

ECE 476/676 - Homework #11

BlueTooth - Due Monday, November 21st

Roulette!

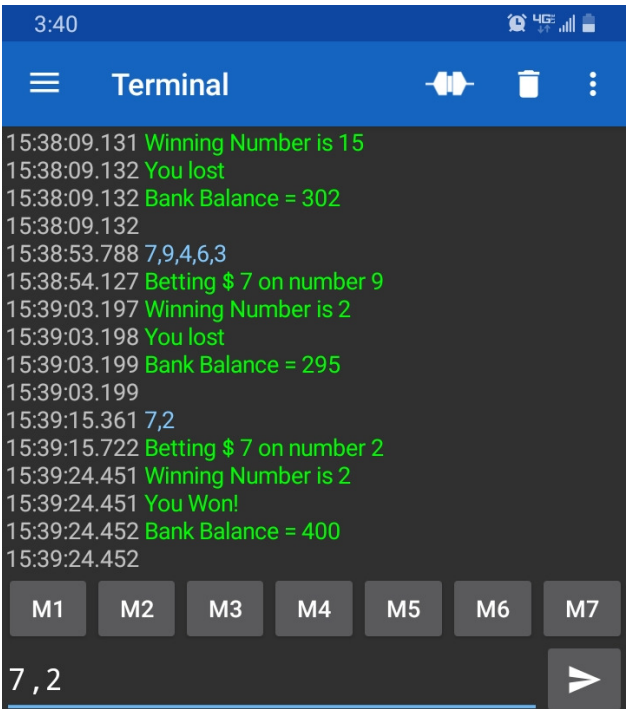
Write a Python program to play a simplified game of Roulette on your Pico board from your cell phone with a Bluetooth interface

- On reset, you start with \$100 in your bank account.
- Your bank value is displayed on
 - The LCD display and
 - Your cell phone via a Bluetooth message
- You can then place bets on numbers 1..8 using
 - the keyboard or
 - your cell phone with a Bluetooth interface
- Once bets are placed a random number in the range of 50..80 is generated
 - The marble moves one position every 100ms
 - Where it stops is the winning number (position mod 8)
- Bets that win increase your bank balance by 8x that amount
- Bets that lose decrease your bank balance by that amount
- The game then repeats

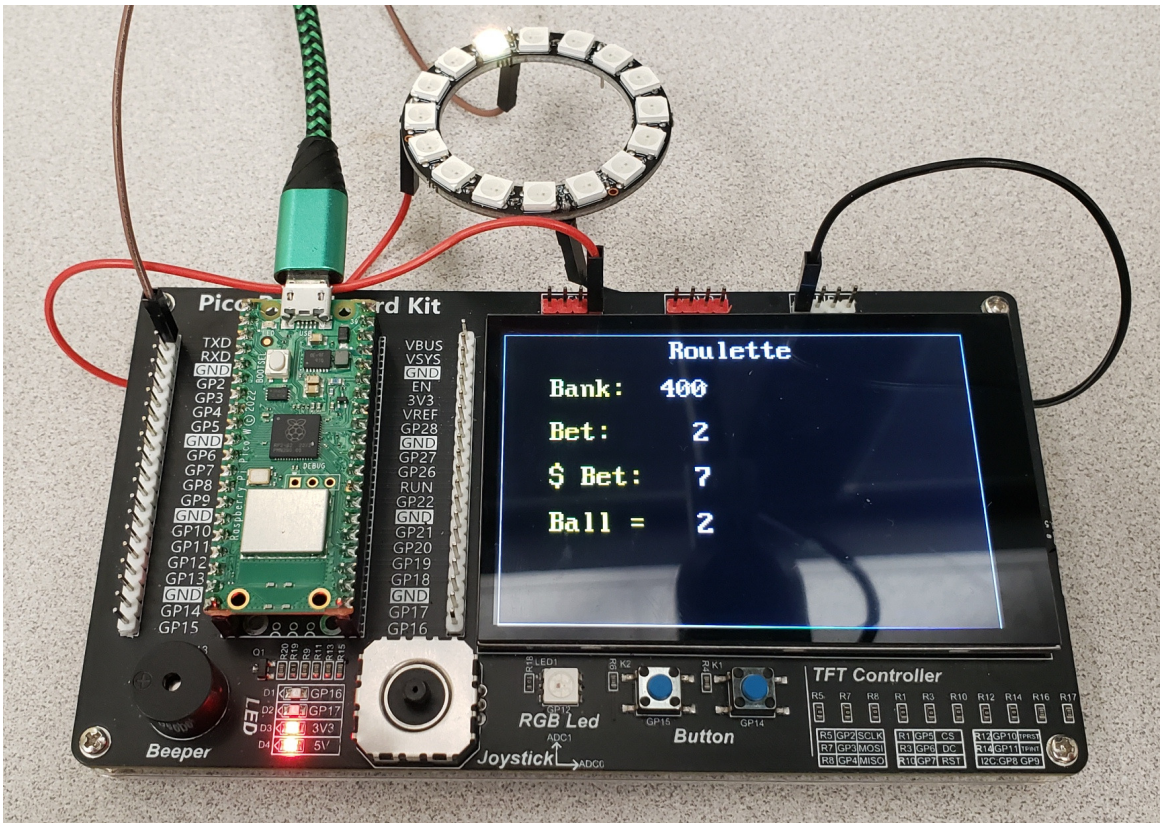
Grading

- (10pt) Display your bank balance on the LCD display
- (10pt) Display your balance on your cell phone via Bluetooth
- (10pt) Display the numbers and amount bet on each number on the LCD display
- (10pt) Accept bets from your cell phone via Bluetooth
 - Use the keyboard if you can't get bluetooth to work (no points for this)
- (10pt) Can spin the wheel with a bluetooth message
 - Use a button if you can't get bluetooth to work (no points for this)
- (10pt) Display the changing numbers on the LCD display as the marble goes around the roulette wheel
- (10pt) Bank balance decreases on all losing bets
- (10pt) Bank balance increases 8x for all winning bets
- (10pt) Game then restarts (can play over and over)
- (10pt) Demonstrate your Roulette wheel

Cell-Phone Connection via BlueTooth



Bluetooth interface with a cell phone. Currently betting \$7 on #2



Pico connected to a NeoPixel. Red LED is the number you're betting on, Green is the current ball position

Bluetooth Routines

```
from ble_simple_peripheral import BLESimplePeripheral

def on_rx(data):
    global Number, Bet, flag
    print(data)
    data = str(data)
    n = len(data)
    data = data[2:n-5]
    print(data)
    try:
        x = data.split(',')
        Bet = int(x[0])
        Number = int(x[1])
        print('Betting $', Bet, ' on number ', Number)
        flag = 1
    except:
        print('invalid data entry')
        flag = 0

while(1):
    if sp.is_connected():
        sp.on_write(on_rx)

    if(flag==1):
        flag = 0
        Bank -= Bet
        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)

        X[3*Number+1] = 50
        sp.send('Betting $ ' + str(Bet) + ' on number ' + str(Number) + '\r\n')

        N = randint(48, 64)
        for i in range(0, N):
            X[N0*3] = 0
            N0 = (N0 + 1) % 16
            X[N0*3] = 50
            bitstream(np, 0, timing, X)
            LCD.Number2(N0, 3, 0, 150, 200, Yellow, Black)
            Beep()
            sleep_ms(20 + int(1000/(N-i)))
        sp.send('Winning Number is ' + str(N0) + '\r\n')
        if(N0 == Number):
            Bank += 16*Bet
            sp.send('You Won!\r\n')
        else:
            sp.send('You lost\r\n')
        sp.send('Bank Balance = ' + str(Bank) + '\r\n')
        sp.send('\r\n')

        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)
        X[3*Number+1] = 0
```

NeoPixel Routines

```
from machine import Pin, PWM, bitstream

timing = [300, 900, 700, 500]
np = Pin(0, Pin.OUT)
X = bytearray([0,0,0])
for i in range(1,16):
    X.extend(bytearray([0,0,0]))
bitstream(np, 0, timing, X)

while(1):
    if sp.is_connected():
        sp.on_write(on_rx)

    if(flag==1):
        flag = 0
        Bank -= Bet
        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)

        X[3*Number+1] = 50
        sp.send('Betting $ ' + str(Bet) + ' on number ' + str(Number) + '\r\n')

        N = randint(48, 64)
        for i in range(0, N):
            X[N0*3] = 0
            N0 = (N0 + 1) % 16
            X[N0*3] = 50
            bitstream(np, 0, timing, X)
            LCD.Number2(N0, 3, 0, 150, 200, Yellow, Black)
            Beep()
            sleep_ms(20 + int(1000/(N-i)))
        sp.send('Winning Number is ' + str(N0) + '\r\n')
        if(N0 == Number):
            Bank += 16*Bet
            sp.send('You Won!\r\n')
        else:
            sp.send('You lost\r\n')
        sp.send('Bank Balance = ' + str(Bank) + '\r\n')
        sp.send('\r\n')

        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)
        X[3*Number+1] = 0
```

LCD Display Routines

```
import neopixel, LCD, time

LCD.Init()
White = LCD.RGB(250,250,250)
Black = LCD.RGB(0,0,0)
Yellow = LCD.RGB(250,250,0)
LCD.Clear(Black)
LCD.Box(1,1,479,319,White)
LCD.Title('Roulette', White, Black)
LCD.Text2('Bank: ', 50, 50, Yellow, Black)
LCD.Text2('Bet: ', 50, 100, Yellow, Black)
LCD.Text2('$ Bet: ', 50, 150, Yellow, Black)
LCD.Text2('Ball = ', 50, 200, Yellow, Black)

N0 = 1

while(1):
    if sp.is_connected():
        sp.on_write(on_rx)

    if(flag==1):
        flag = 0
        Bank -= Bet
        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)

        X[3*Number+1] = 50
        sp.send('Betting $ ' + str(Bet) + ' on number ' + str(Number) + '\r\n')

        N = randint(48, 64)
        for i in range(0, N):
            X[N0*3] = 0
            N0 = (N0 + 1) % 16
            X[N0*3] = 50
            bitstream(np, 0, timing, X)
            LCD.Number2(N0, 3, 0, 150, 200, Yellow, Black)
            Beep()
            sleep_ms(20 + int(1000/(N-i)))
        sp.send('Winning Number is ' + str(N0) + '\r\n')
        if(N0 == Number):
            Bank += 16*Bet
            sp.send('You Won!\r\n')
        else:
            sp.send('You lost\r\n')
        sp.send('Bank Balance = ' + str(Bank) + '\r\n')
        sp.send('\r\n')

        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)
        X[3*Number+1] = 0
```

Final Code

```
from machine import Pin, PWM, bitstream
import bluetooth
from ble_simple_peripheral import BLESimplePeripheral
import neopixel, LCD, time
from random import randint
from time import sleep, sleep_ms

timing = [300, 900, 700, 500]
np = Pin(0, Pin.OUT)
X = bytearray([0,0,0])
for i in range(1,16):
    X.extend(bytearray([0,0,0]))
bitstream(np, 0, timing, X)

Beeper = Pin(13, Pin.OUT)
LED = Pin(16, Pin.OUT)
LED.value(0)

N = 16

ble = bluetooth.BLE()
sp = BLESimplePeripheral(ble)
flag = 0

N = 16

Number = 0
Bet = 0
Bank = 100

def Beep():
    Beeper.value(1)
    sleep_ms(2)
    Beeper.value(0)

def on_rx(data):
    global Number, Bet, flag
    print(data)
    data = str(data)
    n = len(data)
    data = data[2:n-5]
    print(data)
    try:
        x = data.split(',')
        Bet = int(x[0])
        Number = int(x[1])
        print('Betting $', Bet, ' on number ', Number)
        flag = 1
    except:
        print('invalid data entry')
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LCD.Init()
White = LCD.RGB(250,250,250)
Black = LCD.RGB(0,0,0)
Yellow = LCD.RGB(250,250,0)
LCD.Clear(Black)
LCD.Box(1,1,479,319,White)
LCD.Title('Roulette', White, Black)
LCD.Text2('Bank: ', 50, 50, Yellow, Black)
LCD.Text2('Bet: ', 50, 100, Yellow, Black)
LCD.Text2('$ Bet: ', 50, 150, Yellow, Black)
LCD.Text2('Ball = ', 50, 200, Yellow, Black)
```

```

N0 = 1

while(1):
    if sp.is_connected():
        sp.on_write(on_rx)

    if(flag==1):
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        Bank -= Bet
        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
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        X[3*Number+1] = 50
        sp.send('Betting $ ' + str(Bet) + ' on number ' + str(Number) + '\r\n')

        N = randint(48, 64)
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        sp.send('Bank Balance = ' + str(Bank) + '\r\n')
        sp.send('\r\n')

        LCD.Number2(Bank, 3, 0, 150, 50, White, Black)
        LCD.Number2(Number, 3, 0, 150, 100, White, Black)
        LCD.Number2(Bet, 3, 0, 150, 150, White, Black)
        LCD.Number2(N0, 3, 0, 150, 200, White, Black)
        X[3*Number+1] = 0

```