

Find Beauty in Everything...

Professor Prater

RBT211 Embedded Programming

University of Advanced Technology

Tempe, Arizona

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What is *Find Beauty in Everything*...

Project Overview:

Find Beauty in Everything... is a project I have put a great deal of thought, care, and time into. Its foundation is rooted in empathy, healing, and symbolism. The original idea was to design a lifelike butterfly for hospice patients to provide comfort during times of anxiety, agitation, or need. The butterfly serves as a calming presence—especially for patients who may not have access to traditional stress-relief methods such as therapy animals.

Purpose and Hope:

The central hope of the project is to ease emotional and physical distress in patients and to offer symbolic comfort to families after their loved ones pass. The butterfly becomes a gentle companion during life's final moments and a keepsake of peace and beauty for those left behind.

Current Stage:

The project is currently in its first prototype stage. The butterfly is crafted entirely out of scrap and discarded materials—true to the theme of "finding beauty in everything," even in what many consider trash. This first rendition is a testament to how healing and beauty can arise from the most unexpected sources.

Future Vision:

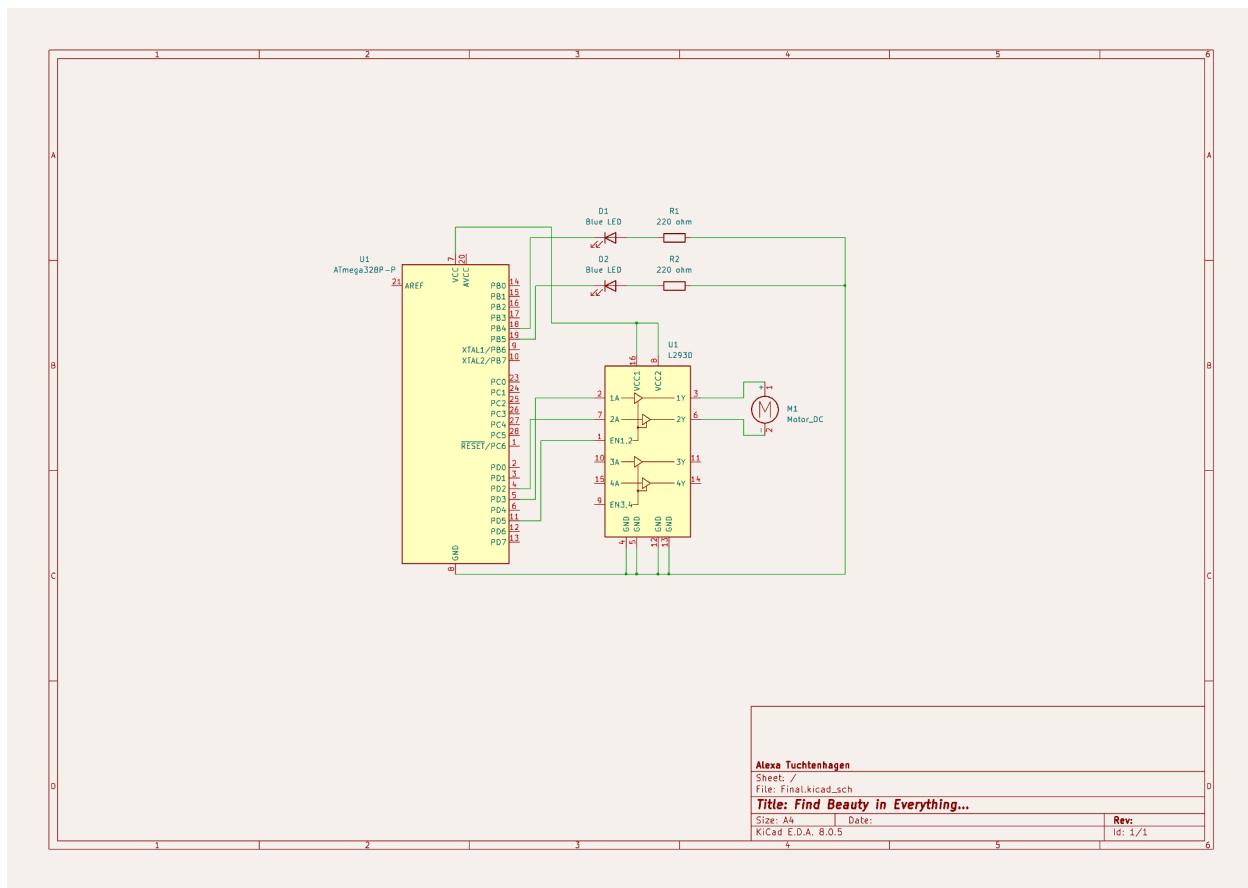
Looking ahead, the goal is to evolve this prototype into a more functional and technologically advanced version. Planned features include:

- **Embedded Electronics:** All internal components housed neatly within the butterfly's body.
- **Calming Audio:** Soft music or nature sounds that play to soothe the patient.
- **Sensor Integration:** Potential tracking of medication schedules, patient well-being, and distress signals to notify caregivers.
- **Post-Life Keepsake:** After a patient's passing, the butterfly can serve as a tangible memory for family members—perhaps storing recorded messages or personalized audio clips.

Conclusion:

Find Beauty in Everything... is more than a project—it's a movement to bring dignity, beauty, and comfort to the end-of-life experience. Through thoughtful design and compassionate technology, this butterfly has the potential to transform how we care for our loved ones—and how we remember them.

Schematic and Bill of Materials for *Find Beauty in Everything...*



BOM

- Arduino Uno
- L293D
- 2 Blue LEDS
- DC Motor
- M-M Connectors
- M-F Connectors
- F-F Connectors
- Tissue Box
- Cardboard
- Craft wire
- Paper
- Straws
- Copic Markers
- Hot glue
- Super glue
- 5V power supply
- 9V Battery
- Fan Blades

How Does *Find Beauty in Everything...* Work

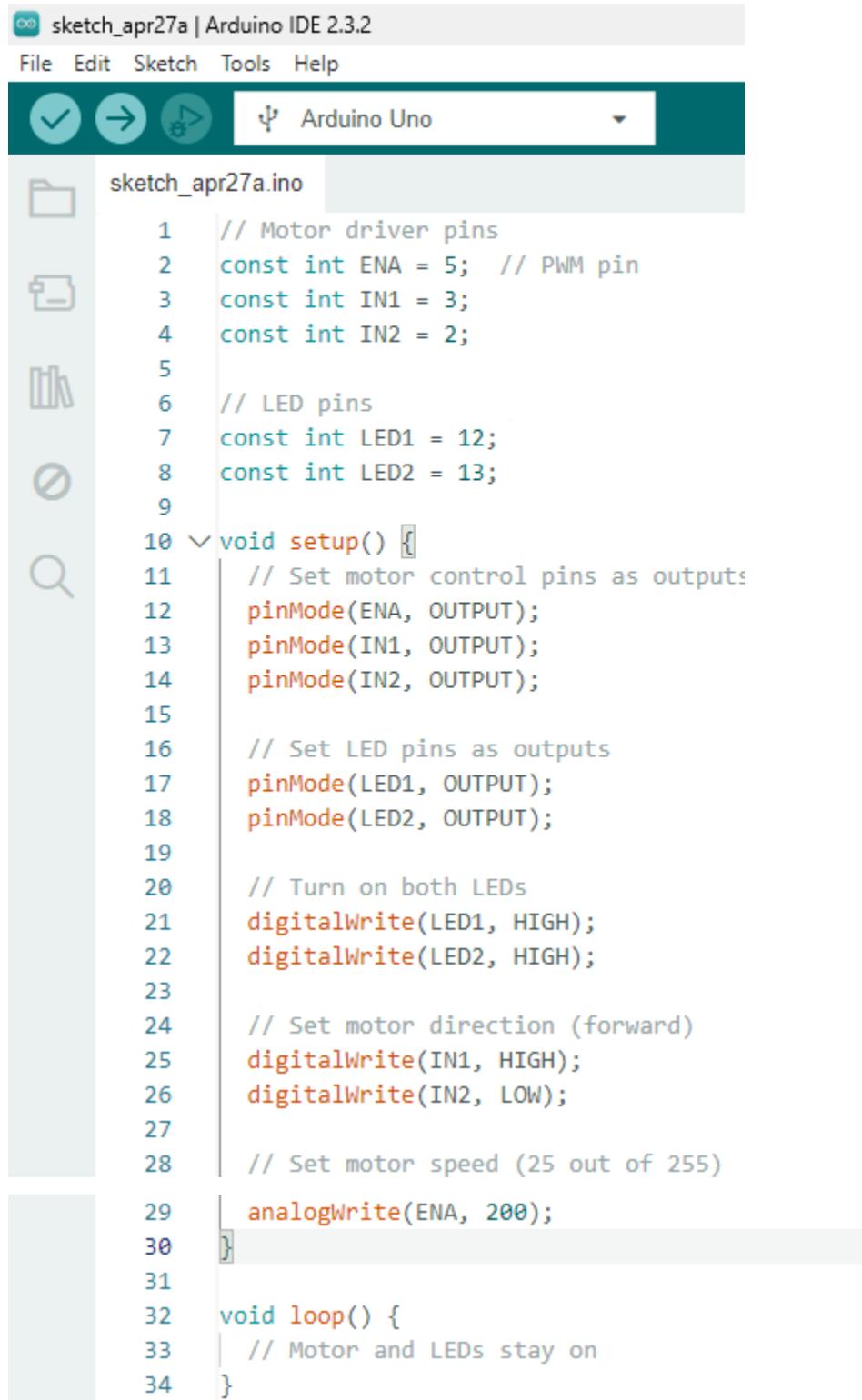
The *Find Beauty in Everything...* butterfly is currently powered by an Arduino Uno, which serves as the central controller for the lighting and motion components.

Key Features:

- **Lighting:**
Two blue LEDs are connected to digital pins 12 and 13, providing an underglow effect that enhances the butterfly's visual presence, especially in low-light environments.
- **Motor Control:**
An L293D motor driver is used to manage the butterfly's wing movement:
 - Pin 5 is used for PWM (Pulse Width Modulation) to control the motor's speed and power (on/off functionality).
 - Pins 2 and 3 are used to control the direction of the motor's rotation.
- **Wing Mechanism:**
The motor is attached to a wire mechanism that spins and causes the butterfly's wings to flap in a lifelike motion, mimicking natural flight.

Code for *Find Beauty in Everything...*

(For testing)



The screenshot shows the Arduino IDE interface with the following details:

- Title Bar:** sketch_apr27a | Arduino IDE 2.3.2
- Menu Bar:** File Edit Sketch Tools Help
- Toolbar:** Includes icons for Save, Upload, Refresh, and a dropdown for board selection set to Arduino Uno.
- Sketch List:** A sidebar on the left shows a folder icon and the file name sketch_apr27a.ino.
- Code Editor:** The main area displays the following C++ code:

```
1 // Motor driver pins
2 const int ENA = 5; // PWM pin
3 const int IN1 = 3;
4 const int IN2 = 2;
5
6 // LED pins
7 const int LED1 = 12;
8 const int LED2 = 13;
9
10 void setup() {
11     // Set motor control pins as outputs
12     pinMode(ENA, OUTPUT);
13     pinMode(IN1, OUTPUT);
14     pinMode(IN2, OUTPUT);
15
16     // Set LED pins as outputs
17     pinMode(LED1, OUTPUT);
18     pinMode(LED2, OUTPUT);
19
20     // Turn on both LEDs
21     digitalWrite(LED1, HIGH);
22     digitalWrite(LED2, HIGH);
23
24     // Set motor direction (forward)
25     digitalWrite(IN1, HIGH);
26     digitalWrite(IN2, LOW);
27
28     // Set motor speed (25 out of 255)
29     analogWrite(ENA, 200);
30 }
31
32 void loop() {
33     // Motor and LEDs stay on
34 }
```

(Final Code)

The screenshot shows the Microchip Studio interface with the file "main.c" open. The code is a C program for an AVR microcontroller. It includes comments, defines, includes, and functions for initializing Timer0, setting pins as outputs, and a main loop.

```
attempt 2 - Microchip Studio

File Edit View VAssistX ASF Project Build Debug Tools Window Help
Hex Debug

main.c

1 /* attempt 2.c
2 *
3 * Created: 4/28/2025 3:57:07 PM
4 * Author : User
5 */
6
7 #define F_CPU 16000000UL
8
9
10 #include <avr/io.h>
11 #include <util/delay.h>
12
13 // Initialize Timer0 for PWM on PD5 (OC0B / Arduino pin 5)
14 static inline void initTimer0(void){
15     TCCR0A |= (1 << WGM00) | (1 << WGM01); // Fast PWM mode
16     TCCR0A |= (1 << COM0B1); // Non-inverting PWM on OC0B
17     TCCR0B |= (1 << CS01) | (1 << CS00); // Prescaler = 64
18 }
19
20 int main(void)
21 {
22     // Set PD2 (IN2), PD3 (IN1), and PD5 (ENA - PWM) as outputs
23     DDRD |= (1 << PD2) | (1 << PD3) | (1 << PD5);
24
25     // LED pins: PB4 (pin 12), PB5 (pin 13)
26     DDRB |= (1 << PB4) | (1 << PB5); // Set pins 12 and 13 as output
27     PORTB |= (1 << PB4) | (1 << PB5); // Turn both LEDs ON
28
29     // Set motor direction: IN1 = HIGH, IN2 = LOW
30     PORTD |= (1 << PD3); // IN1
31     PORTD &= ~(1 << PD2); // IN2
32
33     // Initialize PWM
34     initTimer0();
35
36     // Set speed (duty cycle) - 25 out of 255 (~10%)
37     OCR0B = 200;
38
39     // Keep running
40     while (1) {
41         // Do nothing - motor stays on at set speed
42     }
43 }
44
```

Challenges during the process of building *Find Beauty in Everything*...

There were several challenges throughout the development process, many of which stemmed from late nights and a lack of resources. At times, I found myself in difficult, uncertain moments where I wasn't sure I'd be able to finish the project.

One of the biggest technical hurdles was choosing the right motor for the butterfly's movement:

- I initially used **stepper motors**, but the ones I had weren't strong enough.
- I then **switched to servo motors**, only to find they couldn't rotate a full 360 degrees—causing another roadblock.
- I tried using a **cheap DC motor**, but it also lacked the necessary strength.
- Finally, I connected with *Glenn*, who had a **DC motor typically used to lock deadbolts in doors**—and it worked perfectly for what I needed.

Material issues added another layer of complexity. Some of the parts I used **literally came out of the garbage**, which made things unpredictable. On top of that, I had a few frustrating moments—like **getting super glue all over my hands**—that reminded me just how hands-on and messy creating something from scratch can be.

This is *Find Beauty in Everything*...

Presented to you in class and on video:

<https://youtube.com/shorts/Qx4qN6oJdrw?feature=share>