LilyTiny Project Student Guide

Instructional Technology and Learning Sciences

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Acknowledgments: This guide was created based on our own experiences, and with help from the following: 1. Tutorials on the Sparkfun website (http://www.learn.sparkfun.com/tutorials). 2. the Sparking Bracelet tutorial from the Sew Electronic website (http://sewelectric.org/diy-projects/sparkling-bracelet/) created by Leah Buechley and Kanjun Qiu. Please visit these and other great websites for more craft technology projects and tutorials.

LILYTINY PROJECT STUDENT GUIDE

Description

The LilyTiny is a micro-controller computer that has four pins that have been pre-programmed with four different blinking light patterns. For this project you will complete several activities that will help you to learn more about the LilyTiny and circuit designs. Lastly, you will design and complete your own LilyTiny project.

Objectives

- Learn beginning electricity principles
- Learn the difference between parallel and independent circuits
- Learn how to make a switch
- Learn beginning crafting techniques

Supplies

- Various colors of felt (or other sturdy fabric of your choice)
- Conductive thread
- LilyPad LED Lights
- 3 Volt coin cell battery
- LilyPad Coin Cell Battery Holder
- LilyTiny
- Snaps (sold at any crafting store)
- Thread (just normal thread)
- Alligator Clips

LILYTINY - ACTIVITY ONE

Activity 1: Test it Out

As mentioned in the introduction the LilyTiny is a pre-programmed micro-controller computer that has four different pins with different effects. Try testing out the LilyTiny yourself. Create a circuit using a battery, LilyTiny, LED lights, and some alligator clips.

1. Connect the ***positive*** pin on the battery to the ***positive*** pin on the LilyTiny with an alligator clip, and connect the **negative** pin of the battery to the **negative** pin on the LilyTiny.

2. Connect the ***positive*** pin of the LED to one of the numbered pins on the LilyTiny.

3. Connect the **negative** pin of the LED to the other **negative** pin on the battery holder.

4. Test each of the numbered pins to see their effect.

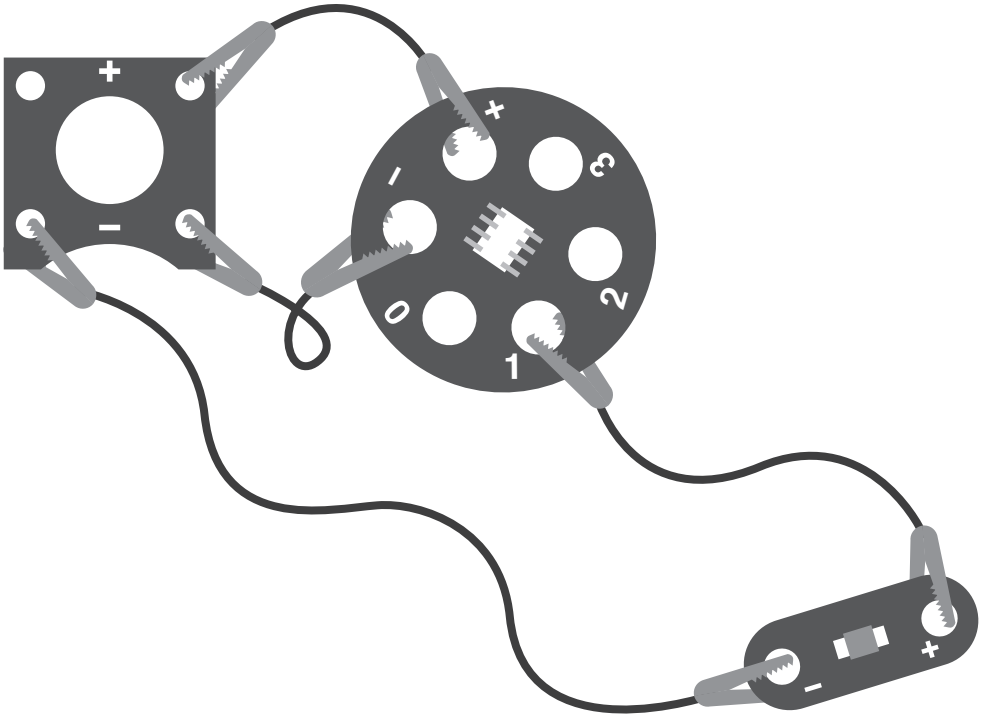


Figure 1: Diagram of Circuit to test LilyTiny

Write Out What Each Pin Does

0 _____

_____

1 _____

_____

2 _____

_____

3 _____

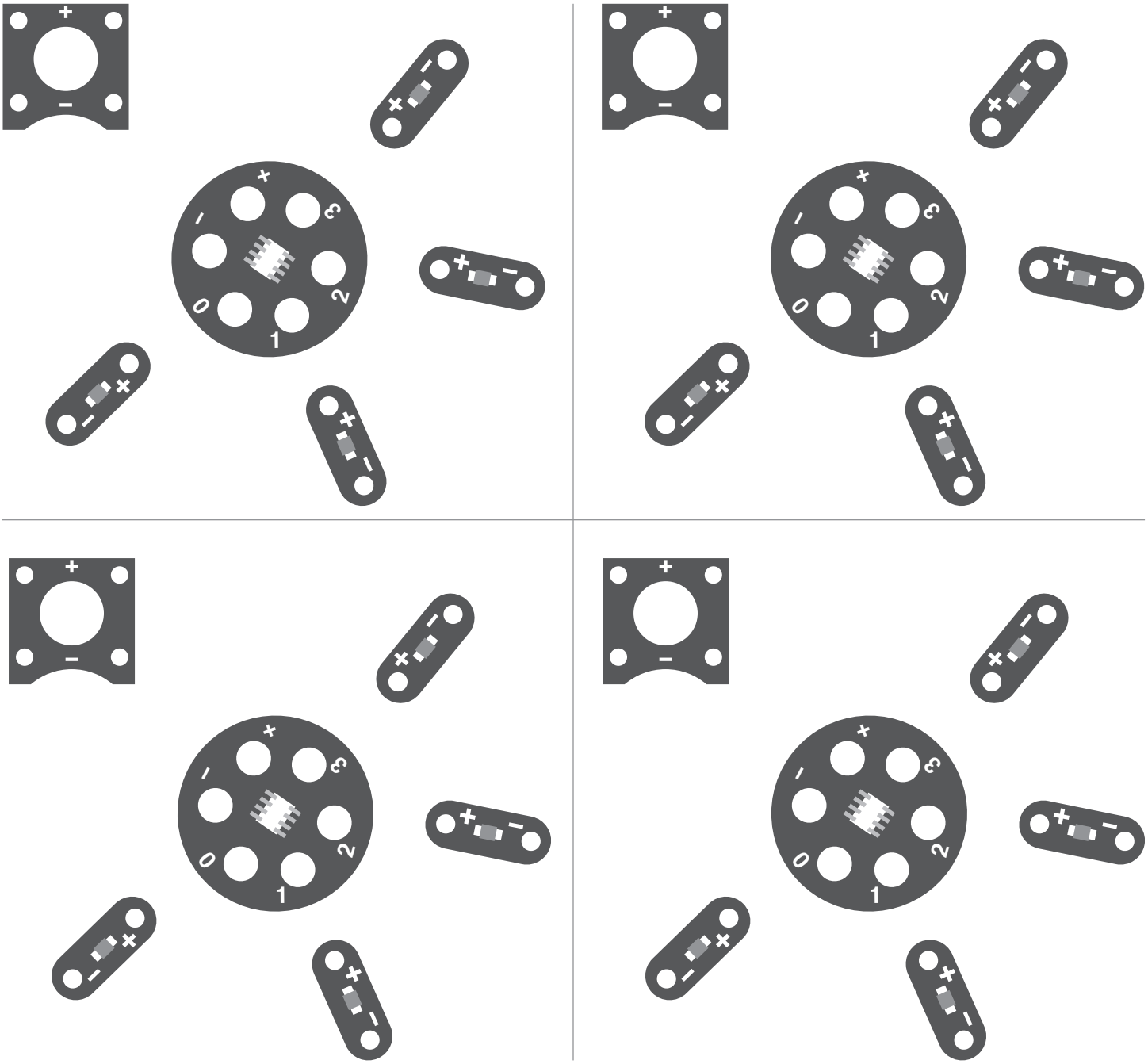
_____

See page 5 for a description each pins.

LILYTINY - ACTIVITY TWO

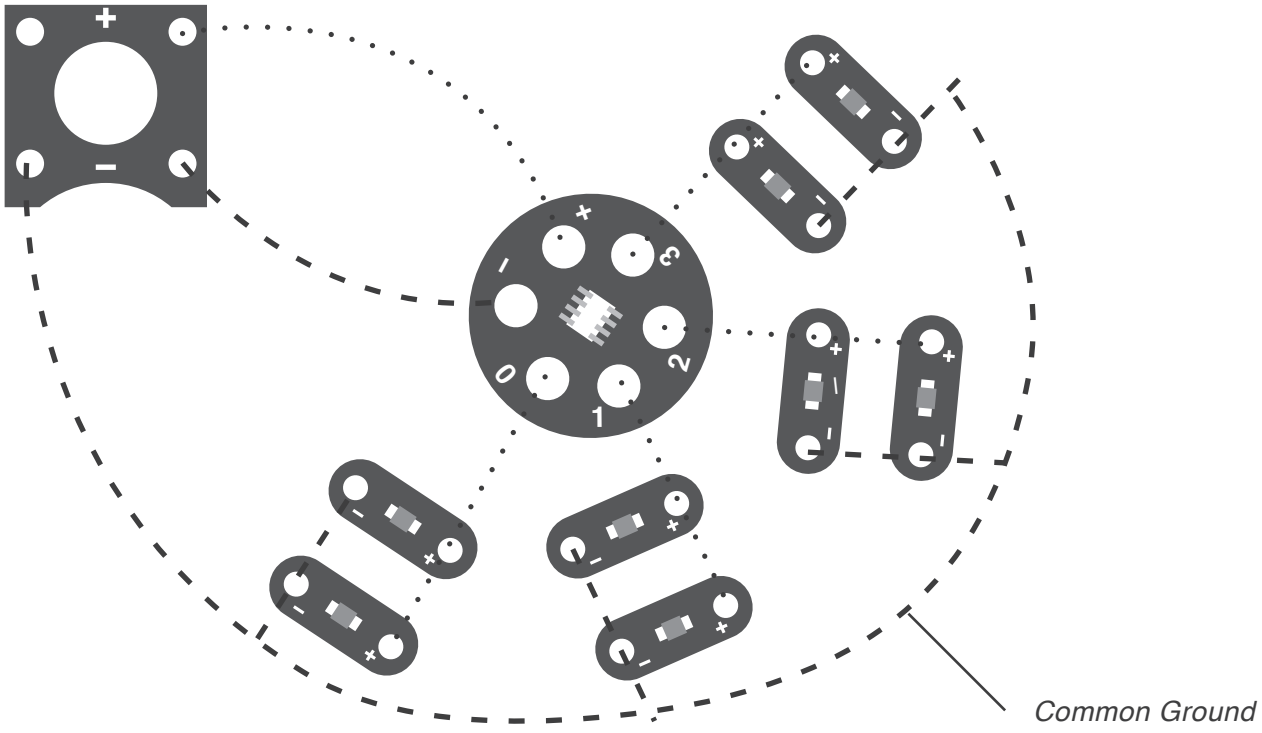
Activity 2: Designing Computer Circuits

Using the LilyTiny you can connect a different lights to each individual numbered pin (independent circuits), or you can connect multiple lights to one numbered pin (parallel circuits). How many different ways can you connect the LED lights to the LilyTiny? Use the diagrams below to sketch four **different** ways to connect the LED lights to the LilyTiny to create a complete circuit.



Activity 3: Adding More Lights: Parallel Circuits

You can connect multiple lights to a single pin to create in parallel. Connecting lights in parallel will cause multiple lights to have the same blinking pattern. Whereas connecting lights independently, like in the previous activity, all of the lights to have a different blinking pattern. In the circuit diagram below each set of two lights act in different ways. Both the *positive* and **negative** lines for each set of lights has to be connected in order for the circuit to work. You'll notice in the diagram below that the **negative** lines for each set of lights are connected to a single **negative** line that connects all the way back to the battery. This is called a common ground. Using a common ground is a technique that can be very helpful especially when your circuit gets more complicated.



Negative Line - - - - - - - - - -

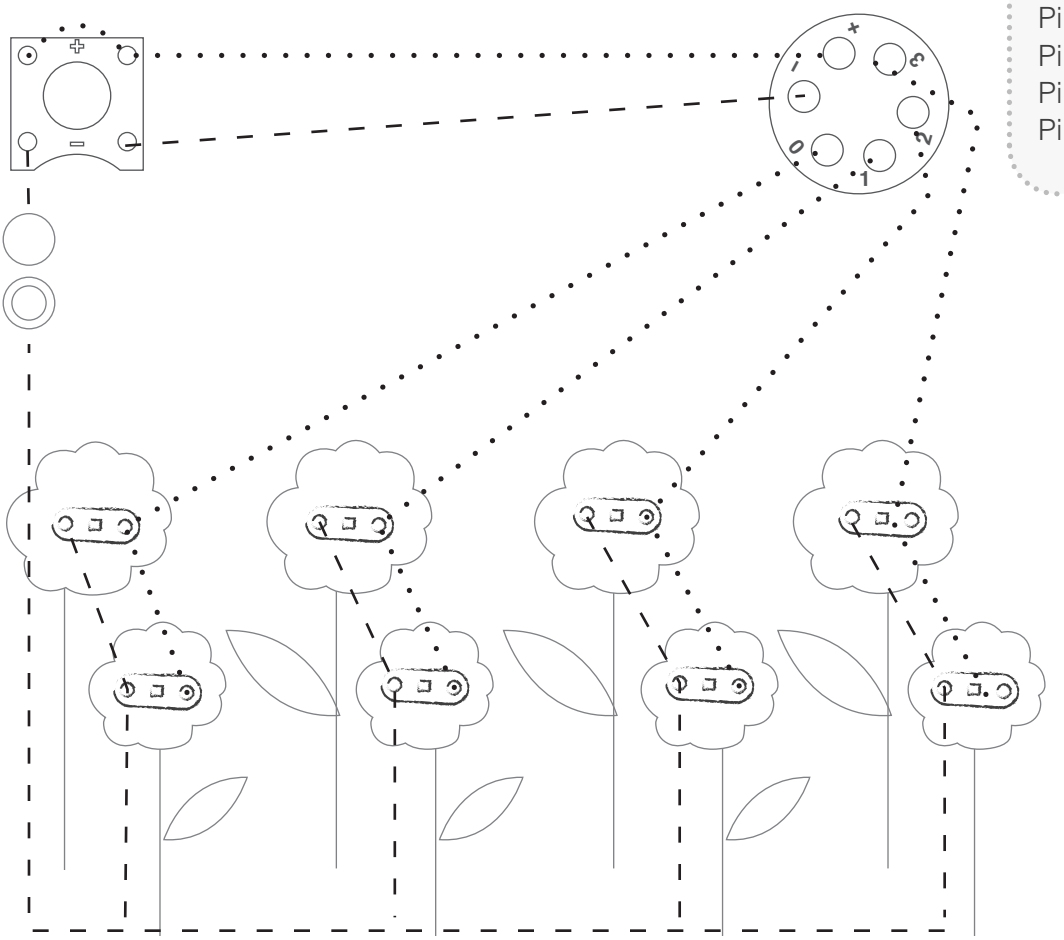
Positive Line . . . . . .

Figure 3: Diagram of Parallel Circuit

Design your Own Project

Now that you have had some experience with the capabilities of the LilyTiny it is time for you to design your own project. Throughout this guide we will show an example project. You may choose to follow this guide step-by-step, remix and adapt this project, or come up with your own idea. The only requirements are that you use at least four LED lights, and include a switch.

However, before you start crafting it is important to create a sketch or diagram of your circuit. Below is an example of a circuit diagram, and all of the components that you will need to include in your own sketch. Use the following page to sketch our your project and circuit. Before starting your crafting you will need to have your teacher approve and sign your diagram.



TIPS AND TRICKS

Color Coding

One way to keep yourself from getting confused with which is your ***positive*** line, and which is the **negative** is to color code them. We recommend that you use **black** for the **negative** lines, and ***red*** for the ***positive*** lines; this is the standard practice.

The Blinking Patterns

Did you discover all of the blinking patterns. Here is a description of each of the pins:

Pin 0: Fading
Pin 1: Heart Beat
Pin 2: On and Off
Pin 3: Twinkle

LILYTINY - PROJECT

Instructor Signature _____ Date _____