

ECE 476/676 - Homework #3

Binary Outputs, Binary Inputs, Serial I/O - Due Monday, September 16th

Binary I/O

Use the buttons, LEDs, and Beeper on the Pico Breadboard Kit:

Input:

- Button GP15 and GP14

Output:

- LED GP16, GP17
- Beeper GP13

1) Write a Python program which turns on the LEDs based upon which buttons are pressed:

- GP16: Turn on if both buttons are pressed (logic AND)
- GP17: Turn on if only one button is pressed (logic XOR)

Test your code to verify it works.

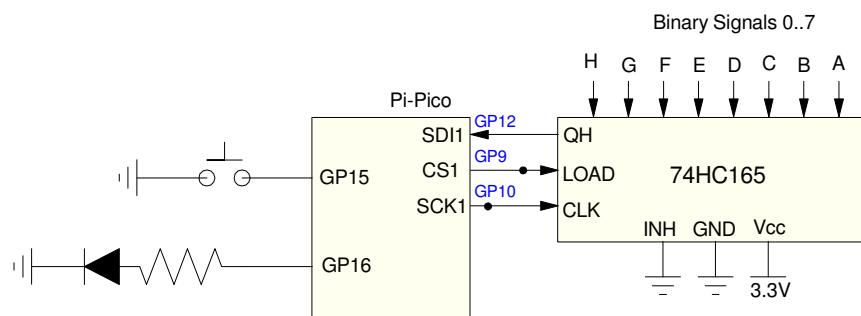
2) Write a Python program which counts when you press the buttons

- The counter starts at 0
- When you press and release GP14, the counter increases by 1
- When you press and release GP15, the counter increases by 10

Verify your code works

Combination Lock

Write a program where you guess the value of an 8-bit binary number, defined by a 74165 shift register



- At the start of the game, the Pico picks a random number from 0 to 255 and the LED GP16 is turned off.
- You then set the eight binary inputs to the shift register
- Once set, press GP15 button.
- The Pico then reads your guess an SPI interface.
- It then tells you if your guess was too low, too high, or correct
- If the code corectis just right, turn on the LED on GP16

- 3) Write a subroutine which generates a random number from 0..255
 - Test your code

- 4) Write a subroutine which reads a 74165 shift register and returns a number from 0..255
 - Test your code

- 5) Write a program for a combination lock program
 - Test your code
 - Display the actual code and your guess
 - Verify your code returns the correct messages (too high, too low, correct)

- 6) Demonstrate your code
 - In-Person or with a video