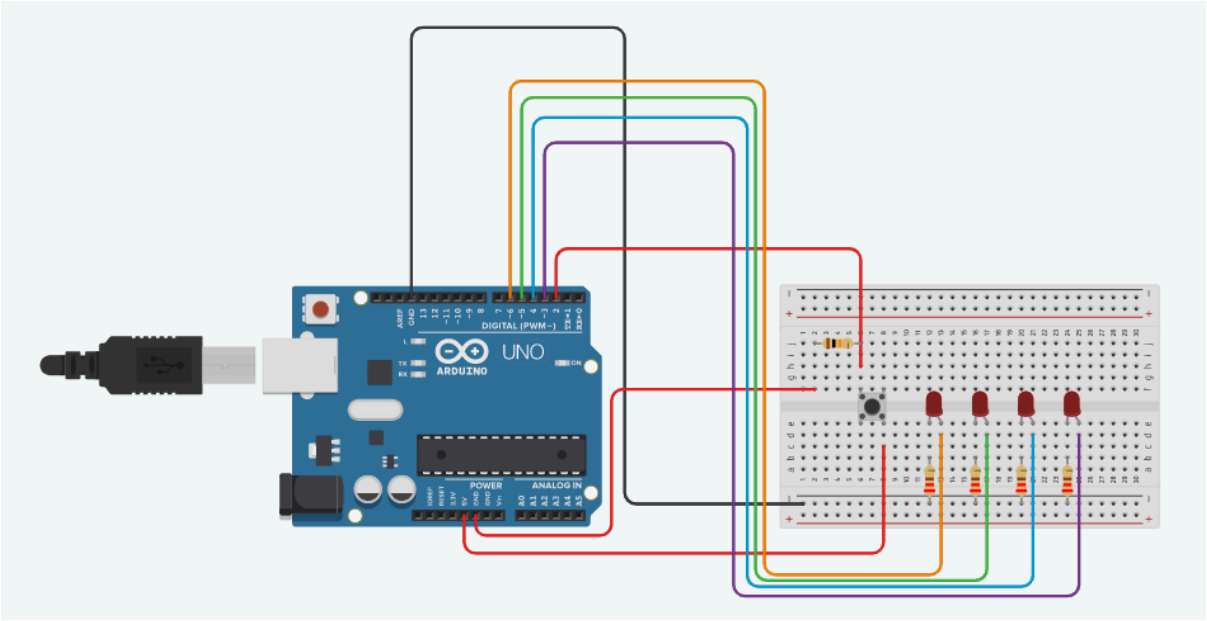
Arduino

Task 3:

Make a binary counter of 4 bits, which increments with every press of the button.

Circuit:



Components and Working:

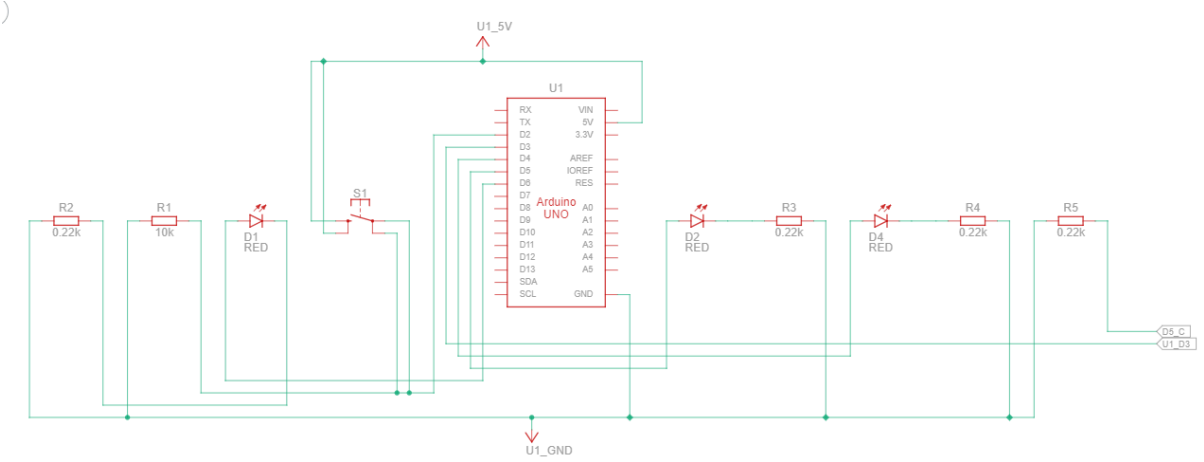
An Arduino Uno, 4 LEDs, 4 of 220Ω resistors for LEDs, 1 Pushbutton, 1 10kΩ resistor which is a pull-down resistor, the rest of the circuit is just wires with a small Breadboard.
So, whats happening here is each LED is being considered as an output and the button pin is obviously acting as input. Each time the button is pressed , it detects that the input goes from low to high and the counter increments by 1. The counter's value (0–15) is converted to

binary using digitalWrite() for each LED. And at the end, as always, a small delay of 200ms that prevents multiple counts from a single press.

Component List

Name	Quantity	Component
U1	1	Arduino Uno R3
S1	1	Pushbutton
D1 D2 D4 D5	4	Red LED
R1	1	10 kΩ Resistor
R2 R3 R4 R5	4	0.22 kΩ Resistor

Schematic View:

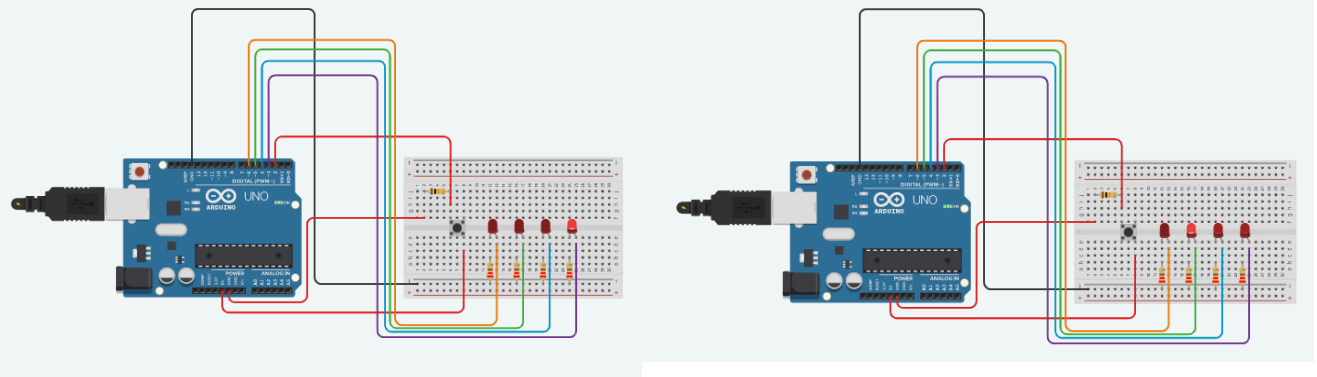


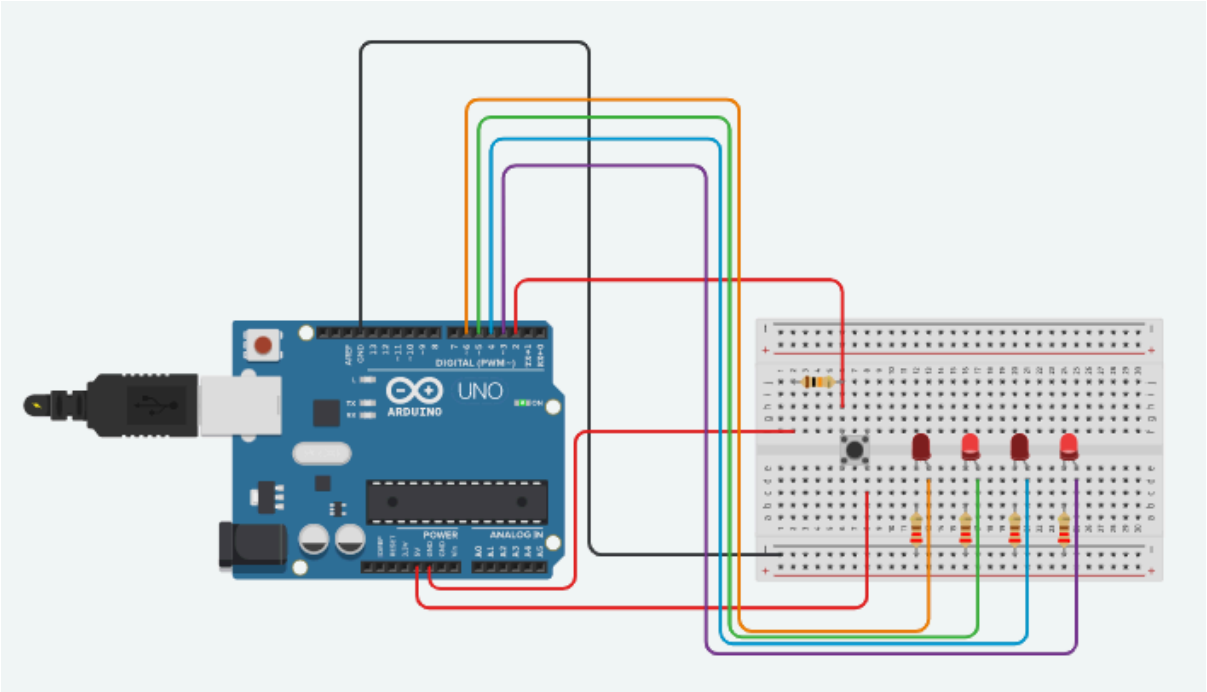
Code:

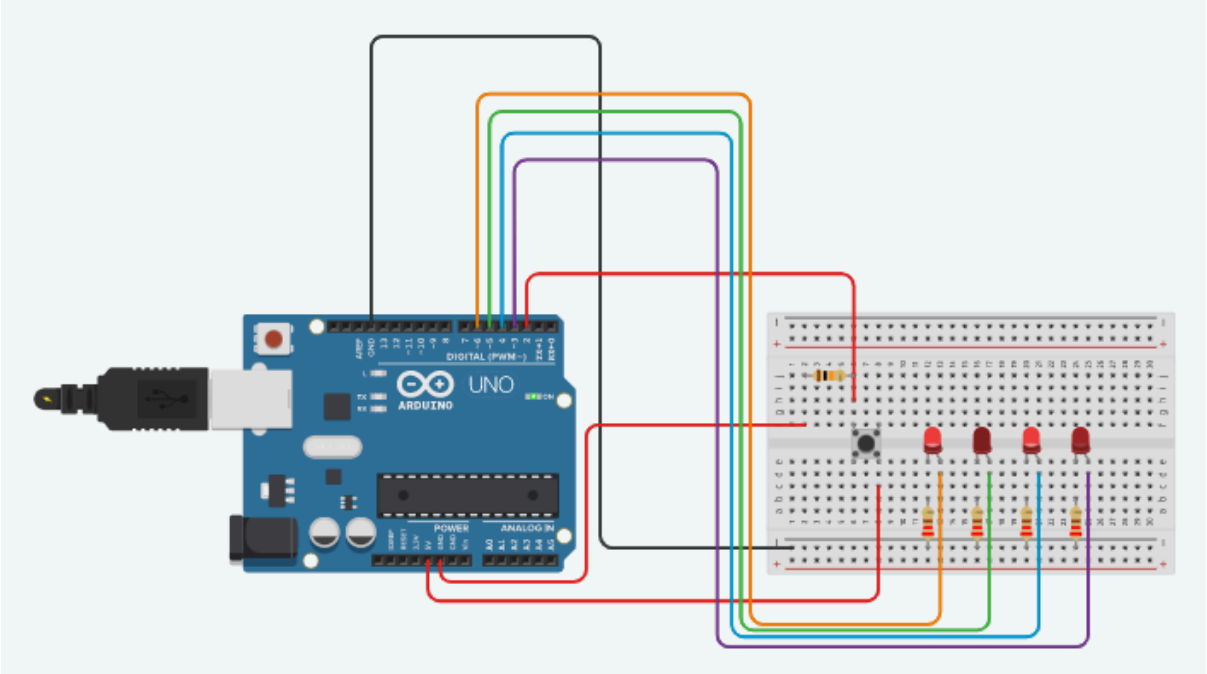
```
int buttonPin = 2;
int leds[4] = {3, 4, 5, 6};

int buttonState = 0;
int lastButtonState = 0;
int counter = 0; // 0-15

void setup() {
  pinMode(buttonPin, INPUT);
  for (int i = 0; i < 4; i++) {
    pinMode(leds[i], OUTPUT);
  }
}

void loop() {
  buttonState = digitalRead(buttonPin);

  // Detect button press (LOW → HIGH)
  if (buttonState == HIGH && lastButtonState == LOW) {
    counter++;
    if (counter > 15) counter = 0; // roll over after 1111
    displayBinary(counter);
    delay(200); // debounce
  }

  lastButtonState = buttonState;
}

// Function to light LEDs as binary
void displayBinary(int num) {
  for (int i = 0; i < 4; i++) {
    int bitValue = (num >> i) & 1;
    digitalWrite(leds[i], bitValue);
  }
}

```

Output:

These are some screenshots of the output:







Tinkercad Link:
https://www.tinkercad.com/things/gTyLBKU3cIs-bit-binary-counter?sharecode=ZqzL1j7dpTMIH0BpJY2pJlewZyc_P_g40fBtSBrFIcg

THANK YOU

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