

COSC120 Programming Project 2
Due November 10, 2010 at 11:59PM
In the Digital Dropbox for COSC120

You have been asked to write a program that will simulate a bouncy ball in a variety of environments. You will compute the ball's height in feet at each second as time passes on a simulated clock. At time zero, the ball begins at height 0 with a velocity provided by the user in an environment chosen by the user. The environment affects both the velocity decay and the bounciness factor of our ball. After each second, change the height by adding the current velocity, then subtract an amount from velocity based on the table below (see: velocity decay). If the new height is less than zero, multiply both the height and the velocity by the modifier noted in the table below (see: bounciness factor) and print "Bounce!" as well as the time and height.

Planet	Velocity Decay	Bounciness Factor
Earth	32	-0.5
Discworld	6	-3
Krypton	74	-0.22

You should have two methods:

1.) compute – compute should be passed as parameters the gravity choice and the velocity. The method should then compute the height over time, printing it out until the ball comes to rest or bounces five times. See the above paragraph for the computations needed. See the program run below for the format of the computation prints.

2.) menu – menu takes in no parameters and returns no value and simply prints out a menu as shown below in the example program run.

Your *main* method should create an instance of FakeGravity, call your menu method then get and process the input for the gravity choice as well as the velocity. Then, continue to loop back and process input until the user enters 0 for the gravity choice.

Error checking: You should print error messages if the user enters a gravity choice other than 0, 1, 2 or 3. You should also not allow the user to enter a negative velocity.

A rubric for the project will be distributed by November 3, 2010. You are also allowed to work in pairs but you must submit your group to me via email by 5pm October 28th. If you'd like to work in a pair, but do not have a partner in mind, you may email me as well and I will attempt to pair you with someone else in the class.

Example Program Run:

***Gravity Menu ***

- 1.) Earth
- 2.) Discworld
- 3.) Krypton
- 0.) Quit

Enter your option: 1

Initial velocity: 100

Time: 1 Height: 100.0

Time: 2 Height: 168.0

Time: 3 Height: 204.0

Time: 4 Height: 208.0

Time: 5 Height: 180.0

Time: 6 Height: 120.0

Time: 7 Height: 28.0

BOUNCE!

Time: 8 Height: 48.0

Time: 9 Height: 126.0

Time: 10 Height: 172.0

//and so on...

***Gravity Menu ***

- 1.) Earth
- 2.) Discworld
- 3.) Krypton
- 0.) Quit

Enter your option: 2

Initial velocity: 100

Time: 1 Height: 100.0

Time: 2 Height: 194.0

Time: 3 Height: 282.0

Time: 4 Height: 364.0

Time: 5 Height: 440.0

Time: 6 Height: 510.0

Time: 7 Height: 574.0

Time: 8 Height: 632.0

Time: 9 Height: 684.0

Time: 10 Height: 730.0

//and so on...

***Gravity Menu ***

- 1.) Earth
- 2.) Discworld
- 3.) Krypton
- 0.) Quit

Enter your option: 0

Goodbye!