University of Bath

Department of Computer Science

CM10194: CS architecture 1

Wac-A-Mole

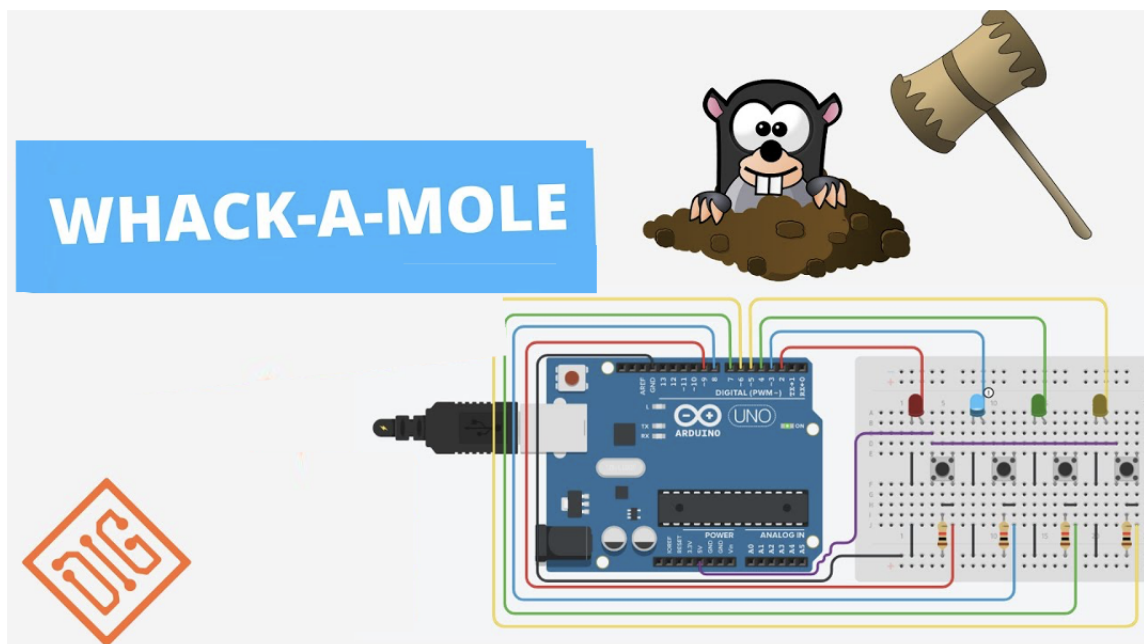## Coursework 1

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1 Introduction

The aim of the coursework is to create the popular arcade game "Wac-A-Mole". We were provided with the basic scematics of the circuit and starter code that needed to be extended. The course specification mentions are some core functionalities and some additional functionalities that needs to be implemented in order to play the game:

No.	Core features	Additional features
1	Check whether the button press happens at the same time as an LED	Include sound output
2	Add a score that is incremented if the player presses the button while an LED is on	
3	Extend to 2 player mode	
4	Use of a servo	

2 Design
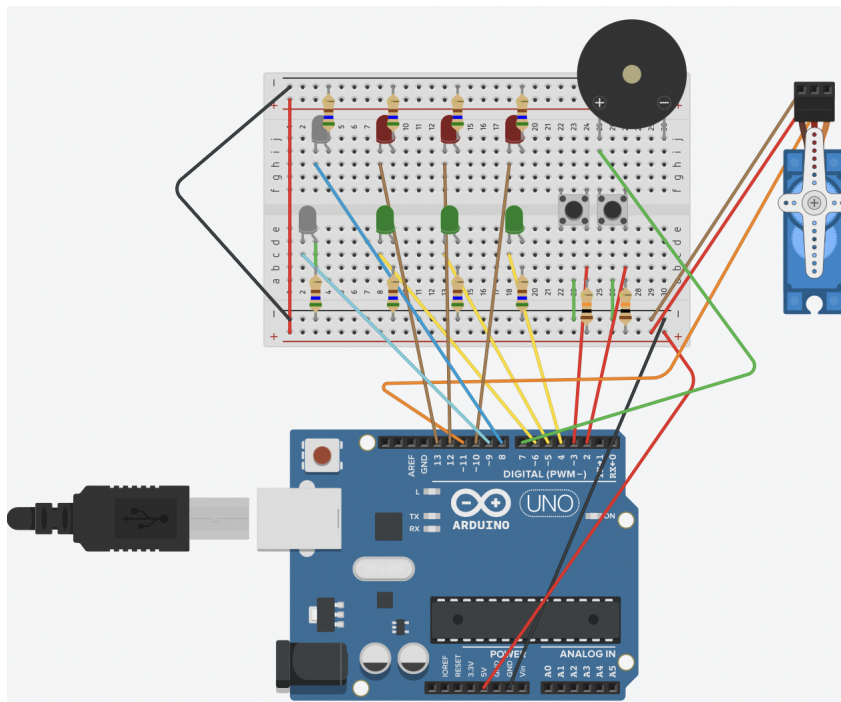
One of the design decisions we needed to make was weather to turn one of both players LEDs in random or turn one LED random for both player. I choose to implement first method as it makes the game more fair and gives each player equal opportunities to score points, which lead to having two separate white LEDs to indicate the point has been scored for a particular player.

Second choice had to be made on how to make use of the servo motor in a creative way. There were many options possible. Forexample, servo can be used to indicate that the game has been ended or used when each time when a player hits the "mole". I used the servo in a way to indicate who in the lead of the game as I couldn't find any other components other than LCD screen to do that. I have given detailed description of implementation of servo in the next section.

3 Implementation

Our implementation of Wac-A-Mole encapsulates both of the core and additional functionalities required. We implemented Wac-A-Mole as a two player game with 8 LEDs: 3 green LEDs, 3 red LEDs, 2 white LEDs and two buttons. The one of each green and red LEDs, representing the mole, will turn on at random at short period of time. Each player's goal is to press the button when one of the lights up. If the player(s) press the button on time the corresponding white LED flashes to indicate that a point has been scored. In addition to that, as described in previous section, the servo motor is used in a creative way such that it shows who is in lead when each time a player scores a point according to this table.

Score situation	Servo angle	result
$greenScore > redScore$	$180°$	green is winning
$redScore > greenScore$	$0°$	red is winning
$greenScore = redScore$	$90°$	draw

In order to achive the additional functionality we made use of the piazzo buzzer to play a note when one of the player scores 10 and the game ends.

4 Conclusion

To conclude, this project meets all of the core requirements and does one of the additional requirement which is making a sound output when a player wins the game. Therefore this project could be improved by implementing other additional requirements which were adding a third player and implementing difficulty functions that allows the players to change the difficulty by using a scroll wheel. One of the reason why I couldn't implement these features was that I didn't have enough pins remaining in the arduino. One way to overcome this challenge would have been using shift register which will expand the number of output pin available.

5 References

[1] Sound output in arduino: https://www.arduino.cc/en/Tutorial/BuiltInExamples/toneMelody.