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Project 03
Lab Times: TR 11:05 - 12:20
I did not collaborate with anyone on this assignment.

Flow of Events

The basic flow of the events of my program isn't very complex, unlike my last project.
Once the user runs the program, my GUI shows up. It's easy to understand that they have to choose a firework type, a color, a launch angle, velocity and speed. Once they click "Launch," the firework appears. If they click "Clear," everything is reset and they can choose new parameters.

How I Coded It

I used only one class for the project.

Like the teacher said, the most basic thing I did was make sure that my code has a JFrame. He mentioned that I could have a main method in my code that makes the JFrame visible. If you scroll all the way down, you will see my main method.

After that, I created all my instance variables. My instance variables include *double values for the parameters of launch (ie time, velocity, etc), components such as buttons, radio buttons, text fields and labels, and finally integers which will store the x and y values of the firework*. They are quite self-explanatory with informative method names.

The next move was to set my gui's layout. I did this in the class's constructor. The overall layout is a Border Layout. Then, I created three different panels. The first one has a label and the launch and clear buttons. I stacked them vertically by using two separate panels, then putting one in the other. The next panel was for the east side of the frame where the user can choose firework type. This time, I used Box Layout to stack the components vertically. The final panel lies at the bottom of the window and contains all the other parameters of launch.

The final thing I did in my constructor was add action listeners to my components.

Everything else lies in the methods I used.

Methods Used

//action performed

A lot of the components I created use action listeners, so this method contains a lot.

If the source of the event is the launch button button, I call the drawTrajectory method (explained below).

If the source of the event is the clear button, I repaint the canvas and clear the text boxes.

If the source is the velocity text field, I read in whatever the user types and set that value as velocity.
Likewise, if it's the time text field, I set the value.
Finally, if the source is any of the color radio buttons, I set my color instance variable to the corresponding color.

//state changed (for slider)

Sliders can only use change listeners and not action listeners, so I have this method to change the value of the angle depending on the position of the slider. If the user forgets to move the slider, the default angle is 45 degrees.

//draw trajectory

This is the most complicated part of the entire program.
What I did is I have a loop to draw a small circle for each increment of time. That is, for example, if time = 6, the loop draws 6 circles at t = 0, t = 1, t = 2, t = 3, t = 4 and t = 5. Note that you might not always see the first circle because it is drawn at height = 0 which is below my bottom panel.
I use the height of the window as a parameter when setting the height. This will ensure that my program still works if the window is resized.
Once the trajectory is done, this method calls drawFirework();

//draw firework

I had to come up with at least five types of fireworks that are chosen based on the radio button the user selects.
If the user selects firework type 1, that is Glitter, I draw a hundred small circles at random point relative to the height and width of the frame.
If they'd selected Swirly, I draw about 6 concentric circles.
If it's firework type 3, I draw 4 lines in the shape of a star. The lines use the height and width of the window so that even though you resize it, you still have a good relatively shaped star.

Note to Grader

The trajectory is drawn from the bottom left corner. You usually will not see the first circle (the one that is drawn @t=0) but it's there.

Requirements

Basic Requirements

- Draw the trajectory of the firework after launch ✓
- Provide a graphical rendering of the firework exploding ✓

Code Requirements

- User can specify launch angle and speed ✓
- Time must also be parameter of launch ✓
- User can specify color used to draw trajectory ✓
- User can choose from up to five different types of fireworks ✓
- Assume that the projectile is launched from bottom left of the screen ✓
- Code uses JFrame ✓
- informative method names ✓
- informative variable names ✓
- comments at top of files ✓
- comments for methods ✓
- comments elsewhere ✓

Math Requirements

- Assume no wind resistance (ie use formulae provided) ✓

GUI Requirements

- Has an area user can set the parameters of the fireworks launch ✓
- Has an area where the trajectory and firework are drawn ✓
- Has a button that renders the drawing ✓
- Application works when window resized ✓

Possible Extra Credit

- Included a "clear" button so that:
  - user must not re-run program to shoot another firework
  - user can have more than one firework showing at a time
- Creativity - cool fireworks with clever names
- Clear and prominent documentation