GLOW GARMENTS

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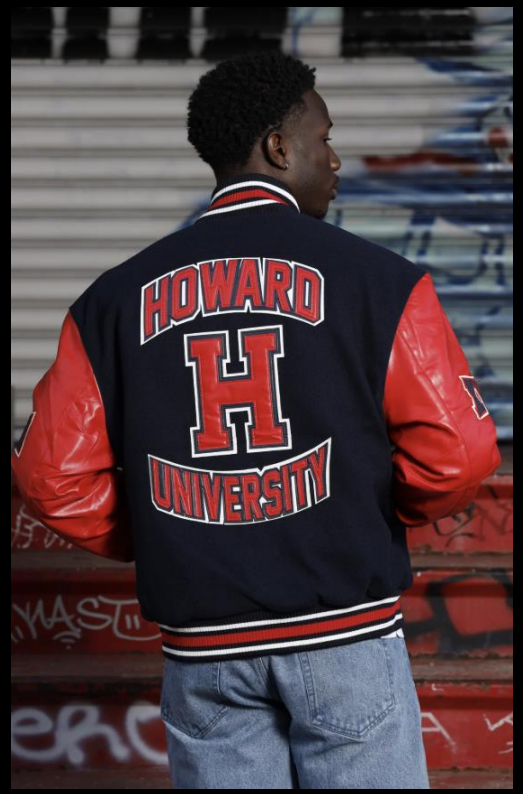
Advisors: Dr. Charles Kim and Dr. Marie Stevens

BACKGROUND

- Inspired by the rise of **wearable tech** and the need for **self-expressive fashion**
- Most modern garments **lack dynamic, motion-responsive features**
- Our team aimed to merge **art, engineering, and interactivity** into a functional design
- Chose a **culturally symbolic jacket** to honor Howard University
- Prioritized **sustainability** by repurposing a thrifted garment

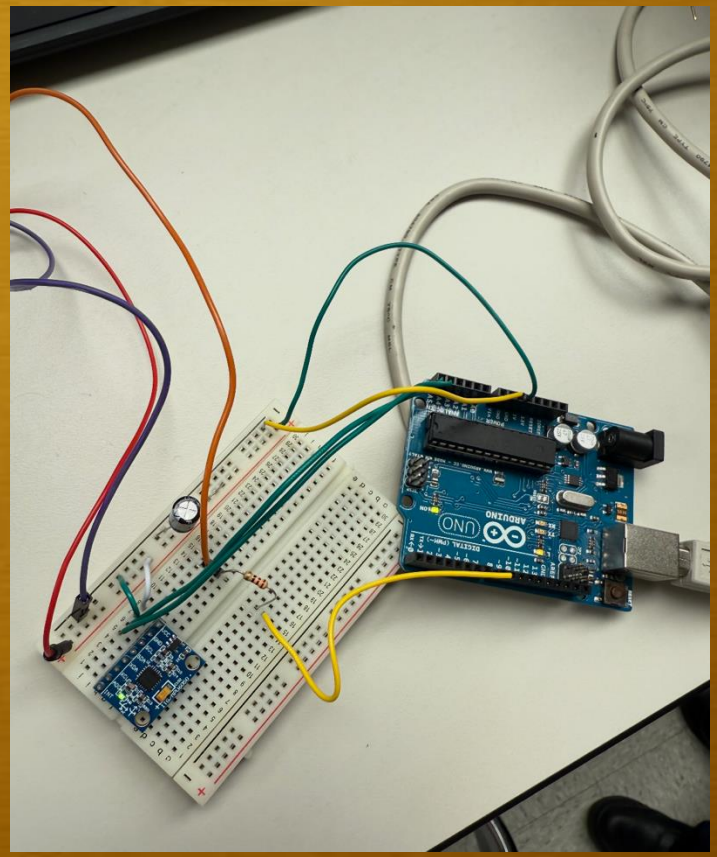


PROBLEM STATEMENT

- There are currently no motion-responsive, tech-integrated garments designed specifically for Howard University or HBCU apparel in general.
- Existing wearable tech lacks cultural relevance, while HBCU fashion lacks interactive innovation.
- Glow Garments bridges this gap by creating a sustainable, LED-activated jacket that honors tradition while pushing fashion forward.

DESIGN SPECIFICATIONS

- Power Supply: 5V rechargeable battery with USB charging
- Motion Sensor: MPU6050 detects movement with a 0.8 threshold
- Microcontroller: Arduino Uno controls LEDs and reads sensor via I2C
- LEDs: 270 WS2812B RGB LEDs with medium brightness FADING effects
- Jacket Materials: Wool front, leather sleeves, elastic waist/neck (red and beige)
- Wiring & Mounting: Silicone wire with heat shrink, LEDs sewn and glued to fabric
- User Safety & Functionality: Auto-activation with motion



SOLUTION DESIGN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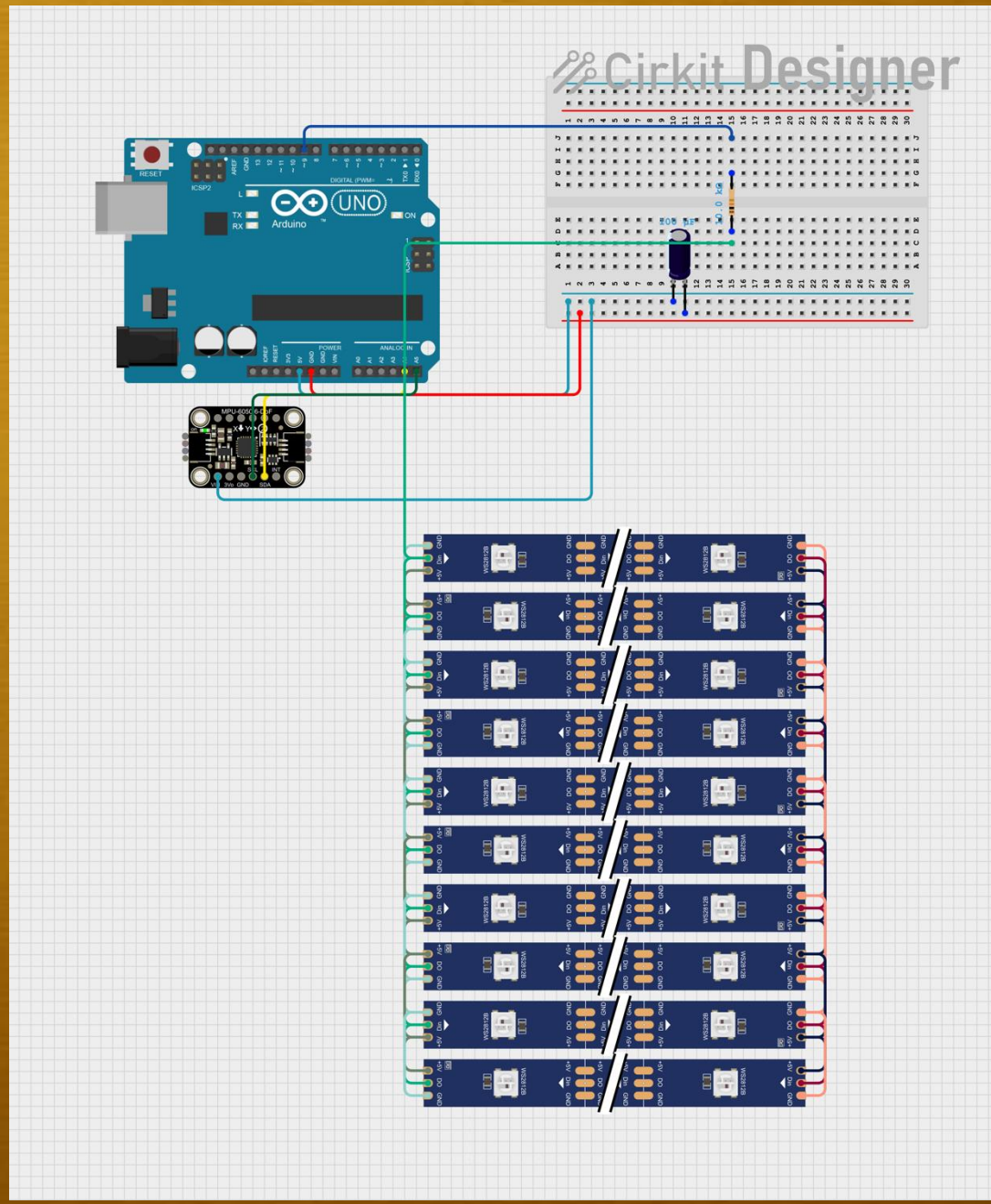

Cirkit Designer
UNO
Arduino

CONSTRAINTS AND RULES & REGULATIONS

Environmental Constraints

- **Material Sourcing:**

Energy Efficiency:

Socio-Cultural Constraints

Standards & Safety Regulations

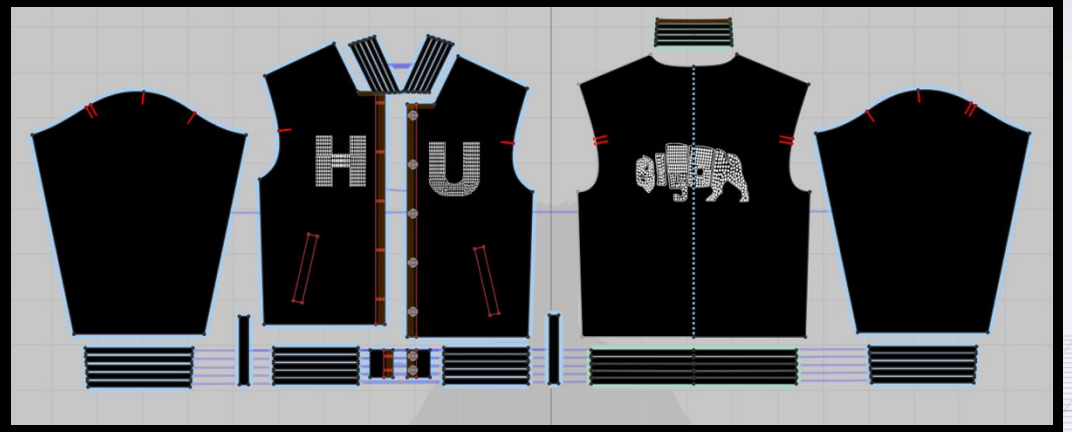
- **Textile Flammability:** Fabric meets **ASTM D1230** safety standards
- **FCC Compliance:** Ensures safe integration of electronic components

AGILE FLOW – SPRINT 1

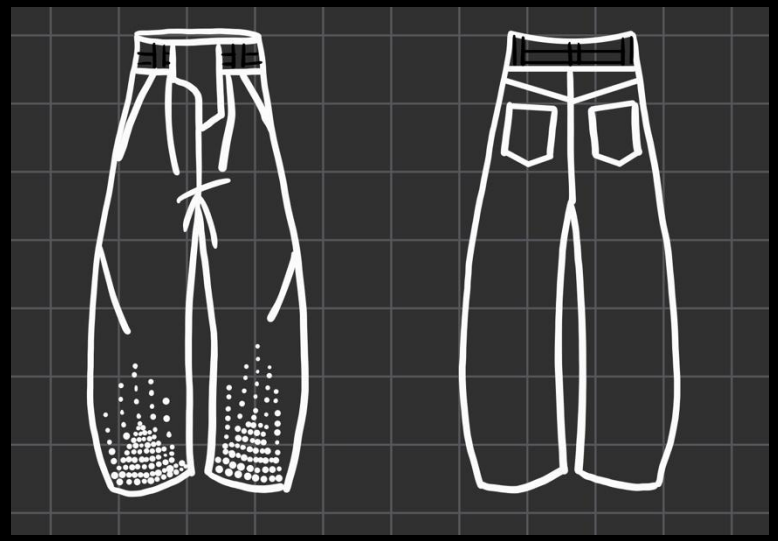
WEEK ONE: Determine fabric material, resketch and finalize the JACKET design

WEEK TWO: Allocate LED placements on the JACKKET, TEST fabric

WEEK THREE: Started writing our final report; revised abstract, problem statement.



AGILE FLOW – SPRINT 2



WEEK 1

Wrote the code for the Arduino and circuit system, implemented features such as color coordination to enhance the aesthetic appeal

WEEK 2

Purchased garment pieces, programmed the LED system to support various lighting patterns

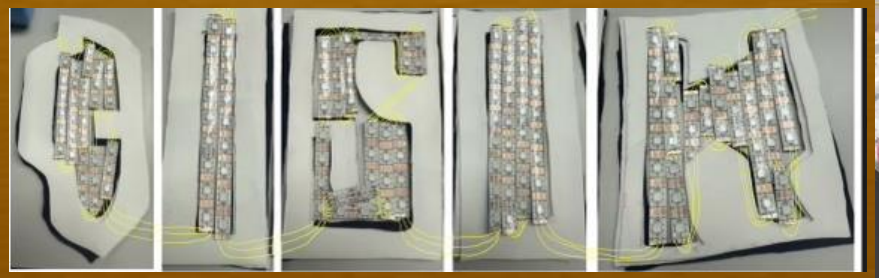
WEEK 3

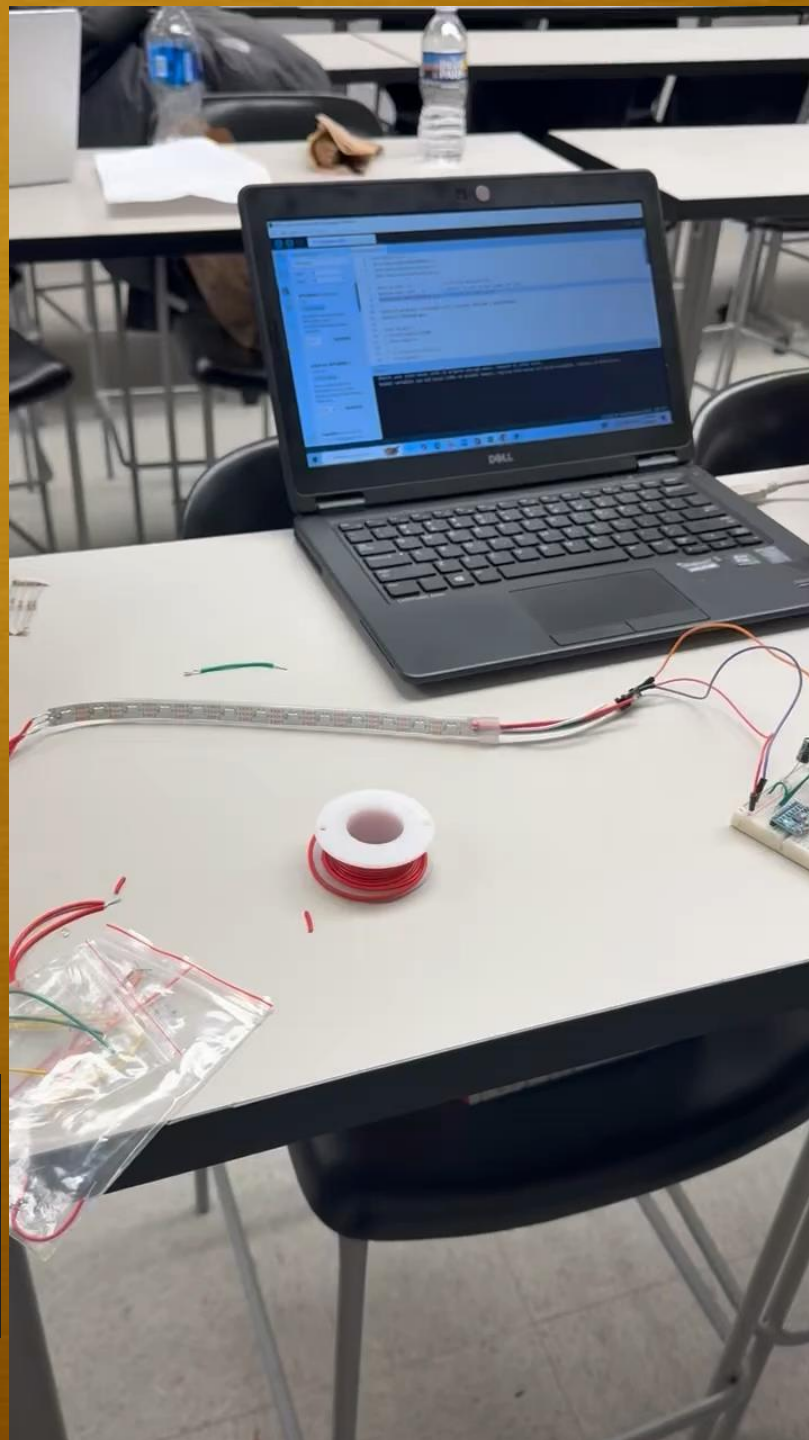
Continued updating our final report: revised abstract, problem statement, agile workflow & weekly plan

AGILE FLOW – SPRINT 3

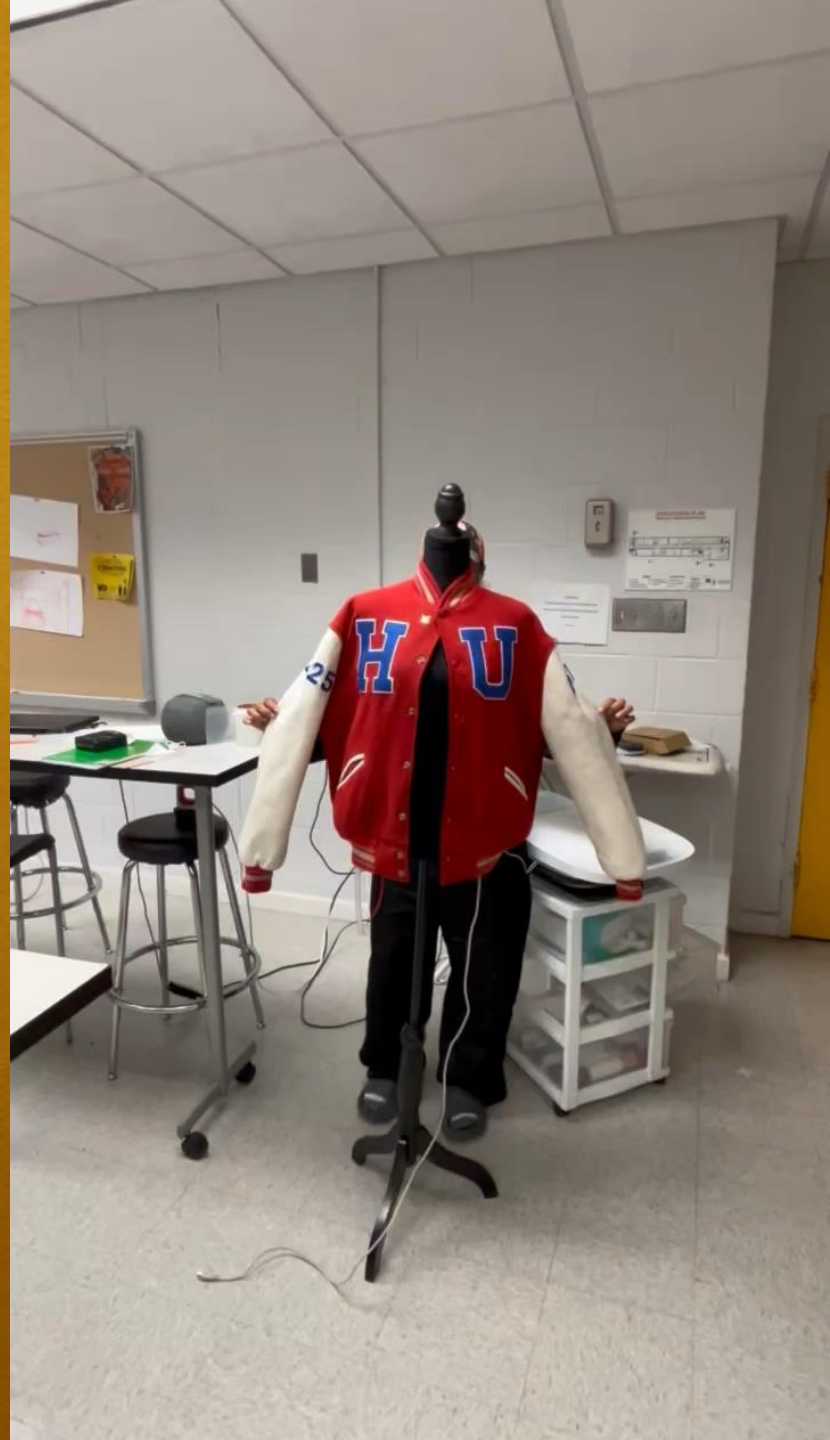
WEEK 1 – FINAL SPRINT

WEEK 2 – FINAL SPRINT





WEEK 3 – FINAL SPRINT



CONCLUSION

Glow Garments doesn’t just light up—it speaks to who we are, where we’re from, and where we’re headed.

- Successfully designed and built a motion-responsive LED jacket that merges:
  Engineering innovation, Cultural identity, and Sustainable fashion
- Demonstrated how wearable technology can be:
  Dynamic, Meaningful , Eco-conscious
- Set a precedent for future designs that blend tradition with technology