ICAU2231B:
Use Computer Operating System

Student Handbook
<table>
<thead>
<tr>
<th>Version</th>
<th>Date of Release</th>
<th>Authorisation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>15/05/09</td>
<td>S.Morris</td>
<td>Primary Release</td>
</tr>
</tbody>
</table>

**Forms Control:**

All documents related to the delivery or assessment of ICA20105: Cert II in Information Technology will have a version number displayed in the footer of the document. This Modification History page will appear after each title page of a handbook to ensure that the materials involved in the delivery and assessment of the certificate remain in a constant state of ongoing review and improvement.

Comments on changes will only show sufficient detail to enable a user to identify the nature and location of the change. Documents will be reviewed at least on an annual basis at the official internal review and fellow instructors and industry representatives will be consulted throughout the year in informal discussion.
UNIT CODE: ICAU2231B

UNIT TITLE: Use Computer Operating System

Description

This unit defines the competency required to apply skills and knowledge in using new or upgraded technology.

Elements of Competency

<table>
<thead>
<tr>
<th>ICAU2231B/01</th>
<th>Configure operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Configure operating system to suit the working environment, including but not limited to setting variables</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICAU2231B/02</th>
<th>Use Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Install, upgrade and uninstall application software to suit the working environment</td>
</tr>
<tr>
<td>2.2</td>
<td>Use both the graphical user interface and the command line interface to perform basic tasks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICAU2231B/03</th>
<th>Optimise operating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Use operating system and third-party utilities</td>
</tr>
<tr>
<td>3.2</td>
<td>Customise the graphical user interface</td>
</tr>
<tr>
<td>3.3</td>
<td>Use techniques unique to the command line interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICAU2231B/04</th>
<th>Support input and output devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Set up input and output devices and check functionality</td>
</tr>
<tr>
<td>4.2</td>
<td>Install drivers as appropriate and check functionality</td>
</tr>
</tbody>
</table>
Operating Systems

The operating system is the platform software that interfaces your hardware to the software applications you want to run. All individual pieces of the software that you use (Microsoft Word, Internet Explorer etc) cannot run unless they are able to sit and run as part of the operating system.

Operating systems can perform the following functions:

- Perform common hardware functions
- Provide a user interface (often known as the ‘desktop’)
- Provide hardware independence
- Manage system memory
- Manage processing
- Control access to system resources
- Manage files
- Accept keyboard input
- Store data on disks
- Send data to output devices
- Command-based interfaces

Operating System Types

There are many operating systems available to IT operators today. All have varying functionality, restrictions and limitations such as file sharing and client capacities. Some common operating systems can include:

**Windows 2000**

Unlike Windows 95 and Windows 98, Windows 2000 is a complete operating system giving users the ability to share files, folders, printers, and other network resources.

In Windows 2000, there are two general networking schemes available. Peer to Peer and Client Server (as discussed in Operate Computer Hardware booklet).

**Windows XP**

An upgrade from Windows 2000, Windows XP integrates all of the security and networking capabilities of Windows 2000 with some added more user friendly functionality. Aspects that were popular in Windows 98 etc such as ‘plug and play’ were improved and included.

Internet based securities such as firewalls etc were also added to keep up to date with the increased web capabilities and connections of many networks.

**Windows Vista**

Windows Vista replaces all earlier versions of Windows and like Windows XP etc, it the control centre of the PC. Windows Vista incorporates current processes such as internet securities, ‘plug and play’ and multimedia programs as well as many new functionalities.

**Novell**

Novell Inc. is responsible for the NetWare operating system. Novell Netware is a windows based operating system that incorporates most of the functionality of it’s Microsoft competitors – Windows.
UNIX

The UNIX computer operating system from Bell Labs is still regarded as one of the most powerful, versatile, and flexible operating systems in the computer world. Its popularity is due to many factors, including its ability to run a wide variety of machines.

This operating system controls all generated user commands in the one system. The UNIX operating system was designed to let a number of users access the computer at the same time and share its resources leading each user to believe he or she is the only person working on the computer.

MAC OS

The operating system for Apple Macintosh systems, MAC OS is a 'windows' type system (Apple actually invented Graphic User Interface software) similar to Microsoft windows products.

MAC OS systems however tend to require far less processing power to run making it a very popular choice in the graphics and video editing industries.

Activity 1

Copy the three Operating Systems PowerPoint presentations from shared to your drive, read and then answer the questions below.

1. Define ‘Operating System’
2. Give some examples of ‘Operating Systems’
3. What does ‘DOS’ stand for?
4. What computer situation was DOS devised for?
5. What are some advantages and disadvantages of DOS?
6. What does GUI stand for? What are the benefits of using GUI?
7. Compare Windows 98 with Windows NT
8. Describe the UNIX OS
9. What are the advantages of using the UNIX OS?
10. What types of files are used in the UNIX OS?
11. Compare UNIX OS to Windows NT
Configuration

Once an operating system has been loaded onto a machine, it will quite often need to be configured to meet the working environment and needs of the user. The configuration of an operating system involves the setup and optimisation of the following:

- Hardware and driver installation
- Security and user setup
- Network mapping
- Customisation of the Graphical User Interface (GUI)
- Downloading and installing software updates and patches
- Installation of virus software, firewalls etc
- Management of control panel variables

Hardware and Drivers

The first step in the configuration process is ensuring that the hardware components required by the PC are installed and that the operating system is able to communicate with them. As stated before, the role of the operating system is to provide a link between the hardware and software components and peripherals of the computer and the software that needs them for their use.

Most operating system and hardware manufacturers these days create their software to support a process called ‘plug and play’. Plug and play devices and operating systems allow the connection of hardware devices to the computer for immediate use. If the hardware being loaded does not need a driver, or windows has the driver already, then it will be loaded automatically and the hardware can be used immediately.

One of the advantages of plug and play is that most operating systems will (in conjunction with the BOIS state procedures) load the required drivers and hardware during the installation process, so it is normally only extra additions that need to be configured after the operating system install.

Input and Output Devices

For a personal computer to be operational to the user, it needs the installation of input and output devices.

Most of the computer’s input devices such as keyboard and mouse are loaded into the operating system as part of its own installation process. The mouse and keyboard can be configured within the control panel.

Output devices however, often need to be installed and configured individually. This process usually involves the physical installation of the device and the loading of it’s driver.

Drivers

A hardware driver is a small piece of software that allows the operating system to communicate with the hardware and then facilitate it’s communication with other software applications.

When new hardware is loaded onto the machine, the operating system will ask for the driver and load it as part of the overall installation process. Drivers are normally included on the installation CD-ROM included with the hardware or they can also be downloaded from the manufacturer’s website.
Installing Hardware

When sourcing and installing computer hardware in an IT environment, it is important that the hardware is going to be able to do what it is that you need it to do. Before any new hardware is installed, it is important to check the following:

| Check that the hardware does what you need it to do | Are there any specific or specialised needs for the hardware? For example, will it be required to run software with a high graphics component? Ensure that the hardware purchased is capable of running all current and future requirements. |
| Check compatibility with current hardware and software | Will the new hardware purchased work on the current network? Most hardware will come with a hardware compatibility list (HCL). Always double check the HCL to ensure that it will work on your system before you purchase. |
| Warranties | Are there any warranties on the hardware? Check the warranty conditions to ensure that you are not going to use the hardware in a manner that may breach them. |
| Company Policy | Check that any new hardware added to the network is compliant with company policies and procedures. |

Adding Hardware

If the piece of hardware being loaded is not plug and play or comes with a device driver to be loaded, it may be useful to load the hardware via the Add Hardware Wizard. The Add Hardware Wizard allows the user to add new hardware or troubleshoot any hardware-related problems.

To open the Add Hardware Wizard:
- Click Start, then select Control Panel
- Select Add Hardware
- Click Continue to allow hardware addition
- Follow the prompts as instructed by the wizard. Windows will search for and locate the new hardware and instruct the user through the loading of the drivers etc.

Checking New Hardware

Once the new hardware has been loaded, there are some important checks that should always be undertaken.

- Check and test all functionality of hardware to ensure that all is working as designed
- Check and test software components loaded (printer setup windows, video card optimisation etc) to ensure are working properly
- Ensure that there are no other software conflicts with the new software
Activity 2

1. Answer the following questions in a Word document:
   a) Configuring an operating system can involve what elements?
   b) Explain the term “Plug and Play”
   c) What is a “driver”?
   d) How does the installation of an input device vary from an output device (most of the time)?
   e) What are the four checks to make when installing hardware?
   f) What are the steps to add hardware?
   g) What do you do once hardware has been installed?

2. View the video on how to install a printer. Write a rough guide of the steps involved.
3. Install the printer driver provided by your teacher onto the laptop provided & check functionality.
4. View the video on how to uninstall software from shared. Once you know how, demonstrate uninstalling the printer from the laptop.

Graphical User Interface

Most operating systems accept and process user commands via the use of a Graphical User Interface (GUI). There is a major amount of customisation that can be undertaken with the GUI.

Some of the areas that can be customised are:

<table>
<thead>
<tr>
<th>Window Colour and Appearances</th>
<th>Change the colour and style of open windows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop Background</td>
<td>The desktop background option allows for changes to the background wallpaper (picture) of the desktop. Pictures can be selected from those supplied by the operating system or from other sources (company logos, product pictures etc.)</td>
</tr>
<tr>
<td>Screen Saver</td>
<td>If a PC is left on a single screen (logon screen for example) for a lengthy period of time, the display can actually burn onto the screen leaving a ‘ghost’ image regardless of the information being displayed. The setting up of a screen saver will alleviate this problem by running a small constantly moving pattern or picture on the screen after a certain pre-set period of time.</td>
</tr>
<tr>
<td>Sounds</td>
<td>Allows the user to change the sounds that they hear as functions such as opening windows and receiving emails are performed.</td>
</tr>
<tr>
<td>Mouse Pointers</td>
<td>Change the mouse pointer and it’s behaviours.</td>
</tr>
<tr>
<td>Theme</td>
<td>A desktop theme affects the entire look of the GUI. Background, window bars, colour schemes etc. are all changed to reflect the theme selected.</td>
</tr>
<tr>
<td>Display Settings</td>
<td>The settings option allows the user to fully customise the display that they see for most software programs they are using. Options included are the setting of the screen resolution and colour quality.</td>
</tr>
</tbody>
</table>
Activity 3

1. Go to Start → Control Panel. Access the Help and Support menu. Create a Word document, and using the Help menu, write instructions on how to access/change the GUI elements below:
   - Window Colour and Appearance
   - Desktop Background
   - Screen Saver
   - Sounds
   - Mouse Pointers
   - Themes
   - Display Settings

2. Once you are comfortable in making changes to the GUI, demonstrate at least three of the above to your teacher.
3. How do you create a shortcut to an application to be placed on the desktop? Research using the Help menu and demonstrate this to your teacher as well.

Software Updates and Patches

In many cases, software manufacturers will release patches and updates to their operating systems after they have been released. These updates can contain:

- Fixes to known ‘bugs’ in original software
- Improvements to software functionality
- Improvements to hardware functionality
- Increased security
- Updates and improvements to drivers
- New additions to software

Many IT departments run a routine search that locates appropriate patches and updates. In most cases, these patches and updates can be found on the Internet sites of the manufacturers. In Windows software, there are options available within the control panel that will automatically search for available updates.

Virus Protection, Spyware and Firewalls

If the operating system that has been loaded will be facilitating access to the internet via a web browser (ie Internet Explorer), it will be necessary to add some protection to your system. Any machine that is connected to the Internet, needs to have protection from viruses, spyware and intrusions loaded or risk software malfunction and/or security issues.

**Anti Virus Software**

A virus is a self-replicating program that spreads by inserting copies of itself into other executable code or documents. Virus software is designed to locate and remove viruses. Due to the fact that new and improved viruses are being constantly created, virus software needs to be updated regularly.
Spyware

Spyware is software that inserts itself into a computer operating system and spies on information being inputted into or stored in the system. As with virus software, Anti-spyware software tracks down and removes it from the system. It also needs to be constantly updated.

Firewalls

Firewalls will restrict access to your network via the internet. This will stop anybody logging into your network and stealing, viewing or corrupting data and information.

Activity 4

Access shared drive and copy & paste the video worksheet into your drive. View the video “Keeping It Secret: Privacy & Security in IT Networks” and fill in the answers.

Windows Variables

There are many other variables that can and should be configured on an operating system. Most of these are found within the Control Panel window and can include:

- System date and time setup
- Input/output device configuration
- Folder options
- Internet options
- Mouse configuration
- Maintenance task schedules
- System setup and many others.

The picture below is of a typical control panel. Each icon is a representation of a variable that can be updated or configured:

As it can be seen by the menu above, there are many variables available. It is important to note, however, that some of the variables changeable can severely affect the running and performance of the operating system. Always ensure that all configuration changes are within company policy.
Activity 5

1. Using the control panel, access and document the configuration changes that are available in the following areas: Mouse, Date & Time and Start Bar & Task Menu.
2. Are there any variables within these areas that could cause processing problems for the user or operating system?

Command Line Techniques

We have discussed making changes through the GUI, but there are some functions that can only be performed via the Command Line. These functions can be used for many reasons including some configuration and maintenance functions, device and function start-up/shutdown and boot file editing.

To start using the command line go to Start → All Programs → Accessories → Command Prompt.

Commands Available:

Below is a list of some of the commands available:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>chkdsk</td>
<td>Creates and displays a status report for a disk based on the file system</td>
</tr>
<tr>
<td>defrag</td>
<td>Locates and consolidates fragmented boot files, data files, and folders</td>
</tr>
<tr>
<td>driverquery</td>
<td>Queries for a list of drivers and driver properties</td>
</tr>
<tr>
<td>helpctr</td>
<td>Starts Help and Support Centre</td>
</tr>
<tr>
<td>openfiles</td>
<td>Queries, displays, or disconnects open files</td>
</tr>
<tr>
<td>prndrvr</td>
<td>Adds, deletes, and lists printer drivers from local or remote print servers</td>
</tr>
<tr>
<td>prnjobs</td>
<td>Pauses, resumes, cancels, and lists print jobs</td>
</tr>
<tr>
<td>prnqctl</td>
<td>Prints a test page, pauses or resumes a printer, and clears a printer queue</td>
</tr>
<tr>
<td>shutdown</td>
<td>Shuts down or restarts a local or remote computer</td>
</tr>
<tr>
<td>systeminfo</td>
<td>Queries the system for basic system configuration information</td>
</tr>
<tr>
<td>taskkill</td>
<td>Ends one or more tasks or procedures</td>
</tr>
<tr>
<td>tasklist</td>
<td>Displays a list of applications, services, and the Process ID (PID) currently running</td>
</tr>
</tbody>
</table>

Activity 6

Access the Command Line Prompt. Perform at least three of the commands above in front of your teacher.
Application Software

As stated before, a Windows operating system manages the computer hardware and allows it to communicate with the application software programs that require access (see diagram below). It is the application software that performs many of the functions that users require on a PC. The operating system’s job is to store, manage and allocate resources such as memory and hard drive space to the particular application software requirements.

Before any application software is loaded onto the operating system, the following steps should be undertaken:

| Check that the software can do what it needs to do | Is the software to be loaded able to do what is required of it? Ensure that the software application is the right one for the job. |
| Check that it is compatible with the computer hardware | Most software comes with a ‘minimum specifications’ suggestion. This is the minimum capabilities that the hardware must meet in order to successfully run it. |
| Ensure that it is licensed | Make sure that you have enough licenses for the software if it is to be loaded on more than one machine. |
| Check compatibility with other software | Will the new software purchased work on the current network? Check the minimum specs section again to ensure that the software is compatible with the operating system. Check the manufacturer’s website for more details on compatibility. |
| Research company software and security policies | Check with your company’s security policy to ensure that the new software is capable of meeting the outlined security requirements. |

Installing Application Software

Installing application software has become quite a simple task these days as most software manufacturers create their software with a built in setup wizard. Whilst it can be started a number of ways, the wizard is generally instigated by activating the setup.exe file found on the software installation disk (normally in the form of a CD-ROM).

Many software applications are loaded with an Autorun function. A little like the plug and play application of hardware devices, the software will start the installation process automatically by running the installation wizard.

Some software applications require the user to enter a product key. The product key helps to avoid software piracy. The key is a series of characters that can usually be found on the product packaging – nearly always on the CD-ROM cover.
Removing Application Software

When application software is loaded onto a machine, it installs files to a variety of places within the file structure of the operating system. When it comes time to remove the software, it is not simply a case of deleting the main program file or desktop shortcut.

As with the installation process, most software programs and operating systems include an uninstall wizard that will run through the removal of the application software. It is important that all software is uninstalled via the wizard for the following reasons:

- All files are removed
- Any files that are shared by other programs are not removed if still required
- Any other affected programs can be shutdown before removal
- Operating system can provide support if registry entries etc are changed

**Basic Instructions for Uninstall**

To uninstall application software:

- Go to Start → Control Panel
- Select Programs and Features
- Locate the program file to be removed
- Click on the Uninstall icon on the toolbar.

There will be times when the operating system is unable to remove some files or folders due to the fact that they may still be in use. Any files that can not be removed will be listed at the end of the uninstall process and will require manual removal. To remove these files:

- Record files/folders to be removed
- Shutdown and restart PC
- Locate files and/or folders and delete them from the system

**Activity 7**

1. Answer the following questions in a Word document:
   a) What are some steps/questions that need to be addressed before installing application software?
   b) Using the drawing toolbar, draw a diagram that represents how the operating system works with the hardware, application software and the user.
   c) What is the autorun feature?
   d) If the autorun feature doesn’t start, what file needs to be located to start the install wizard?
   e) What is a product key?
   f) Why is it important that all software is uninstalled by the wizard?

2. Demonstrate to your teacher how to install a sample application program.
3. Create a shortcut to the desktop for the program.
4. Re-view the video on shared on how to uninstall software. Use the wizard to uninstall the application. Make sure that the shortcut on the desktop is removed too.