

CS 1213-01 Program #8

Fall 2018

Due: November 28

Peeved Pigeons

For this assignment you will create a new computer game called *Peeved Pigeons*. In the game, a pigeon uses a slingshot to shoot a stone at an annoying pig. The distance that the stone travels is given by this formula:

$$distance = \frac{v^2 \sin(2\theta)}{g}$$

Where:

- v is the velocity of the stone, given in feet per second.
- θ is the angle of elevation of the shot, given in degrees. An angle of zero degrees is horizontal. An angle of ninety degrees is straight up.
- g is the acceleration of gravity, which is approximately 32.2 ft/sec².
- $distance$ is the distance the stone travels in the air, given in feet.

The game begins when the user enters the distance to the pig. The pigeon repeatedly shoots the slingshot by specifying the angle of elevation (in degrees) and how far back to pull the slingshot. We will call this measurement the *draw length*. A draw length of 10 inches gives a velocity of 100 feet per second. The velocity is proportional to the draw length. For example if the draw length is reduced by one third, then the velocity is also reduced by one third. If the draw length is doubled, then the velocity is also doubled.

Implementation Details

Write and include each of these functions in your program:

- A function that computes and returns the distance the stone travels, given the draw length (in inches) and the angle of elevation (in degrees). Remember that $360^\circ = 2\pi$ radians.
- A function that computes the sine of an angle given in radians. You must write your own function; do not use a function from the Python library. (See the previous programming project.)
- A function that returns a Boolean value to indicate whether the stone hits the pig. The arguments are the distance to the pig and the distance the stone travels. A shot is deemed to hit the pig if the stone lands within 2 feet of the pig.

Report on the result of each shot by indicating whether it hits the pig (the pig oinks), or whether it is too long or too short, and if so, by how much. A shot is deemed to hit the pig if the stone lands within 2 feet of the pig.

Sample Runs

Here is a sample to illustrate how the screen must appear when your program runs. You must strictly follow this format, wording, spacing, and alignment. The characters in **red** are typed by the user. The other characters are output by the program.

```
Distance to pig (feet) ----- 100

Angle of elevation (degrees) -- 10.0
Draw length (inches) ----- 10.0

Result of shot ----- 4 feet too long

Angle of elevation (degrees) -- 5.0
Draw length (inches) ----- 8.0

Result of shot ----- 63 feet too short

Angle of elevation (degrees) -- 11.8
Draw length (inches) ----- 9.0

Result of shot ----- OINK!!
```

Instructions for Turning in Your Project

I will not grade your project and you will receive a score of 0 if you do not comply with these instructions. You must turn in all materials by class time on the due date for them to be counted on time. Your submission is not complete—and I will not grade it—until you have turned in all the required materials. Anything that is not turned in by class time will be marked at least one day late and will receive a grading penalty as specified in the syllabus.

Turn in these things:

- Upload your Python program to Canvas.
- Turn in a hardcopy of your Python program at class time on the due date. Your hardcopy must match the electronic copy that you upload to Canvas.
- Turn in a printed, completed copy of the project form along with your hardcopy on the due date. There is a blank project form in *Handouts* on Canvas.