Jeide, Matthew 4/21/2025 Period 2

W16B: DE [Pi-Top/Arduino] State Machine

View the State Machine Video and Take Notes: my.pltw.org

PRACTICE

1. What does the code tell the Pi-Top to do? What will it print?

```
1 print("hello world")
```

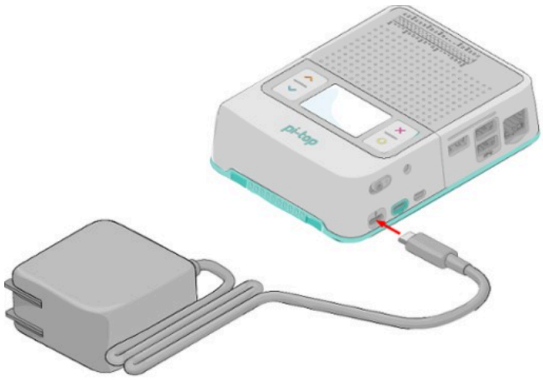

Figure 10. pi-top Connecting to Power Cable

/'/

The pi-top will print out the message onto the screen:
hello world

2. What does this Pi-Top code do?

```
1  from pitop import Pitop
2  from time import sleep
3
4  pitop = Pitop()
5  screen = pitop.miniscreen
6
7  next = "4"
8  while True:
9      screen.display_text(next)
10     if screen.select_button.is_pressed:
11         if next == "4":
12             next = "6"
13         elif next == "6":
14             next = "9"
15         elif next == "9":
16             next = "4"
17     sleep(.2)
```

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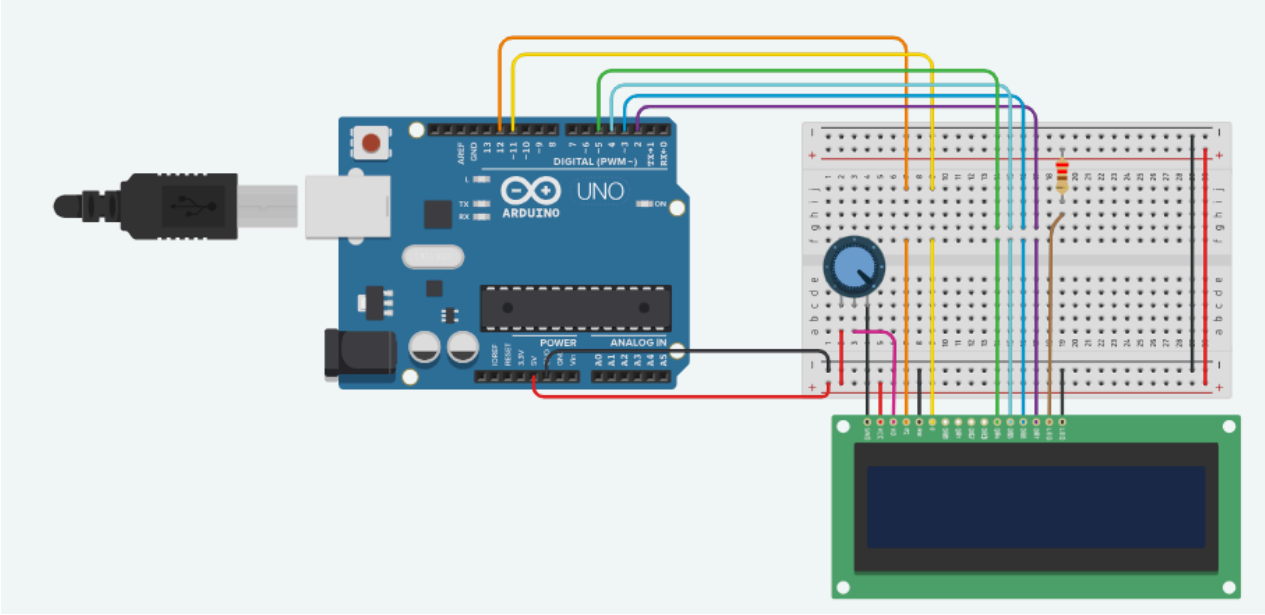
The Pi-Top code initializes the PiTop instance and sets up the miniscreen instance, it then defines a variable called “next” which will be used as the basis for the cycle. It then starts the main loop, where it draws the text to screen, check if the select button is pressed, if it is, it will update the next value, which goes in a pattern:
4->6->9 (if it’s 9, it wraps back around to 6)
Then, it has a delay of ⅕ second for the text to display and have a little delay for the button.

3. Use TinkerCAD to create the same State Machine depicted above. Make sure to use Arduino with the built-in LED Display. Make sure to attach a button to control the changes.
https://www.tinkercad.com/things/jKXNx3gfmgB/editel?returnTo=%2Fdashboard



a. Attach the C++ code that allows you to display the values 4-6-9, then it loops back to 4. The machine should be able to transition to the next number with a press of a button.

C++ Code

```
// C++ code
//
#include <Adafruit_LiquidCrystal.h>

int next = 4;

Adafruit_LiquidCrystal lcd_1(0);

void setup()
{
  lcd_1.begin(16, 2);
```

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```
  pinMode(3, INPUT_PULLUP); // select button

  lcd_1.print("matthew jeide"); // show my name
  lcd_1.setBacklight(1);  // turn on the backlight
}

void loop()
{
  lcd_1.setCursor(0, 1); // set the cursor to the start of the second row
  lcd_1.print(next); // show the current variable
  if (digitalRead(3) == LOW) {  // pullup button, if low, that means it's being pressed
    if (next == 4) {  // if 4, switch to 6
          next = 6;
    } else if (next == 6) { // if not 4 and instead 6, switch to 9
          next = 9;
    } else if (next == 9) { // if not 4 or 6 and instead 9, switch to 4
          next = 4;
    }
  }
  delay(200); // Wait for 200 milliseconds
}
```

b. Attach a video of your State Machine Displaying the numbers 4-6-9 and then looping. Make sure to display a few loops on the display and how they operate with the button.

Video of TinkerCAD showing the code working
https://youtu.be/HfjVQEMcbEo