



## Course Details

- ❖ Office hours will be held in MGH 450
  - ≡ **Monday:**
    - 9:00 AM - 10:00 AM
    - 2:30 PM - 3:30 PM
  - ≡ **Tuesday:**
    - 11:00 - 12:00 PM
    - 3:30 PM - 4:30 PM
  - ≡ **Wednesday:**
    - 3:15 - 4:15 PM
  - ≡ **Thursday:**
    - 10:30 AM - 11:30 AM
- ❖ Software licensing (to use for Projects 2 and 3)
  - Visual Studio
  - Check out procedures

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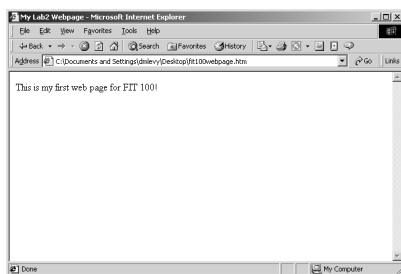
## Digital Representation

Or, where do the letters come from?

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## This week you'll create a Web page!



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## Technologies of writing and publishing

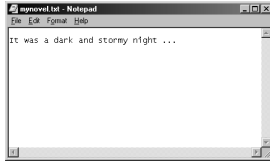


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## The computer as a writing tool

How does it work?

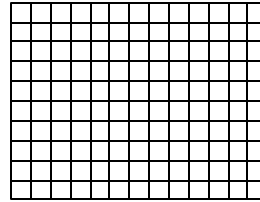


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## The display screen

The screen is a grid of rectangular regions, called pixels, each one of which can be made black or white (or a color)

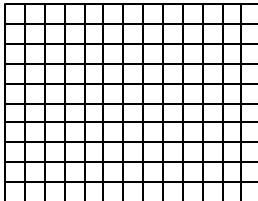


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## The display screen

Patterns of black and white (or colors) can be used to create meaningful marks, such as letters or other characters

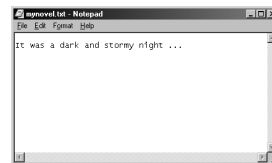


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## Saving the text

- ❖ But the marks on the computer screen are transient
- ❖ The letters and words need to be saved somewhere so they can be viewed, printed, or edited at a later time
- ❖ They are saved in computer memory in a file



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## Little, teeny letters?

But computer memory (e.g. your file) doesn't actually contain letters or characters

~~It was a dark and stormy night~~

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## Character codes

- ❖ Instead, what it contains are character codes
- ❖ The character codes represent the characters

65 A  
 66 B  
 67 C  
 97 a  
 98 b  
 99 c

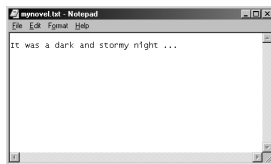


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## Character codes and characters

73 116 32 97 32 100 97 114 107 32 ...



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## ASCII character encoding

ASCII	0	1	2	3	4	5	6	7	8	9	:	<	=	>	?	
0000	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
0001	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
0010		*	#	\$	%	&	'	(	)	*	*	.	-	/		
0011	0	1	2	3	4	5	6	7	8	9	:	<	=	>	?	
0100	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0101	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
0110	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
0111	p	q	r	s	t	u	v	w	x	y	z	(	)	-	%	
1000	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1001	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1010	%		%	%	%	%	%	%	%	%	%	%	%	%	%	%
1011	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1100	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
1101	E	N	O	O	O	O	O	O	O	O	O	O	O	O	O	O
1110	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1111	8	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O

ASCII, pronounced AS-key, stands for American Standard Code for Information Interchange

A is represented as 0100 0001  
 B is represented as 0100 0010  
 C is represented as 0100 0011  
 ...

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## FIT 100 Bits and Bytes

- ❖ It's customary to name the two possible patterns of a bit 1 and 0, but we could use any names to represent the 2 distinct patterns

- ❖ Sequences of 8 bits create a byte
- ❖ Two pattern in sequences of 8 ...  
 $m = 2, n = 8, 2^8 = 256$  possibilities from 0000 0000 to 1111 1111
- ❖ The two pattern options (1 or 0) naturally fall to the term binary for this representation

### Names for Patterns

Present	Absent
On	Off
Yes	No
1	0
True	False
+	-
Black	White
For	Against
Yin	Yang

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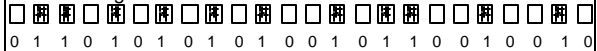
## FIT 100 Storing Text

- ❖ Information is often stored by charge or magnetic field



Schematic diagram of magnetic spots, like on a disk

- ❖ The presence or absence of the magnetic charge can be detected, which leads to a natural association with 1 and 0 to charged/neutral states



Byte 0

Byte 1

Byte 2

- ❖ Text is stored as a sequence of keyboard characters

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## FIT 100 Character codes

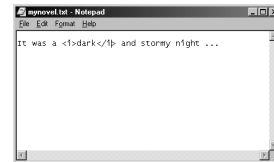
- ❖ The ASCII character codes represent
  - the identity of the characters, e.g. A vs. B
  - upper and lower case, e.g. A vs. a
- ❖ But they don't represent
  - the **size** of the characters
  - their detailed shape (font)
  - Whether they're **bold** or *italic*

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## FIT 100 Character codes

- ❖ To represent these additional properties, additional character codes can be added, sometimes called tags

73 116 32 97 32 100 97 114 107 32 ...



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## For Wednesday

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- ❖ Read Chapters 5 and 6 of the FIT course pack
- ❖ Remember: no labs Wednesday and Thursday
  - However, lab 4 will be posted for you to review
- ❖ Assignment 1 will be posted to the Labs/assignments page today
  - To be done by next Monday/Tuesday Lab
- ❖ Project 1 will be introduced on Wednesday