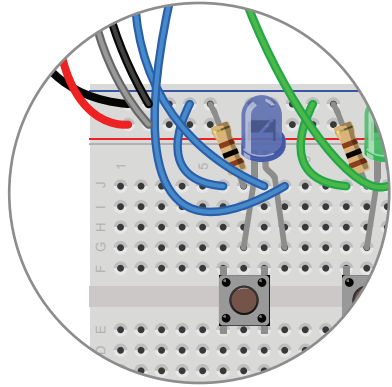# Memory Game - Assembly Instructions

Step 1:

a) Install the first button, LED, resistor, and blue jumper wire as shown.
b) Connect the LED and button to P1.4 and P2.0 of the microcontroller repsectively using the coloured jumper wires.
c) Connect the black (negative) battery wire to the blue ground rail, and the red (positive) battery wire to the red power rail.
d) Connect VCC from the microcontroller to the red power rail, and GND from the microcontroller to the blue ground rail.
e) Install the 3 batteries.
f) Verify the first step by pressing the button. The LED should illuminate if wired correctly.

Step 2:
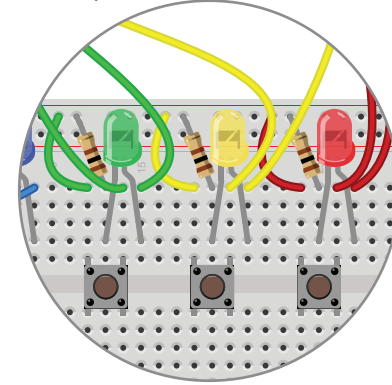
a) Before continuing, disconnect the battery from the circuit.
b) Repeat Step 1 for the next 3 buttons, LEDs, resistors, and jumper wires.
c) Refer to the image on the right for the corresponding microcontroller connections.
d) Once complete, reconnect the battery and verify the operation of all 4 LEDs and buttons. Each LED should illuminate when its corrsponding button is pressed.

Step 3:
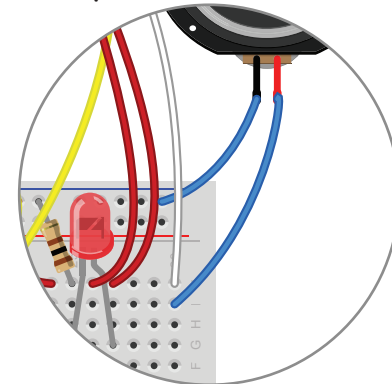
a) Before continuing, disconnect the battery from the circuit.
b) Finally, attach one of the speaker wires to the blue ground rail, and the other to an unused location on the breadboard as shown.
c) Connect the speaker to P1.6 of the microcontroller as shown using a jumper wire.
d) Reconnect the battery and again verify the operation of all 4 LEDs and buttons. This time, each LED should again illuminate, and the speaker will play a tone when each button is pressed.
e) Once each button, LED, and speaker is confirmed, you can proceed to the "Gameplay" section.
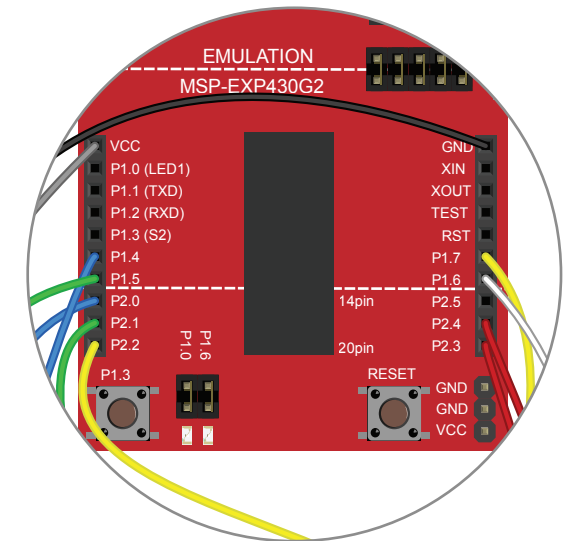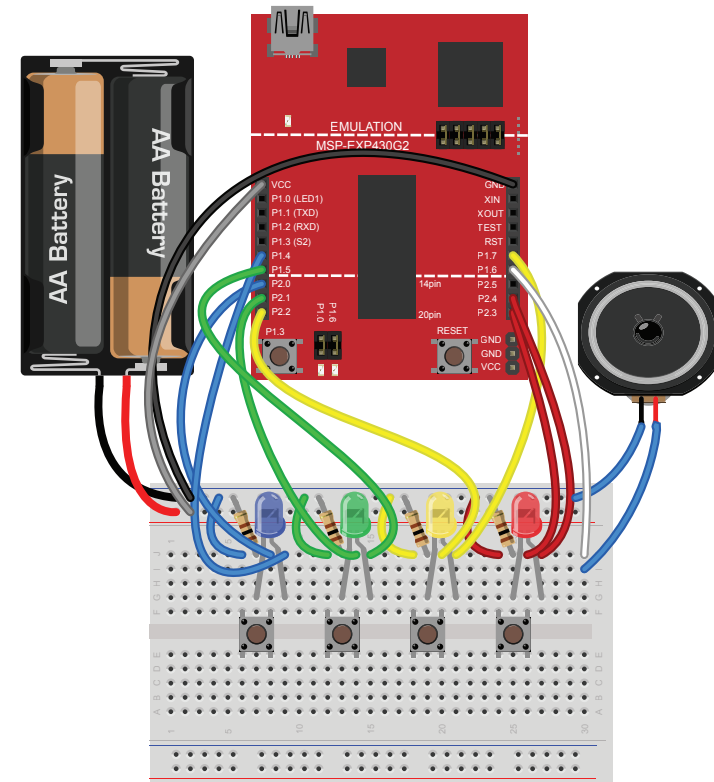
Memory Game - Gameplay & Schematic

Gameplay:

• When the device is powered up (by connecting the battery), all four LEDs will blink in sequence and a two note melody will play.

• To enter gameplay mode, press the 'S2' switch on the microcontroller board.

• When the device enters gameplay mode, all four LEDs will blink in sequence and a six note melody will play.

• This will be immediately followed by a single blink of an LED, and a corresponding single note will be played.

• The object of the game is to copy the sequence using the corresponding buttons.

• If the sequence is copied correctly, the sequence will replay with the addition of a new LED flash and note.

• If you copy the sequence incorrectly, a low tone will play and the game will restart.

• You can replay your highscore at anytime by pressing the 'S2' switch while in gameplay mode.

• You can reset the entire device by pressing the 'RESET' switch or temporarily disconnecting the power source.

S2 Switch   RESET
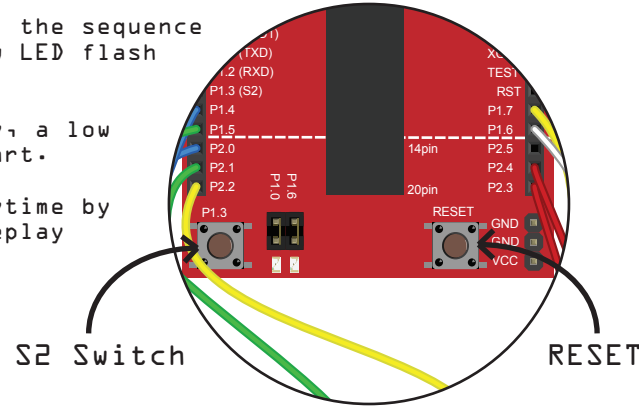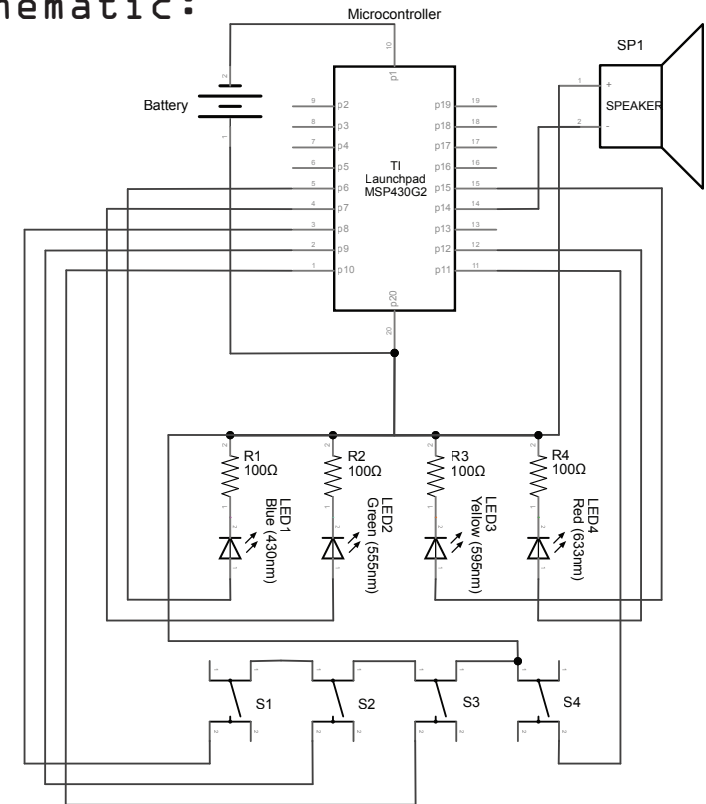
Schematic:

Resources:

Source Code & Documentation: https://github.com/designwaterloo/Memory_Game

All source code and documentation, including schematics, drawings, parts lists, and instructions can be found at the link provided above.

Energia Development Environment: http://energia.nu

The Energia website includes the free development environment, getting started guides, example code, and everything you need to start editing and writing your own programs with the MSP430 LaunchPad development kit.

MSP430 Links: http://www.ti.com/launchpad

Tons of information and resources for developing applications on Texas Instruments' MSP430 microcontrollers.

Contact:

Ryan Walker
Design and Lab Instructor
drwalker@uwaterloo.ca

If you have any questions or comments regarding this project, please feel free to contact me. I'd love to hear about any projects this kit has inspired!

This project was created using:

Energia   Fritzing   GitHub