

## Purpose

The purpose of this assignment is to give you more practice with writing while loops

## Problem

The coefficient of restitution of a ball, a number between 0 and 1, specifies how much energy is conserved when the ball hits a rigid surface. A coefficient of 0.9 for instance, means a bouncing ball will rise to 90% of its previous height after each bounce.

Write a program to input a coefficient of restitution and an initial height in meters, and report how many times a ball bounces when dropped from its initial height before it rises to a height of less than 10 centimeters. Also report the total distance traveled by the ball before this point. The coefficients of restitution of a tennis ball, basketball, super ball, and softball are 0.7, 0.75, 0.9, and 0.3 respectively.

## Inputs

Only one set of *valid* inputs are sufficient for program completion, meaning that you do not have to keep looping once a set of inputs have been processed. Order of inputs are important – coefficient of restitution followed by height.

Invalid (non-numeric, out of range for coefficient of restitution) input must be caught using exceptions or otherwise. Input validation for the coefficient of restitution is to make sure the value entered is between 0 and 1; validation for the initial height is to be greater than 10 cm.

When invalid inputs are entered by the user, you must loop and keep asking the user to enter new inputs until one set of valid inputs are supplied.

## Sample Output

Shown below are outputs for 3 *different* executions of the program. **Program should run just once if the inputs are valid.**

### Sample Output 1

```
Enter coefficient of restitution: 0.7
Enter initial height in meters: 8
Number of bounces: 13
Meters traveled: 44.81659
```

### Sample Output 2

```
Enter coefficient of restitution: 0.9
Enter initial height in meters: 12
Number of bounces: 46
Meters traveled: 226.11476
```

### Sample Output 3

```
Enter coefficient of restitution: xxx
Invalid Input, please try again
Enter coefficient of restitution: 20
Enter initial height in meters: 30
Coeff of Restituion shoud be between 0 and 1; Initial height should be greater than 10 cm
Enter coefficient of restitution: 0.3
Enter initial height in meters: 8
Number of bounces: 4
Meters traveled: 14.67200
```

### Grade Key

<b>A</b>	Comments (including Name, brief description about program)	<b>5</b>
<b>B</b>	Inputs are accepted correctly in the right order as indicated (invalid range for coefficient of restitution and initial height is indicated correctly). Only one set of valid input should be accepted, until then program continues.	<b>15</b>
<b>C</b>	Exception Handler catches non-numeric input, error message, program continues	<b>15</b>
<b>D</b>	Number of bounces correct	<b>30</b>
<b>E</b>	Total distance traveled is correct (difference in decimal digits might actually mean the result is incorrect in this case)	<b>30</b>
<b>F</b>	Output is clear	<b>5</b>