

ECE177: Programming I: From C...
Lab #4 — Loops
Week of 23 February 2026

1 Objectives

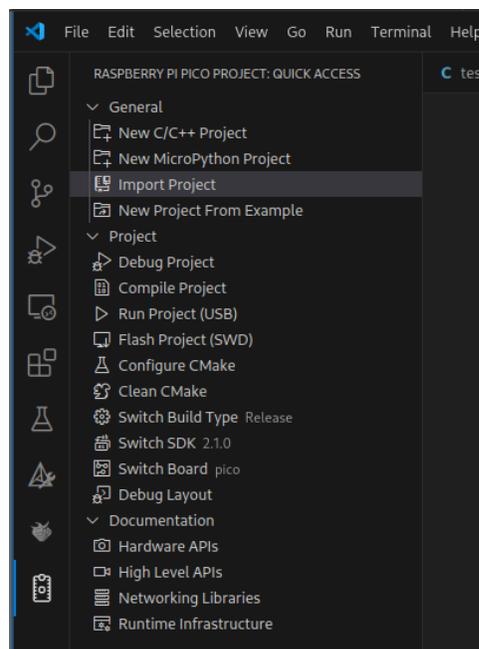
- Complete all of the steps outlined in the comments of `loops.c`
- Program the Pico breadboard with the modified `loops.c` file and confirm working output

2 Materials Needed

- Assembled and working Pico breadboard
- USB cable
- Laptop / Laptop charger

3 Loading the Project

1. Make sure to read all of the directions carefully before getting started.
2. Download the `lab04_code.zip` file here:
https://web.eece.maine.edu/~vweaver/classes/ece177/labs/lab04_code.zip
3. Extract the zip file in your `Documents/ece177/labs/` directory that you created in lab01.
4. In VS Code, use the Raspberry Pi Pico Extension to import the lab04 folder as a project.



4 Modify the Provided Code

1. Edit the provided `loops.c` file
2. Below each task is briefly described, there are more details in the comments of the code on what you need to do
3. Make sure to read all of the comments carefully before getting started so as to not miss any of the instructions.
4. Be sure to comment your code!
5. Test your code often! Don't try to write it all at once!
6. To run your code, compile it so it generates the `loops.uf2` file that you can find in the `build` subdirectory. Unplug/replug the USB cable to the Pi Pico with the BOOTSEL button held down to have it appear as a drive on your computer. Ideally the "Run" (triangle button in lower right corner) will compile and copy your code to the Pico. If it doesn't you might have to manually copy or drag & drop the `loops.uf2` file in the `build` directory to the Pico drive to reprogram it.
 - (a) Update the code comments at the top of the file with your name, the date, and a brief description of the lab.
 - (b) First add a proper `int main()` declaration where indicated at the start of the file. Add a proper return and closing curly brace at the end of the file. After doing this the project should now compile.
 - (c) Follow the directions near the bottom to create an infinite loop calling the `jump_to_MSD()`; . This will wait forever when your code is done, and if you press '*' and 'D' on the keypad at the same time it will enter BOOTSEL mode so you can reprogram the Pico without having to unplug it.
 - (d) Print various number patterns using the `for` loops and `printf()`. See the code comments for details. A brief summary:
 - i. Print the numbers 0 to 9, each on it's own line
 - ii. Print the numbers -5 to 5
 - iii. Print the even numbers 0 to 12
 - (e) Using nested `for` loops print various ASCII art pictures using the '*' character as detailed in the code comments. Use `printf()` but you're only allowed to print one character at a time with it. You can't print a whole row of characters.
 - i. Print an 8x8 square
 - ii. Print a triangle
 - iii. Make a Sierpinski Triangle

5 Grading/Checkoff

1. Upload your `loops.c` file to BrightSpace.
NOTE: this is the plain text `loops.c` file, not a screenshot of it!

2. Upload a screenshot of your board running the Sierpinski triangle code (the last thing printed after the full program you wrote runs).
3. TAs will check the output of your final program running on your hardware. They will ask you to demonstrate the lab requirements and will enter grades after the requested information has been uploaded on the assignment rubric.
4. TAs: Enter grades only after verifying full functionality of the code running, the requested information has been uploaded, and the assignment has been submitted.