#### Heatmaps

COMP 364 - Lecture 21 March 12th, 2012 Mathieu Perreault



#### A heatmap is one way to render a matrix.

#### Making a matrix

import numpy as np
A = np.zeros((5,5))

A 5x5 matrix full of zeros.

import numpy as np
A = np.random.random((10,10))

A 10x10 matrix full of random numbers.

## Our first heatmap

```
imshow(A) - shows matrix A.
Values in A must be between
0 and 1
```

import numpy as np
import matplotlib.pyplot as plt

```
A = np.random.random( (10,10) )
plt.gray()
plt.imshow(A,interpolation='nearest')
plt.show()
```



# print A[i,j] A[i,j] = 0.3 print A[i,j]

Exercise: create and plot a matrix that has the value 0.0 all the way down the diagonal.

### Exercise: read a microarray matrix and visualize it.

### Color in the computer

RGB Hex Triplet Color Chart E-mail-wareWhat a concept!												
	FFFF	FF	FFCCFF		FF99FF		FF66FF		FF33FF		FF00FF	
	FFFF	cc	FFCCCC		FF99CC		FF66CC		FF33CC		FF00CC	1
	FFFF	99	FFCC99		FF99999		FF6699		FF3399		FF0099	
EEEEEE	FFFF	66	FFCC66		FF9966		FF6666		FF3366		FF0066	00FF00
000000	FFFF	33	FFCC33		FF9933		FF6633		FF3333		FF0033	00EE00
222222	FFFF	00	FFCC00		FF9900		FF6600		FF3300		FF0000	000000
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666666	CCFF	88	000000		009900		003333		CC3300		000000	007700
555555	99FF	FF	99CCFF		99999FF		9966FF		9933FF		9900FF	006600
444444	99FF	cc	990000		9999900		996600		9933CC		9900CC	005500
333333	99FF	99	990099		9999999		996699		993399		990099	004400
222222	99FF	66	990066		999966		996666		993366		990066	003300
111111	99FF	33	99CC33		999933		996633		993333		990033	002200
000000	99FF	88	990000		999900		996608		993300		990000	001100
FF0000	66FF	FF	66CCFF		6699FF		6666FF		6633FF		6600FF	0000FF
EE0000	66FF	cc 🗌	660000		6699CC		6666600		6633CC		6600CC	0000EE
606000	66FF	99	660099		6699999		666699		663399		660099	000000
CC0000	66FF	66	660066		669966		6666666		663366		660066	0000CC
BB0000	66FF	33	66CC33		669933		666633		663333		660033	0000EB
AA0000	66FF	00	66000		669900		666680		663300		660000	0000AA
990000	33FF	FF	33CCFF		3399FF		3366FF		3333FF		3300FF	000099
880000	33FF	cc	330000		3399CC		3366CC		3333CC		3300CC	000888
770000	33FF	99	330099		339999		336699		333399		330099	000077
660000	33FF	66	330066		339966		336666		333366		330066	000066
550000	33FF	33	33CC33		339933		336633		333333		330033	000055
440000	33FF	88	330000		339900		336600		333300		330000	000044
330000	00FF	FF	ØØCCFF		0099FF		0066FF		0033FF		0000FF	000033
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110000	00FF	99	000099		0099999		006699		003399		000099	000011
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#### Red-Green-Blue

#### A color heatmap

# imshow(X) - if X is MxMx3, shows color (X[i,j,0],X[i,j,1],X[i,j,2]) at position X[i,j]

# Exercise: create a figure with a gradient from black to red.

# Exercise: create a figure with a gradient from red to black to green.

Exercise: read a microarray matrix and visualize it such that the largest negative is very red, 0 is black, and the largest positive value is very green.

#### Exceptions and Errors

fh = open('\$\*!JB;','r') → IOError

How can we catch the error and print something nicer?

```
try:
  fh = open(fname,'r')
except IOError as e:
  print 'Unable to open file %s: %s' %
  (fname,str(e))
```