

Making a Lilypad Lilymini powered wallet 2019

Wallet design and pattern from: <https://www.instructables.com/id/Three-Stitch-Wallet/>

Materials:

Sturdy fabric for wallet
Thread and needles
Tailors chalk
Cutting mat
Razor knife/scissors
Sewing Machine
Lilypad Lilymini kit
Conductive thread
Hot glue gun
Puffpaint for fabric
GitHub repository for Arduino files

Procedure:

Learning to sew

1. We will start with the basics of sewing. This will include threading a needle, sewing on a button and doing a simple stitch. These will be important for building the circuit into your wallet.
2. Obtain a sample of fabric, needle, thread and a button.
3. Watch the demo and then practice

Wallet

1. Select fabric
2. Obtain pattern and cut out
3. Follow directions to lay out fabric on pattern and pin/tape in place on a cutting mat
4. Cut fabric to match pattern
5. Fold and pin according to pattern

Arduino/Lilymini

1. Introduction to Lilymini and Arduino. (Be careful not to flex or break the board)
2. Open Arduino software
3. Open Github repository
4. Practice blink, alternating blinks. Timing and discuss basic language
5. Add in light sensor and button use.
6. Practice setting up different combinations of blinking and sensor use.
7. Create a new page in Notability(on your iPad) that is the same size as your wallet(Letter or 216 x 279 mm). Sketch a design for up to four LED lights, a button and a light sensor that can go onto your wallet. The Lilymini is about 4cm in diameter. Each light and the button is 1x0.5 cm and the light sensor is 2cm across. You will be able to use puff paint to accent your design and protect the thread if you want. Come up with several designs as there are some restrictions to how things can be laid out. We will talk about these as we work.
8. Pay special attention to the thread lines connecting the various pieces. Remember the thread can not touch itself or other lines of thread/sensors or it will short circuit. Also remember that

this is a circuit and each light will need a thread from a "pin" on the Lilymini and also one from the "negative (-)" or ground on the Lilymini.

9. Transfer the plan to your wallet using tailors chalk
10. Sew the Lilymini onto the fabric with a needle and conductive thread, then glue on one light in its proper place.
11. Sew the thread to connect the light and board. Test to see if it works.
12. Continue this process of adding a single light or sensor and testing until all parts are in working order.
13. Use puffpaint to protect the thread from abrasion and shorting.

Putting it Together

14. Watch sewing machine demo.
15. Use an iron set to "nylon" to make creases along the fold lines from the pattern.
16. Carefully sew along marked lines with sewing machine when it is your turn.
17. While waiting to sew write additional programs to sequence the lights/sensors in various ways

Reflection

The goal of this class is to introduce you to new ways of thinking and doing and teach you new skills, while also considering how a process or idea could be improved. Your reflection, in a new Doc, needs to include:

1. Pictures of each step of the process including any drawings or sketches you made during brainstorming and redesign of your wallet and light/sensor layout.
2. Your initial thoughts on the project. Were you confident, concerned, excited?
3. What different designs or ideas did you initially come up with for your circuit layout?
4. How did those designs change or were they modified as you went through the process?
5. Describe what you did during the different phases of making or constructing the project. Include pictures to show the steps. Use complete sentences.
6. Did the final product come out as you had envisioned it? Did you need to modify your design as you went? Why did it need to be redesigned?
7. How would you change either your design or the process if you were to do it again to make it better?
8. What was the most challenging part of the project? What was the most rewarding part of the project?
9. What was the most surprising thing you discovered while working on the project?