CS180 Lab 10: Android Lab 1: Methods, Parameters

Sections from the textbook relevant for this lab: Chapters 7, 8, and 10
Lab for week: 11
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Learning Objectives

1. Review methods and parameters.

Objectives

- Setup files and directories.
- Manipulate image.
    - invert
    - left shift
    - right shift
    - grayscale

Files

ImageManipulation.java

Setup

Make a new directory for Lab 10:

```
$ cd
$ cd cs180
$ mkdir lab10
$ cd lab10
$ /homes/jfrankl/pal
$ drjava ImageManipulation.java &
```

Bitmap and Color API

The images you will be manipulating are in the form of a bitmap. A bitmap can be seen as a two dimensional array of pixels. Each pixel represents the RGB value at that position in the image. Also each

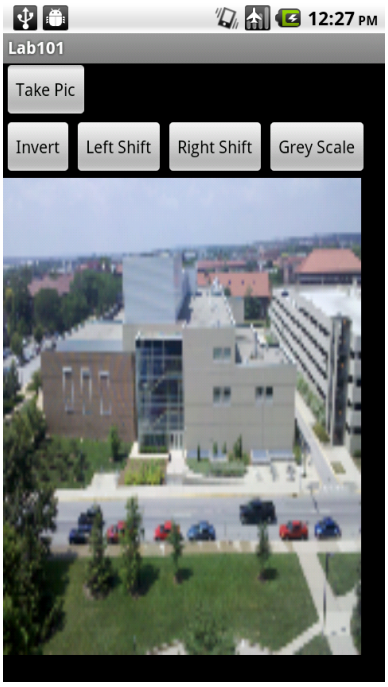
pixel, or color, is represented as an integer. To change the color that each pixel represents use the static methods withing the `Color` class. To get more details on how an image is represented, look at the Color and Bitmap API.
http://developer.android.com/reference/android/graphics/Color.html
http://developer.android.com/reference/android/graphics/Bitmap.html

Exercise 10-1: Invert

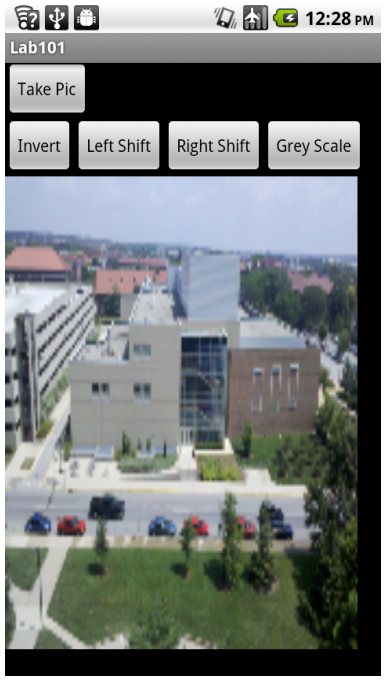
Objective: Invert the bitmap given as a parameter to the invert method.

Steps:

1. Find the invert (Bitmap) method within the `ImageManipulation.java` file.
2. Get the width and height of the bitmap.
3. Loop over each pixel height wise and half the pixels width wise.
4. Get the pixel at position `x` and set that pixel at position `width-x-1` and vice versa.
5. Run the `pal` command and press the `Invert` button on the Android device; use the `invert` method on the picture shown.



Original



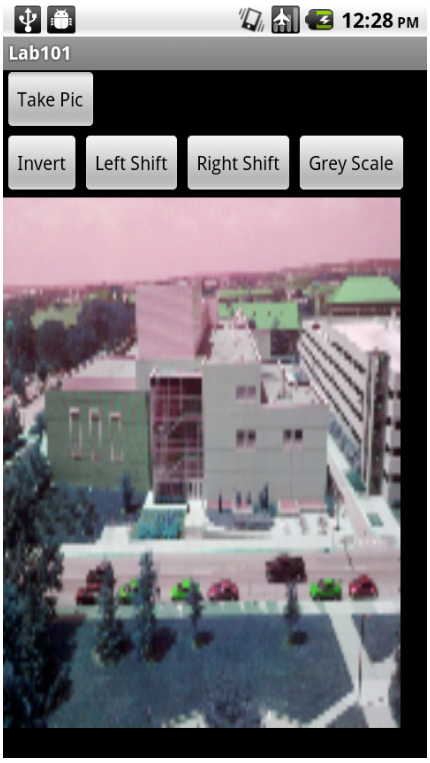
Inverted

Exercise 10-2: Left and Right Color Shift

Objective: Shift the individual red, blue, and green components of each pixel to the other red, blue, and green components. For right color shift the red component should be placed in the blue position, and the blue component in the green position.

Steps:

1. Find the `rightShift(Bitmap)` and `leftShift(Bitmap)` method within the `ImageManipulation.java` file.
2. Get the width and height of the bitmap.
3. Loop over each pixel in the bitmap.
4. Get the individual components of each pixel.
5. Create a new pixel with the pixel's components set to the desired value and store it back into the bitmap.
6. Run the pal command and press the `Right Shift` and `Left Shift` button to use the `rightShift(Bitmap b)` and `leftShift(Bitmap b)` methods on the picture shown.



Left Shift

Right Shift

Exercise 10-3: Grey Scale

Objective: Create the grey scale of the image.

Steps:

1. Find the greyScale(Bitmap) method within the `ImageManipulation.java` file.
2. Get the width and height of the bitmap.
3. Loop over each pixel in the bitmap.
4. Get the individual components of each pixel.
5. Create the grey scale of each pixel by setting each pixel's components to the average of each pixels's components.
6. Run the pal command and press the `Grey Scale` button to use the `greyScale(Bitmap b)` method on the picture shown.

Grading

Criteria	Percent
Invert	40%
Right Shift	35%

Left Shift	35%
Gray Scale	20%

Turn In

Show your TA your application for a grade. There will be nothing to turn in for this lab.

<End of lab 10>