Computer Science Basics

Binary Number System

Converting **binary to denary** numbers. Example: Convert 01110101 to denary.

1. Write the place values above each bit (1 or 0).

Place value	128	64	32	16	8	4	2	1
	0	1	1	1	0	1	0	1

2. Add up the place values where there is a 1 below it.

64 + 32 + 16 + 4 + 1 = **<u>117</u>**

Logic Gates

Name	Graphic Symbol	Algebraic Function	Truth Table	
AND	A B	F = A + B or F = AB	A B F 0 0 0 0 1 0 1 0 0 1 1 1	
OR		F = A + B	A B F 0 0 0 0 1 1 1 0 1 1 1 1	
NOT	AF	$F = \overline{A}$ or F = A'	A F 0 1 1 0	

von Neumann Architecture

In 1945, John von Neumann proposed a design for computer systems which is still used in most computers today.

Computer programs (instructions) and data are stored in **memory**. Instructions are **fetched** in sequence by the **central processing unit** (CPU). They are then executed **one-at-a-time**. Instructions and data travel between components on wires called a **bus**.







Above: data and instructions move between computer components on buses.

Left: Instructions are fetched in sequence from memory (RAM). They are then carried out (executed) by the CPU. Data (your work) may be stored in RAM.