Getting Started with Greenfoot

What Will I Learn?

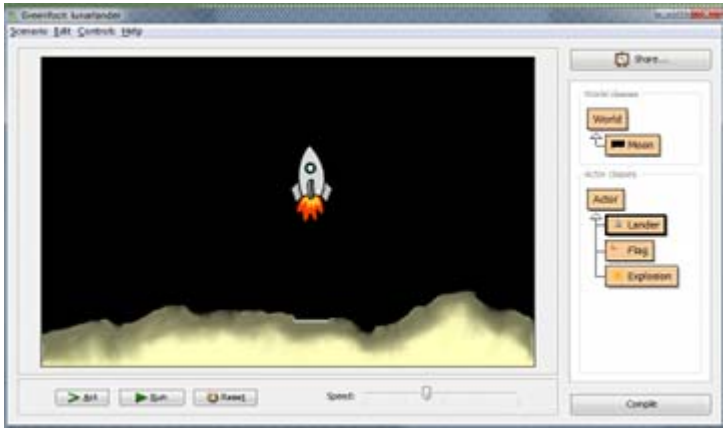
Objectives

- How to download and install Greenfoot
- Describe the components of the Greenfoot interactive development environment
- Create an instance of a class
- Describe classes and subclasses
- Recognize Java syntax used to correctly create a subclass

Why Learn It?

Purpose

Learning to program, and learning programming concepts while creating a game can be fun. Using Greenfoot, you will learn basic Java programming techniques to create fun and interactive games.



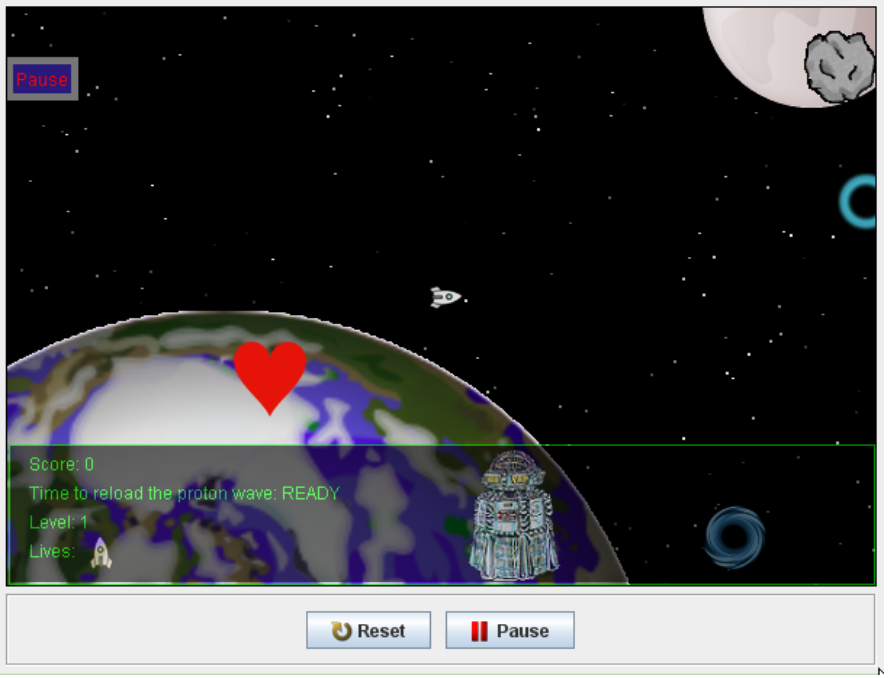
Launch Greenfoot

To launch Greenfoot, double-click the Greenfoot icon on your desktop with your mouse, or select it from your list of computer programs.

Greenfoot Scenarios

To quickly become familiar with how Greenfoot works you can download and run a scenario created by the authors of the Greenfoot textbook from the Greenfoot website.

A scenario is a game or simulation implemented in Greenfoot.



Download A Scenario

To download a scenario:

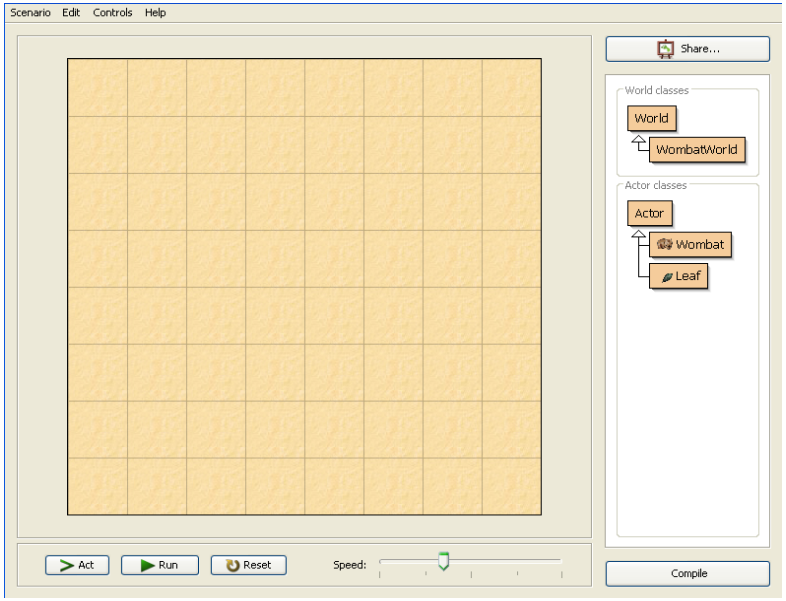
1. Go to the webpage for the Greenfoot textbook: http://www.greenfoot.org/book
2. Click the Book Scenarios link.
3. Save the zip file to a folder on your computer.
4. Extract the zip files to a folder on your computer.
5. Name this folder “Greenfoot Scenarios”.

Note: Zip file extraction software is required. Go to 7zip.com to download free, open source zip file extraction software if your computer does not already have a zip file extraction solution installed.

Open A Scenario in Greenfoot

To open a scenario:

1. In the Scenario menu, select Open.
2. From the Greenfoot scenarios folder you created on your computer, select the leaves-and-wombats scenario from the chapter01 folder.
3. The scenario will open in a new window.



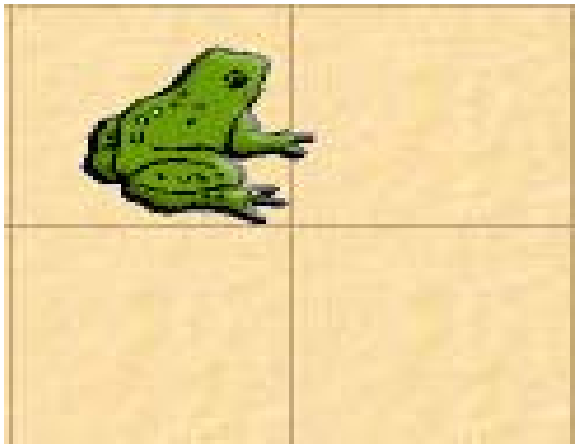
Execution Controls to Run a Game

The execution controls to run a game include:

- Act: Runs all actions in the scenario once.
- Run/pause: Runs all actions in the scenario repeatedly until Pause is clicked.
- Reset: Pauses the scenario or resets the scenario back to its starting position.
- Speed: Executes actions faster or slower.

Classes Example

There are thousands of frogs in the world, that all share some common characteristics: two eyes, four legs, slimy skin and the ability to make a “ribbit” sound.



The forest a frog lives in may contain maple trees. There are hundreds of these trees that have similar bark, leaves, and are the same sizes and colors.

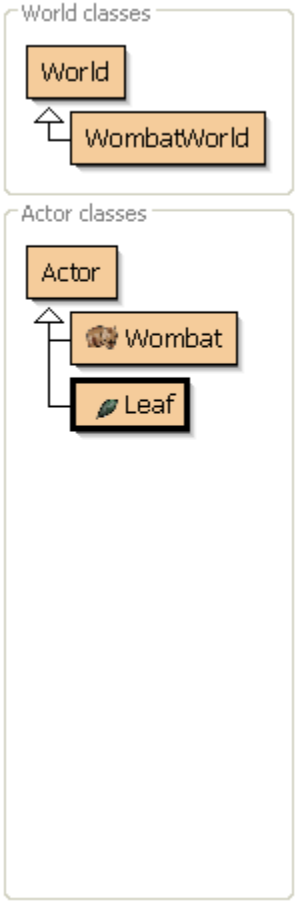
Classes

In programming, the class tells us general information about how the object looks and moves, and what it can do.

A class is the general attributes that define an object, such as its appearance, features, and movement.

An instance is an object of the class.

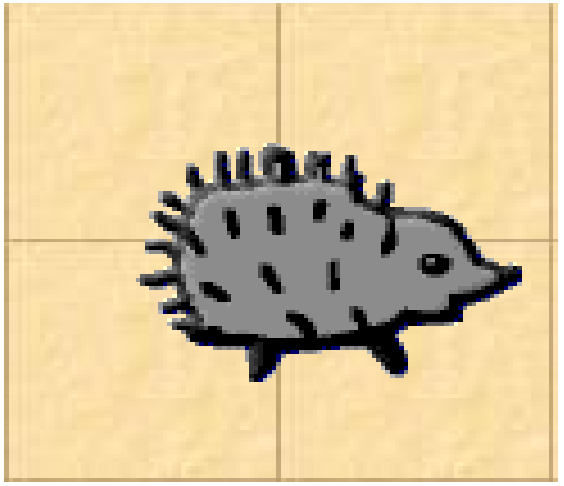
By adding a class to your scenario, it gives you the ability to put those type of objects—or instances of the class—into the scenario.



Subclasses and Superclasses

There are many species of hedgehogs. Each species has the general properties of the hedgehog class, such as prickly skin, a pointy nose, and four legs, but differences in color, shape, and size that are specific to the species.

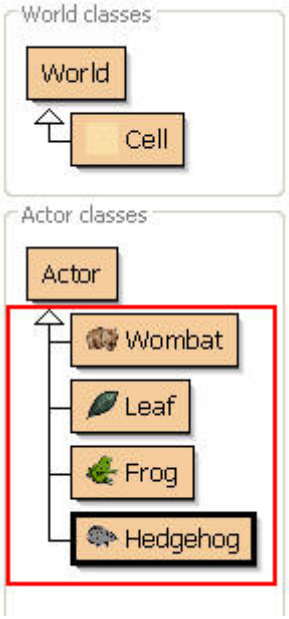
The overarching class of a group of classes is called a superclass. Specializations of a class are called subclasses.



Subclass Properties

A subclass:

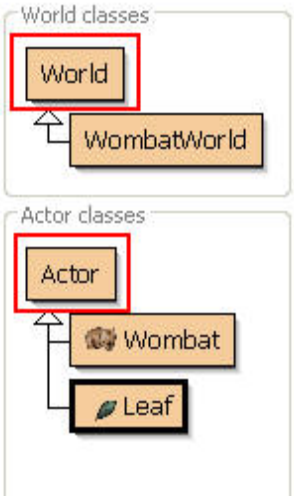
- Is a class with an “is-a” relationship to a superclass (e.g., hedgehog is a subclass of the actor superclass)
- Has its own instances
- Can be renamed
- Has an arrow that points to the superclass in the class hierarchy



Superclass Types

The two superclass types used in Greenfoot are:

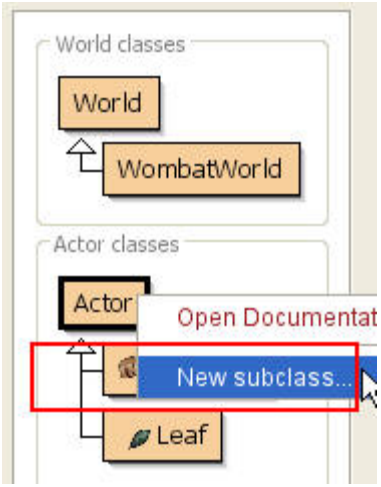
- World:
  - Holds the World subclasses
  - Defines the size and resolution of the world
- Actor:
  - Holds subclasses that produce actor instances

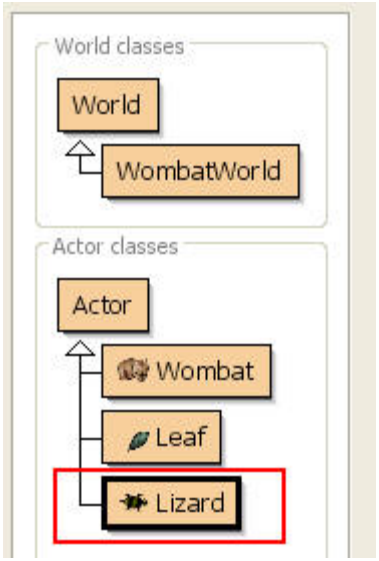


Steps to Create a Subclass

To create a subclass:

1. Right click on a superclass.
2. Select *New subclass...*
3. Name the class.
4. Select a class image from the menu, then click OK.
5. The subclass appears in the class menu.





Create a Subclass and Import an Image

To import a new image from your computer to assign to a new subclass:

1. Right click on a superclass.
2. Select *New Subclass...*
3. In the New Class window, click the Import From File... button.
4. Select the file to import from your computer.
5. Name the new subclass, then click OK.
6. The subclass with the new image appears in the class menu.

Draw a New Image For a Subclass

To draw a new image in your computer's paint program and import that image into Greenfoot:

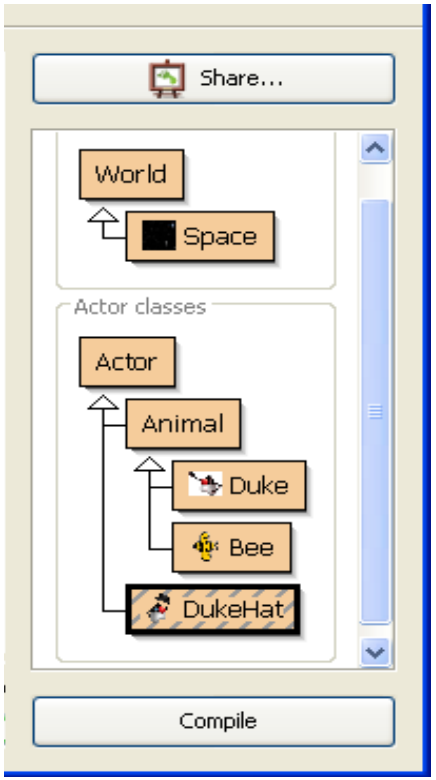
1. Right click on the Actor superclass.
2. Select *New Subclass...*
3. In the New Class window, click the editor icon. 
4. In the drop-down list that appears, select Create New Image.
5. Enter the name of the image file and dimensions. Click OK.
6. Draw the image in your computer's paint program. Save it to your computer.
7. Create a new subclass, and import the image file. The new subclass will be added to the scenario.

Compilation

If a subclass is striped, compilation needs to occur.

After you add a class to a program, or write source code that instructs the class on how to act, you cannot add additional classes or source code until the program is compiled.

Compilation translates the source code into machine code that the computer can understand. The striped appearance ensures that you added the source code or class correctly before you proceed.



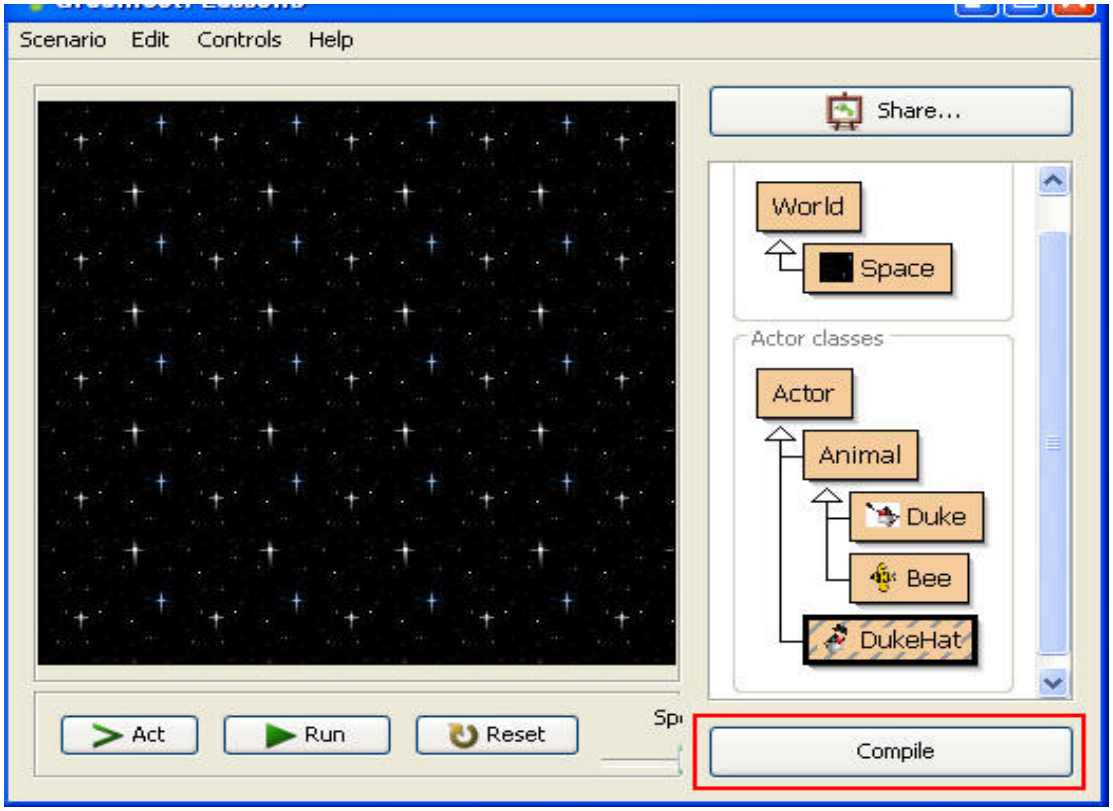
Understanding When Compilation Occurs

Compilation occurs:

- When source code is changed
- Before new instances of a class can be created
- For all subclasses, if a superclass is created or changed

Compile the Program

Click Compile. Once compiled, the stripes disappear.
Continue programming or run the scenario.



Saving a Scenario

Follow these steps to save a scenario:

1. In the Scenario menu, select Save a Copy As...
2. Save a copy to a folder on your computer.

Each time you close Greenfoot, it saves your current work.
Save multiple versions of scenarios:

- To return to an earlier version of a scenario
- To have multiple scenarios to work from

Opening a Scenario

Follow these steps to open a scenario:

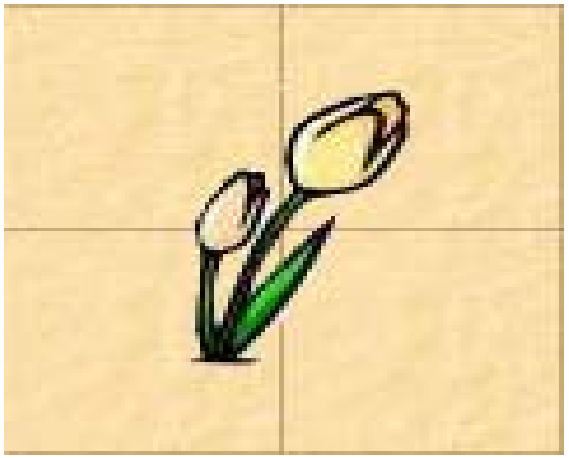
1. In the Scenario menu, select Open.
2. Locate the folder where the scenario resides, and select the scenario to open it.
3. The scenario will open in a new window.

Instances of a Class

A tulip has its own class with attributes such as petal shape, color, and size.

A single tulip that grows in a field, or sits in a vase, is an object that is a unique instance of the tulip class.

It has all of the characteristics of the tulip class, but it is a single object that can be manipulated and changed.

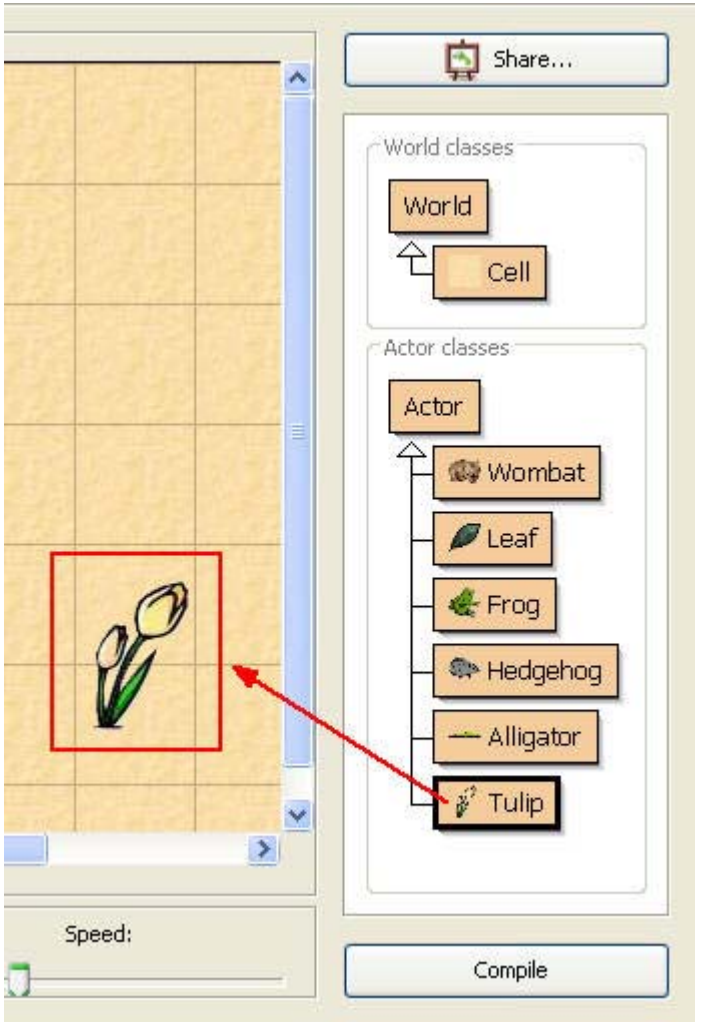


Instances

You can add as many instances of a class as you want to a scenario.

Instances are the objects from a class that act in your scenario.

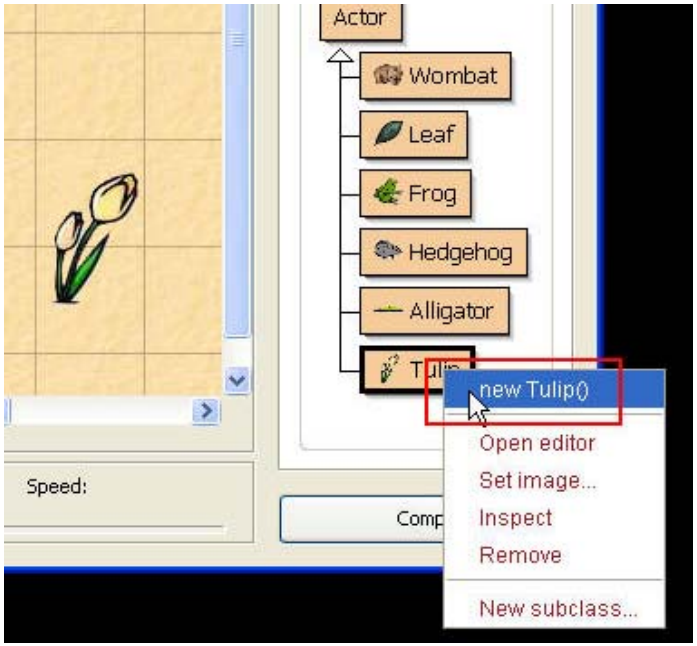
Instances can perform the behaviors detailed in the class's source code.

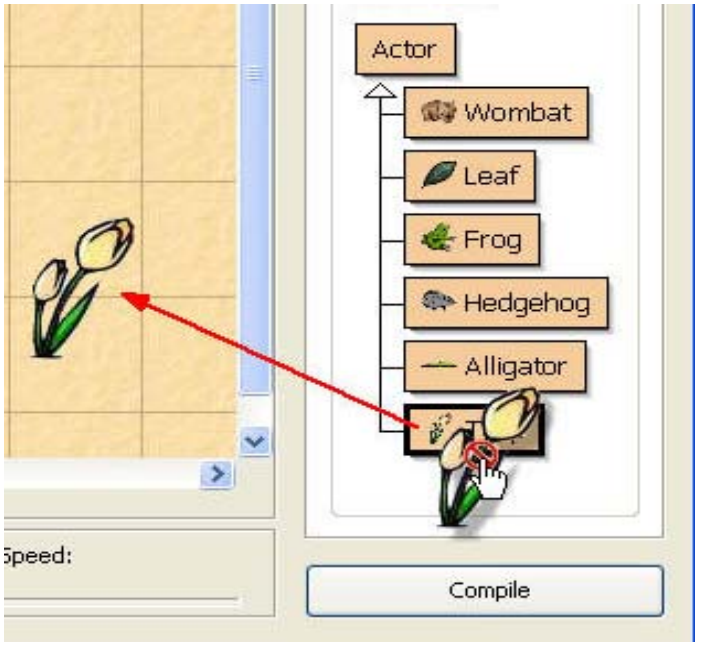


Adding Instances to a Scenario

Follow these steps to add an instance to a scenario:

1. Right click on the class.
2. Click the new[class name] option.
3. Drag the instance into the scenario with your cursor.
4. Program the instance to act in your scenario.





Source Code

As humans, our DNA gives us certain characteristics, such as our appearance, our ability to move, and communicate with others.

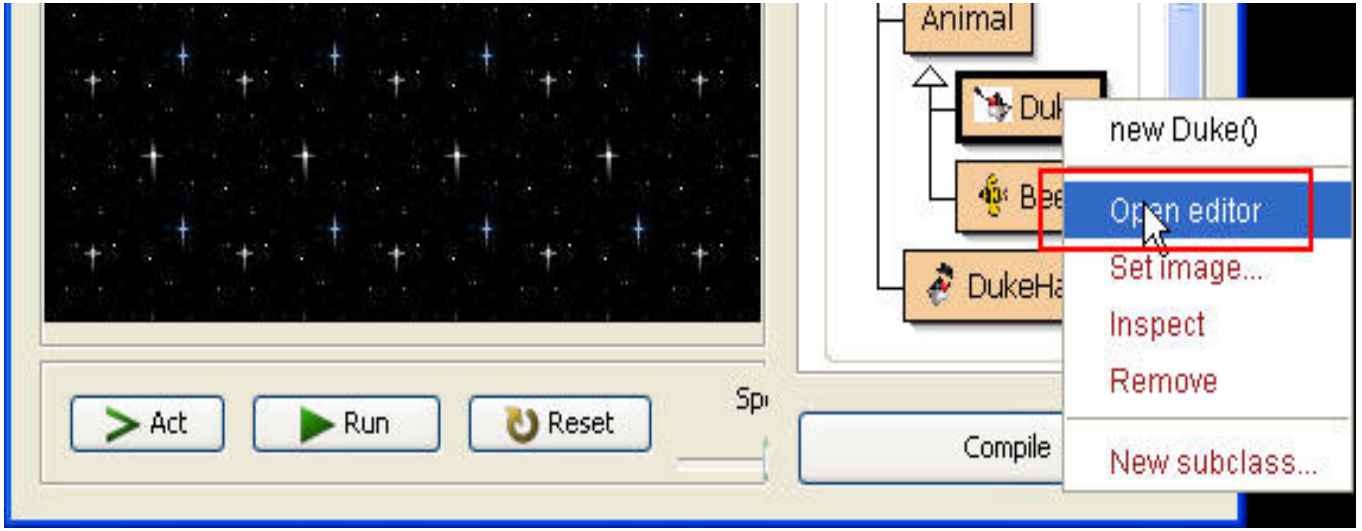
Source code defines what all instances of each class are capable of doing. The behavior of each instance is determined by the source code of its class.

Source code is written to tell the class how its objects should act in the scenario.

Viewing Source Code

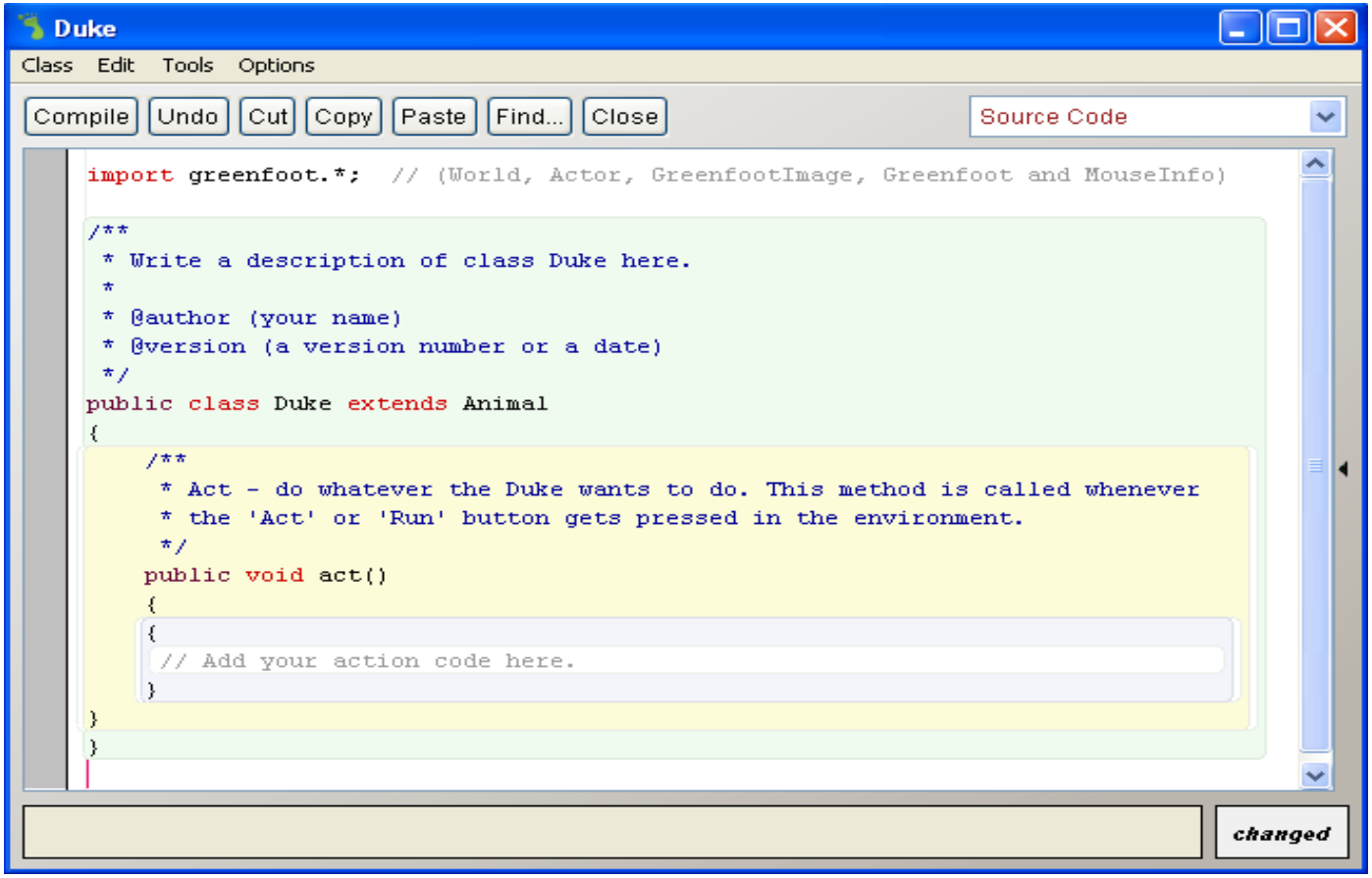
To view the source code for a class:

1. Right click on a class in the class menu.
2. Select Open Editor.



Code Editor

The code editor displays the class's source code. This is where instructions for instances are programmed.



Terminology

Key terms used in this lesson included:

Class

Compilation

Instance

Source code

Subclass

Superclass

Summary

In this lesson, you learned how to:

- How to download and install Greenfoot
- Describe the components of the Greenfoot interactive development environment
- Create an instance of a class
- Describe classes and subclasses
- Recognize Java syntax used to correctly create a subclass

Practice

The exercises for this lesson cover the following topics:

- Getting to know Greenfoot's components
- Creating instances
- Compiling and debugging programs
- Identifying properties of an object