

10x10 LED strip - an example

This example of the lamp that was designed and put together by our **summer high school interns**. It intends to mimic the display of a screen and this design is more versatile for doing creative programming projects than the single LED-strip.

All the students began with minimal or no exposure to programming and learned to code using the 1 LED strip. By the end of 4 weeks, they redesigned the lamp and developed their own programs for the 10x10 screen. Trying the following programs in sequence will help to understand the students' learning progression through the summer.

List 1: These are programs that run on the single LED strip as well as the 10x10 matrix.

*Note: Programs marked with a * run continuously. To stop them, press cntrl + c together.*

Program name	What it does	CS Concepts learned
EvenOrOdd.py	<i>Asks the user for a number. If it is even, all lights turn Green. If it is odd, all lights turn Blue</i>	<ul style="list-style-type: none">- Getting input from user- If-else logic statements
*Chasing1LEDLoop.py	<i>Lights up one LED after another in a continuous loop.</i>	<ul style="list-style-type: none">- Using 'while' loop
*ChasingRainbowLoop.py	<i>Lights up many LEDs at a time in Rainbow colors in a continuous loop.</i>	<ul style="list-style-type: none">- Using 'for' loop- Using nested loops
*DimToBrightLoop.py	<i>Changes the intensity of the light color in a continuous way</i>	<ul style="list-style-type: none">- Learning to generate more colors and intensities
*Twitter-3.py	<i>This is an example written by the teaching team flashes every time a user-defined hashtag (#) gets tweeted. The students learned to modify the base function to add more functionality.</i>	<ul style="list-style-type: none">- Understanding complex programs written by others.- Incorporating others' programs into the students' work.

List 2: Here are some programs that use the 2-D nature of the 10x10 display

→ Learning to Scroll

- Students learned to scroll by first moving a dot (`scrollingDot.py`), then a square (`scrollingSquare.py`) and then a vertical line (`scrollingVerticalLine.py`)

→ Learning to print user-entered text

- Students learned to painstakingly display each individual character
- They learned to scroll each letter across the screen, both to the left and right! (`ScrollingAleftToRight.py`, `ScrollingArightToLeft.py`)
- They then learned to scroll user-entered data across the screen (`ScrollUserEntered.py`)

→ Learning to read and display data sets

- Students used the energy data from Dunner Academy, a CPS school that was the site of our pilot program. They learned how to represent numerical data in terms of colors. In their first attempt, they used one color for each display (`DunneEnergyDisplayed.py`)
- Later they tried more complex color visualizations (`DunneEnergyBarGraph.py`)