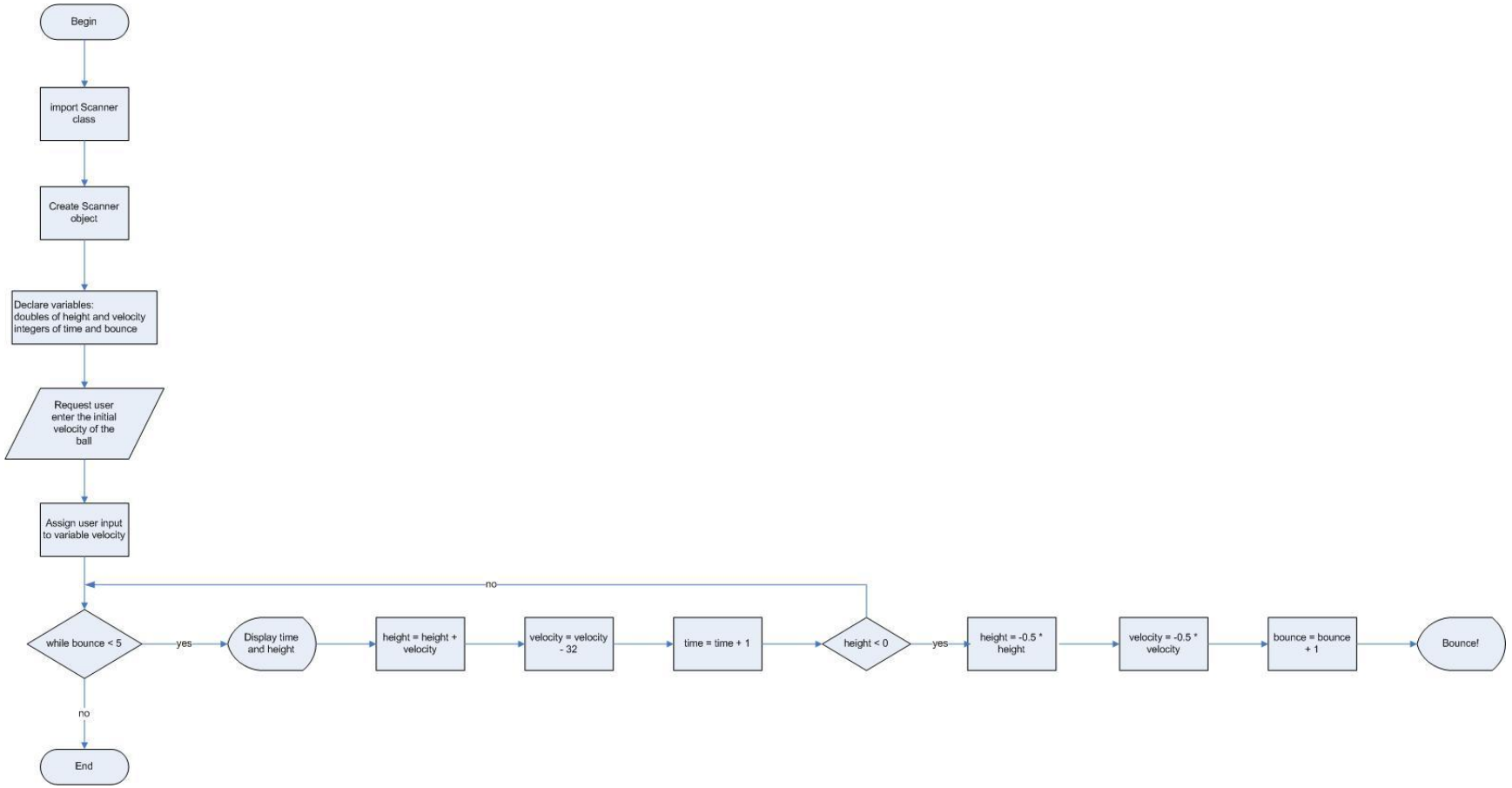
CIT 149: Java I
Chapter 4 Lab 1

In this lab we will complete Programming Project #14 on page 253. This program will determine the height of a bouncing ball, stopping at the fifth bounce. A do-while loop will be used.


Begin
import Scanner class
Create Scanner object
Declare variables: doubles of height and velocity integers of time and bounce
Request user enter the initial velocity of the ball
Assign user input to variable velocity
while bounce < 5
yes
Display time and height
height = height + velocity
velocity = velocity - 32
time = time + 1
height < 0
yes
height = -0.5 * height
velocity = -0.5 * velocity
bounce = bounce + 1
Bounce!
no
no
End

1. Open a new document in TextPad and save the program as Bounce.java.
2. Type the code that will import the Scanner class as done in previous chapters.
3. Type the class header and opening brace, main method header and opening brace.
4. Construct a Scanner object named *keyboard*.
5. Declare the following variables. All but the variable *velocity* will be assigned initial values of zero. The variable *velocity* will receive its value from user input, so an initial value is not required. Type:

   ```
   double height =0.0, velocity;
   int time = 0, bounce = 0;
   ```

6. Type the following code which will request the user to enter the velocity of the ball. The user input will be assigned to the variable *velocity*.

   ```
   System.out.println("Enter the initial velocity of the ball");
   velocity = keyboard.nextDouble();
   ```

7. A while loop will be used to repeat code until the value of the variable *bounce* equals 5. Type:

   ```
   do
   {
       System.out.println("Time: " + time + " Height: " + height);
       height = height + velocity;
       velocity = velocity - 32;
       time = time + 1;

       if(height< 0)
       {
           height = -0.5 * height;
           velocity = -0.5 * velocity;
           bounce = bounce + 1;
           System.out.println("Bounce!");
       }
   }
   while(bounce<5);
   ```

   - With a do-while loop the loop is run at least once. While loops may or may not ever be run. This is the difference between the two.
   - Within the loop, first the values of the variables *time* and *height* are displayed.
   - height equals height plus velocity which means that height equals the previous value of height plus velocity.
   - velocity equals velocity minus 32 which means that velocity equals the previous value of velocity minus 32.

- time equals time plus 1, so 1 second is added to the variable time every time the loop is run.
- if height is less than zero:
    - height equals -0.5 times height
    - velocity equals -0.5 times velocity
    - bounce equals bounce plus 1
    - The word Bounce! displays

8. Close the while loop, main method and class.
9. Compile the program and fix errors if necessary.
10. Compress both the .java and .class file into a single zip or rar file.
11. Submit to the appropriate drop box.