



## Introduction

This project is a Wordle-based little game built with Arduino.

The aim of this project was to make students enjoy studying the fundamentals of Arduino, with the game-based learning principles.

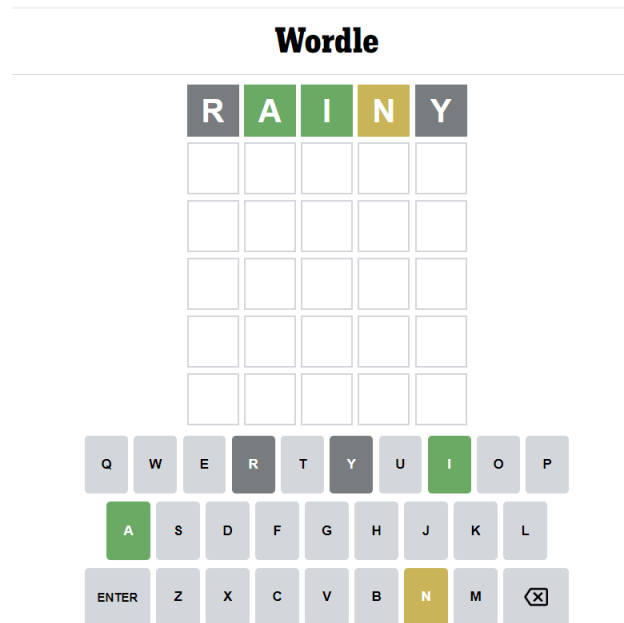
The hardware is composed of: an ELEGOO UNO board (compatible with Arduino IDE projects), a potentiometer, a joystick, a buzzer, a LCD display and a one digit 7-segment LED display.

## Wordle

Wordle is a New York Times game in which every day people can join and challenge themselves guessing the correct word in 6 tentatives. The rules of the game are the following:

- You have to guess a five letter word and at the beginning you don't have any tip (you just have to try);
- If you put the correct word in less than 6 tentatives, all the letters become green and the game ends with you winning the game;
- You can see in a grid all the words you put before;
- There's no time bound in which you have to finish the game;
- If a letter you put belongs to the word but it's in the wrong position, this one becomes yellow;
- If a letter you put belongs to the word and it's in the right position, this one becomes green;
- If a letter you put doesn't belong to the word it becomes grey;
- If you don't manage to guess the right word in 6 tentatives, you loose the game and you can't try again;

This below is a screen of a first round in Wordle.



## Implementation

At first, an homepage is displayed. The user can decide whether to begin the game or not. The one digit 7-segment LED display is always on showing the remaining rounds (it starts from 6 and goes down throughout the game). If the user decides not to begin the game, an "OKAY, GOODBYE!" message is shown on the LCD display. Instead, if they decide to start the game, a little gingle plays and the game begins.

There are two different functions for the management of the joystick: one for the homepage in which the user can just move on the bottom line of the LCD display selecting Y or N, and one function which controls the movement of the joystick in the game.

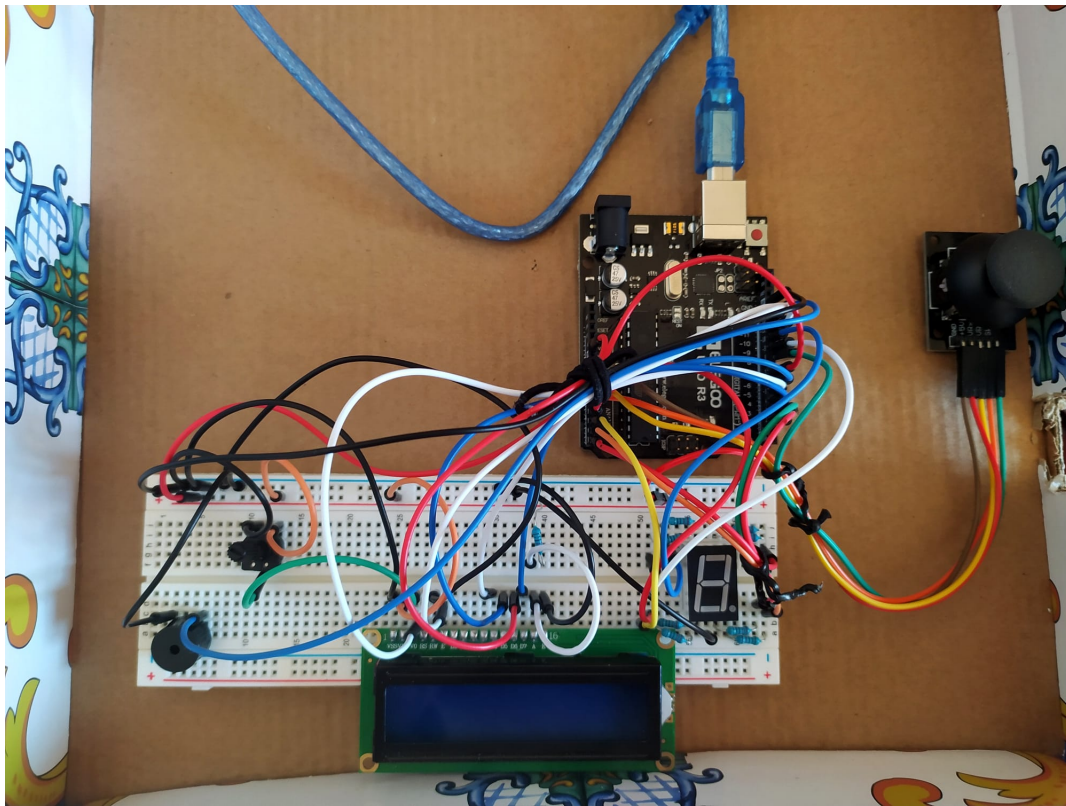
The game is organized in two main LCD pages: the page which displays the word you're putting and the page that allows you to select a word from the english alphabet. The user can move in the two pages and select all the elements with the joystick.

There's a function that controls whether the word put by the user is correct or not: if the word is not correct, the function also checks the letters present in the misterious word, which can be:

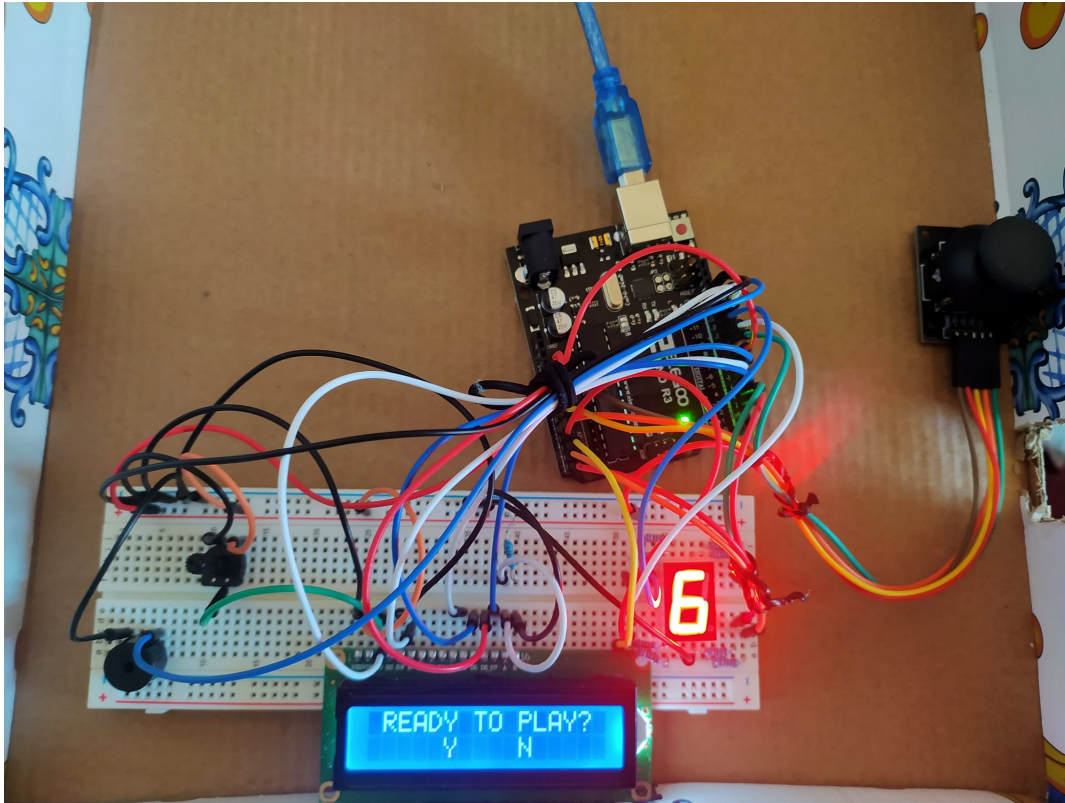
- in the right place, and in this case at the following round the user can find them already written at their places;
- in the wrong place, and in this case the user can find them at the right side of the screen at the following round;

At every round, the letters to be shown at the right side are reset.

If the user manages to put the right word, a "WIN!" screen is displayed with a winning sound. Otherwise, if the user fails to guess the word at the last round, a losing screen is shown with a sad gingle. At the end, the game can be restarted with a new word to be guessed.



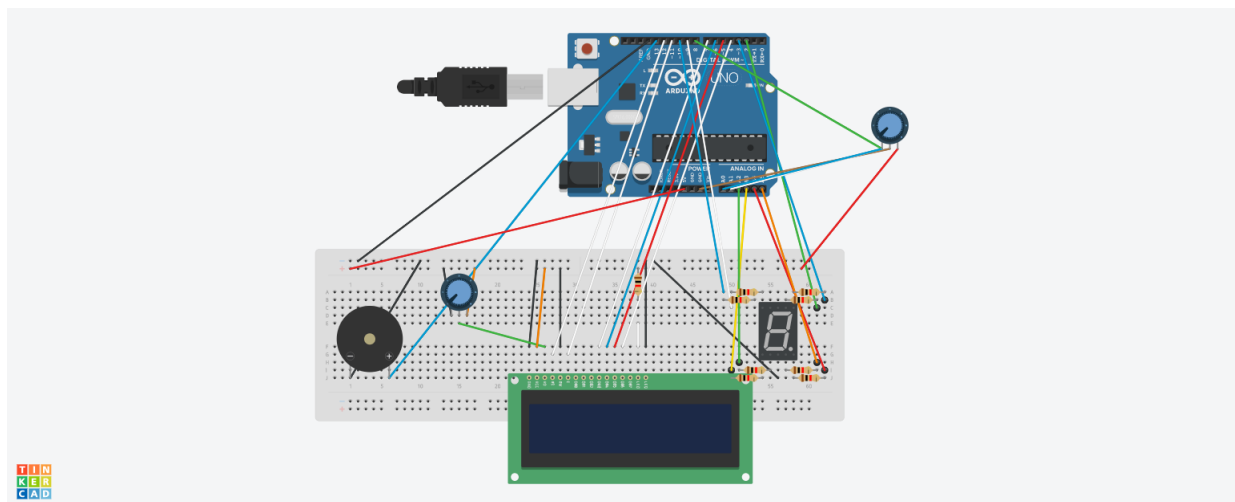
*Circuit without the dressing*



*Homepage of the circuit without the dressing*

## Circuit Diagram

The components used are described in the following section (**Circuit blocks**). Unfortunately, Tinkercad didn't have the joystick module, so I used a potentiometer to emulate it and connected the first pin to three wires to show the first three pins of the joystick.



## Circuit blocks

NOME	QUANTITA'	COMPONENTE
U3	1	ELEGOO Uno R3
U4	1	LCD 16 x 2
PIEZO2	1	Piezo
Digit1	1	Anodo Display a 7 segmenti
Rpot3	1	250 kΩ Potenziometro
R1 R2 R3 R4 R5 R6 R7 R8 R9	9	1 kΩ Resistenza
Joystick	1	Analog Joystick Module

## Dress of the circuit

The circuit has been covered with a carton box of a plate and decorated in order to make the overall project seem more appealing. The box has holes which show just the LCD screen and the one digit 7 segment led display and little holes to increase the sound of the buzzer. I also created holes to let the wires of the joystick and the USB cable pass.

I also used a long carton to put inside the hole of the LCD which isolates the screen and covers all the wires that surround it.

The box has a cover so it's easy to open it and to show the wires along with all the components.