“Introduction to C++ Programming” Online Course

Assignment 7 — The Grande Pumpkin Shoot

In fall, amid our local pumpkin festivals, pumpkin tossing contests are held. Each contestant spends the year designing the best contraption to lob pumpkins the farthest. Each year, the target is set up at a specific distance from the shooters. Each contestant gets up to five attempts to hit the target with a pumpkin toss. There are two variables that the contestants can change in order to hit the target — the initial velocity of the launch and the angle of the launch.

The distance, dist, to the landing point of a fired pumpkin is given by

\[ dist = \frac{velocity^2 \sin(2 \cdot angle)}{32.2} \]

Note that we are ignoring air friction effects and other aerodynamics of flying pumpkins. The angle is in radians which is given by the following.

\[ \text{radians} = \text{degrees} \times \pi / 180 \]

Write a program that first, one time only, inputs the distance to the target. Then, notify the player that he or she has five attempts to hit the target and prompt the player to enter a pair of values for the velocity and the angle in degrees. All distances are in feet.

For each set of input data, the main function calls a function, ToRadians, that returns the angle converted into radians. Then, the main function calls another function, ComputeDistance(), that calculates both the distance this shot travels and the difference between this distance and the target’s distance. Next, the main function displays the distance this shot traveled and by how much it missed the target. If the absolute value of the distance traveled minus the target distance is less than .1% of the target distance, display a message that this shot hit the target and that they win the game; then quit the program. If it misses the target, prompt for another set of initial velocity and angle values. Repeat the process five times. If they have not hit the target after five tries, display a message that they have lost the game and quit.

Turn in a printed copy of the program along with two test run outputs. For both test runs, use a target distance of 2000 feet. The first test run shows someone winning the game and the second one shows someone losing the game.