

Section 1

System Technologies and Implications

Modules

- 1.1 Introduction to computers**
- 1.2 Software**
- 1.3 Hardware**
- 1.4 File management**
- 1.5 ICT in perspective**
- 1.6 Extended software concepts**
- 1.7 Extended hardware concepts**
- 1.8 The impact of ICT**



Introduction to computers

Computer Applications Technology (CAT) is a subject that focuses on learning how to use computers effectively. We all love to be 'hands-on' as soon as possible. However, it is important first to understand some of the jargon or terminology, and to have a very basic idea of what is happening behind the scenes. So this module will serve as a quick starter pack to teach you the very basics of computers.

What is a computer?

The picture below shows you the three types of computer that you are most likely to see in use around you in everyday life, namely *laptops*, *smartphones* and *tablets*.



Another common type of computer is the *desktop computer* that you usually find in offices, businesses, and school computer labs. These are bigger, clumsier devices.

All of these computers can do many different things (they are *multi-purpose*) and so they can be used as tools to help us complete a wide variety of tasks better and faster. They are also all *electronic* devices (they need electricity to work). The first three devices (laptop, smartphone and tablet) are made to be *portable* or *mobile* (i.e. you can carry them around). This means they have to run on batteries, which need to be recharged periodically.



Most desktop computers have several components that need to be connected to each other.

What is a computer?

- Hardware and software
- The information processing cycle

Introduction to Windows

- Start-up time
- The desktop
- Common features of programs

Saving our work

Introduction to the keyboard

- The keyboard (input)
- Keyboard skills



These are not the only types of computers you get, but rather the ones you are most likely to have used or seen.

Although there are different types of computers, they all need hardware and software to work.

Hardware and software

We refer to the physical parts of a computer that we can touch and see as *hardware*. Examples include the mouse, the monitor, the keyboard, a printer and the different parts found inside the computer box.

To get the computer to do something useful, we need to give it very specific instructions. These instructions are what we know as programs or *software*. Another word that has become common for a specific program is 'app' (short for application). 'App' was originally used to describe programs used on smartphones and tablets but is now used for almost any kind of program.

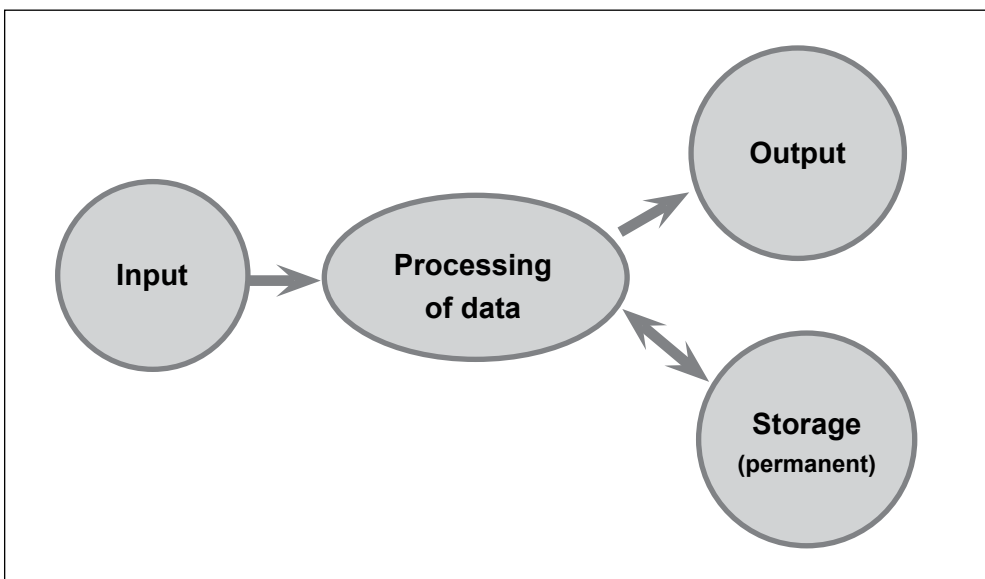
It is the ability of your computer to run different types of programs that makes it a multi-purpose tool. Using the same hardware you can load a game program (or a music player or a video player) and use your computer for entertainment – or you can load a word processor and type out a document – or you can load a graphics program and create a picture – and so on. There are many different types of programs, which allow you to perform completely different tasks using the same hardware.

The apps on your smartphone enable you to do much more with it than just make phone calls. This is why a smartphone can also be regarded as a 'computer'.

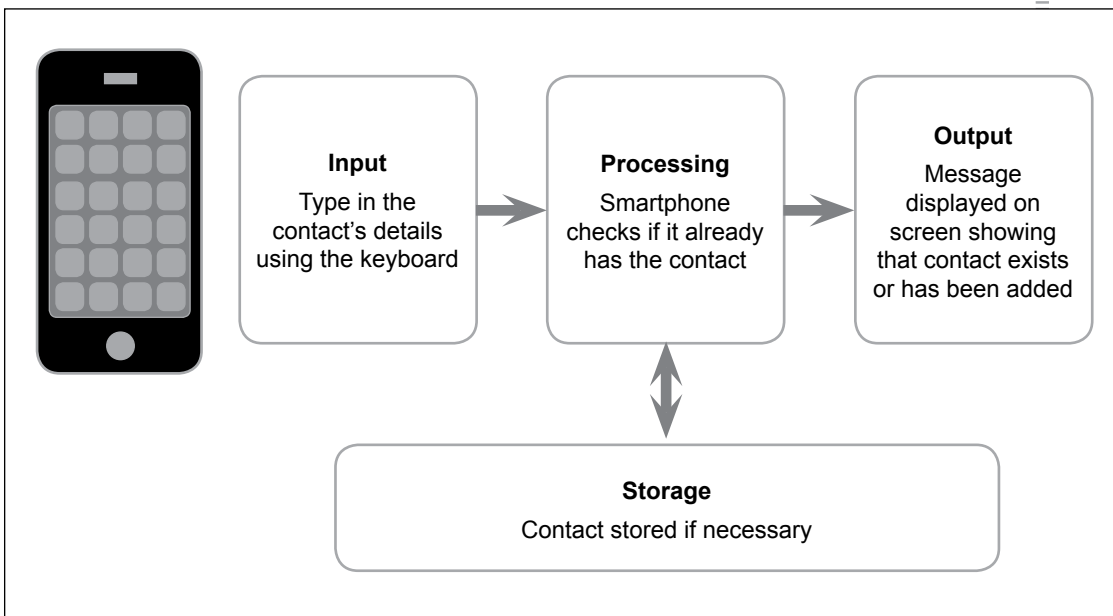
All computers are made up of hardware and software (programs). What is also important is that they all work in the same basic way – according to a cycle known as the information processing cycle.

The information processing cycle

Computers receive *input* – usually from the keyboard or the mouse, do something with it (*process* it), and then produce some form of *output* – usually on the screen or on a printer. Often the output needs to be *stored* for use later.



As an example of the information processing cycle, consider the process of adding a contact to your smartphone:



These days most computers are linked to other computers in some way, so that they can communicate with one another. *Communication* has therefore also become a very important element in this cycle.

When you send or receive an email or when you browse the web or download an app, your computer is communicating with other computers.

We use computers to process data into information.

- **Data** is unprocessed items. This can include text, numbers, images, audio and video.
- **Information** is the result of the processing of data and should be useful and meaningful.

A learner's learner number and test and exam marks is an example of *data* input. After the data has been processed, the result or output is a printed report (*information*) which indicates whether the learner fails or passes, and what the learner's average is. This information is more meaningful than the raw marks would be.

data

50 54 71 67 80 84 60 90 55 75 60 70 76 80 1102



information

Simunye Secondary School

Report Term 2

Grade 10

	Term 1	Term 2	Term 3	Year Mark
English Home Language	69	78		
Accounting	69	65		
Life Orientation	72	70		
Mathematics	64	65		
Physical Science	78	82		
Circle Average	69	69		
	42	52		
	65	69		

1 Activity

1. Write down the names of the four types of computers mentioned in this module.
2. Which one of these types of computers is not 'a single piece of equipment' (i.e. it is made up of separate parts connected to one other)?
3. Distinguish between hardware and software.
4. What makes a computer a multi-purpose tool, i.e. able to perform different tasks, such as playing a video or letting you type out a document?
5. Categorise each of the following items as either hardware or software:
 - a) Screen
 - b) Computer game
 - c) Microphone
 - d) WhatsApp
6. List the main steps in the information processing cycle or 'the way that a computer works'.
7. Indicate in each of the following cases whether the phrase or definition refers to input, output or storage:
 - a) Typing a WhatsApp message or an SMS.
 - b) A 'please call me' from a friend displayed on the smartphone's screen.
 - c) Music that you listen to on your headphones.
 - d) Photos on your phone.
 - e) Touching your phone's screen to start an app.
 - f) Printing a document.
 - g) The movie on a DVD.
8. Distinguish between data and information.



Distinguish means that you need to say how two items that have a lot in common, differ from each other.

Categorise means that you have to say in which group an item fits.

Introduction to Windows

The most important program on a computer is the one that controls all the activities in the computer. This is known as the operating system, and Windows is probably the most well-known operating system. In this section we are going to explore the Windows environment a bit.

Start-up time

The operating system automatically loads when the computer is switched on. We call this the *booting* process. Depending on how your computer is configured (set up), you may have to press <Ctrl><Alt><Delete> to log on. In addition, you may be asked to enter a username and password.

Logging on is the process of getting access to the programs and data on a computer, which are protected with a username and password.

This is necessary when many people use the same computer, and when a computer is linked to several other computers in a network (as you most likely have at school).

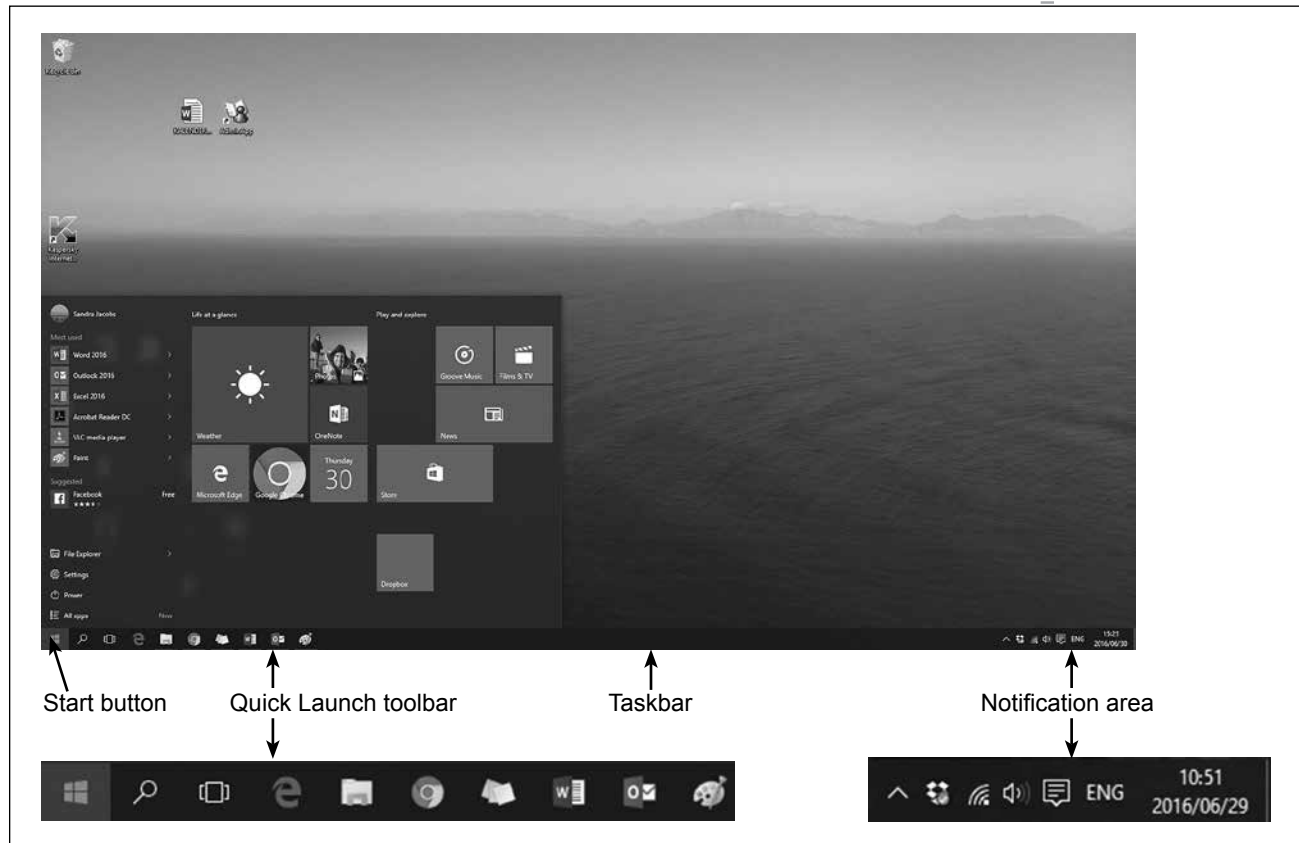
The use of a unique username and password is for security purposes – so that only YOU can access your files. Other users must not be able to view, tamper with or delete your files.



Windows is not the only operating system available. Your phone or tablet probably uses either Android or iOS, and desktops and laptops can also run Linux or MacOS instead of Windows

The desktop


When you switch on your computer, you will eventually see the desktop. This is the first basic 'screen' of the operating system. It will often vary in appearance, as each operating system looks slightly different, and the desktop can also be customised or changed by the user. The *tiles* (bigger rectangular blocks) and the smaller pictures or *icons* on the desktop itself, represent programs or 'places' on the computer.



All modern software makes use of a graphical user interface or GUI, (pronounced as 'gooey'). This allows users to interact with the computer (actually the operating system), and to make selections through the use of graphical elements such as icons and tiles.

A GUI is designed to be used with a keyboard and mouse (or a finger or hand in a touch screen environment). Here are some common mouse actions:

- | | |
|-----------------|--|
| Clicking | Resting the pointer on an object and then selecting the object by clicking the left button once. |
| Double-clicking | Quickly clicking the left button twice. |
| Right-clicking | Clicking the right mouse button instead of the left mouse button. |
| Dragging | Clicking on an object, holding down the left mouse button and moving the mouse. The object will move along with the pointer. |
| Scrolling | Most mouses have a wheel between the two buttons, which is used to scroll up and down in a document on the screen. |

 *Select* means to choose something to be able to work with it. Many people refer to this (incorrectly) as 'highlight'.

2 Activity: Exploring the desktop

- Switch on your computer and log on. Wait until the desktop appears.
- You will see *icons* (or, if you click on the Start button, *files*) that represent objects such as programs.
- Rearrange some of the icons on the desktop by dragging them.

- Rest the pointer on some of the icons. We call the description that appears when you rest or 'hover' your pointer on an object a *tooltip*. Read the description that appears for an icon such as the *Recycle Bin*.

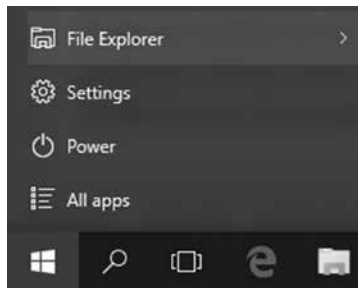


- Right-click on the *Recycle Bin*. A list of options will pop up. This is known as a *pop-up menu*. To remove this menu, click on an open part of the desktop.



- Some pictures or icons have a small curved arrow in the bottom left corner. These icons are known as *shortcuts*. See if you can identify a shortcut on your desktop. Shortcuts provide fast access to programs, files, printers, etc.

- Click on the *Start* button. Notice how some of the options have a small triangle next to them. This simply means that there are more options to be found on another menu.



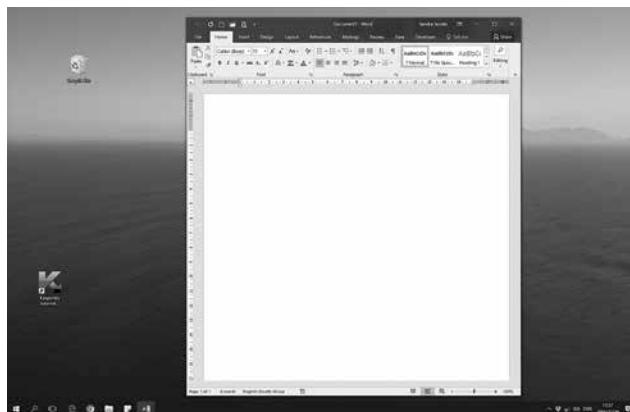
- An important option located on the Start menu is the option to *Shut down* the computer. (Do not select anything yet!)

It is important to use this option to switch off the computer. If you use the power button to switch off the computer, it could damage files that are still open, and the computer might not save changes to documents and settings in programs that are still running.

You can sometimes cancel an option or get back to where you were by pressing the Escape key (<Esc>).

Common features of programs

Programs written to run on a computer that has a Windows operating system are called Windows programs. When a new program is started, an area on the screen is used to display the feedback or output from the program. This area is known as a *window*.



Let's explore some features that are common to all applications.

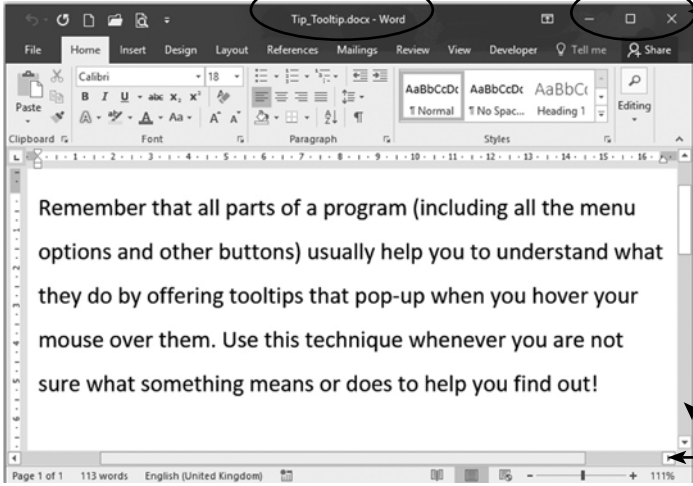
3 Activity

- To complete this activity you first need to watch the video *WindowsMod1_1Act3.mpg*. The video discusses the basics of the user interface in Windows, including:
 - Title bar
 - Active window
 - Taskbar
 - Resizing or moving a window
 - Window control icons at top right
- Open the Microsoft Word program.
- Also open *Paint*.
- Maximise both programs and see if you can switch between them, using the taskbar.
- Now resize the two windows (use 'Restore Down') and place them next to each other on the screen. (They should only touch – not overlap.)
- Try making the windows wider or narrower by dragging their borders and/or corners.
- Close the windows, using a different 'close' procedure for each one.

As we have already seen, Windows programs have similar features. The following typical components of a window are shown in the screenshot below:

Title bar – shows the name of the file and the program you are working in.

Ribbon – a combination of menus and toolbars.

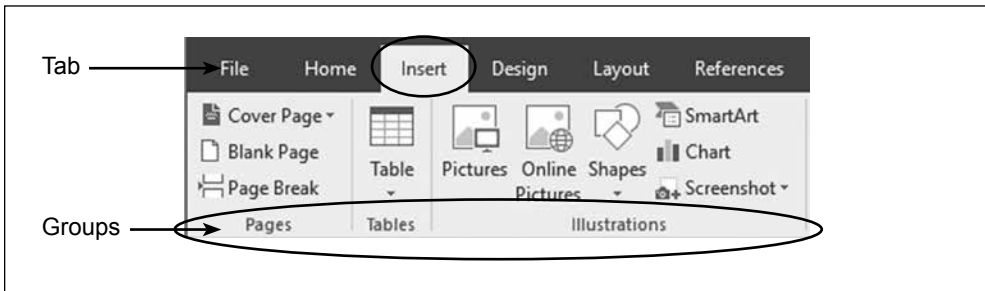


Minimise, Maximise and Close buttons – used to minimise, maximise and close windows. (Note that Maximise changes to Restore Down if the window is already maximised.)

Scrollbars – let you scroll up or down (or across) the window to see parts of the document that may not be visible due to the size of the window.

The screenshot shows a Microsoft Word window titled 'Tip_Tooltip.docx - Word'. The title bar contains the file name and three window control buttons (minimise, maximise, and close). Below the title bar is the ribbon, which is divided into tabs: File, Home, Insert, Design, Layout, References, Mailings, Review, View, Developer, Tell me, and Share. The Home tab is active, showing options for Clipboard, Font, Paragraph, and Styles. The main document area contains the text: 'Remember that all parts of a program (including all the menu options and other buttons) usually help you to understand what they do by offering tooltips that pop-up when you hover your mouse over them. Use this technique whenever you are not sure what something means or does to help you find out!'. At the bottom of the window is a status bar showing 'Page 1 of 1', '113 words', 'English (United Kingdom)', and a zoom level of '111%'.

In all the Microsoft Office applications the separate menus and toolbars have been combined into a new type of component – the Ribbon. The Ribbon has the commands organised in logical groups on different tabs (such as the Pages, Tables and Illustrations groups on the Insert tab of *Word*).



4 Activity

Match each of the terms in Column B with the description in Column A.

Column A: Description		Column B: Term
1	A mouse action that causes a pop-up menu to appear	A Start button
2	A tip or information that pops up when you rest the pointer on an icon or object	B Desktop
3	Using a mouse to move up or down in a document	C Drag and drop
4	A mouse operation to move objects	D Esc key
5	The most important program, that controls all activities in a computer	E Click
6	The first basic screen that appears when Windows is loaded	F Icons
7	The process of starting a computer and loading the operating system	G Restore Down
8	The small pictures on the desktop which represent programs or 'places' on the computer	H Right-click
9	The bar at the top of a program/window that displays the name of the file and the program you are working in	I Maximise
10	A combination of menus and toolbars into a new component used in Microsoft Office	J Booting
11	The horizontal bar at the bottom of the desktop, which holds minimised programs	K Minimise
12	Pictures or icons which have a small curved arrow in the bottom left corner	L Operating system
13	The key used to cancel an option or get back to where you were	M Ribbon
14	A rectangular area on the screen used to display the feedback or output of a program	N Scroll
15	An action which reduces a window to a button on the taskbar	O Delete key
16	An action which makes the size of a window as large as possible	P Shortcuts
		Q Taskbar
		R Title bar
		S Tooltip
		T Window
		U GUI

Saving our work

When you work on paper you have a permanent record of everything you do. In fact, should you decide that you no longer want the record of the work that you have done on the piece of paper, you have to purposefully destroy that record (e.g. throw away the paper on which it is written) in order to get rid of it. Computers work just the opposite way. Work currently being done on a computer is kept temporarily in *memory* – and it stays there (in memory) only as long as the program is open and the computer is switched on. To keep that work so that you can use it again later you have to *save* the work to *storage*. Everything that is saved on a computer (*Word* documents, drawings done in *Paint*, etc.) is saved in *files*. You organise files by grouping them into *folders*.

A file is a collection of data or information that is stored on a computer under a single name.

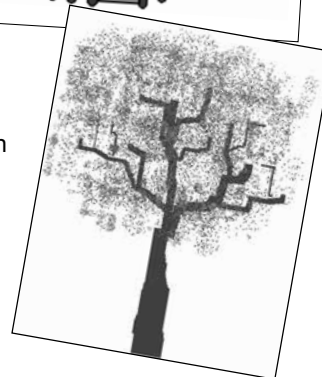
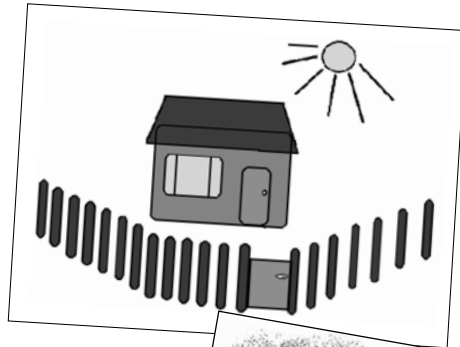
It is important that both files and folders should have meaningful names that describe what is kept in them. So when you get to save a file, you should never call it 'myfile' or 'file1' but rather something like 'CAT Mod1_1 Act5'. Yes it takes a little effort to name your files properly, but the big advantage is that you will always know what is in the file – especially when you look for it later.

You will learn more about files and folders in Module 1.4 on p. 40.

5 Activity

Sometimes you may wish to create a drawing to put in a document. We are going to use the basic drawing program *Paint* to have some fun – and to practise saving our work.

- Open the program Paint.
- What you have now is really a 'blank drawing'.
- Rest your cursor on each of the icons in turn, to see the tooltips describing their functions.
- Move your pointer to the bottom right corner of the white rectangle, and you will see that it changes to a two-headed arrow. (It is possible that your 'blank drawing' is initially a very small area.)
- Drag the pointer downwards to the right to make your drawing bigger.
- Now have some fun exploring and drawing – you will learn some cool things from one another!
- Do the following to save your drawing:
 - Click on *File* at the top left.
 - Select the *Save* option to save your work as a file. (Remember – everything we work on is saved in files.)
 - Type in a descriptive file name for your drawing and click on *Save*. (Your teacher may give you further instructions as to where specifically to save your file.)



- Now close the program (window).
- Try re-opening the file by reloading the *Paint* program and selecting the *Open* option on the *File* menu.
- Make some changes to the drawing, then save it under a different file name by selecting the *Save As* option on the *File* menu.

Introduction to the keyboard

At the moment the keyboard is still the most commonly used input device. It allows us to type information into the program that we are using.

The keyboard (input)

The type of keyboard that is most commonly used with desktops and laptops is known as a QWERTY keyboard because of the first six letters on the top row of alphabetic keys. On smartphones and tablets the keyboard is displayed by software on the screen – which allows you to change the keyboard to display letters alphabetically rather than in the QWERTY order.



More important than the name of the keyboard is the fact that most of your time spent working with a computer involves entering text. That means using a keyboard, and the better you are at doing this, the more efficient you will be as a computer user. That means you need some serious keyboard skills!

Keyboard skills

People who are really good with the keyboard can type without looking at the keys. They can type at speeds of over 120 words per minute – all without making mistakes! We say that such people can ‘touch type’.

Touch typing involves the use of all the fingers on both hands. You hold your hands over the keyboard and then only use specific fingers for specific letters. This is a practical skill – and the more you practise, the better you will become at it. Luckily you get Typing Tutor software that teaches you how to touch type and helps you practise.

Being a really competent computer user refers not to how fast you can type, but rather to your ability to use the mouse and keyboard expertly in conjunction with software.



Using the mouse to do things like saving a file or applying formatting to text (e.g. making it bold) can really slow you down. Learn keyboard shortcuts instead!



Test and improve

Summary – concepts, terms and tips

What is a computer?

- Electronic (because it needs electricity to work)
- Multi-purpose (can be programmed to perform different tasks)
- Some are mobile (laptops, tablets, smartphones)
- A smartphone is also a 'computer'
- Desktop computers have separate parts (components) that need to be connected to each other
- Two critical components: hardware and software
 - Hardware refers to the physical parts of a computer that we can touch and see – the mouse, the screen, the keyboard, a printer, etc.
 - Software refers to specific instructions or programs we need to give to the computer so that it will do something useful for us.
- Information processing cycle: Computers receive *input*, *process* it and then produce some form of *output*. Often the output needs to be *stored* for use at a later stage. *Communication* with other computers is also important.
- Data and information
 - Data is unprocessed items. This can include text, numbers, images, audio and video.
 - Information is the result of the processing of data and should be useful and meaningful.

Introduction to Windows

- Operating system – Most important program that controls all activities in a computer.
- Booting up – The process whereby a computer starts up and loads the operating system. This is initiated by the user.
- You may need a password/username to log onto Windows.
- The desktop is the first basic 'screen' of the operating system.
- GUI: Graphical User Interface designed to be used with a keyboard and mouse (or a finger or hand in a touch screen environment).
- Mouse actions
 - Left-click: generally used to select something
 - Right-click: generally brings up a pop-up menu with options related to the current activity
 - Double-click: generally used to open a file or folder, or to run a program
 - Drag: generally used to move or resize an object
- The taskbar, Start button, shortcuts, icons, Recycle Bin, Notification area and Quick Launch toolbar are all located on the desktop.
- <Esc> key can be used to cancel an option or get back to where you were.
- Use the Start menu to shut down the computer.

Saving your work

- File: A collection of data or information that is stored on a computer under a single name.
- Storage: Place on a computer where work is kept permanently.
- Memory: Place on a computer where work is kept temporarily, while we are still working with and before we save it to storage.

Introduction to the keyboard

- Most common input device, used to type in text or data
- QWERTY refers to a standard 'full' keyboard
- Touch typing – typing using all fingers on both hands, without looking down at the keyboard
- Practising with a Typing Tutor – important to improve keyboard skills

Written module activity

1. Give two differences between a laptop and a desktop computer, apart from their different sizes.
2. The hardware part of a computer – considered on its own – is not much more than a big doorstopper or paperweight. Explain then how a computer can be the incredibly useful multi-purpose tool that it actually is.
3. Where else can the computer 'send' the results of processing other than to 'output'?
4. Explain the difference between data and information by referring to a practical example (other than the one used in this module).
5. Why does a computer need an operating system?
6. Every time a friend tries to select something in Windows, a menu pops up instead. Explain to her what she is doing wrong, and what she should be doing instead.
7. The functions of some icons are easy to work out by looking at their pictures. Give a quick way to find out what an icon does if the picture itself does not give you a clue.
8. Where else can you look for a program on a computer if there is no shortcut for it on the desktop?
9. Where can one find a window that is currently minimised?