

Name:

Mission 11 Assignment – Spirit Level

How level is your desk or table? Write some code to find out! In this project you'll build a *spirit level*! You will create a **digital level** using the CodeX's built-in accelerometer and display. You'll physically rotate the CodeX to move the digital "bubble" on the display!



Mission 11: Spirit Level ✓

Create a digital level using the CodeX's built-in accelerometer.

You will create code during this lesson. When you encounter an error, make a note of what is happening and **document your debugging** process in the **table** below.

1. Read the introduction and complete Objective #1. Use the simulator for the second checkbox.

What is the accelerometer?

What are the three directions of the accelerometer?

2. Complete Objective #2.

How many values does `accel.read()` return?

What happens if you shake the CodeX?

`Val[0]` gives the value of which direction?

3. Complete Objective #3. You will be doing a bit of math!

4. Complete Objective #4. You will learn about drawing shapes on the LCD display. Read the instructions carefully and answer the questions. Then use CodeX to help you type the code.

What does "`display.fill()`" do?

What does "`display.draw_line()`" do?

What does "`display.draw_circle()`" do?

What is the size of the LCD display?

Where is **(0, 0)** located on the LCD display?

5. Complete Objective #5 and the quiz. Complete Objective #6.

EXTENSION #1:

Program a wait function to pause the run of the spirit level until button A is pressed.

EXTENSION #2:

Use button B to program a “kill switch” to end the program. Display a message after the loop that indicates the program is over.

CHALLENGE #1:

Right now the spirit level only detects a change in the x. Modify the code so the spirit level detects a change in y instead of x.

CHALLENGE #2:

Right now the spirit level only detects a change in the x. Modify the code so the spirit level detects a change in both x and y. You will need separate variables for x and y, but otherwise the code is the same.

CHALLENGE #3:

Modify the spirit level so it draws a square in the center when the spirit level is level.

```
fill_rect(x1, y1, width, height, color=(255, 255, 255))
```

To turn in the assignment, download your code (FILE-DOWNLOAD), which will be a text file. Add your name in the filename. Then submit the file through Google Classroom or the class LMS.

Debugging Table

As you create code, you will make mistakes. Keep track of the mistakes in the table below. Doing so will help you become a more confident programmer. Add rows to the table as needed.

Error message that is displayed	Actual bug	How you fixed it

SUCCESS CRITERIA:

- Display a numeric “tilt” value from the accelerometer.
- Scale the raw tilt value to show 0-9, indicating 0° to 90° incline.
- Replace the number display with a graphical bubble simulation!
- Use at least one function in your code.