

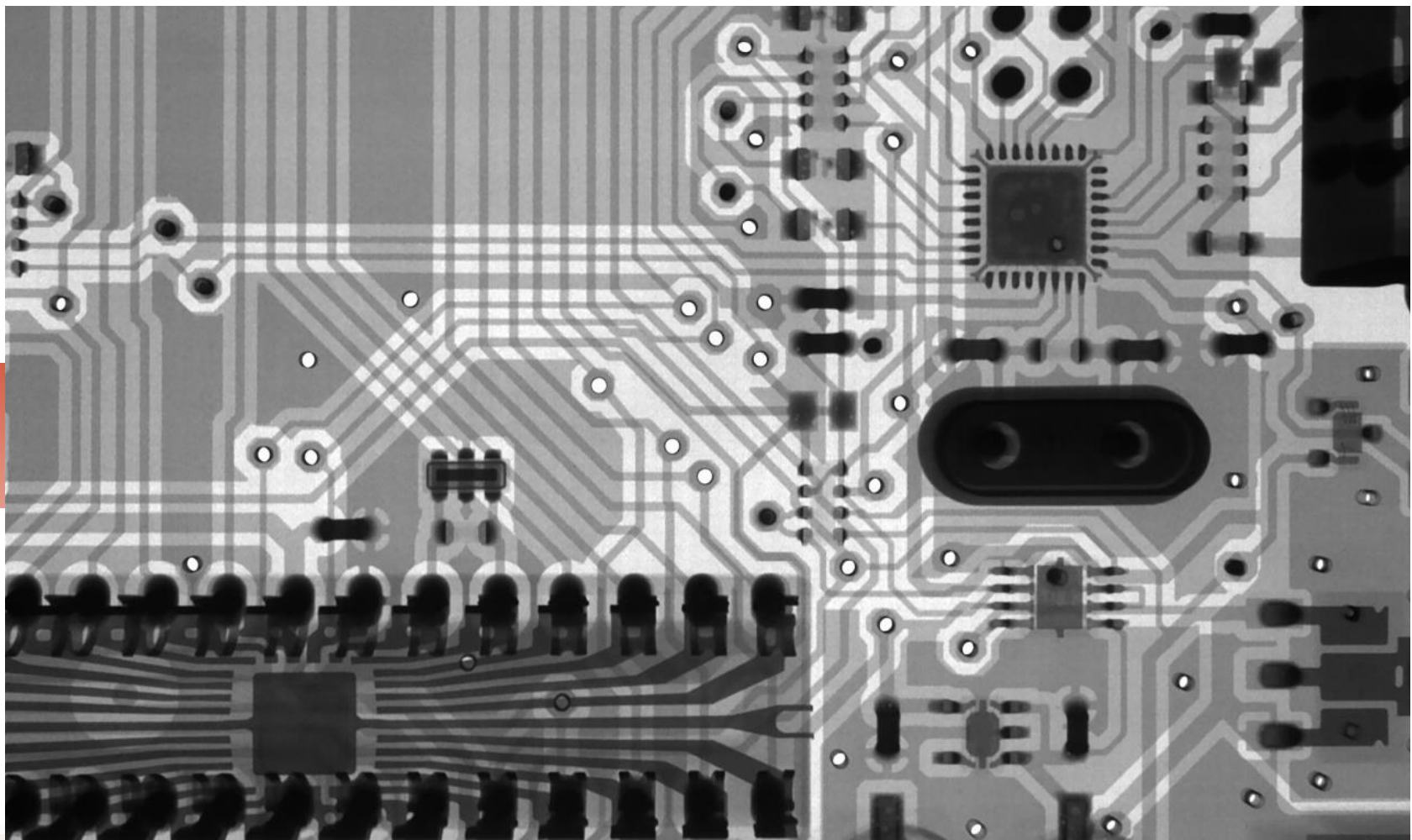


Arduino SYS-STEM for Schools

Training Methodology

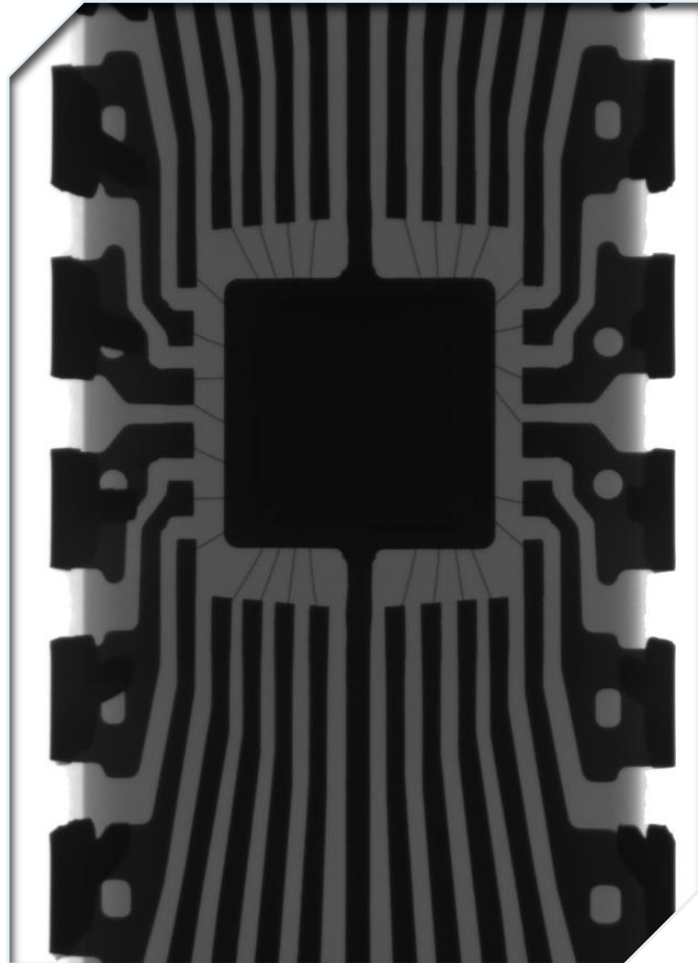
MODULE 3

FIRST PROGRAMS



TRAINING MODULE CONTENTS

- ▶ Objective
- ▶ Learning Outcomes
- ▶ Introduction
- ▶ Materials



OBJECTIVE

In this module the learner will be able to train the concepts of Arduino sketching and its structure practicing with some exercises that attach a possible solution.

Knowledge

- ▶ Variable declaring
- ▶ Programming function theory
- ▶ Assembling electronic circuits

Competences and Skills

- ▶ C lenguaje
- ▶ Arduino Programming structures

EXPECTED LEARNING OUTCOMES

INTRODUCTION

This module features several basic exercises where the learner will have the opportunity to make his/her first steps into Arduino assembling and programming.

Exercises will be explained, with their functionality for the learner to solve them. Remember that programming allows more than one solution, but in case you struggle to get to it, we will give you the solved exercise, in a link to Tinkercad.

You will find a link to Tinkercad in every single exercise in the module, which have several comments along the sketch explaining the code for a better comprehension.

LED BLINK EVERY 0.5 SECONDS

- ▶ To do:
 - ▶ You will have to make a LED blink every 0.5 seconds lapses. Switch it on for 0.5 seconds and switch it off for another 0.5 seconds.
- ▶ Devices needed:
 - ▶ Arduino
 - ▶ Protoboard
 - ▶ LED(any color)
 - ▶ Wire
 - ▶ Programming USB cable

Solution

TRAFFIC LIGHT

- ▶ To do:
 - ▶ You will simulate a traffic light that repeats the following sequence: Red light, Orange light, green light, Orange light, red light and restart the loop.
- ▶ Devices needed:
 - ▶ Arduino
 - ▶ Protoboard
 - ▶ 3 LEDs (red, Orange and green)
 - ▶ Wire
 - ▶ Programming USB cable

Solution

LED AND BUTTON

- ▶ To do:
 - ▶ You will have to achieve, through a sketch, to give the button a switch behaviour, so that a short push of the button will swap the status of the LED permanently unless the button is pushed again
- ▶ Devices needed:
 - ▶ Arduino
 - ▶ Protoboard
 - ▶ Button
 - ▶ LED
 - ▶ Wire
 - ▶ Programming USB cable

Solution

LIGHT DIMMER

- ▶ To do:
 - ▶ You will have to assemble the components and develop a sketch to let a potentiometer regulate the brightness intensity of a LED
- ▶ Devices needed:
 - ▶ Arduino
 - ▶ Protoboard
 - ▶ Potenciometer
 - ▶ LED
 - ▶ Wire
 - ▶ Programming USB cable

Solution

BUZZER

- ▶ To do:
 - ▶ You will have to assemble a circuit with just a buzzer and make it emit sound. The solution shows a short melody that is the anthem of a football team
- ▶ Arduino
- ▶ Protoboard
- ▶ Buzzer
- ▶ Wire
- ▶ Programming USB cable

Solution

LED BLINKING LOOP AND BUZZER

- ▶ To do:
 - ▶ You will design a circuit that works as follows: when the button is pressed a loop starts and make a LED blink 5 times, and when the loop is over a buzzer will sound
- ▶ Devices needed:
 - ▶ Arduino
 - ▶ Protoboard
 - ▶ LED
 - ▶ Button
 - ▶ Wire
 - ▶ Programming USB cable

Solution (using for)

Solution (using while)

LIGHT MANAGER

- ▶ To do:
 - ▶ You will have 3 buttons and 2 LEDs, one of the buttons will turn on one LED, another button will turn on two LEDs and the other button will turn both off. Solve the exercise using a switch ... case structure.
- ▶ Arduino
- ▶ Protoboard
- ▶ 2 LEDs
- ▶ 3 Buttons
- ▶ Wire
- ▶ Programming USB cable

Solution



CONGRATULATIONS

You have completed SYS-STEM Module 3 First programs