Media Computation: Fun with Images!
What You Might Do
For-Each Loop

- Loops through all of the elements in a sequence
- Syntax
  ```
  for (type name : sequence)
  ```
- Example
  ```
  for (Pixel pixelObj : pixelSequence)
  ```
- Each time through the loop this will be a different pixel from the collection of pixels until all of the pixels have been processed
Create a new method called `multicolored()`

How can we apply different operations to different pixels?
For Loop

- Has three areas: initialization, condition, and update

- Syntax
  ```java
  for (initialization; condition; update)
  ```

- Example
  ```java
  for (int x = 0; x < pic.getWidth(); x++)
  ```
For Loop Sequence of Actions

for (initialization; condition; update)

Example

for (int x = 0; x < pic.getWidth(); x++)

1. Execute initialization once
2. Each time through the loop, check the condition
3. If condition is true execute both the body of the loop and then the update step
4. Go back to 2. and repeat until condition is false
Processing pixels using (x, y) coordinates

```java
for (int x = 0; x < this.getWidth(); x++)
{
    for (int y = 0; y < this.getHeight(); y++)
    {
        // process pixel at (x, y)
    }
}  
```

How do we know when to setGreen() vs. setBlue() vs. setRed()?
public void flipHorizontal()
{
    // make a copy of this picture
    Picture in = new Picture(this);

    for (int x = 0; x < in.getWidth(); x++)
    {
        for (int y = 0; y < in.getHeight(); y++)
        {
            this.getPixel(x, y).setColorFrom(in.getPixel(x, y));
        }
    }
}
Flip Vertical

- Make a new `flipVertical()` method
- Use nested loops to create a vertical flip of the image
- Use `flipHorizontal()` as a model
Make a new `crop()` method

Have it crop out the center ¼ of the photo

What parameters should you send to `setColorFrom`?

Experiment as needed to figure it out!

**Challenge**: add parameters to make it more flexible!
public void copyPicture(
    Picture from, Picture to, int startX, int startY)
{
    for (int x = 0; x < from.getWidth(); x++)
    {
        for (int y = 0; y < from.getHeight(); y++)
        {
            Pixel source = from.getPixel(x, y);
            to.getPixel(????, ????) setColorFrom(source);
        }
    }
}
public void tile() {
    // Make a copy of original version
    Picture in = new Picture(this);

    // Resize to fit 4 copies
    this.changeDimensions(2 * this.getWidth(), 2 * this.getHeight());

    copyImage(in, this, 0, 0);
    copyImage(in, this, in.getWidth(), in.getHeight());
    ...???...
}

To place 4 copies of the image
How Would You Create This?
How is it done?

- What kinds of transforms?
- What image size?
- How did they all end up in the same image?
Activities

- Dream up your own collage
- Sketch it on paper
- Create your own method and write your own version of a collage!
- Use your own images!