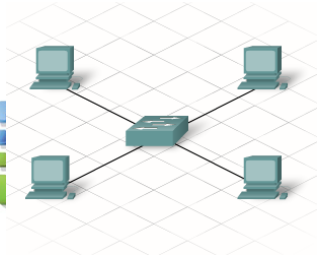
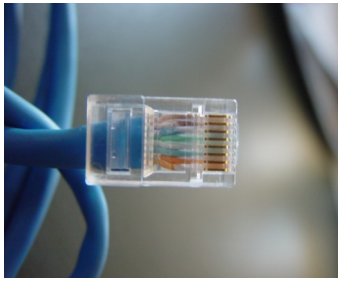
Name

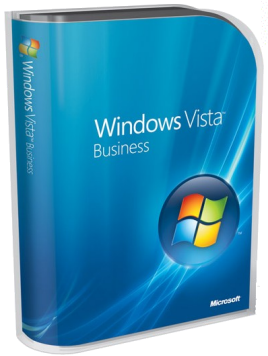
Hardware, Software & Networking



Microsoft Office

CISCO





Introduction

This unit is about how computers work and how they talk to each other. By the end of this module you will have a basic understanding of ;

- What's inside a computer, that is, the **HARDWARE** (the bits you can physically touch)
- How we tell a computer what to do using **SOFTWARE** (the instructions or programs)
- How the computers talk to each other using **NETWORKS**

Module Content

The work you do in this module will involve

- Looking at different circuit boards, types of memory and building a computer
- Changing the way programs run and carrying out maintenance tasks
- Looking at network cables, building a small network and sharing files with other people

By the end of this module you will be able to;

- Fix simple problems with your computer (or sort your parents laptop out!)
- Have a basic understanding of how PC's, laptops and mobile devices work
- Make a network at home to share files, applications (games!) and resources (e.g. Printers)

Peripheral Devices:

These are devices that are attached externally to the computer with a cable. Examples include mouse, keyboard, monitor and printer.
Each device needs a piece of software called a 'driver' for it to work.

Label the following parts;

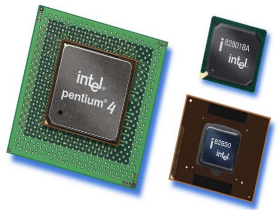
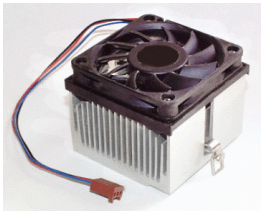
Homework 4; Networking		
1	Describe the follow terms; • Client • Server	
2	Why are computers networked?	
3	What equipment do you need to network two PC's together	
4	What is an IP address?	
5	How can you test the connection between two computers?	Method 1: Method 2:

Hardware

Why do we need to know about the bits inside a computer?
Well, a computer may break down or it may need upgrading to be able run the latest programs and if you're able to do that yourself .
Computers such as a PC, Laptop or mobile devices (PDA, mobile phone etc) will have the following physical components:

1. **Motherboard**; this is the main circuit board into which everything is connected by cables or plugged in directly.
2. **Processor**; this is the thinking bit which processes your information
3. **Heat sink & Fan**; both of these sit on top of the processor and are used to draw heat away from it. Without this the processor will overheat and stop working They can run as hot as 65°C.
4. **Memory**; is obviously where data is stored but there are two main types of memory, permanent (or Non-volatile) and temporary (volatile).
   - Volatile memory; data stored in volatile memory will only be there as long as the computer has power to it. Data is stored electronically and is 1000 times quicker to read than data in non-volatile memory
   - Non-volatile memory; data stored in non-volatile memory will be there for as long as you want it. Data can be stored magnetically (harddrive), optically (DVD or CD)
   a. Random access memory—RAM; (volatile electronic memory) this is what the programs are loaded into when they are first started and why you lose your work if software crashes before you save
   b. Hard-drive; (usually magnetic memory) stores all the programs and data permanently
   c. Optical drive; DVD and CD—permanent and portable storage
   d. Flash drive; (electronic but non-volatile) usually USB.
5. **Power supply**
6. **Expansion circuit boards** (called 'cards') that give the computer extra functions such as network card, graphics card (if, for example you play games you will most likely need one of these).
7. **Data cables**

Worksheet 1—Hardware

Picture	Name	Function
		
		
		
		
		
		

Homework 3; Software		
1	What does an operating system do?	
2	What does GUI & CLI stand for?	
3	Name one situation where you would have to maintain a computer.	
4	Name three programming languages	
5		

Homework 1: Hardware		
1	What kind of memory is used in a flash drive pen?	
2	How much data can the following hold; DVD, CD-ROM?	
3	Why is the operating system loaded into the RAM memory when we turn a computer on?	
4	What kind of memory is the following (volatile or non-volatile); USB pen drive, mp3 player, RAM memory in a smart phone.	
5	What is volatile memory?	

Homework 2		
1	What component is a heat sink and fan used on?	
2	A student owns a PC and has just installed Windows vista. She finds it now runs very slowly. What could be causing this problem and why?	
3	What precautions must you take when handling circuit boards?	
4	Which two devices must not be worked on or maintained?	
5		

Worksheet 2—Device recognition;
Write out descriptions for the following;

Picture	Device name; PDA, Games Station, etc	Description/uses
		E.g.: Mainly used for playing games, it has specialist connection ports for joysticks, and very powerful graphics cards to display high quality moving images
		
		
		

Tools:

To work on a laptop or PC you will need a few tools. The important thing to remember when working on a computer is;

1. Monitors and power supplies are non-serviceable so NEVER WORK ON THEM! It is dangerous to open them up – if they don't work, chuck them.
2. Electro-static wrist straps must be worn when handling circuit boards and processors as the static electricity sometimes present in your body will destroy them.

Worksheet 3, Using the picture of the open tool kit, complete the following table below;

Item	Name	Use
A		
B		
C		
D		
E		

Worksheet 8;

In this series of practical tasks you will learn how to set an IP address to join two PC's into a peer-to-peer network.

1. Load an image of Windows XP using virtual machine.
2. Using the method shown by your teacher enter the following details;
   a. An IP address in the range 192.168.32.1 to 192.168.32.254
   b. A default subnet mask of 255.255.255.0
3. Get the IP address of someone who you want to connect to
4. Click start/run and type CMD to open the Command line interface.
5. Type **ping 192.168.32.xx** (where xx is your friend's IP address).
6. Record the results below

_____

_____

_____

_____

7. Use net meeting or move a file between computers to test the connection.

CMD

This brings up a window that simulates a command line interface

Ping

This tool allows you to send a test packet of data to another machine. If a reply is sent back then the connection is working.

Networking

A network is formed when computers are joined together.
There are two types of network;

1. Client/Server; here one PC, the server, controls the network and provides services (such as logging on and file storage) to the other PC's (known as clients).
2. Peer to peer; here all machines are equal.

Worksheet 7;

Network type	Advantage	Disadvantage
Client		
Server		

Network Equipment;

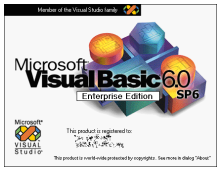
Item	Name	Purpose
	Network Interface Card (NIC or wireless NIC)	
 	Cable, fibre (left) and copper twisted pair	

Network addressing;

A network will only work if each computer has its own unique number. This number is called an IP address and acts like a postcode telling the other computers which address to deliver the right packets to.

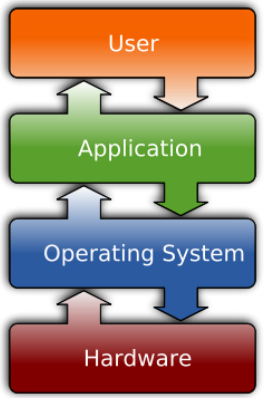
SOFTWARE

Software refers to the instructions or programs written to tell the computer what to do. They are usually very complex and contain thousands of lines of code written in special languages that have rules, verbs and structure (known as the syntax of the language—just as English has rules and 'syntax'). Examples of languages include Java, Hypertext Markup Language (html), C++ and Visual Basic.



If you want to have a go at writing your own programs, the ICT department run a programming club together with students from Leeds University. See staff for further details.

Broadly speaking, software falls into three categories;



1. **Operating systems (OS);** responsible for the management and coordination of activities and the sharing of the resources of the computer. It handles the operation of the hardware. Operating systems offer services to application programs and users e.g. Printing. Users may interact with the operating system with a:
   - Graphical user interface (GUI) - menus
   - Command line interface (CLI) - where you have to type commands.
2. **Applications;** are programs written to do a certain job e.g. Word processor, spreadsheet, game.
3. **Utilities;** are programs written to carry out maintenance on the computer such as; disk backup, firewall and virus protection.

Worksheet 4; Indicate the category of each piece of software with a tick.

Software name	Application	Operating System	Utility
Word	yes		
Windows 95			
Task manager			
Disk Clean up			
Linux			
Media Player			
Windows defender			
Apple OS			
Paint			
Windows Vista			

Worksheet 5;

Virtual machine allows a computer in school to operate as if it had a normal operating system installed and is NOT connected to the school network (RM). This means you can do anything to the computer such as add your own users, install a printer or join two computers together.

Complete the following tasks;

1. Run virtual machine with an image of '*Windows 95*' and '*Windows Vista*'
2. For each OS above, add a user.
3. Change the users' permissions from administrator to guest
4. How does the process of doing 2 & 3 above differ?

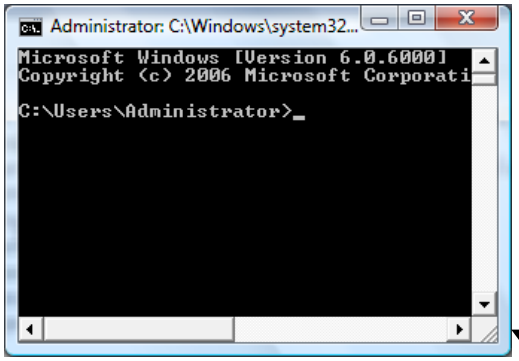
Windows _____

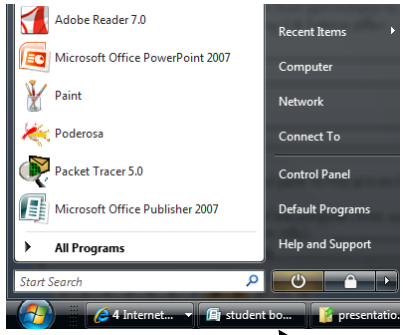
Vista _____

Windows _____

95 _____

5. In Windows Vista, use control panel to find answers to the following questions:
   a. The processor speed of the computer (hint; system info); _____
   b. RAM size (hint; system info); _____
6. Change the following in Vista
   a. Desktop picture (hint; 'appearance & personalisation')
   b. Screen resolution (hint; 'appearance & personalisation')
   c. Turn off the firewall (hint; security)
7. Describe the differences between Windows 95 and Vista below;





A

B

Worksheet 6; answer the following questions

1. Describe the type of OS shown in image A (CLI or GUI)

2. Describe the type of OS shown in image B (CLI or GUI)