Practice Examples for Lab: Set 4

- 1

Plot the graph of $y = \sin(x)$ for x ranging in the interval 0 to 4π. Draw the axes and mark the axes at appropriate points, e.g. multiples of $\pi/2$ for the x axis, and multiples of 0.25 for the y axis.

- 2

Draw an 8×8 chessboard having red and blue squares. Hint: Use the `imprint` command. Use the repeat statement properly so that your program is compact.

- 3

Modify the projectile motion program so that the velocity is given by a second click. The projectile should start from the first click, and its initial velocity should be in the direction of the second click (relative to the first). Also the velocity should be taken to be proportional to the distance between the two clicks.

- 4

Write a program that accepts 3 points on the canvas (given by clicking) and then draws a circle through those 3 points.

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- 5

In this problem you are to determine how light reflects off a perfectly reflecting spherical surface. Suppose the sphere has radius r and is centered at some point (x, y). Suppose there is a light source at a point (x', y). Rays will emerge from the source and bounce off the sphere. As you may know, the reflected ray will make an angle to the radius at the point of contact equal to that made by the incident ray. Write a program which traces many such rays. It should take r, x, y, x' as input. Of course, in the plane the sphere will appear as a circle.

- 6

This is an extension to the previous problem. Extend the reflected rays backward till they meet the line joining the circle center and light source. The points where the rays meet this line can be said to be the image of the light source in the mirror; as you will see this will not be a single point, but the image will be diffused. This is the so called spherical aberration in a circular mirror.