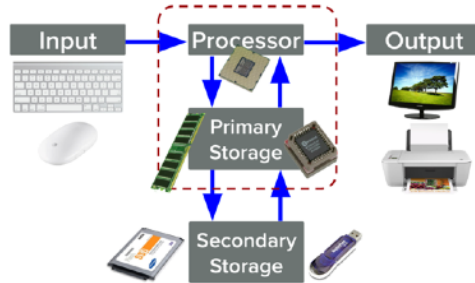


How Computers Work

A computer is an electronic device that can be programmed to complete specific tasks. Computers receive data, it is stored in primary memory where it can be accessed for processing, and it outputs new information.



Types of Data

Computers need to be able to receive, store, process and output different types of data:

	Input or Output	Numbers	Text	Images	Sound	Movement	Instructions
Keyboard	Input	✓	✓				✓
Mouse	Input					✓	✓
Microphone	Input				✓		
Scanner	Input	✓	✓	✓			
Touch Screen	Both					✓	✓
Monitor	Output	✓	✓	✓			
Speakers	Output				✓		
Printer	Output	✓	✓	✓			
Actuator	Output					✓	

Converting Binary numbers to Decimal

Convert Binary numbers (Base 2) to Decimal (Base 10) by adding the column values

128	64	32	16	8	4	2	1		Calculation		Decimal Value
0	0	0	0	1	0	0	1	=	8 + 1	=	9

Converting Binary numbers to Hexadecimal

Hexidecimal is used in computing as a way of displaying binary code in a way that is easier to read and spot mistakes. It also takes up less space on the screen than binary.

1 1 1 1 1 0 0 1

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

1 1 1 1 1 0 0 1

↓ ↓

15 9

↓ ↓

F 9

↓ ↓

F9

Split the binary sequence into nibbles

Convert each nibble into decimal

Convert decimal number into hexadecimal

Join the hexadecimal numerals together

1 1 1 1 1 0 0 1 = F9

Hexadecimal	Decimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	12
D	13
E	14
F	15

American Standard Code for Information Interchange

A method of encoding text as binary.

Each character (including spaces and punctuation) is given a number between 0 and 255, this is converted to binary. Each character takes up 8 bits (1 byte).

Character	ASCII Value		128	64	32	16	8	4	2	1
E	69	=	0	1	0	0	0	1	0	1
e	101	=	0	1	1	0	0	1	0	1

Key Word	Definition
Binary	A term meaning that there are 2 possible states (e.g. OFF or ON). Also refers to the Base 2 counting system. Counts using 2 numerals (0 to 1).
BIOS	Basic Input/Output System. The bootstrap system found on PCs, stored in non-volatile memory.
Bootstrap	Software that is stored permanently in the primary memory of an General Purpose Computer, and contains the start-up instructions.
Decimal	The Base 10 counting system. Counts using 10 numerals (0 to 9).
Embedded Computer	A computer that is built into a device and performs one or more specialised tasks, following the instructions stored in the firmware.
Firmware	Software that is stored permanently in the primary memory of an embedded computer and contains the instructions for how it operates.
General Purpose Computer	A computer that is used for many different applications. It can run many different pieces of software.
Hardware	The physical parts of the computer
Hexadecimal	The base 16 counting system. Counts using 16 numerals (0 to F).
Non-Volatile Memory	Does not need an electric current to keep the data stored in memory.
Peripherals	Hardware devices that are plugged in to a General Purpose Computer
Primary Storage	The internal storage of a computer where data is stored ready for processing. The processor has direct access to it.
Secondary Storage	Considered external storage, used for long-time storage so must be non-volatile.
Software	The programs that contain the instructions of the computer to follow
Volatile Memory	Data is stored on integrated circuits that need an electric current to maintain the data being stored. Data is lost/wiped when it is switched off.