

Micropython:

Binary Code Guesser

Project Overview:

The student will learn a portion of the Pin subset of the machine module. The student will demonstrate their knowledge by creating a simple breadboard-based hardware application where the user would need to guess a binary number from 0 to 7.

Standards:

- MP.01 Binary conversions
- MP.02 Breadboard logic
- MP.03 Circuitry
- MP.04 Inputs and Outputs
- MP.05 Pull-Up Switches

Objectives:

- Student will learn how to incorporate Python 3 functions in a Micropython environment.
- Student will demonstrate how to convert between binary & base-10 integers.
- Student will use input and output with Pull-Up switches to build their game.

Requirements:

Must use the Raspberry Pi Pico only!

Must use the integrated Pull-Up switch in Micropython.

Maximum of 4 buttons, minimum of 2.

Must have 3 blue LEDs with reasonable resistors.

Must have 1 red LED with a reasonable resistor.

Must have 1 white LED with a reasonable resistor.

Must use ONLY the following modules:

- Pin from machine
- sleep from utime
- randint from random

Links for review:

Click [here](#) to review binary and base-10 number systems. Click [here](#) to review I/O and Pull-Up switches. If you still have questions after watching both videos, feel free to send me an email at satej.online@outlook.com or online.satej@gmail.com. Please know that I might take some time before your email catches my attention.

How it works:

The game starts by picking a random number from 0 to 7. Then the program begins waiting for user input in the form of at most three buttons and one button to submit. When a blue button is pressed, its corresponding blue LED lights up. If pressed again, the LED turns off. If the blue button is held down, its blue LED does not flicker. When the submit button is pressed, the program converts the binary value (displayed by the blue LEDs) into a number and checks if the number given from the LEDs is equal to the randomly generated number. If the two values are equal, the white LED turns on for a second and then resets the machine. If not, then the red LED lights up and the process repeats.

Teacher initials *AG*

You are ready to create your project! Please revisit the project tasks/requirements as you work.

Summarize what you learned:

How many more numbers can a base-4 number system represent compared to the base-3 number system that was used in this project?

What would the number 29 be represented as on a base-5 number system?

What is the theoretical probability that a person guesses the code after 2 incorrect attempts?

How would you expand this project if the code ranged from 0 to 15?

Project link:

Please provide a video recording of your project in action as well as the main code for the project. There should only be two files submitted in total! (mp4 and py)