

Adaptable Simulations for Introductory Physics (ASIP)

Launching EJS

If you don't have the CD you can always get the latest version from

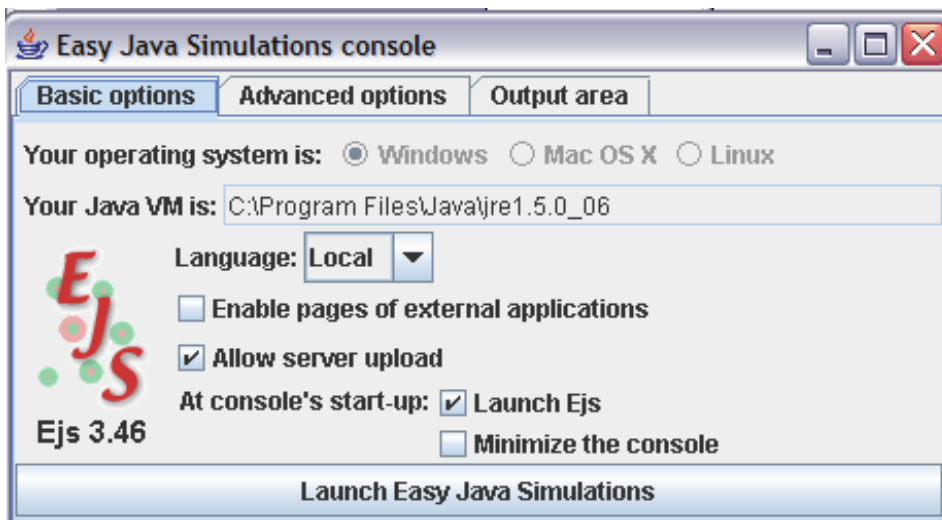
<http://www.um.es/fem/Ejs/>

Be sure to have the latest JDK (Java Developer Kit) from

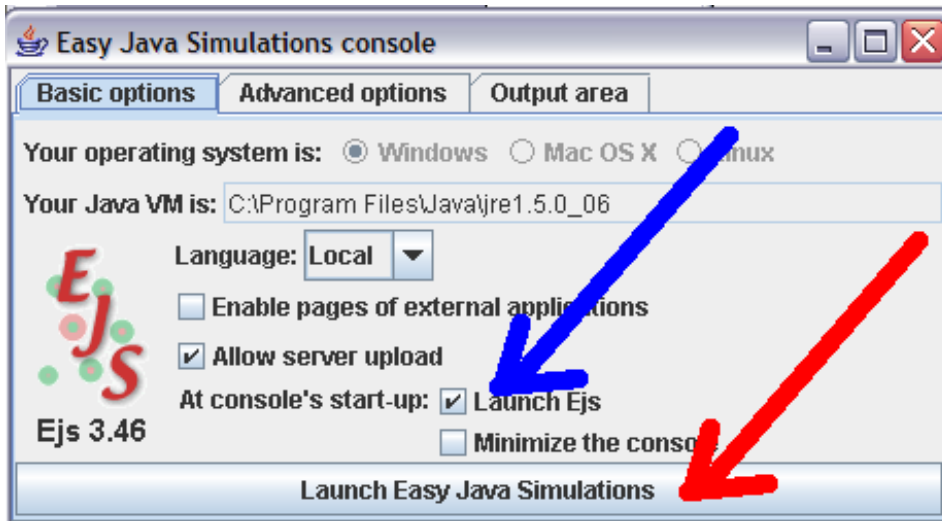
<http://java.sun.com/javase/downloads/index.jsp>

Working with the CD

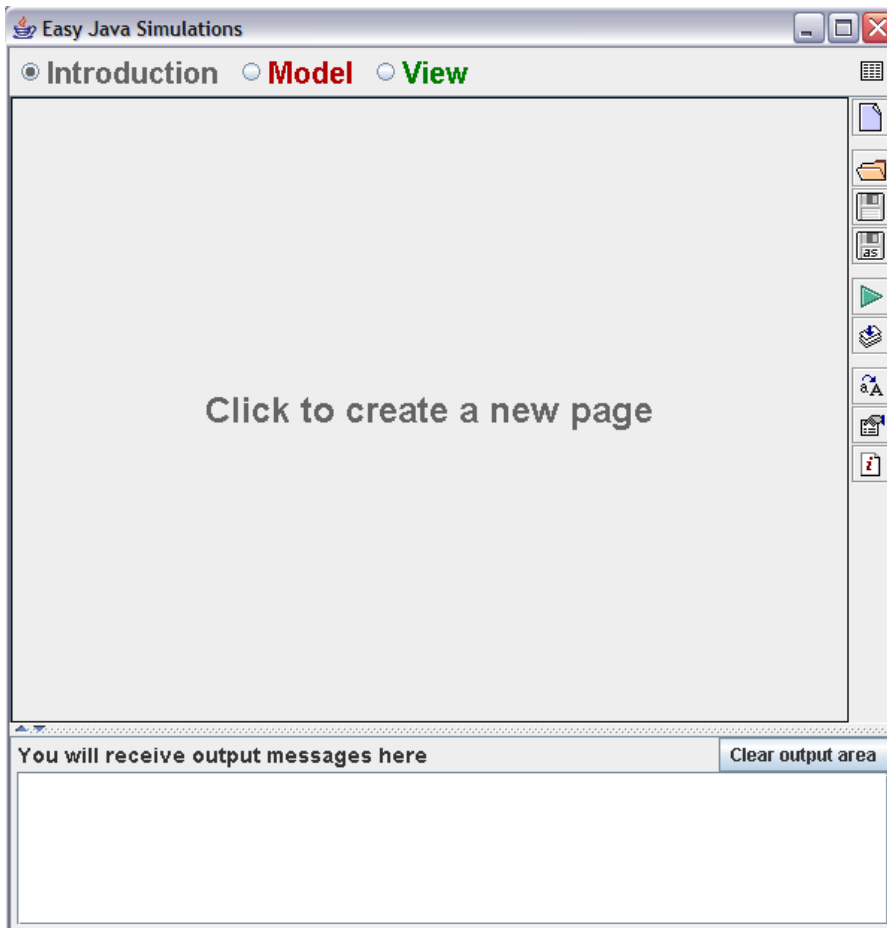
1. Drag EJS folder from CD to Desktop
2. Open the Easy_Java_Simulations folder
3. Double-click on EJSConsole.jar
4. A small window with the title “Easy Java Simulations console” should appear in the bottom left corner of your screen (your particular version may differ from the picture below)



5. If the box “Launch Ejs” is not checked, check it and click the bar titled “Launch Easy Java Simulations”. After checking the box, EJS will start automatically the next time you click on EJSConsole.jar



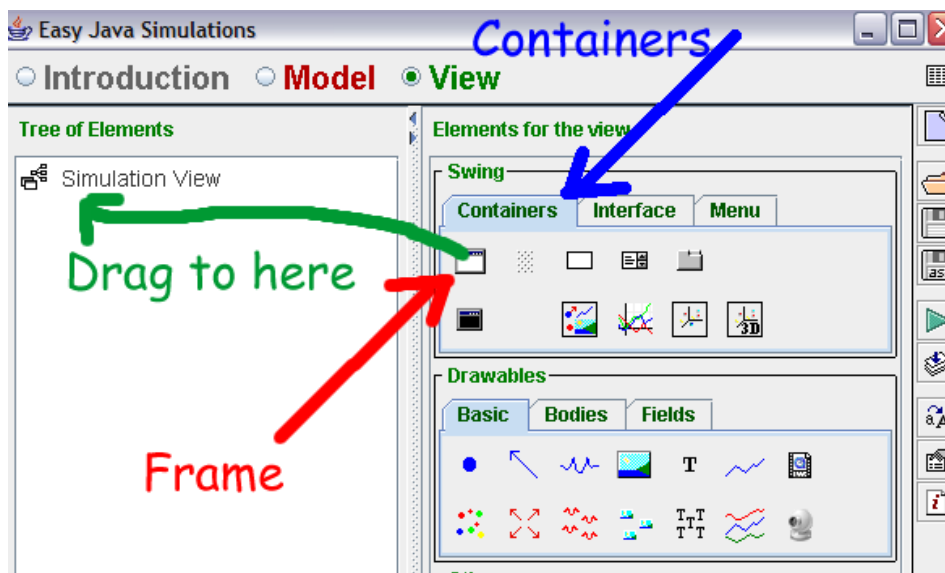
6. After a few seconds you should see the EJS working environment shown below



Start a new simulation

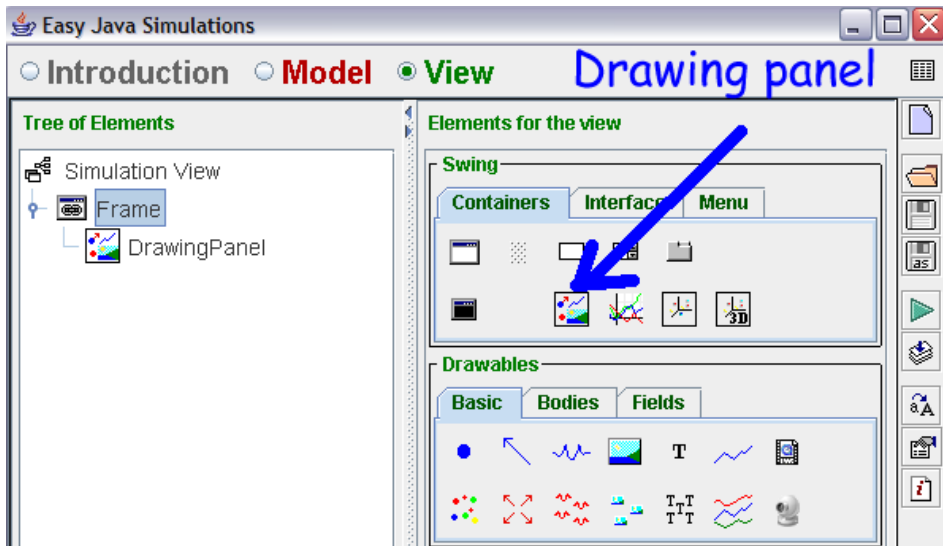
This simulation will consist of a ball moving across the screen with and without acceleration. We will start with a ball moving with a constant velocity, and then add the acceleration.

7. Click on “View”. From the “Containers” panel in the “Swing” section on the right-hand side **click once** on the first item “Frame”. This will highlight the icon. Then move your pointer to the left panel. The pointer should change to a “magic wand”. Click on “Simulation View” to paste the Frame in the simulation. Click “OK”.

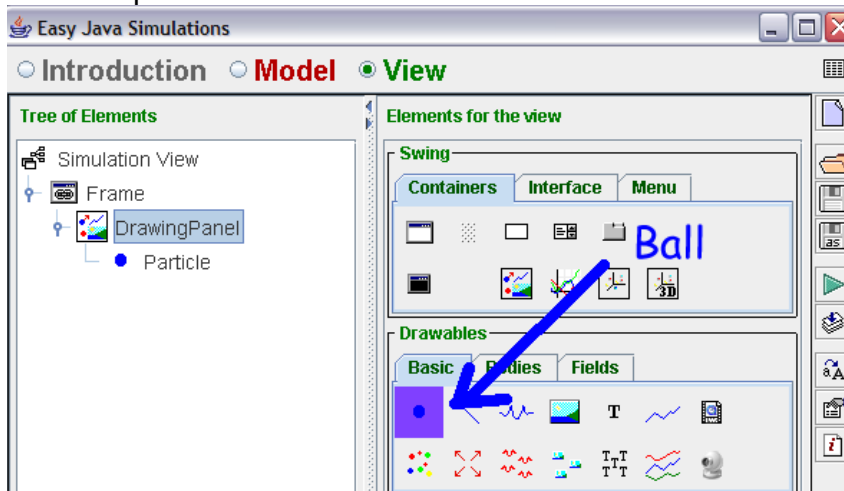


A new window should open with the title “Frame (Ejs window)”

8. Using the same technique, drag a DrawingPanel to the left (click on the Frame in the tree on the left panel). Click “OK” whenever asked. Your view should now look like this.



9. Now bring a ball from the left panel to the right panel and click on the Drawing Panel to paste it. Click “OK” whenever asked.



This bare-bone structure will be sufficient for this exercise. More details can be added later.

We now need to define our model

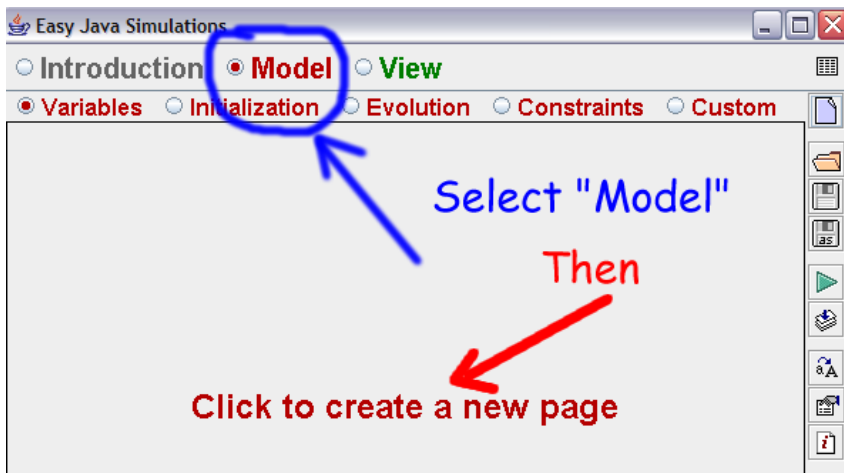
The ball will move according to the following equation:

$$x = v_0t + \frac{1}{2}at^2$$

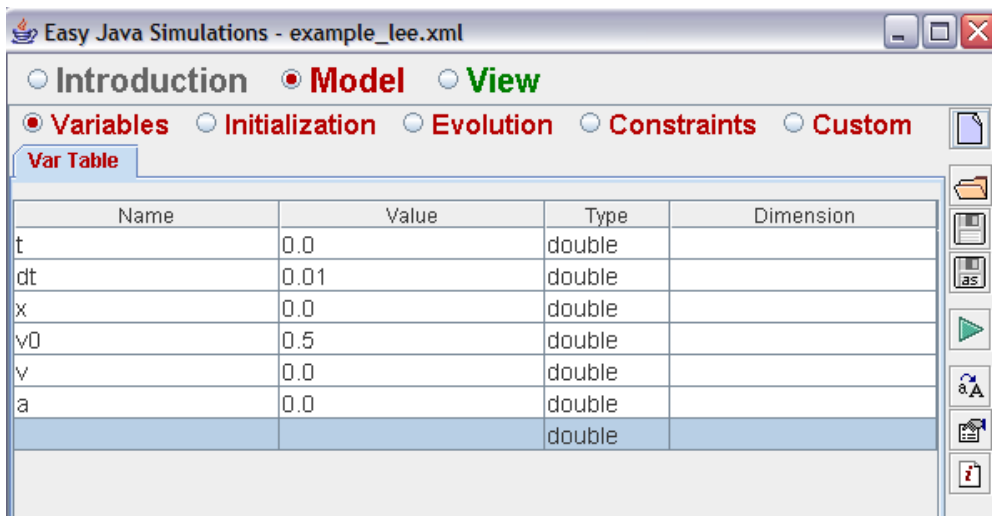
(We'll assume zero initial position)

We need to provide that information to EJS.

11. Click on “Model” in the top panel then click anywhere in the middle of the panel to create a new page (say “OK” to choose the default name).



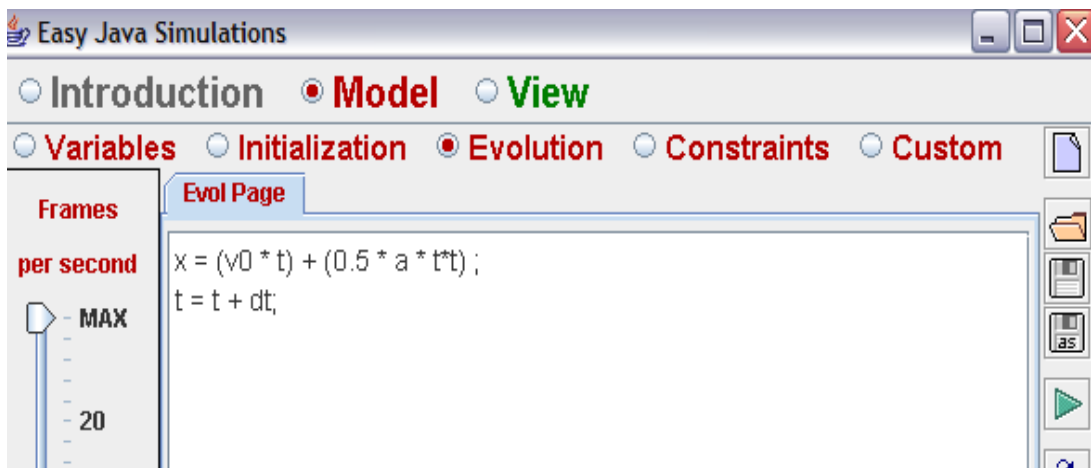
12. In the variables page create the set of variables we will need for the simulation and set their numerical values as seen in the figure below



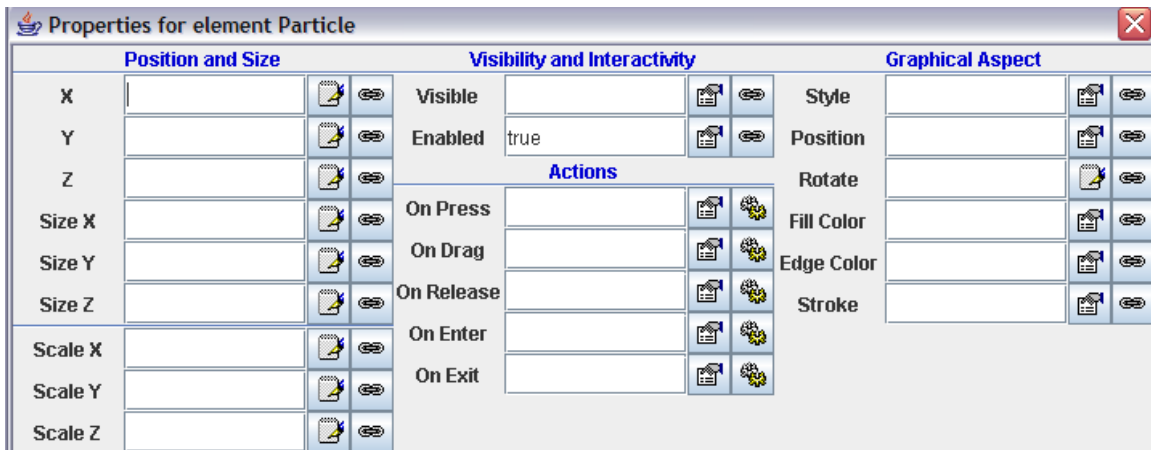
13. Switch to the "Evolution" panel and click on the upper half of the panel to open a new page.



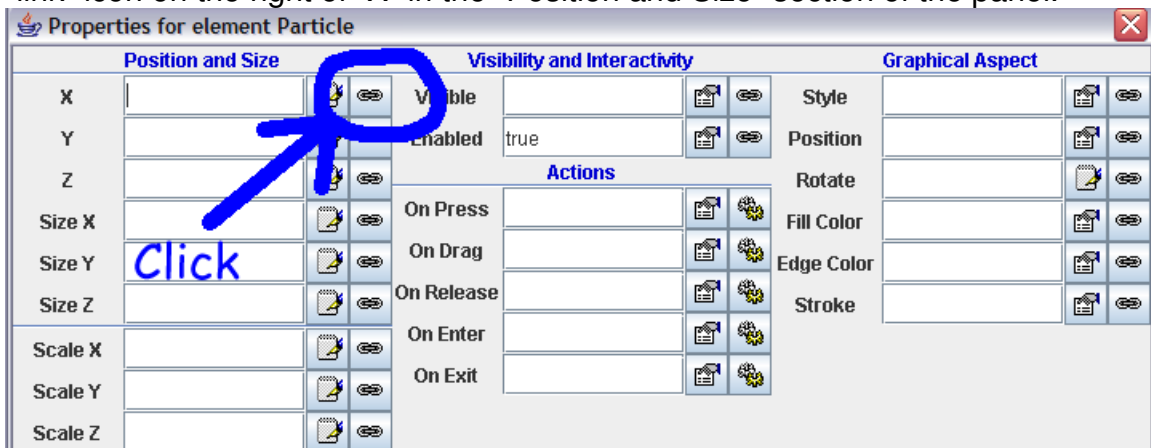
14. Type the code shown below in the evolution page



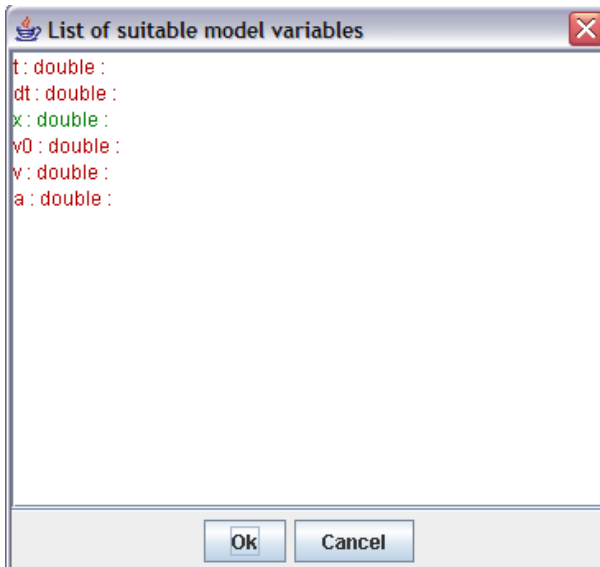
15. At this point we need to instruct EJS to make the ball move according to this equation. So go back to the “View” panel and double-click on the blue ball to open the properties panel for this object.



16. To link the x position of the ball to the x variable in the equation click on the “link” icon on the right of “X” in the “Position and Size” section of the panel.

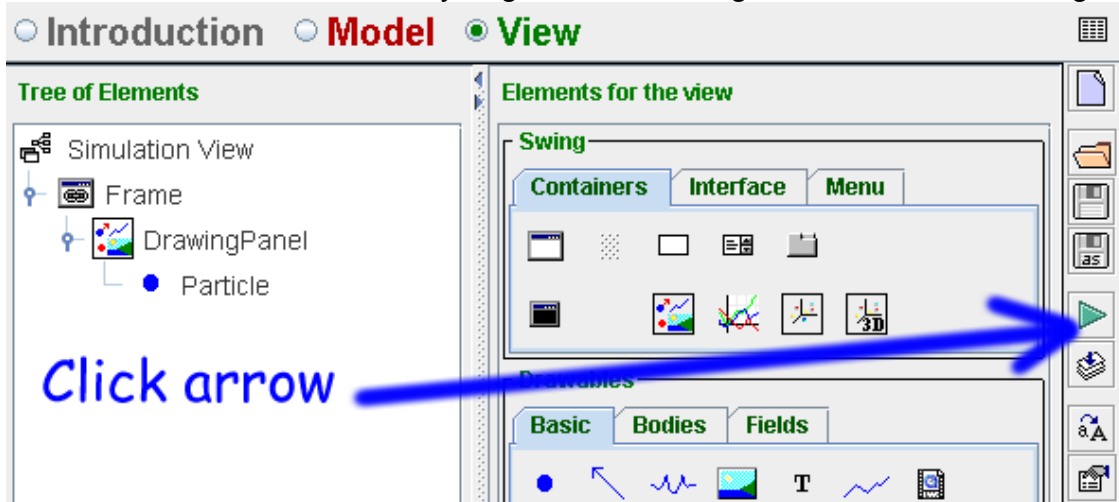


Then select x by clicking on it and click “OK”.



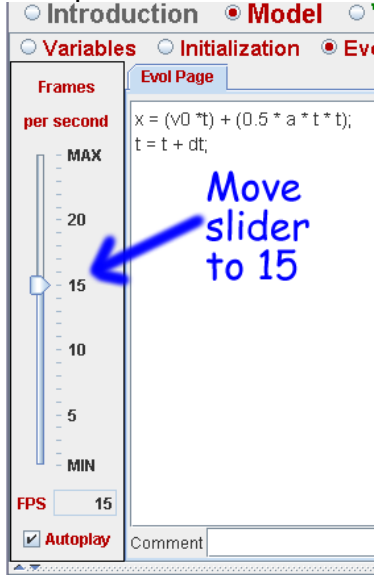
Close the properties panel by clicking on 

17. The simulation is now ready to go. Click on the green arrow on the far right.



You should see the blue ball zoom across the screen.
To slow it down we will modify the frame rate of the simulation

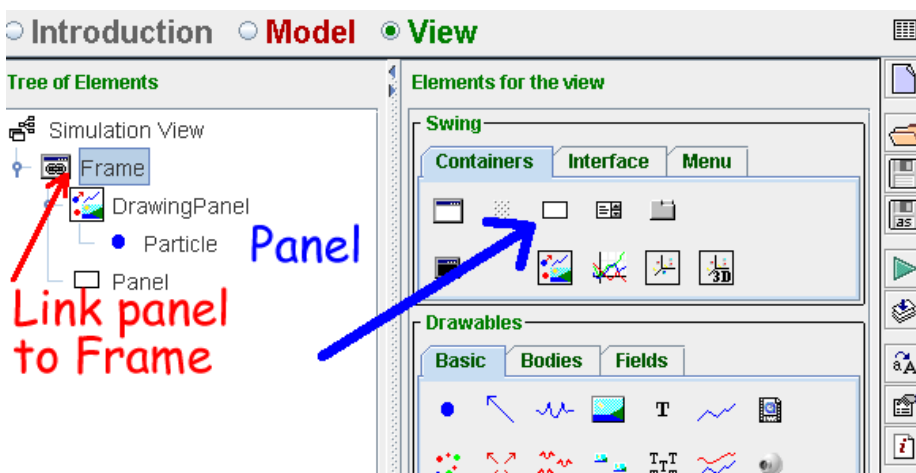
18. Go back to the Model panel and select the Evolution page. On the left-hand side panel, in the “Frames per second panel” move the slider down to 15



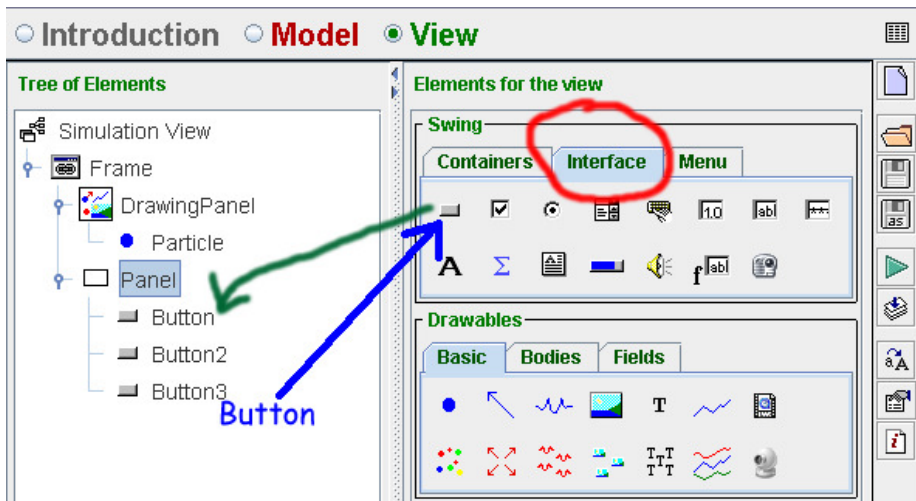
Run the simulation again (click on the green arrow). This time you should see the ball slowly move across the screen.

The simulation runs as soon as you click on the green arrow. We are now going to add controls that will allow us to run, stop, or reset the simulation.

19. Go back to “View” and drag a “Panel” from the “Containers” area to the tree. When the “magic wand” appears, use it to click on “Frame” (not on Drawing Panel). When you are asked for the position, select “Down” before clicking on “OK”.

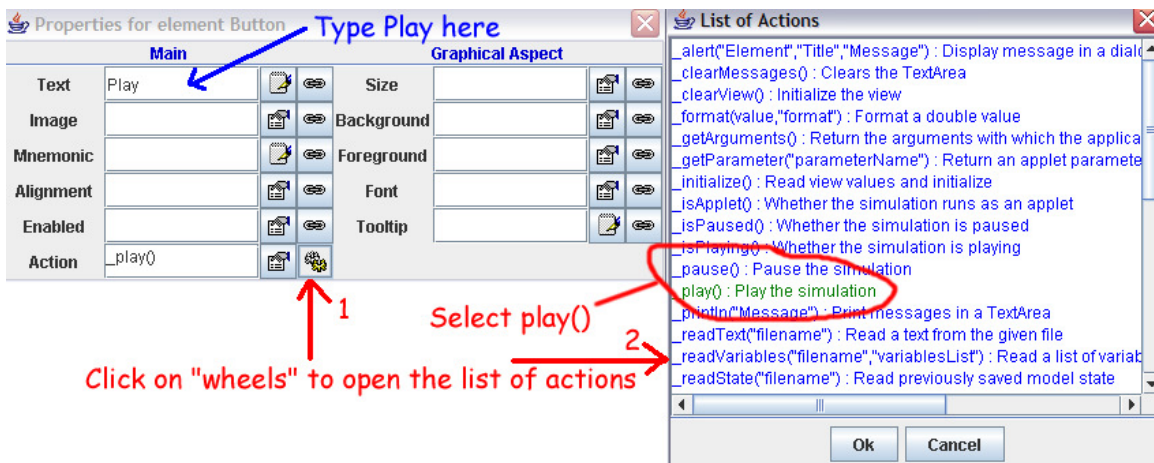


20. Now add 3 buttons to the Panel. To do this, switch to the “Interface” tab in the “Swing” area. You can use the default names, but when asked to select the positions, choose left, then center and right in succession.



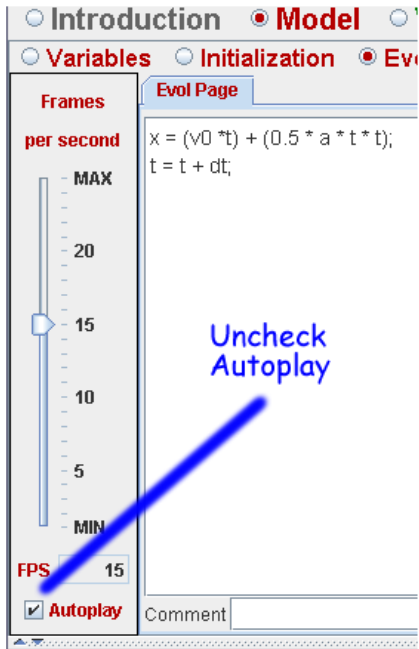
21. Change the name of the buttons. Right-click (Windows) or Control-click (Mac) on a button to activate its menu. Select “Rename” and type “Play” for the first button. “Pause” for the second button. “Reset” for the third button.

22. Now assign a role for each button. Double-click on the first button to open its properties panel. Change the text to Play. Change the “Action” property by clicking on the “wheels” to open the panel that shows a list of possible actions. Select `_play()` and click OK.



23. Repeat the previous operation for the other two buttons using the `_pause()` and `_reset()` functions.

24. Finally we need to uncheck the Autoplay function to prevent the simulation from running on its own. To do this go back to the Model/Evolution/ panel and uncheck the “Autoplay” box at the bottom of the “Frames per second” panel.



25. Run the simulation again (Click on the green arrow) You should get something like this:

