Exercise 12: Catch the LED game

Equipment

For this exercise you will need:

- 1 x Arduino Uno
- 5 x LEDs
- 5 x $\sim 60 - 220\Omega$ Resistors
- 1 x button
- Wires
- LCD Screen

The ternary operator:
`condition ? IfTrue : IfFalse`
Ex.
`(a==5) ? "a is five" : "a is not five"`

Setup

- Setup the LEDs close together in one straight line on the breadboard.
- Connect the five LEDs to five different digital pins.
- Connect the button.

Questions & Exercises

The five LEDs should flash in a consecutively pattern, one after the other. The goal of the game is to push the button when the middle LED light up. **12a:** Make the LEDs flash.
12b: When the button is pushed, print out the number of the lit LED to the LCD. Is the timing right?
12c: Implement a specific flashing pattern when the player pushes the button at the right time. If the player missses the LEDs must turn off for 1 second.
12d: Also, count the number of hits and misses. Print out these counters from time to time.
12e: Make the game progressively harder, by increasing the flashing speed every time the player hits.
12f: When the hit counter equals 8 the LEDs must flash randomly, one at a time. At 10 the player wins.
12g: Setup Doxygen and document your code. The hand-in for this exercise should include a fully-made Doxygen.

Hint

In this exercise you have to deal with timing. You probaly want different parts of your program to run at different frequencies e.g. maybe you shouldn't update the LCD everytime you check if the button is pushed. There are many ways of dealing with timing, the easiest is a counter as seen here

```
int count = 0;
loop(){
    if(count%2 == 0){
        // this happens every 20ms
    }
    if(count%4 == 0){
        // this happens every 40ms
    }
    if(count%100 == 0){
        // this happens every second
    }
    count++;
    delay(10); //wait 10ms
}
```