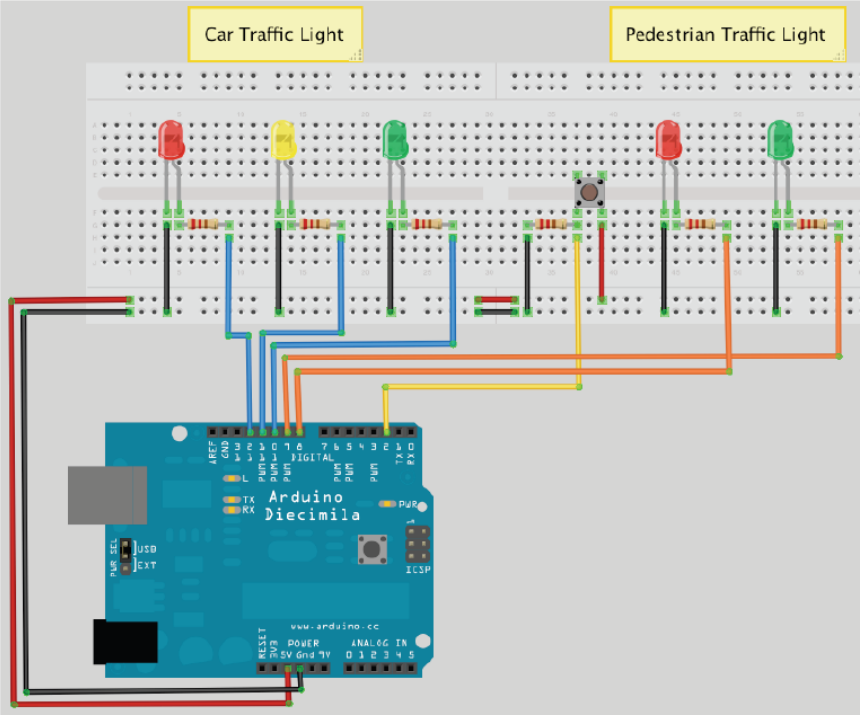

Fig. 1 – Interactive traffic lights.

2. Intermittent mode

Use another push button and adapt your code to change the operating mode of the traffic lights to intermittent. In this mode car lights should blink in yellow (cycle of 1 second, duty cycle 50%) and pedestrian lights should blink in red (same cycle). The operating mode should return to normal mode when this push button is pressed again.

Please note that you must beware of the transition between normal and intermittent modes.

Upload and test you program.