In this assignment you will complete a Processing program for a game called BugHunt. To play this game go to:

https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugHunt.html

The object of the game is to kill all the bugs in the processing window with the minimum possible number of mouse clicks. The source code for the main program is provided in the file

https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugHunt.pde

which uses a class called Bug. It is your goal in this assignment is to write class Bug so as to complete the program and emulate the play of the above game. An outline of the class is provided below.

The game opens a Processing window containing 30 bugs of various colors traveling up, down, left and right at various speeds. To kill a bug click the mouse within 15 pixels of the bug's center. If your mouse click is within 30 pixels of the bug's center, but not within 15 pixels, a disturbing thing happens. The bug gets scared and moves faster (50% faster to be exact) making it harder to kill. By studying BugHunt.pde you can infer that class Bug contains a constructor taking three arguments, and six other methods called: crawl(), display(), squash(), runAway(), mouseOn() and scared() described below. Here is an outline of the Bug class.

```java
class Bug{
    // fields

    // constructor
    Bug(float x, float y, int s){
    }

    // methods
    void crawl(){
    }

    void display(){
    }

    void squash(){
    }

    void runAway(){
    }

    boolean mouseOn(){
    }

    boolean scared(){
    }
}
```
This class will contain 5 fields specifying the x and y coordinates of the bug's center (type float), its color (type color), its speed (type float) and its state (type int). You may give these fields any names you wish. A bug's state will be an int value in the range 0 to 4. These states have the following meanings.

<table>
<thead>
<tr>
<th>State</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>the bug travels left to right</td>
</tr>
<tr>
<td>2</td>
<td>the bug travels right to left</td>
</tr>
<tr>
<td>3</td>
<td>the bug travels top to bottom</td>
</tr>
<tr>
<td>4</td>
<td>the bug travels bottom to top</td>
</tr>
<tr>
<td>0</td>
<td>the bug is dead, does not move and is not drawn</td>
</tr>
</tbody>
</table>

The Bug constructor takes 3 arguments x, y, and s that are assigned to be the x and y coordinates of the bug's center and the bug's state respectively. The bug's speed is assigned to be a random number in the range 1 to 1.5 (pixels per frame). The bug's color is also assigned at random. Function crawl() advances the bug in the correct direction given it's state. Dead bugs do not move. Function display() draws the bug as an ellipse of width 30 pixels and height 20 pixels (if state is 1 or 2) or width 20 pixels and height 30 pixels (if state is 3 or 4). The bug's legs consist of three lines each of length 30 pixels spaced 10 pixels apart. Dead (state 0) bugs are not displayed. You may add other details to function display() to give your bugs features like antennae, eyes or spots. Function squash() kills a bug by setting its state to 0. Function runAway() increases a bug's speed by 50%. Function mouseOn() returns true if the bug is alive and the mouse is within 15 pixels of the bug's center, and returns false otherwise. Function scared() returns true if the mouse is within 30 pixels of the bug's center, and returns false otherwise.

Notice that the Bug class has much in common with the Car class in examples Car6 and Car7 found on the class webpage. You should spend some time studying the entire sequence of Car examples. Another program called BugTest.pde is also included on the webpage. It uses the very same Bug class used by BugHunt. It creates a single stationary Bug which it then draws, along with two concentric circles at the Bug's center of radii 15 and 30 pixels respectively. The Bug screams various messages depending on where the mouse pointer is located. The purpose of this program is to test your Bug class to make sure methods like display(), mouseOn() and scared() work properly. This program is demonstrated at

[https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugTest.html](https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugTest.html)

and it's source code (not including Bug.pde) is at

[https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugTest.pde](https://classes.soe.ucsc.edu/cmps005j/Fall15/Examples/BugTest.pde)

To submit this assignment you will turn in two files:

- BugHunt.pde identical BugHunt.pde on the class webpage
- Bug.pde created by you by following the above outline

Attach both files to the assignment pa7 before the end of the grace period. As usual start early and ask plenty of questions.