Day 4: Android Studio Morning

Arrays, Loops, Intro to Image Manipulation
Android Studio
IDE for Java

- Open Android Studio
- Look at the different panels
- See Java Code
Documentation for Media Library

• http://courses.cs.vt.edu/~cs1114/api/mediacomp/
mediacomp.jar in **libs** directory defines Classes for use in the project (can they see this?)
Investigate Picture Class and SimplePicture (can they see this?)
Android Studio (Done in Main.java) now

- Create a new java file "ImageDisplayer"
- Create a main method to drive the application
- Create a Picture Object and show it
Android Studio
main class shows chosen image

```java
/**
 * Select a photo and display it using various image manipulation strategies
 */

class ImageDisplay {
    public static void main(String[] args) {
        Picture pic = new Picture(FileChooser.pickAFile());
        pic.show();
    }
}
```
Android Studio
Main class shows chosen image
How Does Color Vision Work?

• Our eyes and brain work together to make sense of what we see
• The cones in our eyes are what allow us to see in color
• The rods allow us to see black, white, and shades of gray
• Our cones are sensitive to red, green, and blue light
  • All other colors are combinations of these
Red, Green and Blue Light

• White light is a combination of red, green, and blue
  • Full intensity red, green, and blue combined

• Black is the absence of all light
  • No red, green or blue light

• All other colors are combinations
  • Of red, green, and blue
  • Of different intensities
Color Exercise

- Invesitgate RGB values

- https://www.w3schools.com/colors/colors_rgb.asp
How do Digital Cameras Work?

• There are red, green, and blue filters that capture the amount of each color at a position
  • A part of a grid

• There are many positions
  • picture element or pixel
  • 640 x 480 is low resolution
  • 1600 x 1200 is high resolution

• The more pixels the better the picture
  • Can enlarge it without it looking grainy
Android Studio
IDE for Java
for each pixel

for (Pixel p : pic.getPixels())
{
    // code to apply to every pixel in the image
}
Pixel methods

Enter the variable name followed by a period to see the list of available methods...
Green Photo!

```java
public class ImageDisplayer {
    public static void main(String[] args) {
        Picture pic = new Picture(FileChooser.pickAFile());
        // make green
        for (Pixel p : pic.getPixels()) {
            p.setGreen(250);
        }
        pic.show();
    }
}
```
See original photo too!
Use the Main class provided to you

```java
// Implement your transformation(s) here
pic = new MaxGreen().transform(pic);

// Display the picture in a picture explorer window
pic.explore();
```
Class Hierarchy
Activities

• Create classes for \texttt{MaxRed} and \texttt{MaxBlue}, display 4 variations of the same the image.

• Create a \texttt{GrayScale} class. For each pixel
  • Calculate an average of the red, green and blue values for that pixel
  • Set the red, green and blue values for that pixel to be the average

• Experiment with additional classes.