import simplegui

import random

WIDTH = 600

HEIGHT = 400

BALL\_RADIUS = 20

PAD\_WIDTH = 8

PAD\_HEIGHT = 80

HALF\_PAD\_WIDTH = PAD\_WIDTH / 2

HALF\_PAD\_HEIGHT = PAD\_HEIGHT / 2

LEFT = False

RIGHT = True

ball\_pos = [WIDTH/2, HEIGHT/2]

ball\_vel = [ 0, 0]

paddle1\_pos = [HALF\_PAD\_WIDTH , (HEIGHT - PAD\_HEIGHT) /2 ]

paddle2\_pos = [WIDTH - HALF\_PAD\_WIDTH, (HEIGHT - PAD\_HEIGHT) /2 ]

paddle1\_vel = 0

paddle2\_vel = 0

score1 = 0

score2 = 0

#使球回到中心，並隨機選擇向右上或左下

def spawn\_ball(direction):

global ball\_pos, ball\_vel

ball\_pos = [WIDTH/2, HEIGHT/2]

if direction == True:

ball\_vel = [ 1,-1]

else:

ball\_vel = [-1,-1]

#開啟新局，分數、球拍、球，回到原始位置

def new\_game():

global paddle1\_pos, paddle2\_pos, paddle1\_vel, paddle2\_vel, ball\_pos, ball\_vel

global score1, score2

paddle1\_pos = [HALF\_PAD\_WIDTH , (HEIGHT - PAD\_HEIGHT) /2 ]

paddle2\_pos = [WIDTH - HALF\_PAD\_WIDTH, (HEIGHT - PAD\_HEIGHT) /2 ]

score1 = 0

score2 = 0

ball\_vel = [0, 0]

direction = random.randrange(0, 2)

spawn\_ball(direction)

def draw(canvas):

global score1, score2, paddle1\_pos, paddle2\_pos, ball\_pos, ball\_vel, paddle1\_vel, paddle2\_vel

#畫球桌

canvas.draw\_line([WIDTH / 2, 0],[WIDTH / 2, HEIGHT], 1, "White") #中線

canvas.draw\_line([PAD\_WIDTH, 0],[PAD\_WIDTH, HEIGHT], 1, "White") #左線

canvas.draw\_line([WIDTH - PAD\_WIDTH, 0],[WIDTH - PAD\_WIDTH, HEIGHT], 1, "White") #右線

#球速會越來越快

ball\_vel[0] = ball\_vel[0]\*1.0012

ball\_vel[1] = ball\_vel[1]\*1.0009

#球的位置

ball\_pos[0] = ball\_pos[0] + ball\_vel[0]

ball\_pos[1] = ball\_pos[1] + ball\_vel[1]

canvas.draw\_circle(ball\_pos, BALL\_RADIUS, 1, "White", "White")

#球拍的位置，球拍不能超過畫布

if paddle1\_pos[1] < 0 :

paddle1\_pos[1] = 0

elif paddle1\_pos[1]+PAD\_HEIGHT > HEIGHT:

paddle1\_pos[1] = (HEIGHT - PAD\_HEIGHT)

else:

paddle1\_pos[1] = paddle1\_pos[1] + paddle1\_vel

if paddle2\_pos[1] < 0 :

paddle2\_pos[1] = 0

elif paddle2\_pos[1]+PAD\_HEIGHT > HEIGHT:

paddle2\_pos[1] = (HEIGHT - PAD\_HEIGHT)

else:

paddle2\_pos[1] = paddle2\_pos[1] + paddle2\_vel

canvas.draw\_line(paddle1\_pos, [HALF\_PAD\_WIDTH , paddle1\_pos[1]+PAD\_HEIGHT], PAD\_WIDTH, "White")

canvas.draw\_line(paddle2\_pos, [WIDTH - HALF\_PAD\_WIDTH, paddle2\_pos[1]+PAD\_HEIGHT], PAD\_WIDTH, "White")

#球的位置，球撞擊到上下邊緣會反彈

if ball\_pos[1] <= BALL\_RADIUS:

ball\_vel[1] = - ball\_vel[1]

if HEIGHT - ball\_pos[1] <= BALL\_RADIUS:

ball\_vel[1] = - ball\_vel[1]

#球撞擊到球拍會反彈

if paddle1\_pos[1] <= ball\_pos[1] <= paddle1\_pos[1]+ PAD\_HEIGHT and ball\_pos[0] < HALF\_PAD\_WIDTH + BALL\_RADIUS:

ball\_vel[0] = - ball\_vel[0]

if paddle2\_pos[1] <= ball\_pos[1] <= paddle2\_pos[1]+ PAD\_HEIGHT and ball\_pos[0] > WIDTH-(PAD\_WIDTH + BALL\_RADIUS):

ball\_vel[0] = - ball\_vel[0]

#球撞擊到左右邊緣會回到原點，且會使對方得分

if (paddle1\_pos[1] >= ball\_pos[1] or ball\_pos[1] >= paddle1\_pos[1]+ PAD\_HEIGHT) and ball\_pos[0] < BALL\_RADIUS + PAD\_WIDTH:

spawn\_ball(RIGHT)

score2 = score2 +1

if (paddle2\_pos[1] >= ball\_pos[1] or ball\_pos[1] >= paddle2\_pos[1]+ PAD\_HEIGHT) and ball\_pos[0] > WIDTH - (BALL\_RADIUS + PAD\_WIDTH):

spawn\_ball(LEFT)

score1 = score1 +1

canvas.draw\_text(str(score1), (WIDTH / 4 , 50), 50, "White")

canvas.draw\_text(str(score2), (3\* WIDTH / 4, 50), 50, "White")

#設定玩家鍵盤

def keydown(key):

global paddle1\_vel, paddle2\_vel

if key == simplegui.KEY\_MAP["w"]:

paddle1\_vel = -2

if key == simplegui.KEY\_MAP["s"]:

paddle1\_vel = 2

if key == simplegui.KEY\_MAP["up"]:

paddle2\_vel = -2

if key == simplegui.KEY\_MAP["down"]:

paddle2\_vel = 2

def keyup(key):

global paddle1\_vel, paddle2\_vel

global paddle1\_vel, paddle2\_vel

if key == simplegui.KEY\_MAP["w"]:

paddle1\_vel = 0

if key == simplegui.KEY\_MAP["s"]:

paddle1\_vel = 0

if key == simplegui.KEY\_MAP["up"]:

paddle2\_vel = 0

if key == simplegui.KEY\_MAP["down"]:

paddle2\_vel = 0

# create frame

frame = simplegui.create\_frame("Pong", WIDTH, HEIGHT)

frame.set\_draw\_handler(draw)

frame.set\_keydown\_handler(keydown)

frame.set\_keyup\_handler(keyup)

frame.add\_label("Right side player", 200)

frame.add\_label("Up = up", 200)

frame.add\_label("Down = down", 200)

frame.add\_label(" ", 200)

frame.add\_label("Left side player", 200)

frame.add\_label("Up = w", 200)

frame.add\_label("Down = s", 200)

frame.add\_label(" ", 200)

frame.add\_button('Restart', new\_game)

# start frame

new\_game()

frame.start()