

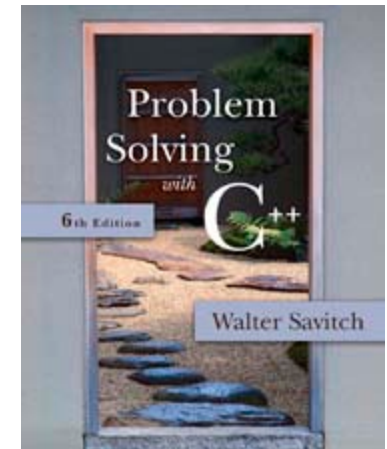
# APS105: Lecture 1

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Acknowledgement: These slides are a modified version of the text book slides as supplied by Addison Wesley





# Problem Solving

*with*

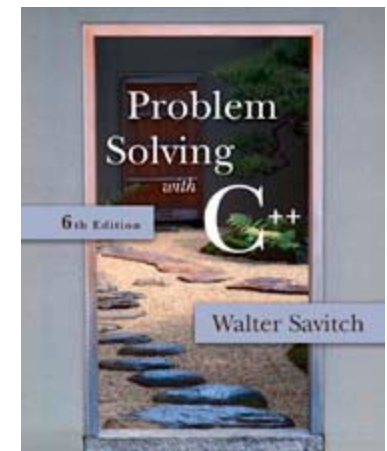
# C++

6<sup>th</sup> Edition

Walter Savitch

# Chapter 1

## Introduction to Computers and C++ Programming



# Computer Systems

- A computer program is...
  - A set of instructions for a computer to follow
- Computer software is ...
  - The collection of programs used by a computer
    - Includes:
      - Editors
      - Translators
      - System Managers

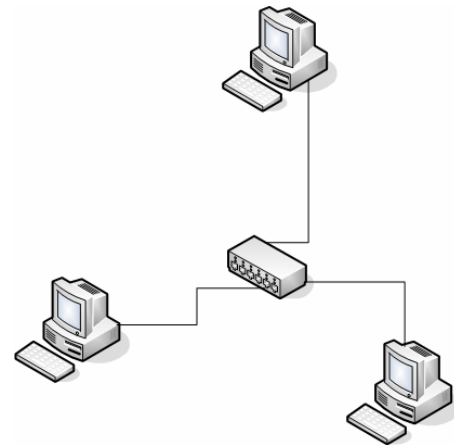
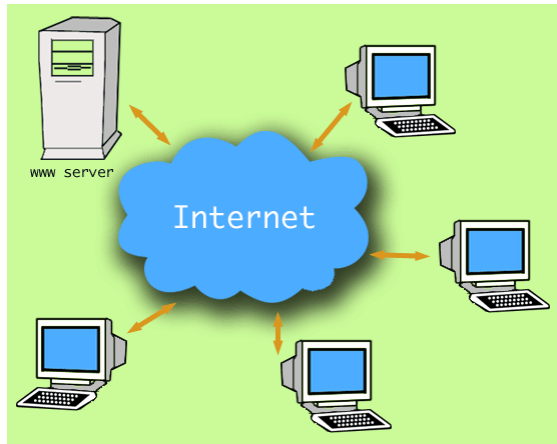
# Hardware

- Three main classes of computers
  - PCs (Personal Computer)
    - Relatively small used by one person at a time
  - Workstation
    - Larger and more powerful than a PC
  - Mainframe
    - Still larger
    - Requires support staff
    - Shared by multiple users



# Networks

- A number of computers connected to share resources
  - Share printers and other devices
  - Share information



# Computer Organization

- Five main components
  - Input devices
    - Allows communication to the computer
  - Output devices
    - Allows communication to the user
  - Processor (CPU)
  - Main memory
    - Memory locations containing the running program
  - Secondary memory
    - Permanent record of data often on a disk

**Display 1.1**

# Computer Memory

- Main Memory
  - Long list of memory locations
    - Each contains zeros and ones
    - Can change during program execution
  - Binary Digit or Bit
    - A digit that can only be zero or one
  - Byte
    - Each memory location has eight bits
  - Address
    - Number that identifies a memory location



# Larger Data Items

- Some data is too large for a single byte
  - Most integers and real numbers are too large
  - Address refers to the first byte
  - Next few consecutive bytes can store the additional bits for larger data

**Display 1.2**

# Data or Code?

- 'A' may look like 01000001
- 65 may look like 01000001
- An instruction may look like 01000001
  
- How does the computer know the meaning of 01000001?
  - Interpretation depends on the current instruction
  
- Programmers rarely need to be concerned with this problem.
  - Reason as if memory locations contain letters and numbers rather than zeroes and ones

# Secondary Memory

- Main memory stores instructions and data while a program is running.
- Secondary memory
  - Stores instructions and data between sessions
  - A file stores data or instructions in secondary memory

# Secondary Memory Media

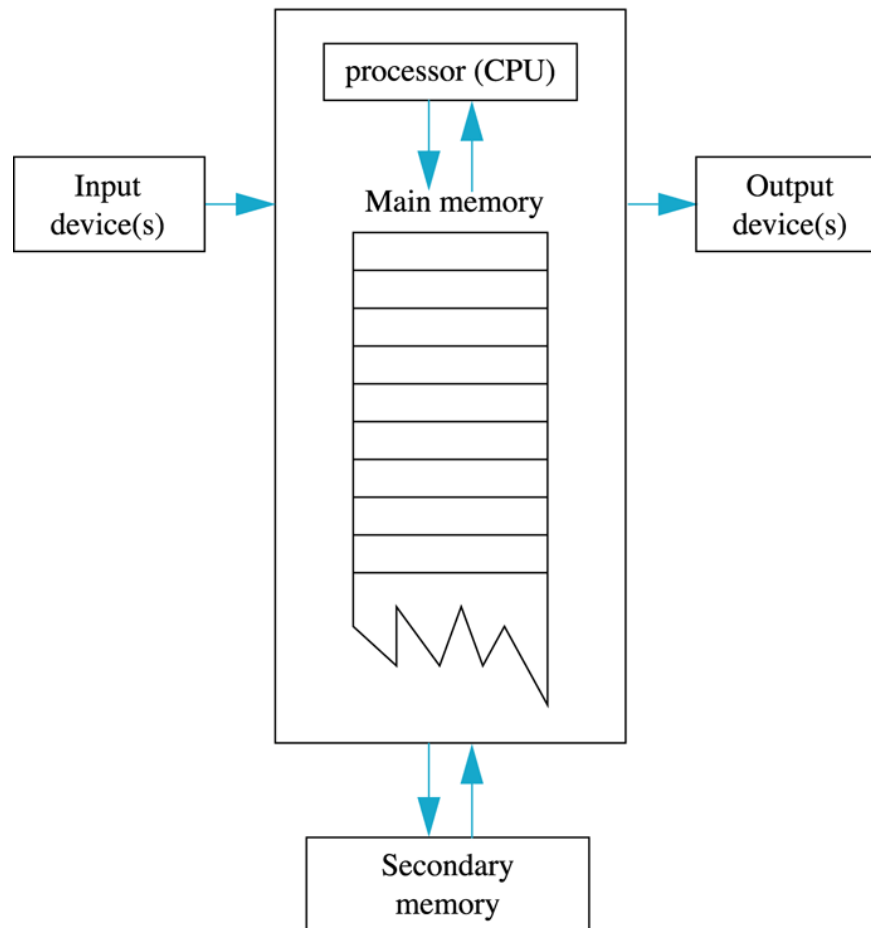
- A computer might have any of these types of secondary memory
  - Hard disk
    - Fast
    - Fixed in the computer and not normally removed
  - Floppy disk
    - Slow
    - Easily shared with other computers
  - Compact disk
    - Slower than hard disks
    - Easily shared with other computers
    - Can be read only or re-writable

# Display 1.1



## Main Components of a Computer

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# Display 1.2



## Memory Locations and Bytes

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