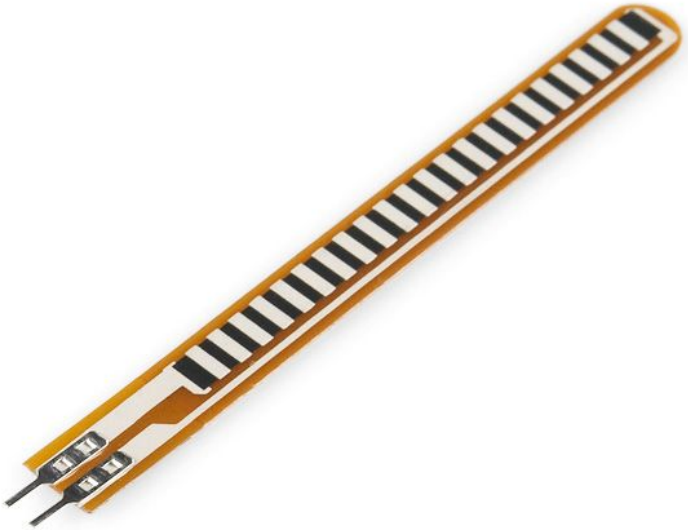
The Torchbearer

By Russell Poag, Christian Pack and Joshua Kupras

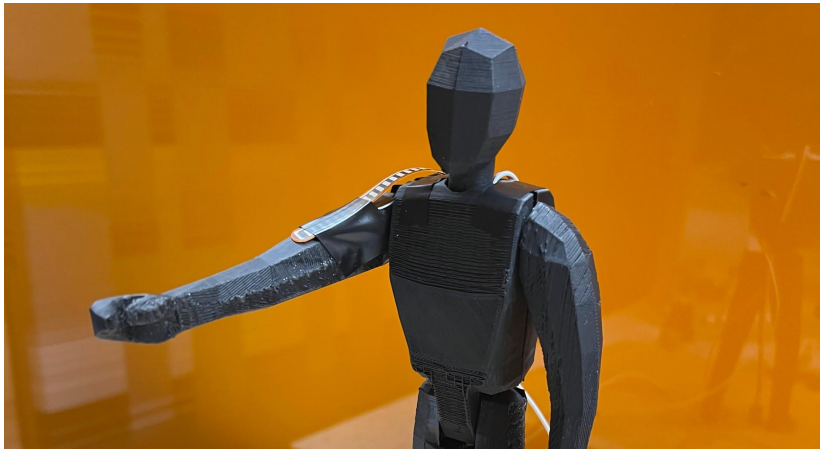
Tool Incorporated - Flex Sensc

- The **flex sensor** is a resistor in which the amount of resistance increases as the sensor is bent to a greater degree.
- Useful when varying amounts of electricity need to be used for different positions of a machine
- Examples include:
  - automatic door mechanisms
  - human movement tracking

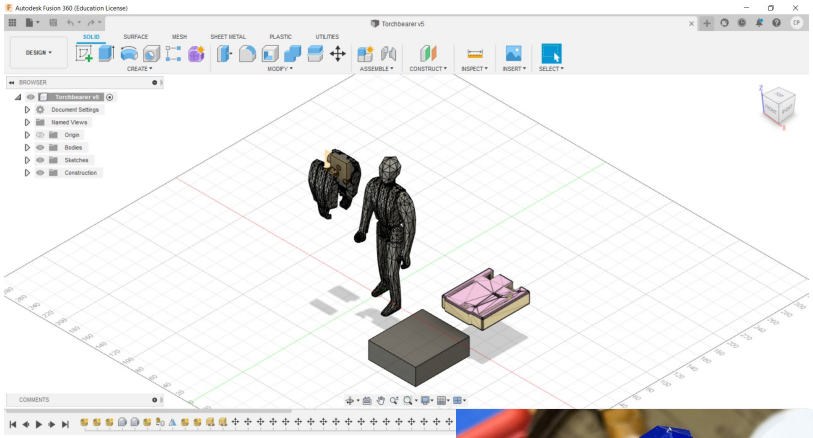


Basic Functioning

1. Button is pressed which triggers the servo to raise the torch bearer's arm.
2. Once the arm is raised and the flex sensor is bent, the lights in his hand begin to turn on as they receive current.
3. When the button is pressed again, the Torch Bearer lowers his arm and the lights turn off as the flex sensor returns to its original bent state.

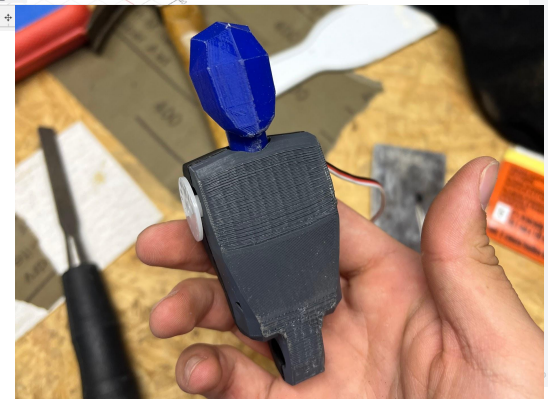


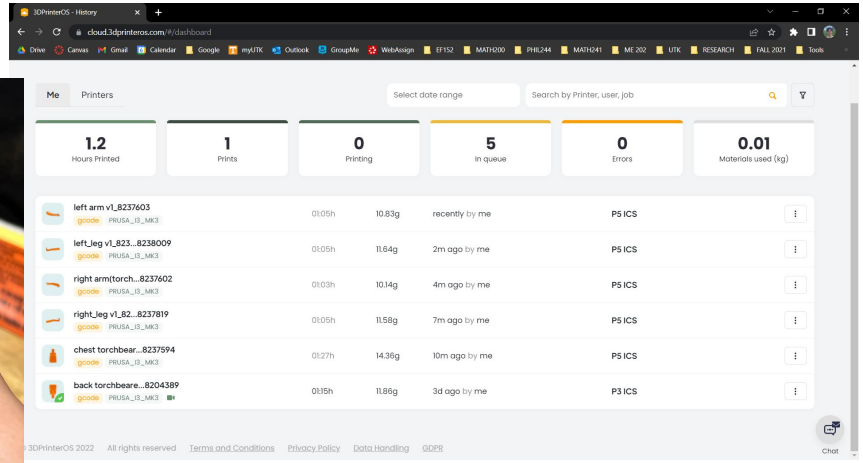
Computer-Aided-Drafting & Printing



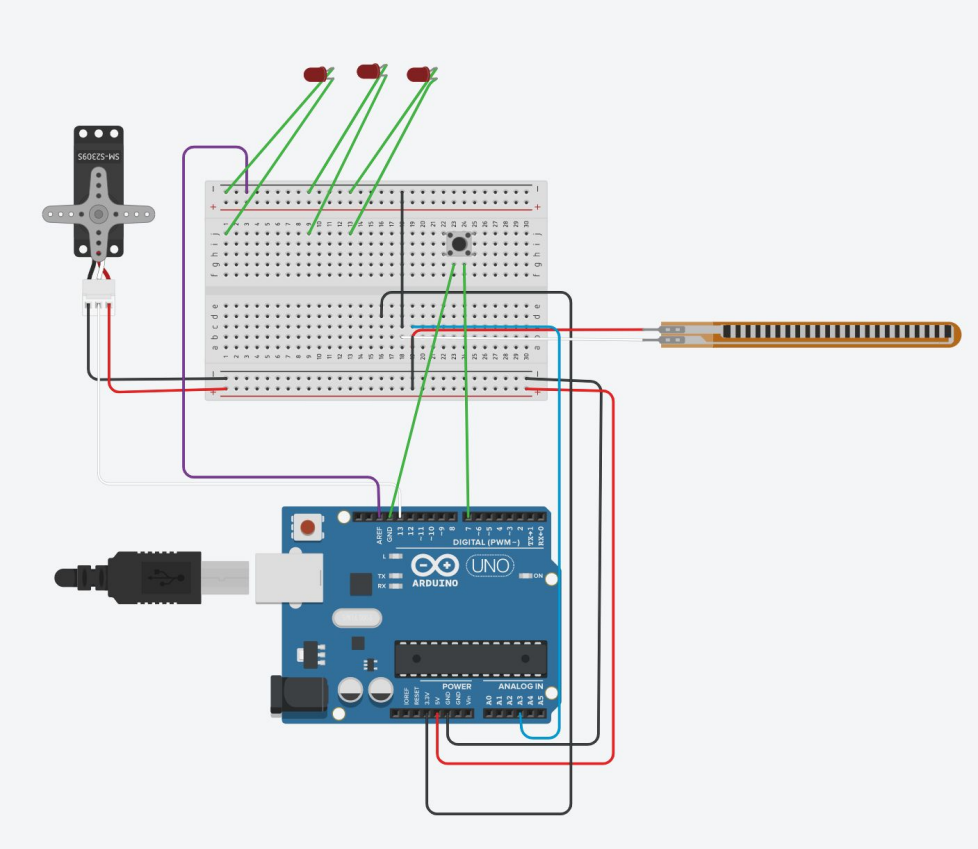
CAD Designed a figurine with a section cut out of torso for Servo placement.

Sanding and Fine Tuning
(White Disc is attached to internal Servo)

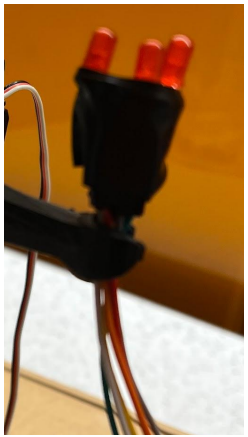




Circuit



Simple Circuit Layout of our project.
LED’s were routed to the torchbearer’s hand.



Coding

- Lights turn on/off in a pattern
  - Maintains a list of pins to be held HIGH or LOW
  - Waits a while, and switches pin to be held on
  - Can be extended to any number of lights
- Arm raises up when button is pressed
  - Initiates Servo
  - Boolean value switched when button is pressed
- Flex sensor value is read to determine when arm is up
  - When resistance is above a certain value, it turns the light sequence on

```
void loop() {
//Read value and change light
 flexValue = analogRead(flexPin);
  flexValue = map(flexValue, 400, 1000, 0, 255);
  flexValue = constrain(flexValue, 0, 255);
   Serial.println(flexValue);
  if (flexValue<180){
LEDSon=true;
  } else{
    LEDSon=false;
  }

  if (LEDSon){
     digitalWrite(lightPins[lightIndex], LOW);
     delay(lightTime);
     digitalWrite(lightPins[lightIndex], HIGH);
     lightIndex++;

     if (lightIndex>=sizeof( lightPins)){

      lightIndex=0;
     }

  } else{

     digitalWrite(lightPins[0], HIGH);
     digitalWrite(lightPins[1], HIGH);
     digitalWrite(lightPins[2], HIGH);
  }


  // Read button and change bool if pushed
  if(digitalRead(BUTTON_PIN) == LOW)   {
     up=!up;
     Serial.print("Push");
  }

// Raise arm if bool is up
  if (up){
      raiseArm();
  } else{
     lowerArm();

  }
```

Pictures