

Introduction

- CMSC 102 – Section 0101
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- Class Web site:
http://www.cs.umd.edu/class/fall2006/cmssc102_nelson/index.shtml
- Keep in mind there are two other sections taught by another coordinator
- Read the information provided on the class web page.
- Office hours will be posted next week
- Go over class Syllabus and grades.cs.umd.edu
- Check announcements link at least once a day

Projects

- “Paper” parts due in class at class time in a brown envelope.
- Electronic parts due as specified on project description.
- Effort for projects: between 4 and 20 hours
- Several projects have multiple parts with separate due dates.

Course Goals

- Understand history behind technology we use today.
- Envision future technology based on this history.
- Learning terminology and fundamental concepts of today's information technology.
- Learn the inner workings and risks of commonly used applications.
- Explore different operating systems (e.g., Windows, Mac OS X, etc.).
- Learn to use internet tools to gather ideas and facts.
- Organize and format information using software packages for the personal computer.
- Analyze the societal impact of today's technology-rich world.

Computer Systems Overview

- **Computer systems:** consist of two principal components:
 - Hardware** – the “physical” parts of the computer system. (Chips, boards, cables, USB ports, monitor, printers, and so on.)
 - Software** – a collection of programs. A **program** is a collection of instructions to be executed by the computer’s hardware.
- **Hardware Components:**
 - CPU** - Central Processing Unit "the brain"
Performs all the fundamental processing.
 - Main Memory** – (or Random Access Memory, RAM).
A sequence of cells, accessed by address.
 - Secondary Memory** - hard disks, floppy disks, CD/DVDs, flash memory, etc.
 - Input and Output Devices** (I/O) - mouse, monitor, keyboard, etc.

Computer Systems Overview

- **Main memory:**

- Fundamental data unit the bit
- **Bit** - Binary digit (0 or 1)
- **Byte** – Collection of bits. 8 bits forms one **byte**.
- **Word** – Collection of words. A **word** is typically 4 bytes, or 32 bits.
- **Cells** - Main memory is subdivided into units, called **cells**.
- **Address** - The location of a memory cell.
- With k bits you can store up to 2^k different values

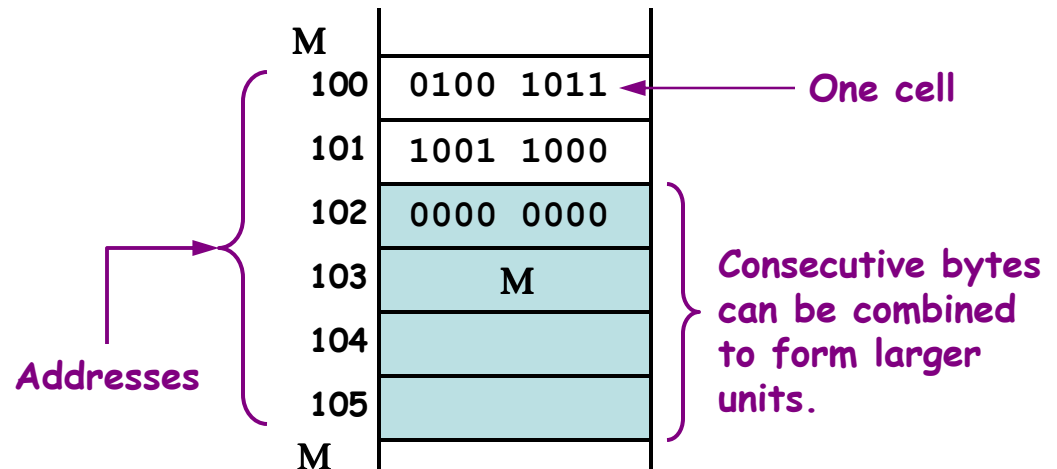
(byte) $2^8 = 256$

(word) $2^{32} \approx 4$ billion

Kilobyte $2^{10} = 1024$

Megabyte $2^{20} \approx 1$ million

Gigabyte $2^{30} \approx 1$ billion



Decimal System vs. Binary System

- Decimal representation of a value is based on powers of 10 and digits 0, 1, ..., 9
- For example, let's analyze 123
- Binary representation of a value is based on powers of 2 and digits 0 and 1
- For example, let's analyze 101
- Let's convert a decimal number to binary.
- You can perform all the mathematical operations you do in the decimal system in the binary system
- For example $5 + 2$ translates to:

101
+011

Software

- The following free software will be useful
- Firefox browser (<http://www.mozilla.com/firefox/>)
- Cutenpdf writer – Allows you to generate pdf files (<http://www.cutepdf.com/Products/CutePDF/writer.asp>)