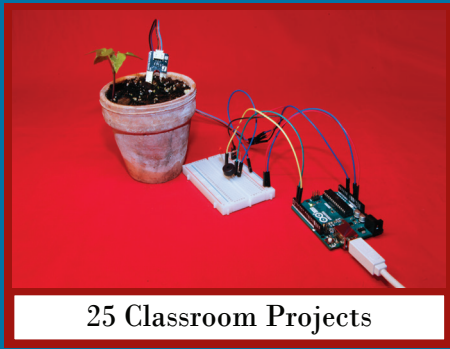


Integrated  
STEAM  
Edition



25 Classroom Projects

Published by Gearbox Labs, Inc.  
sales@gearboxlabs.org

# The ARDUINO® Classroom

## Inside the Book

- 25 Classroom Tested Projects
- Standards Alignments
- 110+ Project Extensions
- Materials Lists
- Tested Code
- Technical Diagrams and Photos
- Assessments

## Integrates

- STEAM
- C / C++ Programming Basics
- Digital Prototyping
- Engineering Design
- Project Management

## Free with Website Registration

- Project Updates
- Community Ideas
- Project Submissions

**C / C++ Programming**

```

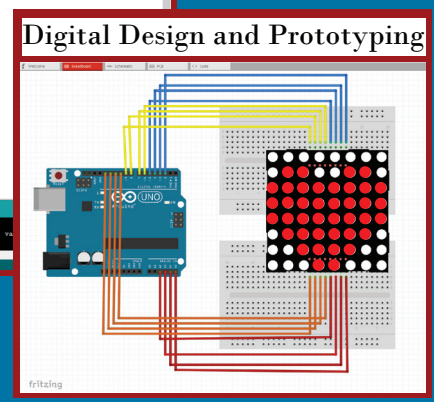
//Project 10
//LCD Counter using two Pushbuttons
//thearduinoclassroom.com
//Copyright 2019, Isabel Mendiola and Peter Haydock

#include <liquidCrystal.h> // Add the library for reading the LCD
liquidCrystal lcd(7,4,5,4,3,2); // Add digital microcontroller pins
const int Up_buttonPin = 8; // Pushbutton 2
const int Down_buttonPin = 9; // Pushbutton 1
int count = 0;

void setup()
{
  lcd.begin(16, 2); //Columns and rows of the LCD
  lcd.print("  and  counting"); //Type the message for the display
  pinMode(8, INPUT);
  pinMode(9, INPUT);
  digitalWrite(8, HIGH);
  digitalWrite(9, HIGH);
}

void loop()
{
  //the rest
}

```



María Isabel  
Mendiola Ramírez  
and  
Peter G. Haydock

[www.thearduinoclassroom.com](http://www.thearduinoclassroom.com)

## Premium Website Membership

- Videos of Projects
- Classroom Presentations
- Images, Diagrams, and Code



Integrating programming, design,  
and prototyping into Science,  
Technology, Engineering, Arts, and  
Math (STEAM) classrooms with  
Arduino® based projects.

## Projects Overview

|   | Project                           | Page | Time to Complete (hr:min) Project / Extensions | Difficulty   | Science |      |           |         | Technology | Engineering | Allied Arts | Math |
|---|-----------------------------------|------|--|--------------|---------|------|-----------|---------|------------|-------------|-------------|------|
|   |                                   |      |  |              | Earth   | Life | Chemistry | Physics |            |             |             |      |
| Section 1<br>Building Blocks                | UNO Heartbeat                     | 18   | 0:15 /0:30                                     | Starter      |         | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Lighting Effects                  | 24   | 0:45 /0:45                                     | Starter      |         | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Buzz Me                           | 32   | 0:30 /0:45                                     | Starter      |         | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Dimmer Switch                     | 40   | 0:30 /0:45                                     | Starter      |         |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Rainbow Light                     | 48   | 0:45 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
| Section 2<br>Displays, Inputs, and Controls | Spin It Up                        | 68   | 0:30 /0:45                                     | Starter      |         | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Count on Me                       | 76   | 0:45 /0:45                                     | Starter      |         |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | LCD Billboard                     | 84   | 0:45 /0:45                                     | Intermediate |         |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Lights On/ Lights Off             | 92   | 0:30 /0:45                                     | Intermediate |         |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Pushbutton Counting               | 100  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Music Maker                       | 108  | 0:45 /0:45                                     | Intermediate | ✓       |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Calculator                        | 116  | 1:00 /0:45                                     | Advanced     | ✓       |      |           | ✓       | ✓          | ✓           |             | ✓    |
| Section 3<br>Sensors                        | Night Light                       | 128  | 0:30 /0:45                                     | Starter      | ✓       | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Sensing Jolts, Bumps, and Rattles | 136  | 0:45 /0:45                                     | Starter      | ✓       | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Polychrome                        | 144  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Digital Ruler                     | 152  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Turbidity Sensor                  | 160  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    |           | ✓       | ✓          |             |             | ✓    |
|   | My Heartbeat                      | 168  | 0:30 /0:45                                     | Intermediate |         | ✓    |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | pH Properties                     | 176  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Soil Moisture                     | 184  | 0:45 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          |             |             | ✓    |
|   | Gas Sniffer                       | 192  | 1:15 /0:45                                     | Advanced     | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           |             | ✓    |
| Section 4<br>Combining Inputs and Outputs   | Cool It!                          | 202  | 1:15 /0:45                                     | Intermediate | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Emoji Me                          | 210  | 1:15 /0:45                                     | Advanced     |         |      |           | ✓       | ✓          | ✓           | ✓           | ✓    |
|   | Did You Hear Me?                  | 218  | 1:15 /0:45                                     | Intermediate | ✓       | ✓    |           | ✓       | ✓          |             |             | ✓    |
|   | Robot Race                        | 226  | 2:00 /2:00                                     | Advanced     | ✓       | ✓    | ✓         | ✓       | ✓          | ✓           | ✓           | ✓    |

✓ = Full match to standards  
 ✓ = Supports standards with extensions  
 ✓ = Supports standards with problem