Quick Exercise

What does this code do?

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It also takes a *really* long time to run.

How Long?

n	n squared	sample time
10	100	1:40
100	10000	2:46:40
1000	1000000	277:46:40
1000000	1000000000000	long wait

Thinking Through the `lakeEffect()`

Idea

make a new image twice as tall
copy the image into the top of the new image

mirror top half into bottom half,
with a "dampening"

Mirroring and Dampening

If we ignore the end pixels...

```
public void mirrorAndDampen()
{
  int height = this.getHeight();
  int width  = this.getWidth();

  for (int y = 0; y < height/2; y++)
    for (int x = 1; x < width - 1; x++)
      mirrorAndDampenPixel( x, y );
}
```

Mirroring and Dampening a Pixel

And then...

```
public void mirrorAndDampenPixel( x, y )
{
  Pixel pixelLeft  = this.getPixel( x-1, y );
  Pixel pixelRight = this.getPixel( x+1, y );
  int   height     = this.getHeight();

  int red   = (pixelLeft.getRed()   + pixelRight.getRed()  )/2;
  int green = (pixelLeft.getGreen() + pixelRight.getGreen())/2;
  int blue  = (pixelLeft.getBlue()  + pixelRight.getBlue() )/2;

  Pixel p = this.getPixel( x, height-1-y );
  p.setColor( new Color(red, green, blue) );
}
```

So, How Long?

```
n                       n squared

10                      100
"1 minutes 40 seconds"


100                     10000
"2 hours 46 minutes 40 seconds"


1000                    1000000
"11 days 13 hours 46 minutes 40 seconds"


1000000                 1000000000000
NumberFormatException: For input string: "1000000000000"
"31688 years 1 months 1 days 15 hours 46 minutes 41.0 seconds"
```