

Class Exercise - Creating a Class

Define a class named `RandomWalker`. A `RandomWalker` object should keep track of its (x, y) location. All walkers created with the zero argument constructor start at the coordinates (0, 0). Include a constructor to set the initial x and y of a walker.

When a walker is asked to move, it randomly moves either left, right, up or down. Each of these four moves should occur with equal probability. The resulting behavior is known as a "random walk." (A 2-dimensional random walk example is pictured at right.)

Each `RandomWalker` object should have the following public methods. You may add whatever fields or methods you feel are necessary to implement these methods:

```
RandomWalker()
```

Create a random walker with x, y of 0, 0.

```
RandomWalker(int x, int y)
```

Create a random walker with x, y equal to the given parameters.

```
move()
```

Instructs this random walker to randomly make one of the 4 possible moves (up, down, left, or right).

```
getX()
```

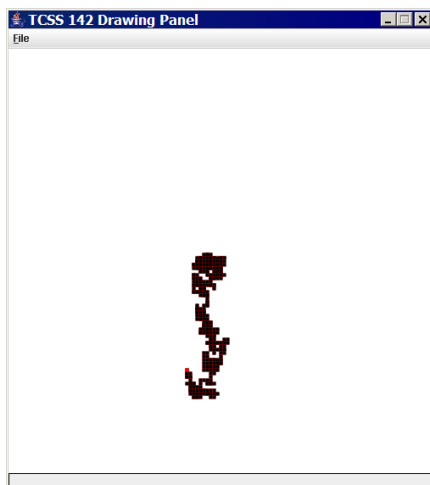
Returns this random walker's current x-coordinate.

```
getY()
```

Returns this random walker's current y-coordinate.

```
getSteps()
```

Returns the number of steps this random walker has taken.



Random walks have interesting mathematical properties. For example, given infinitely many steps, a random walker approaches 100% chance of reaching a particular (x, y) coordinate. To learn more about random walks, visit <http://mathworld.wolfram.com/RandomWalk.html> .

Test your `RandomWalker` by running it with the `TestRandomWalker` test class, found on the problems web site. The `TestRandomWalker` will run your random walker in a loop and animate its position as it moves.

Write another program to test your `RandomWalker`. How many steps does it take for the `RandomWalker` to end up a distance of 500 steps (units) away from its starting point? Write code to repeat the experiment 1000 times.

What is the average number of steps it takes a random walker to end up a distance of 500 steps (units) away from its starting location?