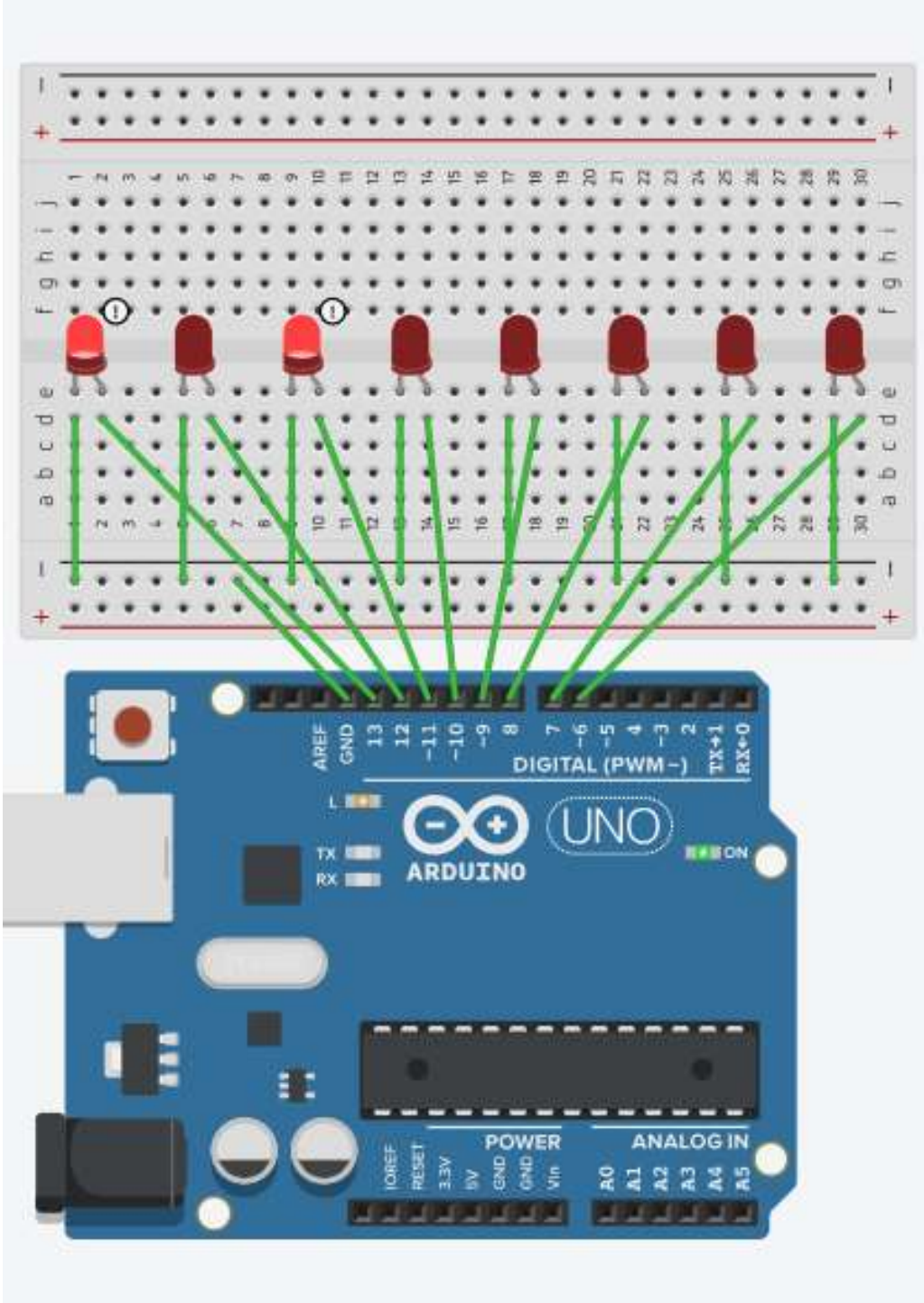
Practical 3

Study of serial communication and device control using serial communication with Arduino.

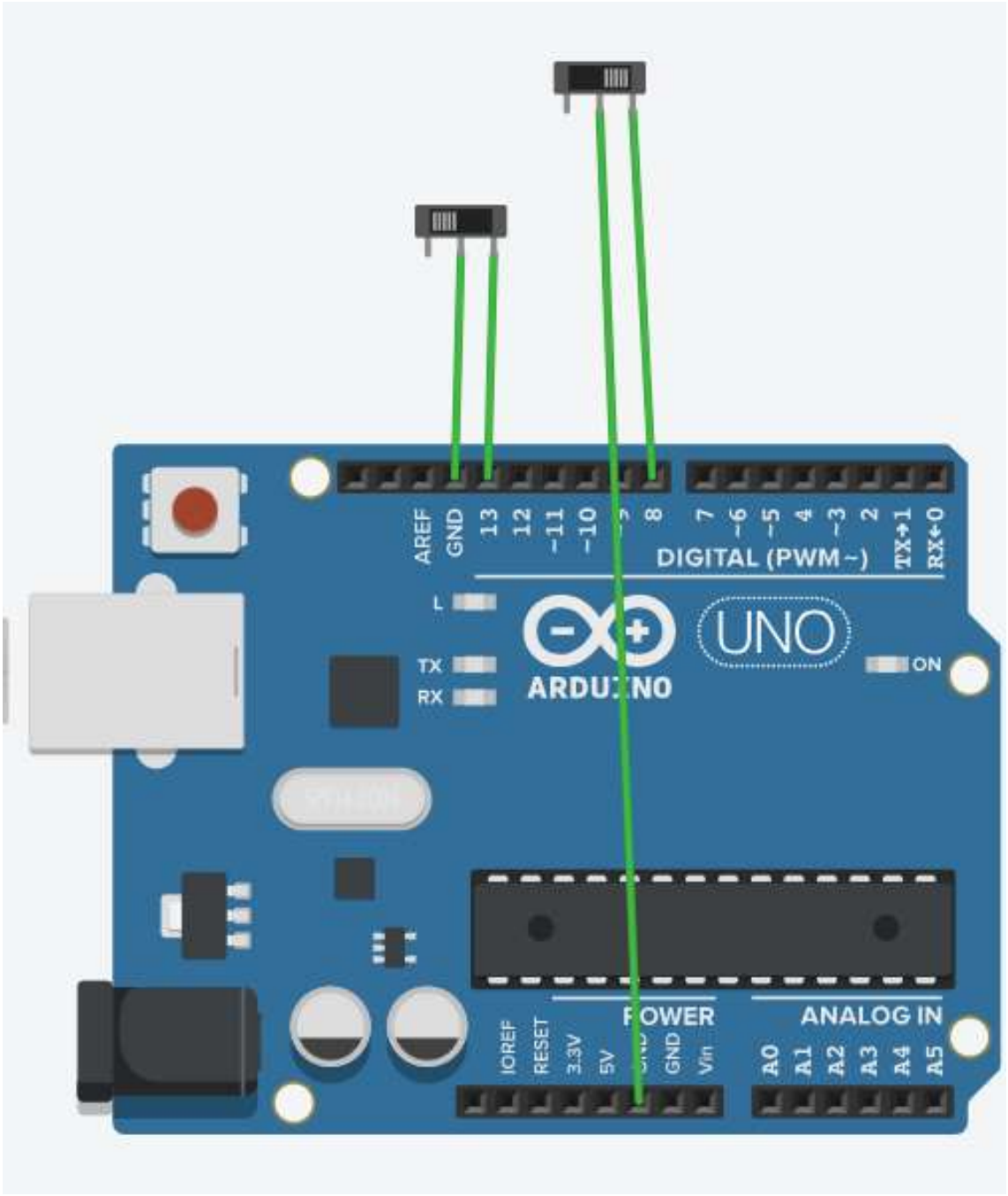
Serial Communication-Based LED Control Using Arduino:

```
int pin[] = {13, 12, 11, 10, 9, 8, 7, 6};  // Array of pins for LEDs
void setup()
{
   Serial.begin(9600);  // Initialize serial communication
   for (int i = 0; i < 8; i++)
      pinMode(pin[i], OUTPUT);  // Set all pins as output
}
void loop() {
   char input = Serial.read();  // Read incoming serial data
   if (input >= 'A' && input <= 'H') {
      Serial.println(input);
      digitalWrite(pin[input - 'A'], HIGH);  // Turn on corresponding LED for capital letters
   } else if (input >= 'a' && input <= 'h') {
      Serial.println(input); // Print input data on serial monitor
      digitalWrite(pin[input - 'a'], LOW);  // Turn off corresponding LED for small letters
   } else if (input == 'X') {
      Serial.println(input);
      for (int i = 0; i < 8; i++) digitalWrite(pin[i], HIGH);  // Turn on all LEDs capital X
   } else if (input == 'x') {
      Serial.println(input);
      for (int i = 0; i < 8; i++) digitalWrite(pin[i], LOW);  // Turn off all LEDs small x
   }
}
```


AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
~3
2
TX→1
RX←0
DIGITAL (PWM~)
L
TX
RX
ARDUINO
UNO
ON
POWER
ANALOG IN
IOREF
RESET
3.3V
5V
GND
GND
Vin
A0
A1
A2
A3
A4
A5

Button-Controlled Increment and Decrement Counter Using Arduino

```
#define buttonp 13
#define buttonn 8
void setup() {
  pinMode(buttonp, INPUT_PULLUP);  // Set pin as input with internal pull-up resistor
  pinMode(buttonn, INPUT_PULLUP);
  Serial.begin(9600);              // Initialize serial communication at 9600 baud
  while (!Serial);                 // Wait for the Serial Monitor to open
}
int counter = 0;  // Initialize counter variable
void loop() {
  if (digitalRead(buttonp) == LOW) {  // Check if the increment button is pressed
    if (counter == 100)               // Reset counter if it reaches 100
      counter = 0;
    else
      counter++;                      // Increment counter
    Serial.println(counter);          // Print the current counter value
    delay(1000);                      // Delay to debounce the button press
  }
  if (digitalRead(buttonn) == LOW) {   // Check if the decrement button is pressed
    if (counter == -100)               // Reset counter if it reaches -100
      counter = 0;
    else
      counter--;                      // Decrement counter
    Serial.println(counter);          // Print the current counter value
    delay(1000);                      // Delay to debounce the button press
  }
}
```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