

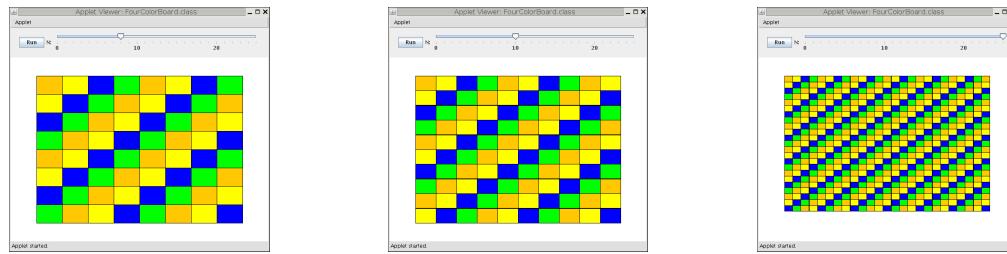
MAT 2170: Laboratory 6

Key Concepts

1. More practice with loops and graphics
2. `switch` and `if` statements
3. Animation
4. Mathematical computation, using the `Math` class methods

Exercises

1. (Four-color Checkerboard) Create this version of a checkerboard as a `SliderProgram`. Center a background rectangle which is 80% the width and height of the window, then display a 4-color checkerboard inside it, with the number of rows & columns determined by the slider (0..25). Use a `switch` statement to determine the color of the current block. You may use any four distinct colors. When you publish this project, choose a window size which isn't square.



2. (Page 172, Exercise 1) Solving quadratic equations. You will need a nested / cascading `if` statement to check whether there is **no** solution, **one** solution, or **two** solutions, and proceed accordingly. Create this program as a `DialogProgram`, with *as few pop-up windows as possible*. Be sure to test your program thoroughly.
3. (Bouncing Ball, page 131, Exercise 15) Be Animated! Create this as a `SliderProgram`, setting the range of the slider to 3...21. Then, rather than the infinite loop using `while(true)` as described in the text, count the number of times the ball “bounces” until it reaches the value of the slider, then stops. If your program gets into an infinite loop, you can click on the red \times in the output window, or open the `Processes` window, and terminate any process that is currently executing. Modify the program so the ball changes color, depending on which wall of the window caused it to bounce. To *negate* the value of `dx` (i.e., to reverse the direction of the ball when it “bounces” against the left or right window boundaries), use `dx = -dx`. Since we want a smooth animation, initialize `dx` and `dy` to 1.
4. (Checkers, Page 130, Exercise 14) Create a graphics program to:
 - Create a background rectangle so it **fills** the graphics window in the **smaller** dimension — i.e., select the smaller of width and height of the window for the size of the blocks (making the checkerboard square), then center the checkerboard in the larger dimension
 - Alternate between two colors, say red and black, on an 8 by 8 board. You may choose other colors if you wish, as long as they are different and the checkers show up.
 - Display yellow checkers in the first three and last three rows on alternating colors, as illustrated in the textbook. Again, you may choose your own colors, as long as the checkers display correctly. Make your checkers centered in their square, and 80% of the square size.

It may be helpful to notice the checkers always begin on black squares, in the first three and last three rows of the board. When you publish this project, choose a window size which isn't square.

Finishing Up

1. Show me Worksheet 6 at the beginning of lab; complete Worksheet 7 by the beginning of Lab 7.
2. By the beginning of Lab 7: publish each project to your web site; submit an electronic copy of the entire lab; hand in printouts of the programs.