Progressing with Matlab

Programming Lecture 2

Nicholas Dwork

Displaying Multiple Figures

figure **creates a new window to display an image.**

Ex:

```
figure;
imshow( img1, [] );
figure;
imshow( img2, [] );
```

Closing Figures

close **closes the window containing the figure.**

Ex:

```
h = figure;
close( h );
```

close all **closes all figure windows.**

BINARY

Computers only have two numbers available:
0 and 1

Numbers in a computer look like this:
0110100101101110
These are called binary numbers.

How are these numbers used? What do they mean?
Answer: It depends

Bits and Bytes

A single 0 or 1 is called a bit.

Eight 0s and 1s is called a byte.

ASCII

There are binary values that correspond to characters. Here are a few:

0	0011 0000	O	0100 1111	m	0110 1101
1	0011 0001	P	0101 0000	n	0110 1110
2	0011 0010	Q	0101 0001	o	0110 1111
3	0011 0011	R	0101 0010	p	0111 0000
4	0011 0100	S	0101 0011	q	0111 0001
5	0011 0101	T	0101 0100	r	0111 0010

In Matlab, x = 'm' **does the following:**

Creates a space in memory to hold a byte.

Assigns that space in memory 01101101.

Strings

Strings are arrays of ascii characters.

x = ‘abc’;

This line allocates some space in memory and sets it equal to
001111010011111000111111

Joining Strings

We can join strings together just like we can any other array

name = ‘Nick’;
status = ‘PhD Student’;

myString = [‘Hello ‘, name, ‘. You are a ‘, status];

BINARY

If we want to represent integers, they are represented in a binary format.

With binary, we count by 2s like we normally count by 10

Decimal	Binary
0	0
1	1
2	10
3	11
4	100
5	101
6	110

BINARY

Decimal	X	X	X	X	X
	100000	1000	100	10	1
Binary	**X**	**X**	**X**	**X**	**X**
	16	8	4	2	1

Floats and Doubles

Fractional numbers are represented in more complicated ways.

These numbers are called floats and doubles. Doubles use more bits than floats to represent the number. They have more precision available.

Images

Images are usually stored using 1 byte binary numbers.

Therefore, images usually have values between 0 and 255.

Displaying Images

Images are usually stored using 1 byte binary numbers.

Therefore, images usually have values between 0 and 255.

In Matlab, imshow(myImage) **maps 0 to black and 255 to white.**

Displaying Different Ranges

imshow(myImage, [min max]) **maps min to black and max to white.**

Ex: imshow(myImage, [0 1]);

imshow(myImage, []) **maps the image minimum to black and the image maximum to white.**