Computer Programming & Game Design
Java #19– Bubbles

Background:
You will take the bubbles scenario started in class and add to it.

Assignment:
You will be turning in this project in stages!

Copy your bubbles folder to a folder titled bubbles-1. All of your work will be done in the bubbles-1 folder.

1. Create 6 buttons labeled 1, 2, 3, 4, 5 and 6. The buttons should have circles around them using the techniques learned in class. (Stage 1)

2. Change the color of your stage so it isn't white. Make sure the color you picked for your buttons looks good with the color of your stage. (Stage 1)

3. In the BubbleWorld constructor (Stage 1)
   a. The 6 buttons should be evenly spaced along the bottom of the world with 25 pixels between the bottom of the world and the bottom of each button.
   b. Draw a line 25 pixels from the top of the buttons that goes across the world parallel to the bottom of the world. This will be the bottom boundary for the bubbles as they move.

4. In BubbleWorld, make sure you have a (Stage 1)
   a. waitToSeePattern method that uses a Greenfoot delay to wait for 100 cycles.
   b. clearBubbles method that removes all of the bubble objects from the word.

5. In the BubbleWorld class, have 6 methods that do the following:
   a. clears all bubbles from the world (Stage 1)
   b. creates a pattern of bubbles as specified below. You should use loops whenever possible.
      i. Pattern 1: Add a single bubble in the middle of the bounded area for bubbles to move. It should be created using the default Bubble constructor. (Stage 1)
      ii. Pattern 2: Add 20 bubbles at random locations, however the entire bubble must show up inside the bounded area. None of the bubbles can be on any edge. (Stage 2)
      iii. Pattern 3: Add 20 bubbles on a diagonal from the upper left corner of the bounded area to the lower right corner of the bounded area. All bubbles must show up inside the bounded area. None of the bubbles can be on any edge. (Stage 2)
      iv. Pattern 4: Add 10 bubbles in a horizontal line. The centers of each bubble will have an x coordinate that is 20 larger than the previous bubble. The y value for each bubble will be the same so that the line of bubbles is in the vertical center of the bounded area. The first bubble should have a radius of 10, and each subsequent bubble will have a radius that is 10 more than the previous radius so that the last bubble has a radius of 100. If you create this correctly, the entire width of all bubbles from the left to the right will be 245. Pick the starting x coordinate so that this line of bubbles is centered horizontally. (Stage 3)
      v. Pattern 5: Add 18 bubbles on top of each other with the largest bubble added first in the center of the bounded area. The largest bubble has a diameter of 190 with each subsequent bubble's diameter decreasing by 10. In addition, the initial direction of each bubble should be specified. The first bubble has direction 0, and the direction between two bubbles increases by 20. (Stage 3)
      vi. Pattern 6: Choose a size for a bubble so that all bubbles will be the same size. Add a bubble to each corner of the bounded area so that the entire bubble fits in the bounded area. You will add bubbles
around the edges so that they are evenly spaced making a rectangle shape out of bubbles. (EXTRA CREDIT – Stage 4)

c. waits to see the pattern (Stage 1)

6. Now, set up the buttons. Clicking on the button labelled 1 causes pattern 1 to display; clicking the button labelled 2 causes pattern 2 to display, etc. (Stages 1, 2, 3, 4 as appropriate)

7. Your code should work regardless of the size of your BubbleWorld. You should get your code working, and then change the super() call in the BubbleWorld constructor to see if everything works fine without changing any other code. If something doesn't look right, go back and fix the code until everything works when you change the width and height. (All stages)

<table>
<thead>
<tr>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>800</td>
<td>600</td>
</tr>
<tr>
<td>750</td>
<td>500</td>
</tr>
</tbody>
</table>

**Turning it in:**

**Stage 1:**

Implement steps 1-3 above and then do Pattern 1 only. This means that the only button that has to work is Button 1.

1. Create a folder titled first_last_java_19.1
2. Copy your bubbles-1 folder and paste it into your first_last_java_19.1 folder.
3. Zip your first_last_java_19.1 folder and turn it in in the usual matter.

**Stage 2:**

Make sure you have finished Stage 1, and then to Patterns 2 and 3. For Stage 2, buttons 1, 2, and 3 must work.

1. Create a folder titled first_last_java_19.2
2. Copy your bubbles-1 folder and paste it into your first_last_java_19.2 folder.
3. Zip your first_last_java_19.2 folder and turn it in in the usual matter.

**Stage 3:**

Make sure you have finished Stage 2, and then to Patterns 4 and 5. For Stage 2, buttons 1, 2, 3, 4, and 5 must work.

1. Create a folder titled first_last_java_19.3
2. Copy your bubbles-1 folder and paste it into your first_last_java_19.3 folder.
3. Zip your first_last_java_19.3 folder and turn it in in the usual matter.

**Stage 4 – EXTRA CREDIT:**

Make sure you have finished Stage 3, and then to Pattern 6. For Stage 4, all buttons must work.

1. Create a folder titled first_last_java_19.4
2. Copy your bubbles-1 folder and paste it into your first_last_java_19.4 folder.
3. Zip your first_last_java_19.4 folder and turn it in in the usual matter.