

# Kickstart 2012

## Day 1 Part 2

Picture Manipulation



# Pictures

- An encoding that represents an image
  - height and width
  - filename
  - Containing *window* if it's opened

```
>>> pic = makePicture(myFile)
```

```
>>> print pic
```

```
Picture, filename
```

```
  /Users/guzdial/mediasources/barbara.jpg height  
  294 width 222
```

# Pixels

- Pictures are a bunch of little dots = pixel
  - *color*
  - Location (graph like format)

## **Methods**

`getPixel(picture,x,y)` - retrieves a single pixel: more later

`getPixels(picture)` - gets *all* of them in a list

## **Example**

```
>>> pixels=getPixels(pic)
```

```
>>> print pixels[0]
```

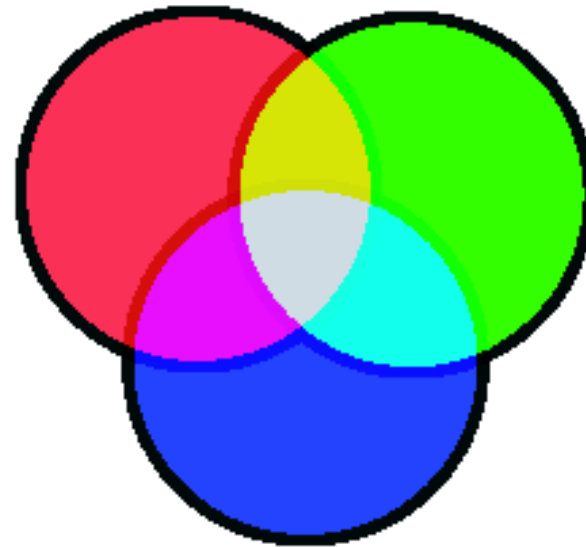
```
Pixel, color=color r=168 g=131 b=105
```


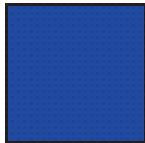
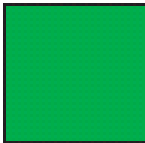
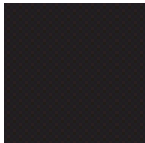
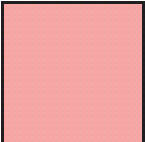
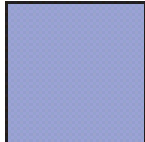
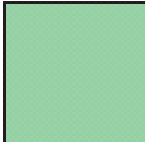
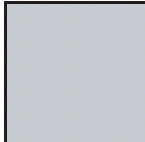
# Colors: RGB

- In RGB, each color has three component colors:

- Redness
- Greenness
- Blueness

- 0-255



	0	1	2	3
0	 255, 30, 30	 30, 30, 255	 30, 255, 30	 0, 0, 0
1	 255, 150, 150	 150, 150, 255	 150, 255, 150	 200, 200, 200

# Pixel Methods

## GETTERS

- **Pixels**

- `getRed(px)`    `getBlue(px)`    `getGreen(px)`

- **Colors**

- `getColor(px)`

## SETTERS

- **Pixels**

- `setRed(px, val)`    `setBlue(px, val)`    ...

- **Color**

- `setColor(px, col)`

# We can change pixels directly...

```
>>> pict=makePicture(file)
```

```
>>> pix = getPixel(pict, 10, 100)
```

```
>>> setColor(pix, yellow)
```

```
>>> repaint(pict)
```

**But that's *really* dull and boring to change each pixel at a time...  
Isn't there a better way?**



How to change the entire picture!

# decreaseRed()

`def decreaseRed(picture):`

**decreases the red in all the pixels of a picture**



# Decreasing the red in a picture

- **Recipe:** To decrease the red
- **Ingredients:** One picture, name it **pict**
- **Step 1:** Get all the pixels of **pict**. For each pixel **p** in the set of pixels...
- **Step 2:** Get the value of the red of pixel **p**, and set it to 50% of its original value



How to change the entire picture!

## For loops!

```
def decreaseRed(picture):
```

```
    for each pixel in the picture
```

```
        get the red value of that pixel
```

```
        set the red value of that pixel to half the original
```



# For loops

```
def decreaseRed(pict):  
    allPixels = getPixels(pict)
```

```
    for pix in allPixels:  
        value = getRed(pix)  
        setRed(pix, value * 0.5)
```

**The for loop**



**The body**



**- Note the indentation!**