

Programming Fundamentals II Sec. 601

Lab Assignment #9

Interfaces

Due date: 11/4/20 at 11:59 pm

Purpose: This two-week lab focuses on interfaces within the broader concept of inheritance. You should be familiar with how to build an application consisting of multiple classes that rely on inheritance relationships.

Task: Create a project called `Interfaces_FirstName_LastName` or `Lab9_FirstName_LastName`. This project will consist of the following files: the Bug interface provided on Blackboard, a `BugGallery` class for the main method and GUI, `Insect` and `Arachnid` classes that implement the Bug interface, and four additional classes of your choosing. Remember to include comments summarizing the various components of this lab.

1. Review the Bug interface on Blackboard. The interface includes four abstract methods that you must implement in both the `Insect` and `Arachnid` classes.
2. Both the `Insect` and `Arachnid` classes consist of two fields: a `String` for the name and an `int` for the number of legs. The name can initially be empty. For `Insect`, the number of legs is 6. For `Arachnid`, the number of legs is 8.
3. Implement the four methods of the Bug interface in both `Insect` and `Arachnid`. The constructor sets the name to a passed in value. The getters and setters have standard behaviors for the fields specified in the method names. The `toString` method returns a `String` indicating the name and number of legs. For example, an `Insect` named grasshopper could return the following `String`:

The grasshopper is an insect. It has 6 legs.

4. Write four additional classes for more specific bugs. Two classes must extend the `Insect` class, and two classes must extend the `Arachnid` class.
5. The constructors of these classes must call the superclass constructor and pass the name of that bug into the constructor. The `toString` methods return a `String` that combines the contents of the superclass's `String` with a simple fact about that bug. Using the grasshopper as an example:

The grasshopper is an insect. It has 6 legs. Grasshoppers have ears on their abdomens.

6. Implement the BugGallery class as a JavaFX application. In addition to classes required for any JavaFX application, essential imports will include Label, Button, Image, and ImageView. Import additional classes as needed.
7. Within the global scope of the BugGallery class, declare a reference variable of the Bug interface. Assign an object of one of the four classes to this reference variable.
8. In the start method, write code to display the interface of the application. The interface must include an image, description, and four buttons. The image and description must correspond to the currently selected bug. The four buttons should be labeled according to the bug that will be shown when that button is clicked. You may arrange the visible elements of the interface in any way you like.
9. Implement the event handler for the buttons using any technique you prefer. When one of the four buttons is clicked, the image and description for the bug corresponding to that button is displayed.

Criteria: Comments summarizing the program are worth 10 points. The two fields for the Insect and Arachnid classes are worth 1 point each (4 points total). The constructors and toString methods for all six custom classes (Insect, Arachnid, and the four of your choice) are worth 5 points each (60 points total). The getters and setters for the Insect and Arachnid classes are worth 3 points each (18 points total). The declaration and construction for the Bug variable and appropriate object is worth 3 points. Constructing the GUI for the application is worth 35 points. Implementing the event handler for the four buttons is worth 20 points.