Tick Tock, Tick Tock, Tick Tock

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Computional Methods in Engineering (ENGR-200)

Abstract

My Project is a more of a stopwatch. During this process, I'm supposed to keep pressing the button and then the numbers will be displayed on the seven-segment display.

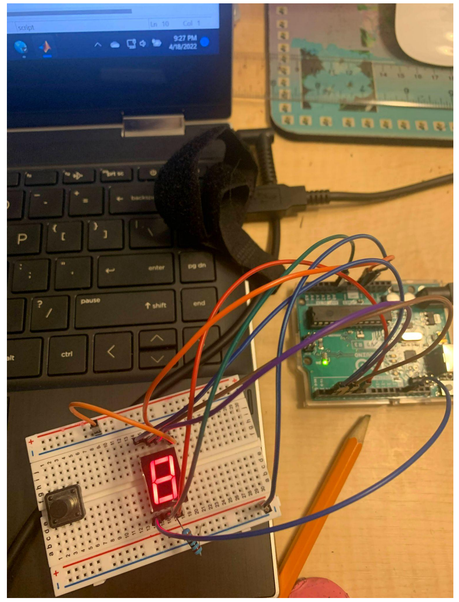
Methods and Materials

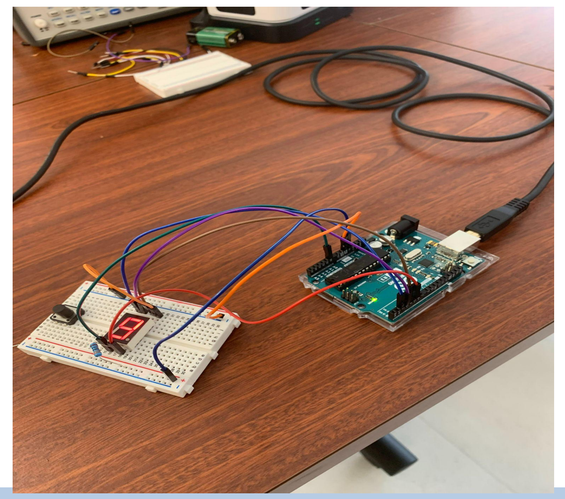
I used the breadboard, the Buzzer, the Wires, and the Arduino Board to generate the results on MATLAB and they are connected to the 7 Segment Display to show results there as well.

Challenges

The Challenges that I went through in this project is that I had to figure out how to create a code that can display time, that was the first step. The second step in this project was that I had to create a randomized 5 number matrix (0-10), and I found it to be really difficult but I was able to accomplish that as well. Then the harder part was incorporating the seven segment display into my code, and now the hardest part is creating a 7 segment display with the timer.

Sneak Peek of the Hardware





Code

The way how my code works is that it helps me use the button counter to display the time. The separate code that I created is the code that has helped me figure out which numbers will appear on the Seven Segment Display, and on the Seven Segment Display; when you have a 1, one of the lights on the Seven Segment Display will go off but if you have a 0, it makes any of the lights go on. I have generated a for loop in this code according to the matrix to make any of the numbers appear on the Seven Segment Display. I had to create a randomized matrix that can compare with the original timing.

```
clear
a = arduino;
a = [ 1 3 3 5 5]
if a(1) = 9
    writeDigitalPin(a, 'D6', 0)
    writeDigitalPin(a, 'D4', 0)
    writeDigitalPin(a, 'D3', 0)
    writeDigitalPin(a, 'D2', 0)
    writeDigitalPin(a, 'A0', 0)
elseif
    writeDigitalPin(a, 'D6', 0)
    writeDigitalPin(a, 'D4', 1)
    writeDigitalPin(a, 'D3', 0)
    writeDigitalPin(a, 'D2', 1)
    writeDigitalPin(a, 'A0', 1)
else
    writeDigitalPin(a, 'D6', 0)
    writeDigitalPin(a, 'D4', 0)
    writeDigitalPin(a, 'D3', 1)
    writeDigitalPin(a, 'D2', 0)
    writeDigitalPin(a, 'A0', 1)
elseif
    writeDigitalPin(a, 'D6', 0)
    writeDigitalPin(a, 'D4', 1)
    writeDigitalPin(a, 'D3', 0)
```

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```
        T(counter) = toc; %displays the results
        round = 0; %determines whether or not you have pressed the button twice. it resets the loop once you press the button twice.
        counter = counter+1; %this function displays the counter 1 at a time
    else
        %nothing
    end
end
T
Question

compare = zeros(5,1);
for i = 1:5
    compare(i) = Question(i) - T(i)
end

% while toc < press
%     if Begin == tic
%         continue
%     else
%         keep_on_going = 1;
%         break
%     end
% end
% displayTime = [minutes + ":" seconds];
%
```

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```
clear
a = arduino;


writeDigitalPin(a, 'D6', 0)
writeDigitalPin(a, 'D4', 0)
writeDigitalPin(a, 'D3', 0)
writeDigitalPin(a, 'D2', 0)
writeDigitalPin(a, 'A0', 0)
```

```
configurePin(a,'D2','pullup') %this function is wired to 'D2'
configurePin(a,'D3','pullup') %this function is wired to 'D3'


x = 5;   %indicates the # maximum number of times you press the button
Question = rand(5,1)*10; %missing Values before you press the button
T = zeros(5,1); %missing Values before you press the button
counter = 1; %you press the button 1 at a time
round = 0; %determines whether or not you have pressed the button twice. it resets the loop once you press the button twice.

while counter <= x %while counter is less than or equal to x
    sensorValue = readDigitalPin(a,'D2');
    if sensorValue == 1 %this button is not being pressed
        continue;
    elseif sensorValue == 0 && round == 0  %in this case, sensorValue is being pressed and round resets the loop once you press the button twice.
        tic
        pause(.1) % eliminate jitter
        round = 1; %it does not reset the loop once you press the button twice
        continue;
    elseif sensorValue == 0 && round == 1 %in this case, sensorValue is being pressed and round does not reset the loop once you press the button twice.
        T(counter) = toc; %displays the results
        round = 0; %determines whether or not you have pressed the button twice. it resets the loop once you press the button twice.
        counter = counter+1; %this function displays the counter 1 at a time
    else
```

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