Loop Lab

Pretend you are the Scientist-in-Chief at the United States Institute of Heraldry. Your assignment is to create a program that can generate alternate versions of the U.S. flag (within certain constraints).

Part 1

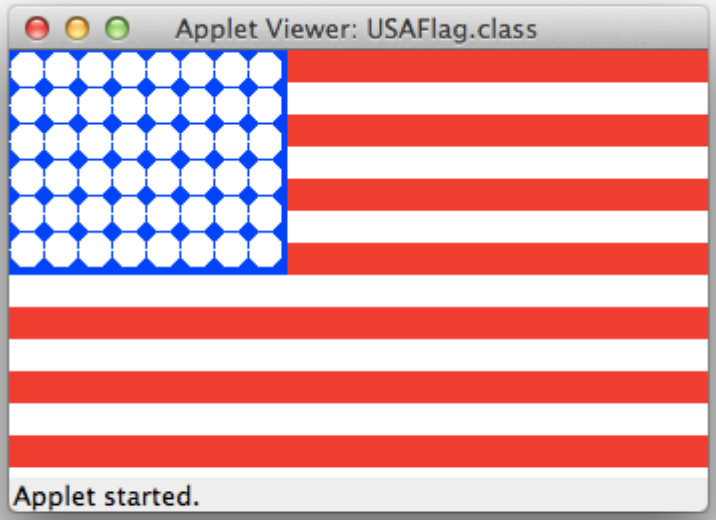
Write a Java application that draws a simplified U.S. flag. Here are the requirements:

- The top stripe must be red, and every stripe below will alternate between white and red.
- All stripes must be the same height.
- The blue field must be in the top-left corner.
- The blue field's height should be equal to the height of 7 stripes.
- The blue field's width must be 2/5 of the width of the entire flag.
- The blue field must be covered with white stars (ovals, in our case).
- The white ovals must be all the same size.
- The flag must scale cleanly when the window is resized.

Hints

- Fill in the entire background as either red or white, then draw in the stripes of the other color.
- Draw the blue rectangle next, and the stars last.
- Use `for` loops to draw the stripes and stars.
- Use lots of variables! Calculate the height of the stripes, the width & height of the blue field, the width/height of the stars (etc.) and store them in variables for use in your drawing commands. At the very least, you must store the number of stripes, the number of star-rows, and the number of star-columns in variables, as you will be modifying these at run-time in Part 2 (below).
- For testing/debugging, first try using 13 stripes, 6 rows of stars, and 8 columns of stars (this is what the flag looked like in 1958, incidentally). Then change them and make sure everything still works.

- Here is an example screenshot, for your reference:



Part 2

Instead of hard-coding the number of stripes and star rows/columns in your code, prompt the user to enter these in a series of three JOptionPane pop-up boxes.

After you have finished:

- Print up the cover page.
- Upload your .java file to Canvas.
- Demonstrate your program to a T.A. They're in the lab M–Th 5pm–11pm and Friday 5pm–8pm.
- Sign your cover page, and turn it in to the TA.

RUBRIC:

1. Explain to the TA how you calculate the width of the blue field. (3 points)
2. Explain to the TA how you calculate the height of the blue field. (3 points)
3. Explain to the TA how you calculate the width of the stripes. (3 points)

4. Explain to the TA how you calculate the height of the stripes. (3 points)
5. Explain to the TA how you calculate the size of the stars/circles. (3 points)
6. The flag should scale so that it exactly fills the appletviewer window. (2 points)
7. The top stripe is red. (2 points)
8. The blue field covers the height of the top 7 stripes. (2 points)
9. The blue field covers 2/5 of the width of the entire flag. (2 points)
10. The white stars (circles) extend the entire width and height of the blue field. (2 points)
11. The flag scales correctly when the screen is resized. (5 points)
12. The flag scales correctly when the TA changes the number of stripes and the number of star rows/columns. (5 points)
13. Each major section of the program is commented. (2 points)
14. Source code is neatly and consistently indented. (2 points)
15. Show the TA that you uploaded your source code to Canvas. (1 point)

TOTAL: 40 points