BURN OUT PROJECT

SUMMARY

This project presents a smart Arduino-based bracelet designed to help prevent burnout.
The device monitors heart rate and stress levels, sends break reminders through vibration and multicolor LEDs.

Its goal is to encourage regular breaks, breathing exercises, and a more balanced lifestyle.

IDEA

A wearable bracelet with sensors that measure heart rate and body temperature, alerting the user when it's time to take a break—move around, practice breathing exercises, or have a small snack to reduce stress.

REQUIREMENTS

- **Break Alerts:** Vibrates and changes LED color according to stress level.
- **Real-Time Monitoring:** Heart rate, stress level, and movement (detects walking or physical activity).
- **Mobile App:**
    - Push notifications and customizable reminders
    - Pomodoro mode (scheduled breaks with vibration and LED signals)
    - Real-time sensor data display
    - Daily/weekly summaries and recommendations
    - Optional social-media blocking during sessions

Must have	Nice to have
Measure heart rate	Motion sensor
Wearable bracelet design	Mobile app – notifications, summary, Pomodoro, social-media block
Measure stress level	
Vibration alerts – "TAKE A BREAK"	

LED lights change color based on stress level	

NECESSARY HARDWARE

- Grove GSR Sensor – stress monitoring
- MAX30102 – heart-rate sensor
- RGB LED
- Coin Vibration Motor (3V–5V) + MOSFET
- Push button
- Bluetooth module for app connectivity
- 3D-printed bracelet casing

CODE

```
const int ledPin = 10;
const int buttonPin = 2;
int brightness;

// Button debouncing variables
int buttonState = LOW;
int lastButtonState = LOW;
unsigned long lastDebounceTime = 0;
unsigned long debounceDelay = 50;

void setup() {
  pinMode(ledPin, OUTPUT);
  pinMode(buttonPin, INPUT);
}

void loop() {
  int reading = digitalRead(buttonPin);

  // Button debouncing
  if (reading != lastButtonState) {
    lastDebounceTime = millis();
  }
```

```
  if ((millis() - lastDebounceTime) > debounceDelay) {
    if (reading != buttonState) {
      buttonState = reading;

      // Start breathing pattern when button is pressed
      if (buttonState == HIGH) {
        breathingExercise();
      }
    }
  }

  lastButtonState = reading;
}

void breathingExercise() {
  // 4-7-8 breathing technique:
  // 4 seconds inhale (LED fades in)
  // 7 seconds hold (LED stays on)
  // 8 seconds exhale (LED fades out)

  // Repeat the cycle 3 times
  for (int cycle = 0; cycle < 3; cycle++) {
    // Inhale (4 seconds) - LED fades in
    for (brightness = 0; brightness <= 85; brightness++) {
      analogWrite(ledPin, brightness);
      delay(10); // 4000ms/255 ≈ 16ms per step
    }

    // Hold (7 seconds) - LED stays on
    brightness=255;
    delay(7000);

    // Exhale (8 seconds) - LED fades out
    for ( brightness = 255; brightness >= 0; brightness--) {
      analogWrite(ledPin, brightness);
      delay(31); // 8000ms/255 ≈ 31ms per step
    }

    // Pause between cycles (optional)
    if (cycle < 2) {
```

```
    delay(1000);
  }
 }
}
```

MOTIVATION

- A survey of 10,243 full-time desk workers in six countries (including the US and UK) found that over **40%** report burnout.
- Nearly **48%** of 18–29-year-olds feel drained, compared with **40%** of those over 30.
- Women report higher burnout (**46%**) than men (**37%**).

The World Health Organization (WHO) defines burnout as a syndrome resulting from chronic workplace stress that has not been successfully managed, characterized by:

- Energy depletion or exhaustion
- Increased mental distance or negative feelings toward work
- Reduced professional productivity

Further data:

- Indeed reports **52%** of employees feel burned out, up **9%** from pre-COVID levels.
- Workplace stress contributes to about **120,000 deaths** and nearly **$190 billion** in annual costs in the US.
- Globally, **625 million** people suffer from depression and anxiety, causing an estimated **$1 trillion** loss in productivity each year.
- **75%** of workers have experienced burnout; **40%** specifically during the pandemic (FlexJobs).
- **67%** believe burnout has worsened since the pandemic (Indeed).
- **40%** have left a job due to burnout.

Burnout is the leading reason US employees quit their jobs. Remote work has gained popularity because **24%** of employees believe flexibility and better work-life balance can help prevent burnout.