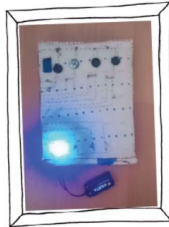# E-TEXTILES

Secret diary box

Secret Diary Box

Create a box which can only be accessed using a secret code! Using an Arduino and integrating the circuit onto fabric you can create a stylish box to safely store all your precious pocessions.

What you need:

CONDUCTIVE THREAD
NORMAL FABRIC
NEEDLE AND THREAD
SEWING MACHINE

4 LEDS
(DIFFERENT COLOURS)
4 PLASTIC BUTTONS
4 ELECTRONIC BUTTONS
SERVO MOTOR
4 RESISTORS (1K OHM)

ARDUINO UNO
PCB BOARD
THIN INSULATED WIRE
BREADBOARD
JUMPER CABLES
PIN HEADERS
9V BATTERY AND CONNECTOR
SOLDERING IRON AND SOLDER

NEWSPAPER
GLUE, FLOUR AND WATER
PAINT
TAPE
CARDBOARD

The secret diary box is the most complex project presented in the E-Textiles course.
It requires creating a circuit with 4 button buttons and 4 LEDs.
This is tested through electronic prototyping and coded with Arduino.
The code requires modifying before the circuit can be transferred on to the textiles.

Step 1: Construction of the box

The box is constructed from cardboard. The minimum dimensions of the box are provided in the tutorial.

To create a box with stable sides and a small section for the Arduino to sit in, you can use tape to hold the cardboard together and then paper mache to hold it in place. The paper mache is created from a mixture of glue, water and a small amount of flower. You can then rip newspaper and cover the cardboard. As it dries it will become firm enough to hold its shape.

Step 2: Electronic prototyping
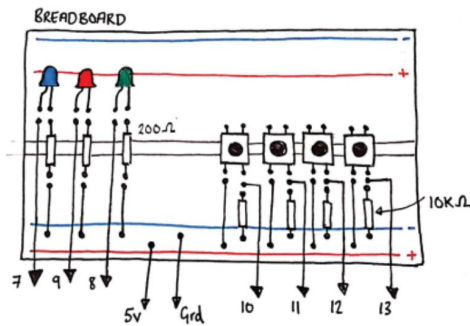
BREADBOARD

The next step is to create the circuit using a breadboard and components.
This circuit allows you to test the programme with Arduino before creating the
E-Textile circuit.
It is important that this circuit is correct before going any further.
The circuit can also be created on TinkerCAD simulator if you do not have all the
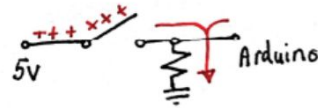resources available to you
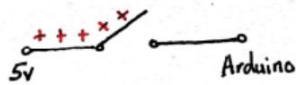
When pushed the charge can flow through to the Arduino connection
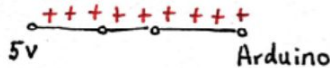
When released, the circuit breaks but the charge is still held within the circuit, still providing an input to the Arduino
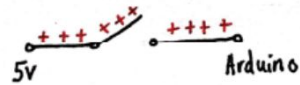
Therefore putting a grounded resistor between the button and Arduino means that the charge can be drawn away when the button is released.

Understanding the components is important.

In this circuit we need to understand how the buttons work to be able to successfully create the circuit in textiles.

Here, it is necessary to insert a resistor with a LARGE resistance, in between the button and its connection to the Arduino.

This helps the Arduino recognise when the button is pressed and when it is not pressed.

When the button is pushed, the circuit closes and the charge can travel through the circuit to the Arduino - sending the Arduino a signal.

When the button is not pushed, the sitch opens and there is a gap in the circuit. However, the charge remains in the circuit - the Arduino still receives a signal, therefore will continue to see the button as pushed.

Therefore, it is necessary to create a second avenue for the charge to go. By connecting the resistor to the ground, the charge will then go to ground rather than to the Arduino when the button is not pushed, draining out the charge from the circuit and removing the signal that Arduino would see.

The large resistor makes sure that the charge only takes that 'exit route' when the button is open, as the electricity will always choose to flow through the path with the least resistance.

Find out more through the tutorial book or through the video.

With the original code...

1. Add a white LED which recognises when a button is pressed.

2. Add a servo motor which turns when the correct code is entered.

Run the circuit with the original code provided on the Huge academy platform.

Now there are two tasks to complete to modify the code to be suitable for the secret coded box.
1. Add white LED which flashes each time a button is pressed
2. Add a servo motor which turns when the correct code is entered

Hints and tips are provided on the tutorial sheets provided on the Huge academy platform.
Submit your attempts to get some feedback and corrections!