
Units of Memory

Section 1.3
pp. 8-14

2/6/07 CS120 The Information Era 1

Learning Objectives

- Units of Memory
- Converting between units
- Files

2/6/07 CS120 The Information Era 2

Units of Memory

- The smallest unit of data is the bit.
 - A bit is either a 1 or a 0
 - All data (and files) are a pattern of bits
- A byte is 8 bits
 - Each byte can represent a:
 - Letter (e.g. A is 01000001)
 - Number (e.g. 5 is 00000101)
 - Symbol (e.g. space is 00100000)

2/6/07 CS120 The Information Era 3

Units of Memory

- The set of upper and lowercase letters, numbers, and other symbols is called the ASCII character set.
- 7 bits are required to code all characters, digits, and punctuation marks
- 1 bit is used for error checking
- How many characters can be represented with 7 bits?

2/6/07

CS120 The Information Era

4

ASCII Characters

- Visible characters that you can type on a standard keyboard are referred to as ASCII characters
- ASCII contain 128 characters
- <http://www.asciitable.com/>
- Why does ASCII contain 128 characters?
- How are languages that have more than 128 characters, such as Japanese, represented?

2/6/07

CS120 The Information Era

5

Files

- A file is a collection of data that has a name
- Almost all the information stored on a computer is stored in files
- The online experience of what we see and hear is comprised of files
- The software that we use needs files to run
- Files have different file sizes
- The larger the file, the more time is needed to download the file to your computer
- How do you know the size of a file?
- What does the file extension do?

2/6/07

CS120 The Information Era

6

Questions

- List the name of two files on your computer other than any Microsoft product or Web browser.
- The software that we use needs files to run. What does this mean? Give an example.

2/6/07

CS120 The Information Era

7

More Files

- Besides the size, there are two types of files:
 - ASCII text files contain ASCII characters
 - Binary files contain characters that cannot be typed on the keyboard, i.e. they are generated by the software
 - A Microsoft Word .doc file is a binary file because it contains non-text data such as formatting data
- How would you create an ASCII text file?
- What happens if you open a Word doc in a text editor?

2/6/07

CS120 The Information Era

8

More Questions

- Using Word, create a file that contains the message "hi there". Save the file as a text file and as a binary file
 - What is the exact number of bytes in the text file?
 - What is the exact number of bytes in the binary file?

2/6/07

CS120 The Information Era

9

Units of Memory

- Bytes are grouped into larger units
 - Kilobytes (KB): 1024 bytes
 - Megabytes (MB): 1024 kilobytes
 - Gigabytes (GB): 1024 megabytes
- Sometimes you might hear that a KB is “about” 1000 bytes, a MB is “about” 1,000,000 (million) bytes, and a GB is about a 1,000,000,000 (billion) bytes
- In this course, use the exact definition of KB, MB, and GB

2/6/07

CS120 The Information Era

10

Questions

1. Three MB equals _____ KB
2. One GB equals _____ MB
3. One GB equals _____ KB
4. One GB equals _____ bytes

2/6/07

CS120 The Information Era

11

Units of Memory

One page of plain ASCII text (54 single-spaced lines, 10pt)	5KB
One color cartoon on a Web page	50KB
One high-resolution photograph	500KB
One floppy disk (high density—double sided)	1.44MB
Three minutes of music (compressed MP3 format)	3MB
One medium-sized Web site (text and graphics)	50MB
One Iomega Zip Disk	100MB
60 minutes of video (compressed MPEG-4 format)	390MB
One CD-ROM	640MB
A hard drive for a new PC (in the year 2002)	40GB
One DVD	4.7–17GB

2/6/07

CS120 The Information Era

12
