

```

int onTime = 500; // 25% of 2000 ms
int offTime = 1500; // 75% of 2000 ms
void setup() {
  pinMode(LED_BUILTIN, OUTPUT);
}
void loop() {
  digitalWrite(LED_BUILTIN, HIGH); // turn the LED on
  delay(onTime);                  // 25% of 2000ms
  digitalWrite(LED_BUILTIN, LOW); // turn the LED off
  delay(offTime);                  // remaining time
}

```

Observation

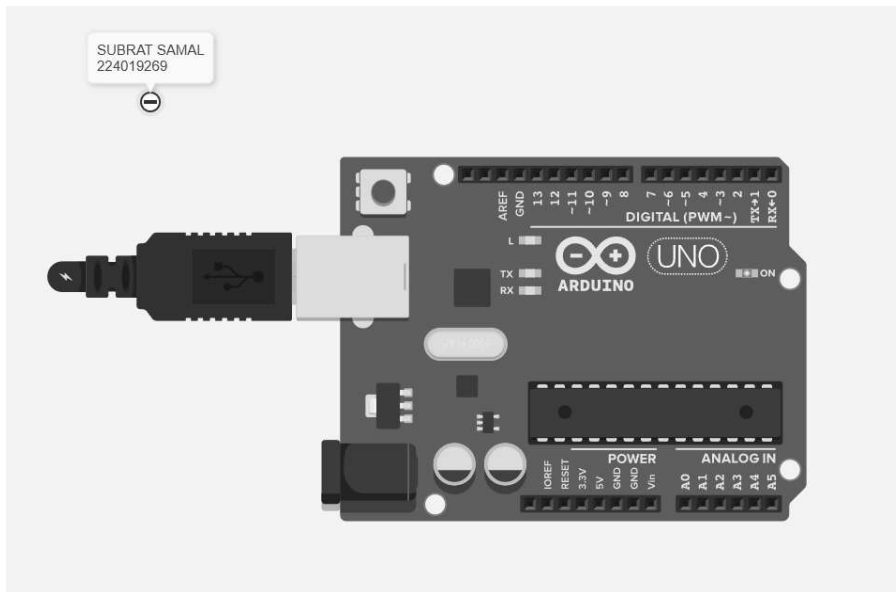


Figure 2: (Simulation based blinking of the onboard LED of the Arduino Uno with a 25% duty cycle for a blink time of 2 seconds)

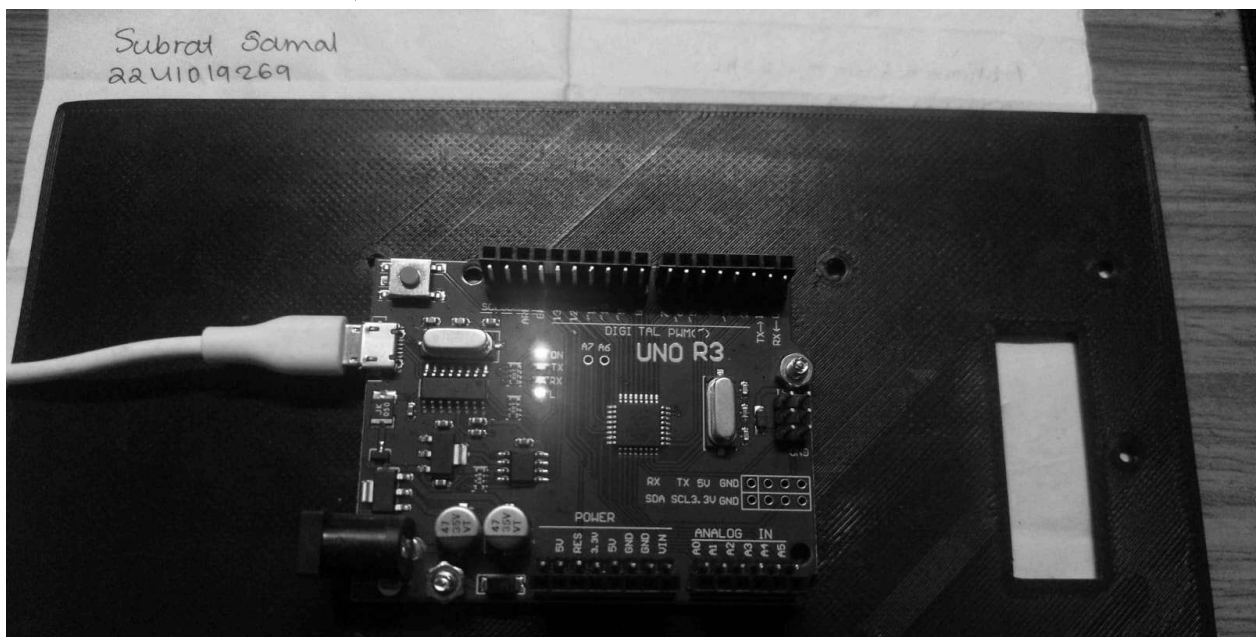


Figure 3: (Hardware Implementation based blinking of the onboard LED of the Arduino Uno with a 25% duty cycle for a blink time of 2 seconds)

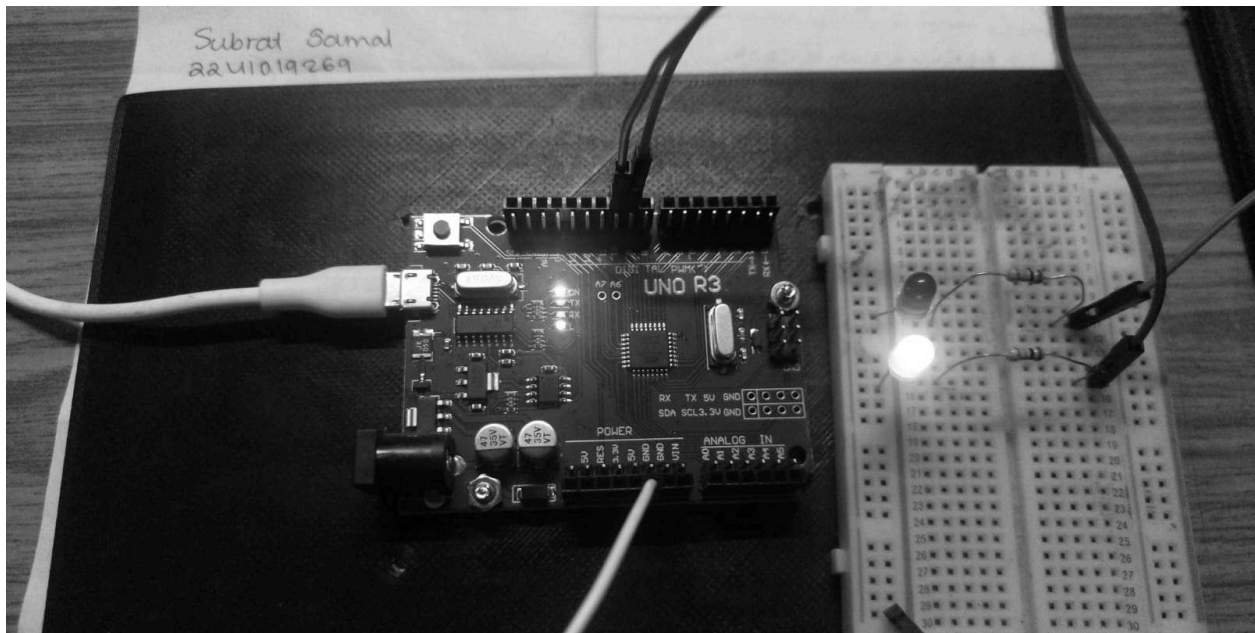
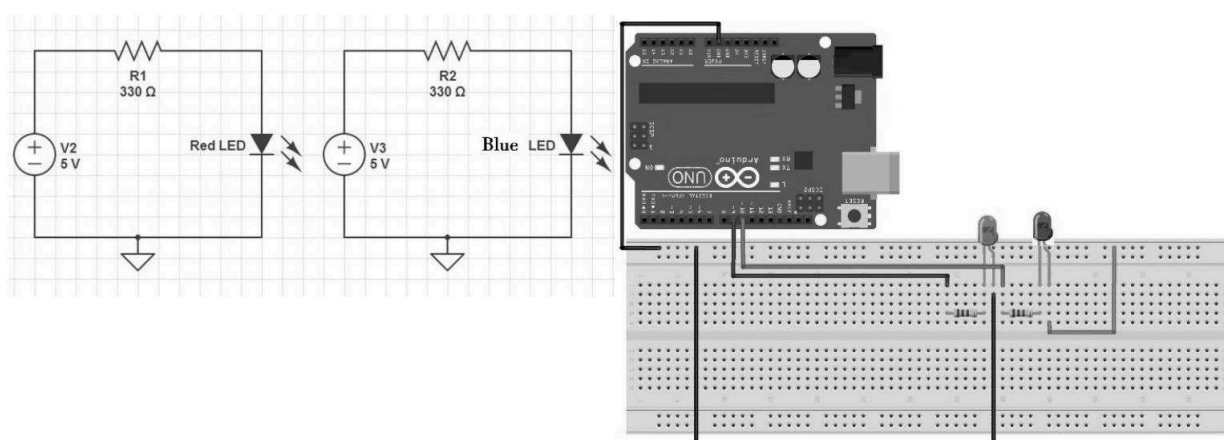


Figure7:(HardwareImplementationbased externalcircuitusinganLEDandcontrolitfromthe Arduino, with a 75% duty cycle and a blink time of 1 second.)

Objective4

Create a circuit with two LEDs and learn about "for loops" with the serial monitor in the Arduino sketch. The Red LED (First LED) will blink for 5 times and the Blue LED (Second LED) will blink for 3 times. The anode of the Red LED will be connected to Arduino digital pin 9, and the anode of the Blue LED will be connected to Arduino digital pin 10. The duty cycle of the Red LED will be 50%, with an on time of 200ms, and the duty cycle of the Blue LED will be 25%, with an on time of 400ms.

Circuit/SchematicDiagram



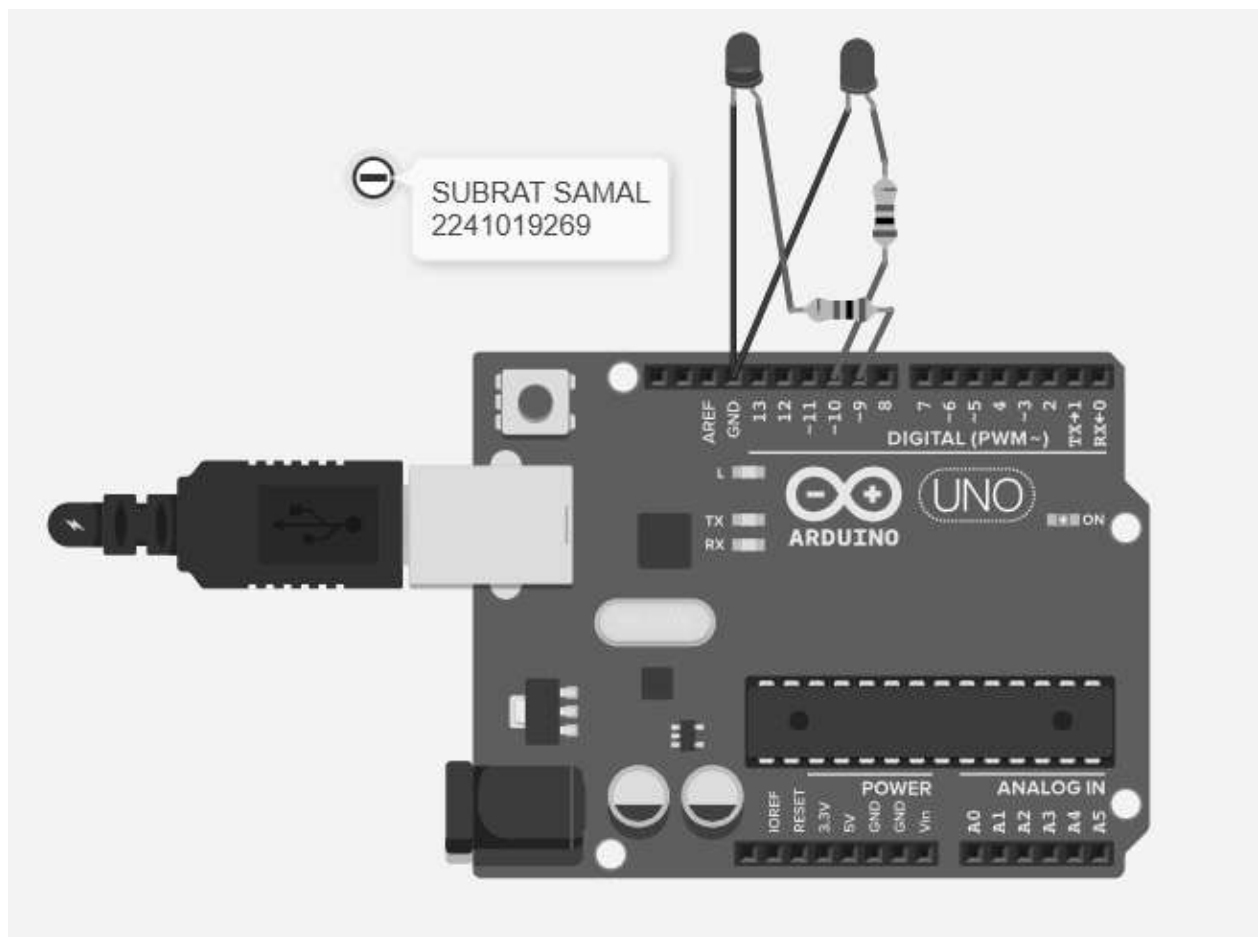


Figure10:(Simulation based Two LED Circuit)

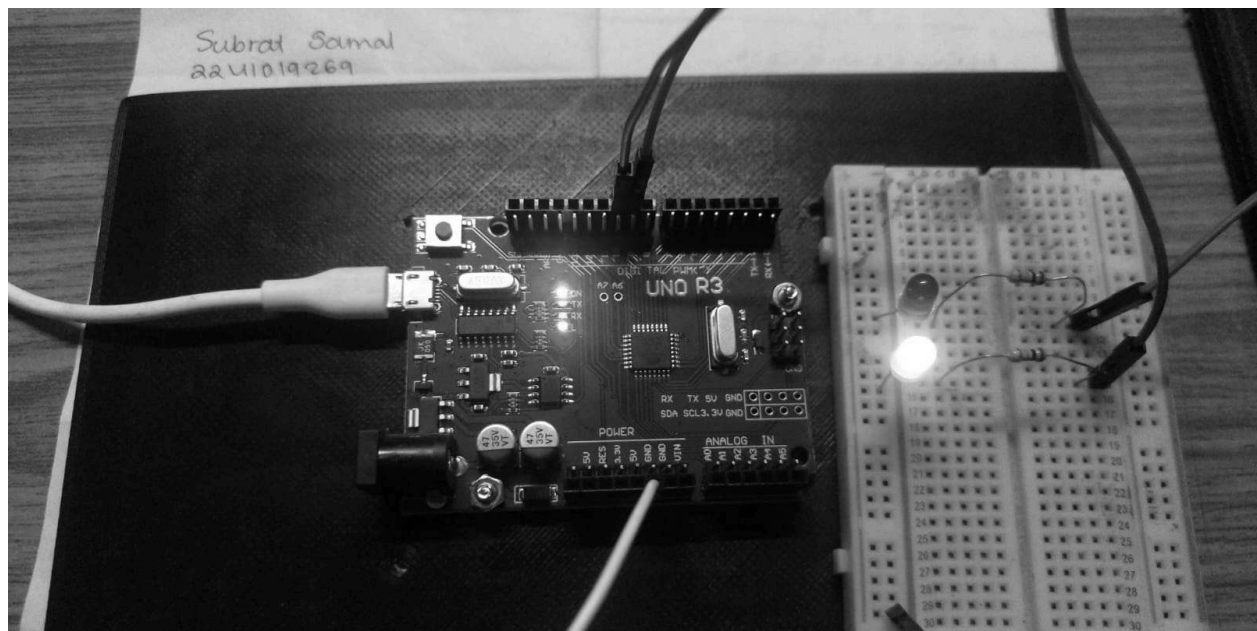


Figure11:(Hardware Implementation based Two LED Circuit)

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    digitalWrite(ledPins[i], LOW);
    if (i < 7) delay(50);
}
for (int i = 6; i >= 0; i--) {
    digitalWrite(ledPins[i], HIGH);
    delay(100);
    digitalWrite(ledPins[i], LOW);
    if (i > 0) delay(50);
}
}
void runningLights() {
    for (int i = 0; i < 8; i++) {
        digitalWrite(ledPins[i], HIGH);
        delay(100);
        digitalWrite(ledPins[i], LOW);
    }
}
}

```

Observation

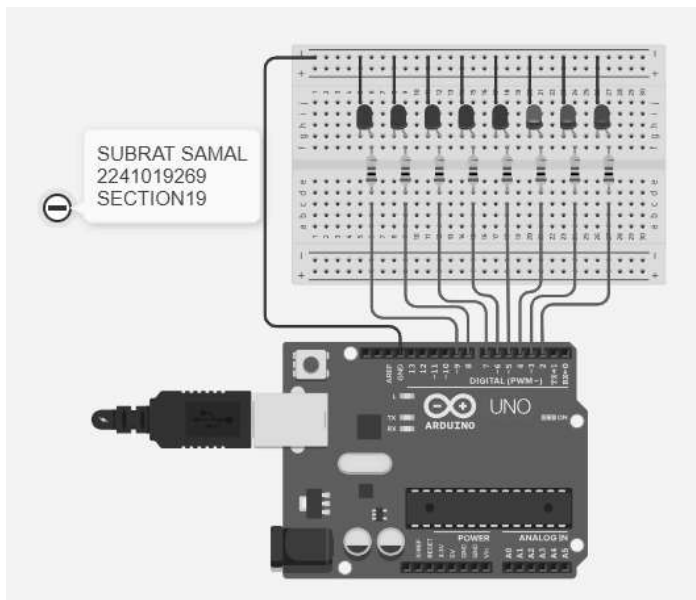


Figure13:(Simulationbased8-bitLEDchascercircuits)

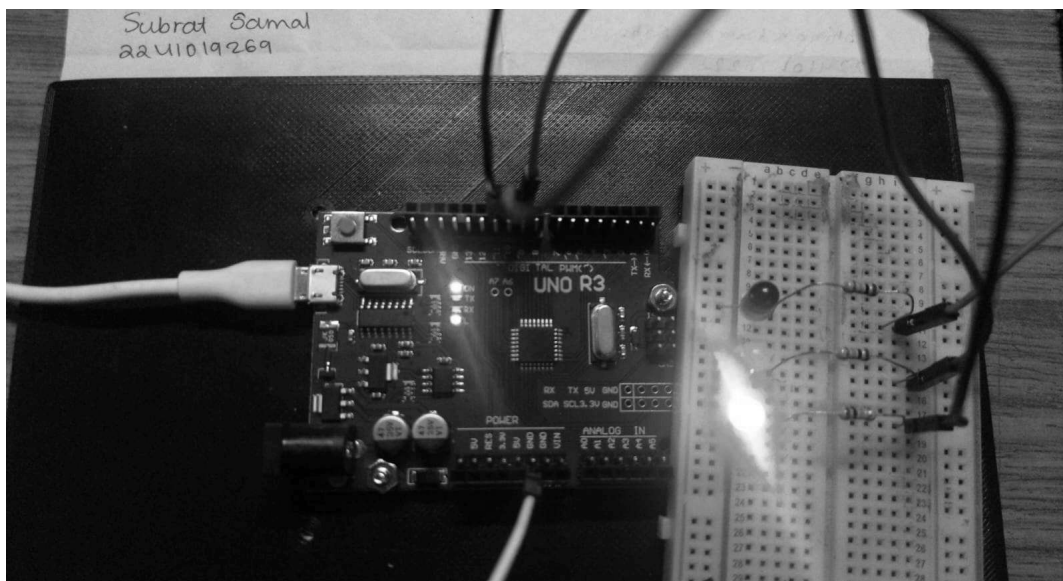


Figure14:(HardwareImplementationbased8-bitLEDchascercircuits)