Week 2: System basics

Week 2: Introduction

In their simplest form, computers are very simplistic in their operation: all they do is process basic logic instructions. It performs these operations so quickly -- billions of times a second -- that enough operations to complete significant tasks can be done.

Binary representation

All information on a computer is stored in a binary format. This means that everything is written in a two-letter alphabet -- 0 and 1. One such piece of binary information is called a "binary digit", or *bit*.

Individual bits may be used on their own to denote a certain status level (e.g. true/false, on/off), or be combined to form a binary word. The most common of these is an 8-digit binary word called a *byte*.

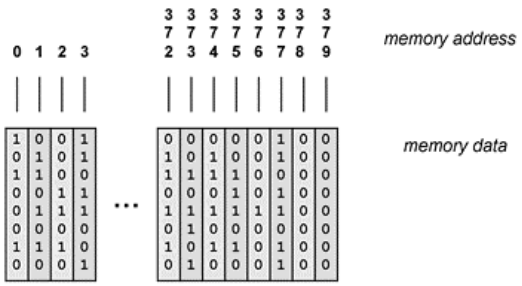
This is where all measures of computer storage come from. For example, "256 Megabytes of memory" is talking about enough memory to store approximately 256 million bytes.

These words can then be given definitions for certain operations. A byte has 256 different combinations -- much more flexible than only two! One such example is the **ASCII code (http://en.wikipedia.org/wiki/Ascii)** ; this is a coding scheme to represent letters, numbers, symbols, and basic control information (e.g. new line, tab, escape, etc.)

Bits can also be arranged into words for storing numbers, both *integer* (whole numbers) and *floating- point* (numbers with decimals). Many of these representations take up more than one byte; after all, we're often interested in numbers reaching higher than 256. Some encoding schemes for floating-point numbers can reach and exceed 64 bits (8 bytes) in size.

Memory

Memory is used by computers as a fast, non-permanent way of storing information. Typically, programs and data are loaded from another storage medium into memory, where operations are then executed.



>A memory address provides a
way to uniquely identify each
area of memory.

Memory is organised in a flat-file manner, with an address denoting a particular space in memory.