

ECE 476/676 - Homework #5

Graphic Display - Due Monday, February 24th

Shoot Game

1) Write a Python program to simulating launching a tennis ball at a target.

At the start of the game, a random location of a target is picked at random at a distance of 240-479 meters.

Each round, you input the speed and angle of a tennis ball, launched at the target.

The Python program then

- Calculates the trajectory of the tennis ball,
- Displays the flight of the tennis ball on the LCD screen, and
- Stops when the tennis ball hits the ground ($y \leq 0$).

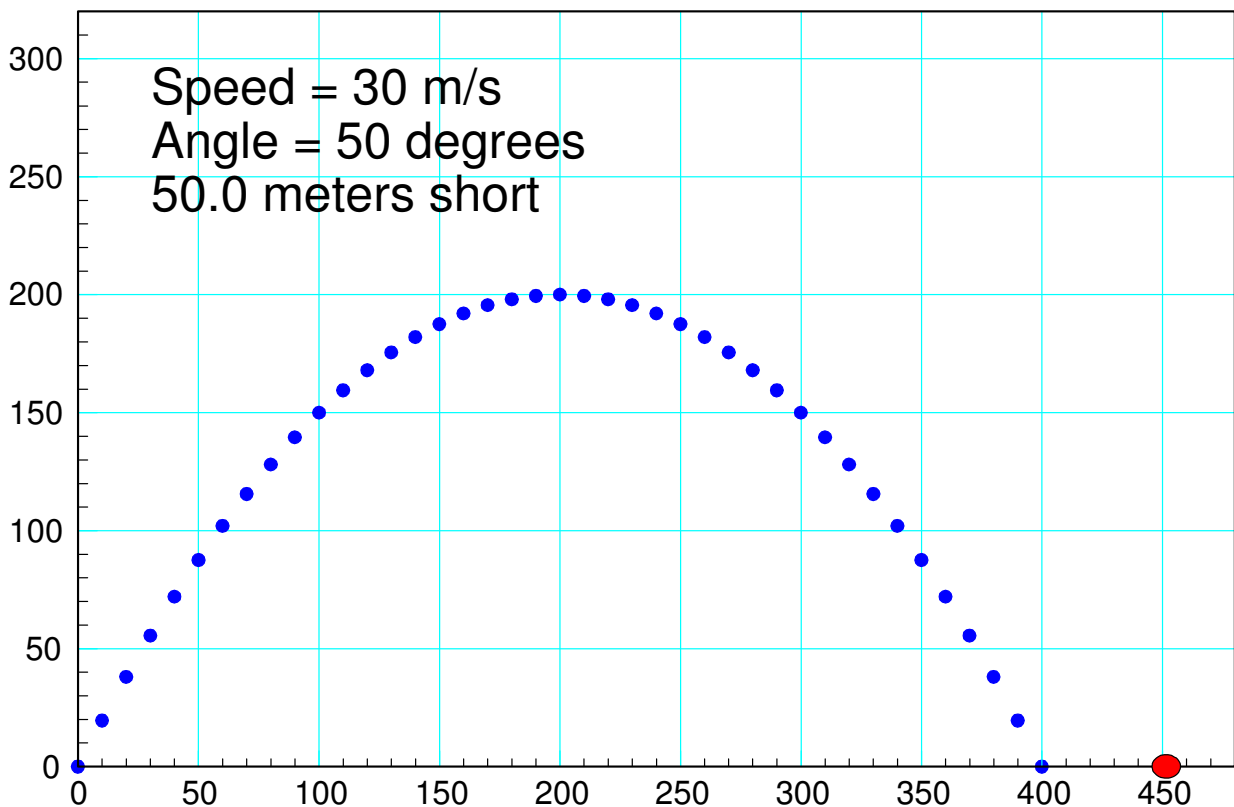
If the distance to the target is less than 1 meter, the game is over and your score is the number of shots.

If the distance is more than 1m,

- The distance to the target is displayed, and
- A new round begins (input speed and angle, repeat)

Give the resulting Python Code

2) Demo your shoot game



Python Code

```
from time import sleep
from random import randrange
from math import sin, cos, pi
import LCD

# Main Routine

LCD.Init()
Black = LCD.RGB(0,0,0)
White = LCD.RGB(200,200,200)
Pink = LCD.RGB(200,100,100)
Yellow = LCD.RGB(200,200,0)
Orange = LCD.RGB(200,100,0)

LCD.Clear(Black)

k = pi / 180

Target = 200 + randrange(280)

LCD.Box(0,0,479,319,White)
LCD.Line(0,310,479,310,White)
LCD.Line(Target, 305, Target, 315, Pink)

flag = 0

Shots = 0

while(flag == 0):
    Angle = float( input('Firing angle: ') )
    Speed = float( input('Speed (m/s): ') )

    x = y = 0
    Shots += 1

    dx = Speed * cos(Angle * k)
    dy = Speed * sin(Angle * k)

    dt = 0.1

    while(y >= 0):
        ddy = -9.8
        ddx = 0

        dx += ddx * dt
        dy += ddy * dt

        x += dx * dt
        y += dy * dt

        if(x < 480):
            LCD.Pixel2(x, 310-y, Pink)
            sleep(0.1)

    Impact = x - (dx/dy)*y
    Error = Target - x

    print('Error = ', Error)
    msg = 'Error = ' + str(Error) + ' '
    LCD.Text2(msg, 10, 10, Orange, Black)

    if(abs(Error) < 1):
        flag = 1
```

```

msg = 'Error = ' + str(Error) + '
LCD.Text2(msg, 10, 10, Yellow, Black)

msg = 'Shots = ' + str(Shots)
LCD.Text2(msg, 10, 40, Yellow, Black)

print('Shots = ', Shots)

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>>> %Run -c $EDITOR_CONTENT

MPY: soft reboot
Firing angle: 60
Speed (m/s): 60
Error = -69.99997

Firing angle: 60
Speed (m/s): 55
Error = -18.74997

Firing angle: 60
Speed (m/s): 53.17
Error = 0.7597809

Shots = 3

```

