

Windows Lab Manual

Common First Year - Operating Systems

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Student Name: _____

Lab Group: _____ Student Number: _____

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Foreword

- This is your ***Operating Systems Lab Manual*** for the ***Common First Year (CFY)*** module, ***Operating Systems***.
- It is based on the ***Windows 10 Operating System*** and we will complete this in the first term, which is approximately 12 weeks. There are 12 labs in total, revision labs will be made available also.
- You are required to complete this lab manual under the supervision of your lab tutor during the allocated lab hours by writing the answers in as you go, you learn by doing! We will have a total of 3 lab hours per week.
- Please bring this lab manual to all lab classes and do not lose this document as there are no re-prints or soft copies available. Be aware that your lab tutor will be regularly checking to make sure that you are completing it. In addition, your attendance will be recorded, and this will impact your overall module grade.
- In places you will be guided by your lab tutor but for the most part you are expected to work through this lab manual independently. You must first try to work out the task/problem and then solve it using the examples given or online resources, if this fails then please ask your lab tutor for assistance or guidance.
- As this is a collaborative class environment, we understand that it can be beneficial to work together or in groups to solve particular problems, but you are not to disturb the class group or other individual students while doing this so please keep the noise down. Additionally, the answers in this lab manual must be your own work, any form of copying or plagiarism is not permitted.
- You will have a Windows Lab exam worth 15% of your overall marks in the first week of December (tbc) and this lab manual is the basis for this practical lab exam. Therefore, ideally you need to be finished this lab manual before this lab exam.
- For this lab exam, you are permitted to bring your own, completed lab manual into the exam. You are not permitted to photocopy the lab manual or bring in someone else's lab manual, again it must be your own work.
- Next term (January 2020), we will focus on the Linux Operating System and you will have a similar lab manual given to you.

Windows Lab 1

Using the File Management System in Windows 10

Objective: To introduce the File Management System in Windows 10

At the end of this lab, you will be able to:

- Use the Windows Explorer file management system
- Access Windows drive by using a drive letter assigned to each storage device
- Manage Directories/Folders
- Discover file operations: operations which can be performed on files
- Discover file attributes: characteristics that describe a file
- Perform operations that can be carried out on folders/directories
- Route through the file system path
- Create desktop and keyboard shortcuts
- Examine other file managers that are available.

Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with Windows 10.

Use the Help option in Windows 10 and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

File System:

The file system is the most visible part of the OS.
Users use the file system to store (on disk) and access their files.
Windows Explorer is the file management system in Windows 7.

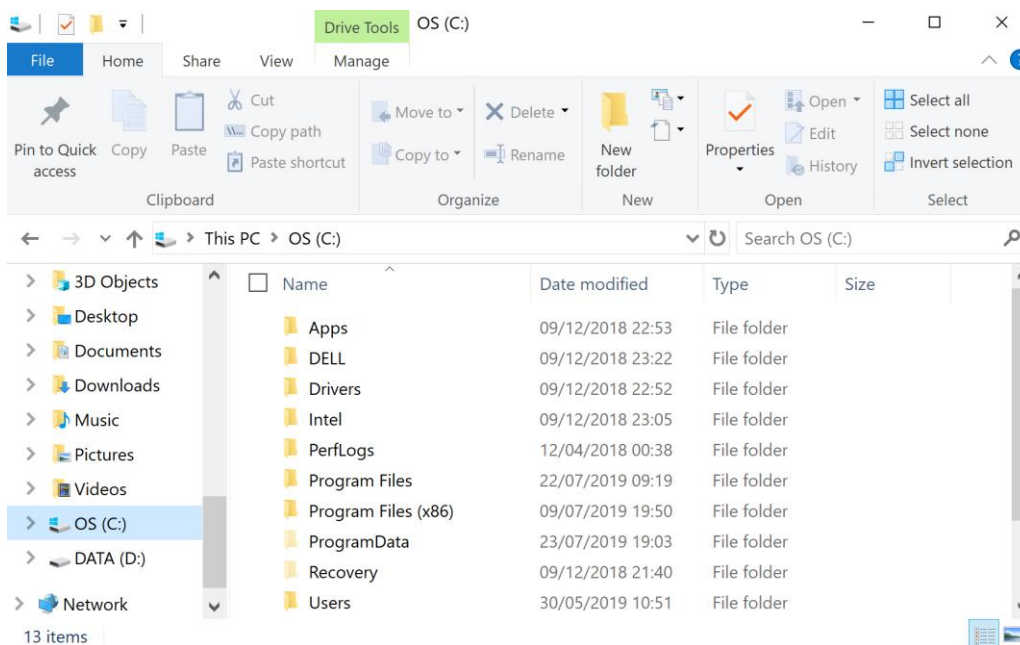
The file system comprises of two parts:

- A collection of files
- A directory/folder structure

In Windows, the file manager is called '**Windows Explorer**', or sometimes referred to as File Explorer. You can access it by clicking on this icon in your Start Menu tray.



A sample file system viewed through Windows Explorer can be seen on the next page.



Drives:

In Windows, the disk management function of the operating system assigns a letter (drive letter) for each storage device that the operating system can see. Looking at the local machine, find out the following:

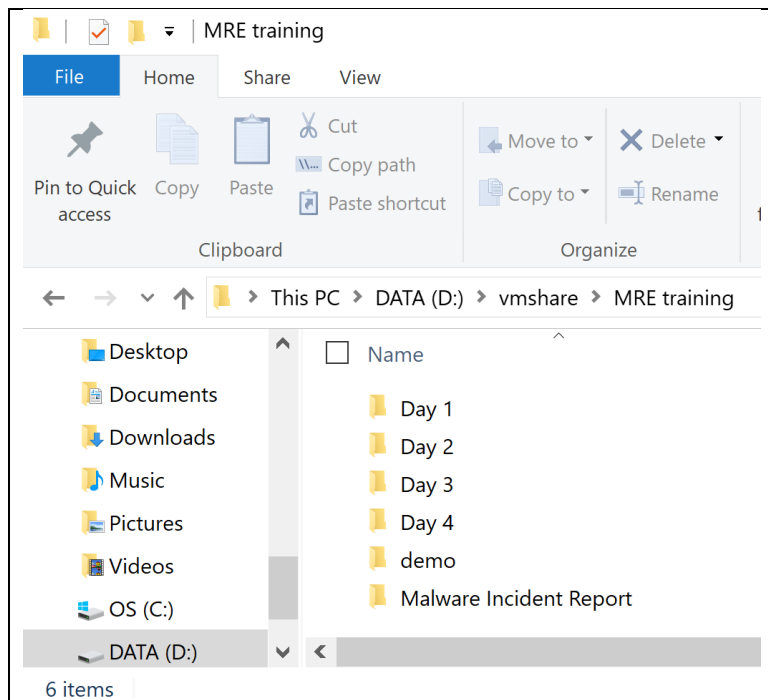

- What is the drive letter for the local disk (hard disk)? _____
- What is the drive letter(s) for the CD/DVD drive(s)? (is there one even present?) _____
- Plug in a USB Key, what is the drive letter for this? _____
- What is the drive letter for your network account in the college system? _____
- What is the drive letter for your exam account in the college system? _____
- Use the File Manager to navigate through the folders and files stored on the computer.

Directories/Folders:

Are used to organize files on the drives in a manageable way. Windows uses a hierarchical directory structure.

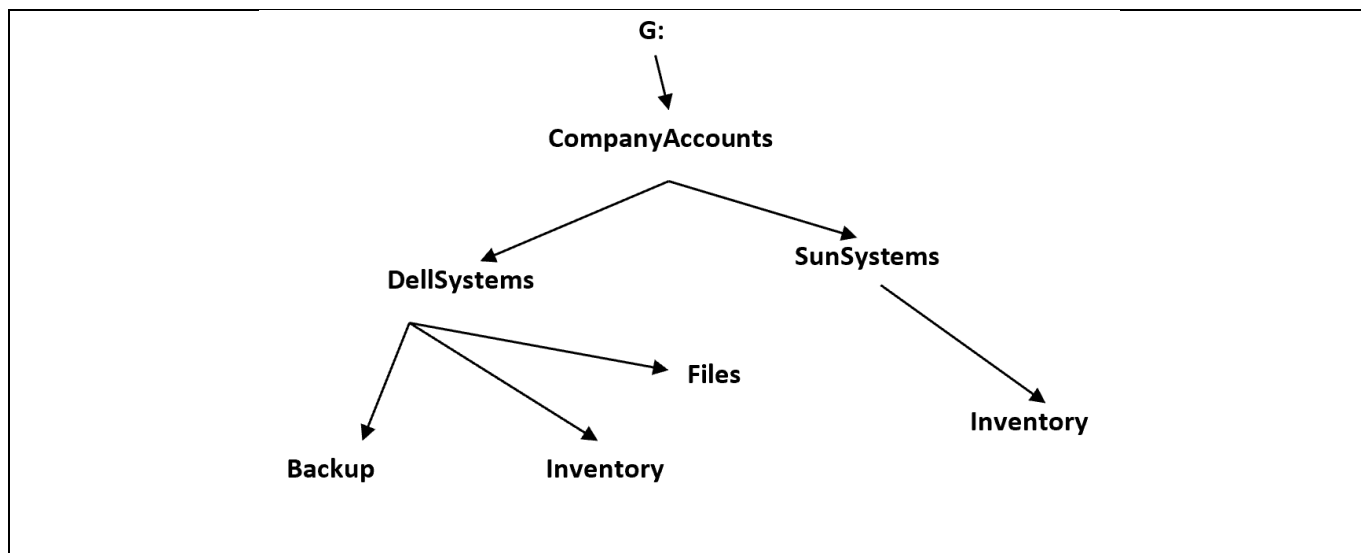
- In a few words explain what is a hierarchical directory structure (file system)? [\[Online Research\]](#)

Now, finish the diagram on the right which depicts the layout of the MRE Training directory structure:

 <p>The screenshot shows a Windows File Explorer window titled 'MRE training'. The address bar indicates the path: 'This PC > DATA (D:) > vmshare > MRE training'. The left sidebar shows the navigation pane with 'DATA (D:)' selected. The main pane displays a list of folders: Desktop, Documents, Downloads, Music, Pictures, Videos, OS (C:), DATA (D:), and 6 items. The '6 items' section lists: Day 1, Day 2, Day 3, Day 4, demo, and Malware Incident Report.</p>	<p>Hierarchical Structure</p> <p>D</p>  <p>The diagram shows the letter 'D' with a downward-pointing arrow below it, indicating the drive letter for the directory structure.</p>
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Task 1:

Create the following directory structure in the root directory of your G: drive (or use the C: drive)



File Operations: What you can do to a file, examples include Create a file, Open a file etc.

List 3 other operations which can be performed on files:

1) _____ 2) _____ 3) _____

File Attributes: Are properties which describe a file, examples include File name, File extension etc.

List 3 other attributed of files

1) _____ 2) _____ 3) _____

Directory/Folder Operations: What you can perform on a Directory, examples Open, Create etc.

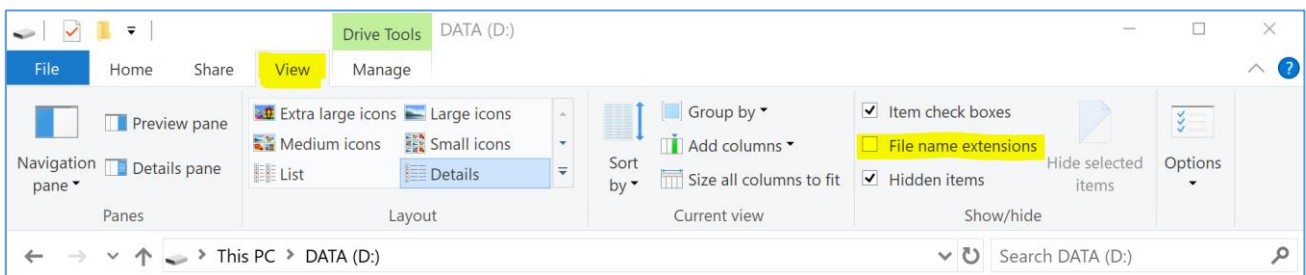
List 3 other operations which can be performed on folders:

1) _____ 2) _____ 3) _____

Task 2:

- Create a Word document called **InventoryDetails** and save it to the *Inventory* directory in the *DellSystems* folder.
- Create an Excel Document called **CostDetails** and save it to the same directory.
- What extensions do these two files have? _____

A file extension is an example of a file attribute/property. File extensions are **not** shown by default in Windows. To view the file extensions of files you must change one of the settings in View options. (Go to File -> View, in Windows Explorer)



File size is another attribute. What is the file size of each of the two files?

File 1: _____ File 2: _____

Task 3:

- Open the saved files and make changes to them.
- Take a copy of the files and copy them to the folder called *Backup*.
 - File copy is an example of a file operation.
- Rename the folder *Files* in the *DellSystems* folder to *AllFiles*.
 - This is an example of a directory operation.

Task 4:

- Delete the folder called *Backup*.
 - Can you delete it when it contains files? _____
- Move the folder called *AllFiles* to be a sub directory of *SunSystems*.
 - This is an example of another directory operation.

Task 5:

What is the recycle bin used for? [Online Research]

Paths

A Path is a route from one point in a directory structure to another point in a directory structure.

For example: using the diagram on Page 4, the **full or absolute path** to the file *InventoryDetails* is:

C:\CompanyAccounts\DellSystems\Inventory\InventoryDetails.docx

Task 6:

What is the full or absolute path of the folder *All Files*?

What is the full or absolute path of the file *CostDetails*?

What are the full or absolute paths to the **two** folders called *Inventory*?

Task 7:

View the contents on the G: drive, there are a number of views available for viewing the contents. List 4 of them here:

Which view are you looking at now? _____

Change to 'Tiles' view, now try 'Details', now change back to the original view.

Task 8:

Sort the contents of the G: drive in alphabetical order of name. [Hint: Use 'Views' tab]

Shortcut Types: There are two types of shortcuts

Desktop Shortcuts: Usually represented by an icon, is a small file that points to a program, folder, document, or Internet location. Clicking on a shortcut icon takes you directly to the object to which the shortcut points.

Keyboard Shortcuts: a set of one or more keys. That when triggered by the user will invoke some operation. i.e. What happens when CTRL+ALT+DEL are pressed together? _____

Task 9:

Create a shortcut to the *SunSystems* folder and place it on the desktop.

- What is a shortcut used for? _____
- How did you do this?

- Create a shortcut to the file *InventoryDetails* and place it on the desktop.

Task 10:

Create a keyboard shortcut to the file *InventoryDetails*.

- What is a keyboard shortcut? _____
- How did you do this?

Task 11:

- Checking properties of a drive.
 - What capacity has the C: drive on your machine? _____

How much space is used? _____

How much free space is there? _____

Now, repeat the same for your G: drive

Other File Manager Software:

The Windows Explorer File Manager comes automatically with Windows but it is not the only file management software that can be used with Windows. Google search the names of some others which might be useful.

1. _____
2. _____
3. _____

Task 12:

- Download another file manager software package called **FreeCommander** from the internet and get it working on the computer.

Is this a suitable file manager for Windows? _____

Is this software useful, more useful than Explorer?

Task 13:

- Remove all installed software by uninstalling it, record here how you did this:

End of Windows Lab 1

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Windows Lab 2

Files, File Searching and File Attributes

Objective: To use the file search function in Windows 10

At the end of this lab, you will be able to perform searches based on the following:

- File attributes
- File size
- File types
- Simple search
- File compression
- Advanced Search
- Wildcards

Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with Windows 10.

Use the Help option in Windows 10 and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

File Attributes

Attributes or properties of a file are used to describe a file and how it is intended to be used.

File size, File name, File extension, Date created, Date modified, File type (read-only, system, hidden etc), owner etc. are all examples.

These are set automatically when the file is created and some maybe changed by the user (filename) whilst others can't be changed (date created).

Task 1

Find out the file extensions for the following file types. (The first one is done).

File Type	Extension
Word Document	<i>.docx</i>
Text File	
Excel Document	
Microsoft PowerPoint presentation	
Java source file	
Internet webpage	

Task 2

Create a text file using notepad called **Cities.txt** with the names of the world's 5 largest cities.

- In Windows Explorer, select the Cities.txt and press enter.
 - Which application does the file open up in? _____
 - Why? _____
- In Explorer rename the file from Cities.txt to Cities.xlsx
- In Explorer, select Cities.xlsx and press enter.
 - Which application does the file open up in? _____
 - What seems to be the problem? _____

[Research] What do the following file attributes mean in Windows and write down a brief description for each.

- Read only: _____
- Hidden: _____
- Archive: _____
- Compress: _____

- How do you set the Read-only attribute?

- Can you delete a read-only file?

- How do you get into the option that turns on/off the display of hidden files?

- Can you delete a hidden file?

- If you copy a read-only file is the copy you make also read-only?

File Size:

One of the attributes (properties) of a file is the file size. All information on a computer is stored digitally as a binary number. An operating system abbreviates these measurements, eg 1 megabyte becomes 1MB (megabyte). Storage capacities and file sizes are measured (from lowest to highest) in:

- bits
- bytes
- kilobytes
- megabytes
- gigabytes
- terabytes

1 bit can be used to represent 2 pieces of data. (0 and 1)

2 bits can represent 4 pieces of data. (00, 01, 10, 11)

3 bits can represent 8 pieces of data. (, , , , , , ,) etc.... 2^3 = 2³ pieces of data.

- 8 bits can represent 2^8 pieces of data = _____
 - 8 bits is called **1 byte**.
- 1 byte could be equal to 1 character (digit, letter or symbol)
- 10 bytes approx. 1 word
- 100 bytes approx. 1 sentence

Task 3

Complete these:

2^{10} bytes = **1 kilobyte** = _____ bytes (it's not 1000, why?? _____)

2^{10} kilobytes = **1 megabyte** = _____ bytes

2^{10} megabytes = **1 gigabyte** = _____ bytes

2^{10} gigabytes = **1 terabyte** = _____ bytes

See the following articles for info on Bits and Bytes:

- <http://www.bettersolutionspc.com/bits-vs-bytes-whats-the-difference/>
- <http://www.athropolis.com/popup/c-comp2.htm#explanation>

bit	b	0 or 1
byte	B	8 bits
kilobit	kb	1000 bits
kilobyte (binary)	KB	1024 bytes
kilobyte (decimal)	KB	1000 bytes
Megabit	Mb	1000 kilobits
Megabyte (binary)	MB	1024 Kilobytes
Megabyte (decimal)	MB	1000 Kilobytes
Gigabit	Gb	1000 Megabits
Gigabyte (binary)	GB	1024 Megabytes

Searching

Basic Search

The search facility on Windows is used to locate files or folders anywhere on your system using their attributes. If you know the exact details of the filename/ folder name that you are looking for, the Search option will find its location for you. The advantage of the Search is that it will also search for files / folders whereby only **partial** details are known:

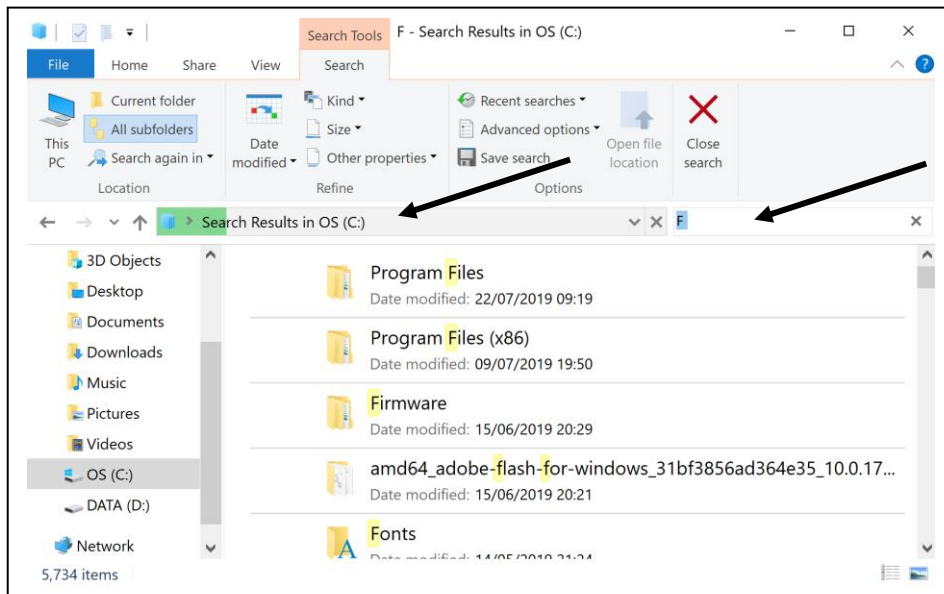
Examples:

- All files that start with the letter F.
- All Word document files.
- All files less than or equal to 10 KB in size.
- All text files that start with the word report.

Look at the Search facility in Windows via Windows Explorer – it helps you locate files/directories.

For any search you will need to identify what folder and drive you want to search in and also type the search criteria in the search box.

See the diagram below, there are two arrows. The first one is pointing to the directory or folder on the drive where it is going to search for the files. In this case it is going to search from the root of the C: drive. The second arrow is pointing to the search box. It is here that you write the criteria for the search. Find these yourself:



Task 4

Using the View icon on the toolbar and change the view to Details.

- Find the file named **calc.exe** on drive C
- You may find 4 of them located on the C drive. Choose one of them:
- In which folder is it located? _____
- Locate the file in the folder and check how large the file is in kilobytes? _____
- When was it created? _____
- When was it modified? _____
- Execute this application. What does it do? _____

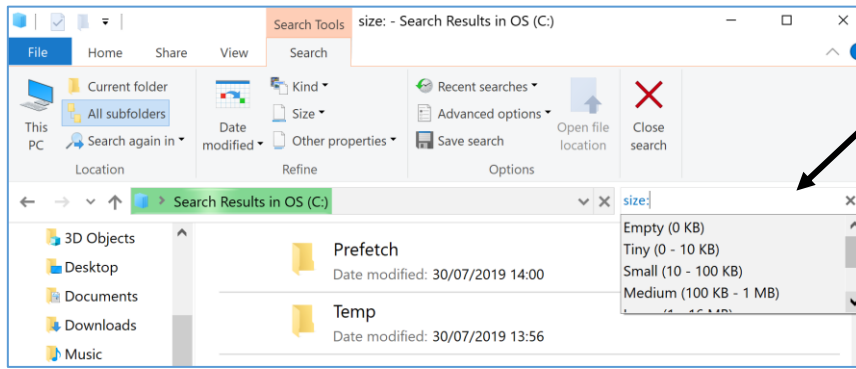
Task 5

Complete the following table.

3 Kilobytes	bytes		
2 Megabytes	bytes	KB	
3.5 Megabyte	bytes	KB	
4.7 Gigabyte	bytes	KB	MB
2.1 Terabyte	bytes	KB	MB

- Find files which are between 1 - 16 Megabytes on the C: drive.
 - What option did you choose and set in the search box? _____

You have used **size** as the attribute in the Search Filter.



Now sort the list of files displayed in size order (largest files first and smallest files last).

- Change directory to the Program Files\Java directory on the C: drive
- What is the **parent** directory of Java? _____
- Change to it's parent directory. How do you do this? _____

File Compression:

Sometimes it is necessary to reduce the size of a file in order to save space or transmission time. This is known as file compression. A compressed file can always be expanded back to its original size also. Windows has a compression facility but it is also possible to download some freeware compression software to do this.

Research the names of 4 compression programs.

- _____
- _____
- _____
- _____

What does compression do with to a file?

Are there any disadvantages to file compression that you can think of?

Create a document in Paint using black & white colours only. Save this file twice.

- Once as a bitmap and call it Plain.bmp and
- Second as a Monochrome bitmap file and call it Mono.bmp

Record the size of Plain.bmp _____

Record the size of Mono.bmp _____

7-Zip is an example of a compression program. It should be installed on your computer in the lab. It is a free compression program very like Winzip. Compress each of the files Plain.bmp and Mono.bmp individually using the 7-Zip program. How much compression can you achieve?

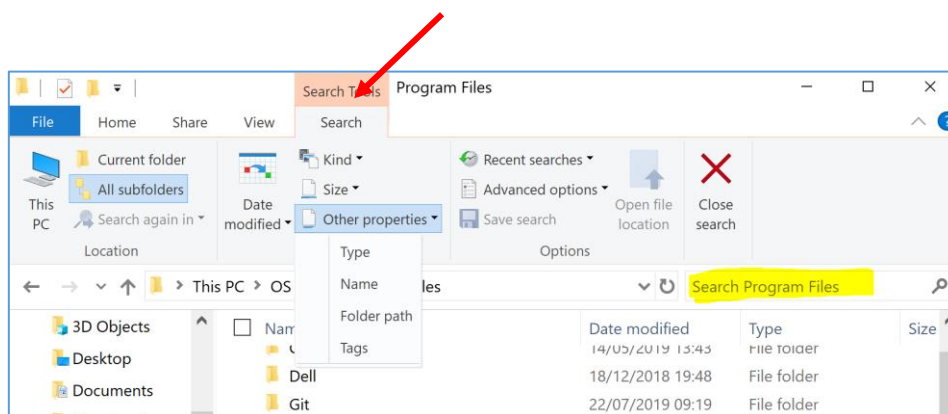
Compressed size of Plain.bmp using 7-Zip _____

Compressed size of Mono.bmp using 7-Zip _____

What different file formats can you compress to e.g. zip, rar? Which of these do you think is the most efficient? Do some tests! Compare compression of files using rar and zip.

RAR Files	Zip files (not WinZip or 7-Zip)

Advanced Search Options



Windows will usually search for whatever you type in the Search box by looking in the file name, file contents, and file properties of all the files in the current view. Type "Summer," for example, and it will find files named "sunset in summer.jpg," files tagged with "summer," and files written by anyone named Summer. This broad approach to search usually helps you find your file quickly.

If you want to search more selectively, however, you can filter your search in the Search box by specifying which file property/attribute to search. To filter by file property, separate the name of the property and the search term with a colon, as these examples show:

Examples	Use this to
Name:Sunset	Finds only files that have the word sunset in the file name.
Size:<10KB	Finds only files whose size is less than 10 KB.
Modified: 05/25/2006	Finds only files that have been modified on that date. You can also type Modified:2006 to find files changed at any time during that year.
Type:word	Finds only MsWord files.

Which file properties can you use in this way? Anything you see in a folder, you can filter by any property that appears in the file list headings.

Task 6

- Find all files which have the word **report** in the name of the file on the C drive.
 - What file attribute are you searching under? _____
 - What did you type into the search box? _____

- Find all files which are larger than 15 Megabytes on the C drive.
 - What file attribute are you searching under? _____
 - What did you type into the search box? _____

- Find all files which were created in September of this year. _____
- Find all Executable files (Applications) on the C: drive. _____

Adding operators

One way to refine a search is to use the operators AND, OR, and NOT. When you use these operators, **you need to type them in all capital letters.**

Operator	Example	Use this to
AND	tropical AND island	Find files that contain both of the words "tropical" and "island" (even if those words are in different places in the file). In the case of a simple text search, this gives the same results as typing "tropical island."
NOT	tropical NOT island	Find files that contain the word "tropical," but not "island."
OR	tropical OR island	Find files that contain either of the words "tropical" or "island."

Search for all files in the Windows directory on the C drive that have the word **report** and **system** in the filename.

- Write the path of the directory chosen for the search _____
- Write down your search string: _____

Search for all files in the Windows directory on the C drive that have the word **Font** but not **Windows** in the filename.

- Write down your search string: _____

Note: You can combine **different criteria** when carrying out a search. For example:

Search for all files in the Windows directory on the C drive whose size is **less than** 10KB and who do not have the word **Font** in the filename.

- Write down your search string: _____

How Windows treats the wildcards * and ? can be different to how you might expect it to behave in some cases. You need to examine carefully the results of the searches. Complete the following searches and examine the results.

More on Search:

Search option with wildcards. A wildcard is a character that is used in search to represent one or more other characters.

The two common wildcard characters are:

- * : used to represent zero or more characters
- ? : used to represent exactly 1 character.

So search using **three*mice**

could represent threemice, three blind mice, three hundred and one mice, three 747 mice etc..

Search using **three?mice**

Could represent three5mice, threeXmice, threeomice etc...

Task 7

Create the following 6 files and save them into a folder called **Reports** on the C drive: **Monday.docx, Tuesday temp.docx, tap.txt, Thursday.txt, Fri temp.docx, ton.txt**

- Search for all files that start with the letter **t** in the folder Reports
 - Write the path of the directory chosen for the search: _____
 - Write down your search string: _____

Note: It will return any file which has a word in the filename beginning with the letter t or it's file extension begins with the letter t.

- How many files are found as a result? _____
- Search for all Microsoft Word files in the folder Reports. Write down your search string.

- How many files are found as a result? _____

Search for all files which have the word **day** as the last part of the file name and are Microsoft Word files in the folder Reports. For example files with names such as Monday.docx or Tuesday.docx

- Write down your search string: _____
- How many files are found as a result? _____

Search for all files on the **C drive** that start with the letter t and the last letter is p and have three characters in the filename.

- Write down your search string: _____
- How many files are found as a result? _____

Examine the results of this search..They are not correct!!

End of Windows Lab 2

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Windows Lab 3

Introduction to MS-DOS

Objective: Using the command line interface of an Operating System

At the end of this lab, you will be able to:

- Access a command line interface (CLI)
- Use the Help facility in MS-DOS
- Display the list of files/folders in a directory using DIR command
- Create a new folder using MD command
- Use the CD command and its various switches
- Use the RD command to remove folders

Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with the DOS Prompt.

Use the Help option in MS-DOS and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Introduction

MS-DOS is a "Disk Operating System". That means it is simply "a System for Operating the Disks". It enables the user to organise data files, load and execute (run) programs and control the input and output devices attached to the computer. MS-DOS is a 16 bit, single-user operating system that does not support multi-tasking.

When compared to graphical interfaces such as Windows, it's also not particularly user-friendly and has faded in significance. What MS-DOS is good for is to introduce you to operating a PC/Computer or Server at a Command Line. Windows 10 includes a DOS-like command line interface which we will use. While DOS is increasingly not being used in the running of 32-bit and 64-bit applications, it is still important to know DOS commands.

You can read more about DOS at the following website addresses:

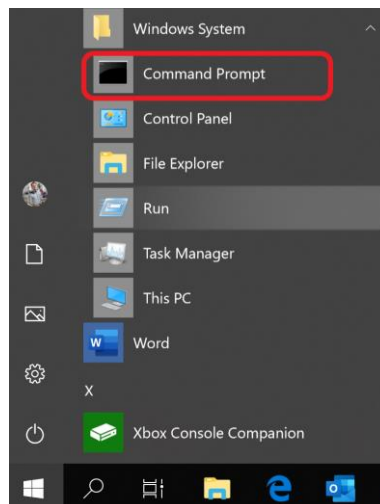
- <https://www.c3scripts.com/tutorials/msdos/>
- <https://youtu.be/kl9u8owo0oM>

You can start command prompt a few different ways:

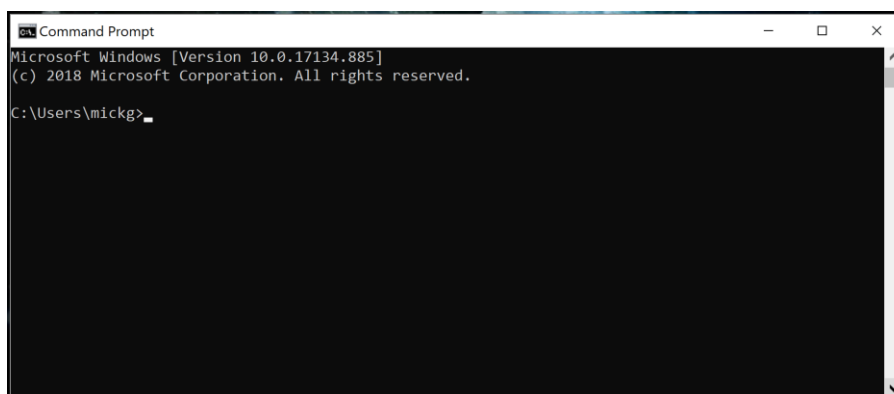
1. Click on the Search Icon in the tray and type in **Command** and enter (below)



2. Go to Start -> Windows System -> Command Prompt (below)



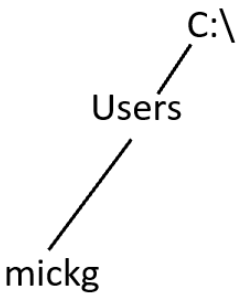
You should now see an image similar to that below



Task 1: What is your *current working directory*? _____

- In the image on the previous page, the answer is **C:\Users\mickg>**
- Your current location is the **path** before the > symbol.

In the box provided below, draw a diagram representing the hierarchial path to your location.

<p><u>Example:</u></p>  <pre> graph BT C[C:\] --- Users Users --- mickg </pre>	<p><u>Your hierarchical path:</u></p>
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Task 2: Type in “help” at the command prompt. This provides a list of the available commands.

Task 3: Check out the following commands and write down what they do.

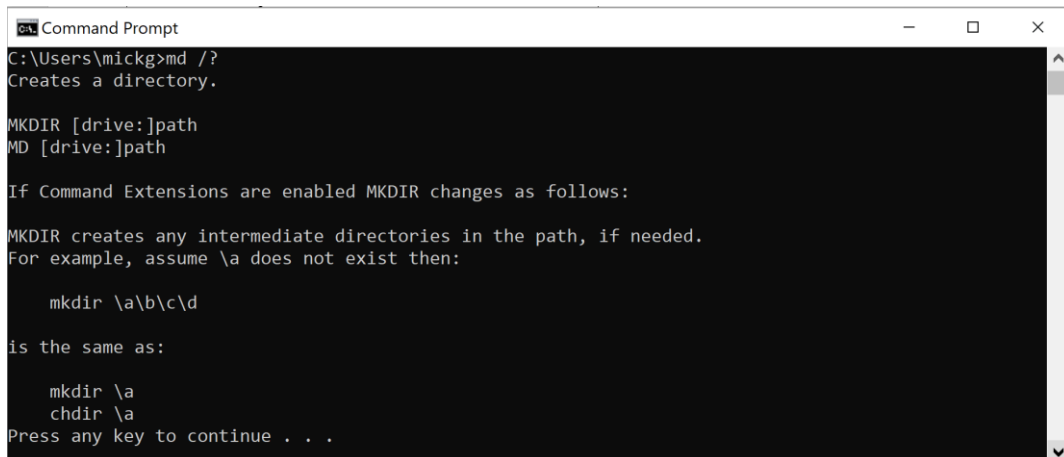
- DIR _____

- CD or CHDIR _____

- MD or MKDIR _____

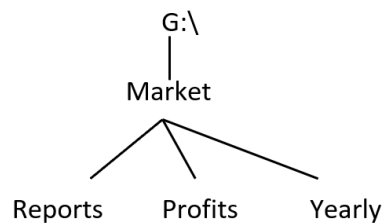
Nearly all commands use the same kind of syntax, the command name followed by one or more arguments.

- You can get information about how to use the command by using the command name followed by **/?**
 - For example **md /?** Will provide you with the help entry for the **md** command



Task 4: Creating a directory

You are going to create the following directory structure on your G: Drive



To do this, complete the following steps:

1. Change directory to the root of your G drive.
 - To do this, type **g:** at the command prompt
2. On the next line, type: **cd **
 - This will bring you to the root folder of the drive
3. Create a directory called **Market** in the root of your G drive.
 - To do this, type **mkdir Market**

```
Command Prompt
G:\>mkdir Market
G:\>cd Market
G:\Market>dir
Volume in drive G is HomeDrives
Volume Serial Number is 9C48-CCB3

Directory of G:\Market

27/08/2019  11:49    <DIR>          .
27/08/2019  11:49    <DIR>          ..
             0 File(s)            0 bytes
             2 Dir(s)      55,185,408 bytes free

G:\Market>
```

Task 5:

Use the **md** command [make directory] to create these directories also.

md g:\Market\Reports

md g:\Market\Profits

md g:\Market\Yearly

These are called **absolute** or **full paths**.

They start at the root of the drive (G: in this case)

g:\Market\Yearly

Task 6:

Create a new folder called **Personal** in the **Market** folder. There should be four folders in the **Market** folder now.

Task 7: Navigating through the directories.

- Use the **cd** [change directory] command to move within the directories you have created.
 - Navigate yourself around your directory structure using these commands.

**cd ** : change directly to root folder

cd .. : change to parent folder (one level up)

cd followed by folder name : change to given folder name (subfolder)

Firstly change to the root of the G: drive.

This will have the effect of changing you **directly** to the root of the G: drive from where you are.

To change down a directory to the **Market** folder from the root directory, type **cd Market**

- What does the command prompt look like now? _____
 - It should look like **G:\Market>**

This indicates that any command typed at this prompt will now be effective from that folder.

Task 8:

1. Change back to the root folder
 - What command did you use? _____
2. Change to the new folder called **Personal**
 - What command did you use? _____
3. Type **cd **
 - What does this command do? _____
4. Change to the **Market** folder
 - What command did you use? _____
5. Change to the **Yearly** folder
 - What command did you use? _____
6. Type **cd ..**
 - What does this command do? _____
7. Change back to root folder.
8. Type **cd Market\Personal**
 - What does this command do? _____

All these exercises use **relative paths**, as they start relative to your current location. Here are some shortcuts and typical paths.

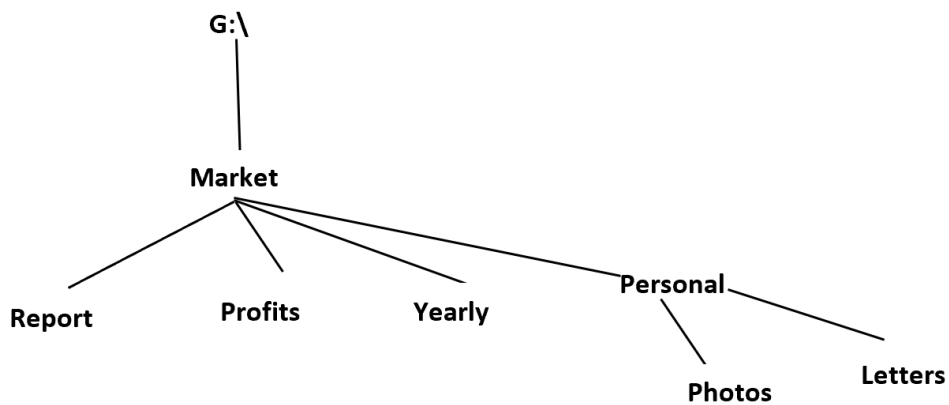
.. (*dot dot*) : this refers to one level up from current location

Market\Personal : two levels down from current location (via market and personal subfolders)

**** (*slash*) : directly to root from current location

Task 9:

Using the command line, add the following extra folders (Photos and Letters):



What DOS command(s) did you use to do this?

- _____
- _____
- _____
- _____
- _____

Task 10:

The **DIR** command, use help to find the purpose of the **DIR** command, write a brief explanation here:

Task 11:

Change to the **Market** folder on your **G:** drive.

1. Type **dir** , What does this command do? _____
2. Type **dir /w** , What is the effect of the /w switch? _____
3. Type **dir /s** , What is the effect of the /s switch? _____
4. Type **dir /p** , What is the effect of the /p switch? _____
5. Type **dir /w/s** , What is the effect of the two switches? _____

Task 12: Changing Drives

To change to another **drive** you must type in the drive letter followed by a full colon. For example, to change to the M drive type:

m:

Your DOS prompt should have changed to **M:\>** you can now browse the directory structure on the M drive.

Change from your current location to the C: drive:

- What command did you use? _____
- What is the prompt now? _____
- Change to your exam drive (M). What command did you use? _____
- Change back to the G drive _____

Question: Typing the command **cd c:** doesn't work to change drive!

Why? _____

Task 13: Remove a directory

- Remove the directory **Photos**, what command did you use? _____
- Remove the directory **Personal**.
 - This doesn't work as can't remove a directory that contains files/folder.
 - Will need to use a **switch** with **rd** command.
 - A switch is an extra instruction that you pass with the command, there are many switches
 - Use help to find the correct switch first, then ask your Lab Tutor if you get stuck.
- Write the correct command _____

Task 14:

Use the inbuilt help function to get information on the following commands.

Command	Write down what each command does and give an example of its use
CLS	
RD	
COPY	
MOVE	
RENAME (REN)	
TIME	
VER	
DATE	
TYPE	

End of Windows Lab 3

Page left intentionally blank for notes

Windows Lab 4 Command Prompt

Objective: Gain further knowledge of the command line interface (prompt) of an OS

At the end of this lab, you will be able to:

- Use a command line editor
- Copy, delete and rename files using the command line interface
- Create directories at the command line with spaces in the name
- Use the RD command to remove folders
- Use the Internet and Help facility to help you complete this lab sheet

Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with DOS Prompt.

Use the Help option in MS-DOS and the internet to find out information on doing the following tasks.

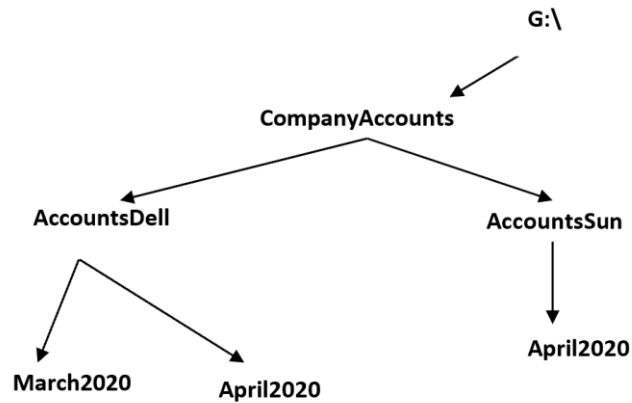
Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Task 1:

Create the following directory structure through the command prompt (using DOS commands only).

- **Note:** The CompanyAccounts directory is off the root directory of drive G.



Task 2: Creating a text file

To create a text file use the **Notepad** command at the DOS prompt. Create a textfile called **DOSPRAC1.TXT** and save it in the folder **CompanyAccounts**.

Type in the following text into the file:

*They heard me singing and they told me to stop,
Quit these pretentious things and just punch the clock.
Sometimes I wonder if the world's so small,
Can we ever get away from the sprawl?*

Task 3: Check the contents of your directory and confirm the existence of the new file.

Write down the command you used: _____

[Online Research] Interpret all the information returned to you on the screen about the new file, do not continue until you understand all of this information.

What information are you given about the file?

- _____
- _____
- _____
- _____
- _____

Task 4:

You can view the contents of your file without opening the file by using the **type** command.

Write the command to view the contents of DOSPRAC1.TXT here: _____

copy Command: Allows the user to copy one or more files to an alternate location. Typical usage:

COPY source [destination]

Source: Specifies the file or files to be copied.

Destination: Specifies the directory or filename for the new file(s).

Some Examples:

- To copy the file File1.txt to and name it File2.txt (in same folder)
 - copy File1.txt File2.txt

- To copy the file File1.txt to and name it File2.txt (in another folder *)
 - copy File1.txt clubs\File2.txt

- To copy the file File1.txt to another folder*. Leave it same name (file1.txt)
 - copy File1.txt clubs

*NB: clubs is a subfolder of where command is issued from

Task 5: Copying Files

Change to the CompanyAccounts folder, if you are not already there.

- Copy file **DOSPRAC1.TXT** and call it **DOSPRAC2.TXT** (in same folder)
 - Write down the command: _____

- Copy file **DOSPRAC1.TXT** and place it on the AccountsDell folder. (Leave name as DOSPRAC1.TXT in AccountsDell folder)
 - Write down the command: _____

Task 6:

- Copy **DOSPRAC1.TXT** to the root of your M: drive _____
- Copy **DOSPRAC2.TXT** to the root of your M: drive _____
- Verify that the copy operations have been complete _____

Task 7:

- Copy file **DOSPRAC1.TXT** and place it on the M: drive and call it **DOSPRAC1.BAC**
 - Write down the command: _____

There should be 3 files on the M: drive now.

Del Command

You can use the **del** command to delete files and also the contents of a folder also but not the folder itself.

`del myfile.txt` : This command will delete the file called myfile.txt

`del reports` : delete any files within the folder reports but not the folder itself.

Task 8: Deleting Files and Folders

- Delete the file **DOSPRAC1.TXT** from your M drive.
 - Write down the command: _____
- Delete the other text files you copied to the M drive.

Task 9: Change to the CompanyAccounts folder.

- Delete the contents of the **AccountsDell** folder but not the folder itself.
 - Write down the command: _____
- If you did want to delete folder AccountsDell, what command would you use? _____

Task 10: Rename the file DOSPRAC2.TXT to be DOSPRACTICAL.TXT

- Write down the command: _____

Task 11:

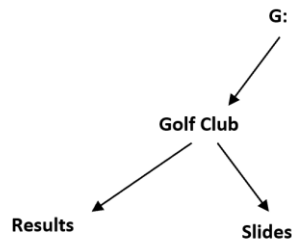
- Create a directory called **Backup** in the **Company Accounts** folder. Copy the file called **DOSPRACTICAL.TXT** into it.
 - Write down the command: _____

Task 12:

- Try to delete the **Backup** directory.
 - What happens? _____
 - Why? _____
 - Write down the command to overcome this: _____

Task 13: Creating a directory with a space in its name.

Use the help function or online research to discover how to create directories with a space in them. Create the directory structure below and verify that it was created correctly.



What command and syntax did you use? _____

In your opinion, do you think having spaces in file names is a good or bad idea? Why or why not? (Explain)

Command	Write down what each command does and give an example of its use
DIR	
CD	
MD	
RD	
COPY (files)	
COPY (directory)	
TYPE	
RENAME	

End of Windows Lab 4

Page left intentionally blank for notes

Windows Lab 5

Advanced Command Prompt

Objective: Advanced knowledge of the command line interface (prompt) of an OS

At the end of this lab, you will be able to:

- Use commands to carry out file operations copy, move and sort
- Search within a file using the 'find' operation
- Change the 'look' of the command prompt
- Perform bulk copy using XCOPY
- Use the navigation arrows to repeat previous commands

Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with DOS Prompt.

Use the Help option in MS-DOS and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

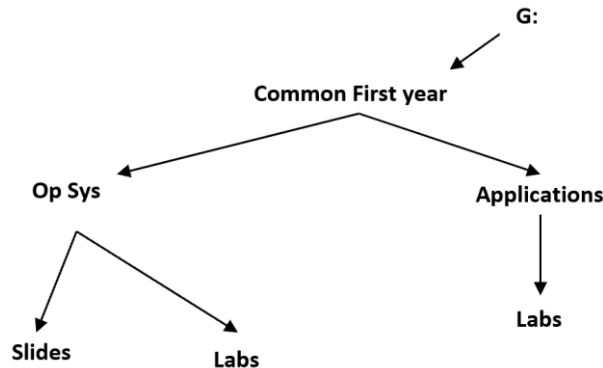
Task 1: Revision from previous lab sheets

- How do you create a directory whose name contains a space? _____
- What is the command to rename a directory? _____
- How can you remove a directory which contains files? _____
- Assume that the directories **groups** and **cfyA** don't exist. What will happen if you type in this command:

md groups\cfyA

- What is the effect of the following **change directory** commands?
- **cd ** _____
- **cd ..** _____
- **cd ..\..** _____
- **cd folder1\folder2** _____

Task 2: Create the following directory structure using the **Windows GUI interface** (Note: Some directory names have spaces!)



Task 3: Change to the command interface

- Change to the root directory of the G drive.
 - Write down the command used _____
- Assume you are in **G: root** directory, write the command to change to the **Op Sys** directory

- Assume you are in **Slides** folder in **Op Sys** directory, write the command to change to **G: root**

- Assume you are in **Slides** folder in Op Sys directory and need to change to **Labs** folder in Op Sys directory
-
-

- Now, if you used more than one command, find an efficient way to achieve this in **one command!**
 - Write down the command used:
-

- Assume you are in **Labs** folder in Op Sys directory and you need to change to **Labs** folder in Applications directory
 - Write down the command used:
-

Task 4:

Assume you are in Slides folder (Op Sys folder), create a file **temp.txt** in the Slides folder.

- **Copy temp.txt** to the Applications directory and call it a different name **temp.bac**

Write down the command you used _____

Confirm/check that the copy took place.

Task 5:

Assume you are in Slides folder (Op Sys folder), create a file **temp2.txt** in the Slides directory. How would you **move temp2.txt** to the Op Sys directory?

Write down the command you used _____

Confirm/check that the move took place.

Using . and .. in your commands

- **cd ..** means change directory to the parent.
- **cd .** means change to the current directory (i.e. no change).

The **.** and **..** can be very useful.

- For example assume you are in Slides folder (Op Sys folder), the DOS command to copy the file temp2.txt from the Op Sys folder to the Slides folder without changing folder is:

copy ..\temp2.txt .

Note: . at end

Task 6:

Change to the Applications folder, create a file **daily.txt** in this directory. Change to the Labs folder (within Applications folder).

- How would you **move daily.txt** from the Applications folder to the Labs folder?

Write down the command you used _____

Confirm/check that the move took place.

Task 7:

Change to the Applications folder, how would you **copy daily.txt** from the Labs folder to the Applications folder and rename it **daily2.txt**?

Write down the command you used _____

Confirm/check that the move took place.

PROMPT command.

You can change the command prompt to any special prompt you want. For example, you can make the prompt display the current time, date or the current directory.

The command prompt that you see at moment is: **current drive and path** followed by > symbol.



Type **HELP PROMPT** to get help for answering the following

Task 8: Type in the command **PROMPT \$N\$G** and observe the effect.

Now try **PROMPT \$P\$G**. What does this do?

Use **HELP** to find out how to include the date and time in your prompt. How did you do this?

Now try **PROMPT Type in here\$G**. What does this do?

- **Important:** Reset the prompt to its original prompt.

How did you do this?

FIND command:

Allows you to search for text within a file, (text is case sensitive). Here is the syntax of the find command:

```
FIND [/V] [/C] [/N] [/I] "string" [[drive:][path]filename[ ...]]
```

Use the inbuilt help function to read up on the find command before attempting these tasks.

Task 9: FIND Command

Using a text editor, create a file called **NUMBERS.TXT** on the root of G:\drive with 3 entries like the following:

Bach	Johann	059 9175400
Stravinsky	Igor	01 2749873
Prokofiev	Igor	01 8898909

Get help on the **FIND** command (type `FIND /?`) and use the FIND command to:

- Locate an entry based on a particular surname
-
- Find an entry ignoring the distinction between upper and lower case
-
- Count the occurrence of a particular entry
-
- Find entry containing 'Igor' and print the line number it occurs on
-

SORT command:

Sorts the input and displays the output to the screen, a file or another device

```
SORT [/R] [/+n] [/M kilobytes] [/L locale] [/RE recordbytes]
[[drive1:][path1]filename1] [/T [drive2:][path2]]
[/O [drive3:][path3]filename3]
```

Task 10: Using the SORT Command

- SORT the file NUMBERS.TXT alphabetic order. What did you type in?

- Has the file NUMBERS.TXT changed? _____

- Has the sorted version been stored? _____

- SORT in reverse order. What did you type? _____

- Redirect the reverse sorted file to a file called S_NUMBER.TXT

Note: There are 2 ways to do this: using /O or using > redirection

Task 11:

Create a file called SECOND.TXT with some more entries similar to NUMBERS.TXT

What is the effect of the following command?

```
copy numbers.txt+second.txt newfile.txt
```

Use the command **TYPE** to see the contents of **newfile.txt**.

XCOPY Command

XCOPY is a powerful version of the copy command with additional features; has the capability of moving files, directories, and even whole drives from one location to another. Basic syntax is...

```
XCOPY source [destination]
```

Look up Help on the XCOPY command.

Some Examples:

To copy a file: XCOPY C:\utils\MyFile D:\Backup\COPYFILE

To copy a folder: XCOPY C:\utils D:\Backup\utils /i

To copy a folder including all subfolders: XCOPY C:\utils* D:\Backup\utils /s /i

(here the /i defines the destination as a folder)

Task 12: Copying in Bulk!

Use **XCOPY** command to copy the file NUMBERS.TXT into a new directory called XCOPY_OUTPUT.

- Write down the command used: _____
 - Choose D for directory, when asked if XCOPY_OUTPUT is a file or directory
 - If you used the /i switch, it won't ask you that question.

Use **XCOPY** command to copy the files SECOND.txt and NEWFILE.txt into this directory also. What are the commands you used?

Task 13: Copy a folder

Copy the folder Op Sys and all its subfolders into the folder XCOPY_OUTPUT.

Task 14: Copy all files and folders (including empty folders) from the Common First Year directory onto the D: drive into a new directory called 15ARCHIVE (You should include empty directories).

Write down the command used: _____

Check that the copying has been done.

Overview Questions:

Q1. Find entries containing 'Igor' and count the occurrences of that particular entry in the file NUMBERS.TXT

Write the command(s) to do this: _____

Q2. SORT the file NUMBERS.TXT in **reverse** order and save the result to a file called S_names.txt in the **Labs (Applications)** directory. Write the command(s) to do this:

End of Windows Lab 5

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Windows Lab 6

Operating Systems and Hypervisors

Objective: To install an Operating System and use a Hosted Hypervisor.

At the end of this lab, you will be able to:

- Use a hosted hypervisor
- Know how to install and configure an OS
- Use an ISO file (an archive file of an Optical Disk)
- Setup and use a proxy server
- Examine how a disk is laid out
- Edit disk partitions and create volumes



Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Introduction

The local workstations in the labs have the Windows 10 Operating System installed on them. This OS is run from the hard disk (Drive C) located inside these workstations.

VMware Player is a **software application** which allows you to run several pseudo or 'virtual' operating systems on one of these workstations. VMware Player is an example of a **Hosted Hypervisor**.

Each workstation is a single physical computer - however we can start VMware Player and run a number of different virtual machines on this single physical computer (the local machine). Each virtual machine can have its own operating system (e.g. Linux, Windows, Mac OS etc.)

Virtual Machines and how they work

VMware Player has been installed on each workstation in the lab. There should be a shortcut to this on the Start Menu or Desktop.

- Please make sure you choose VMware Player and NOT VMware Client.
- We are going to install Windows 7 as a Virtual Machine



VMware player allows you to install another operating system on the local computer, this is also known as a virtual machine. You will use this to install another Windows operating system. We will be using 20GB of the local hard disk (C: Drive) to install the new virtual machine.

- Once this space (10GB) has been allocated to the virtual machine (VMware Player) it cannot be used for anything else. We could use it to install any of a number of different operating systems. Later on, in the year, we might be using it again to install a version of Linux.

What is happening?

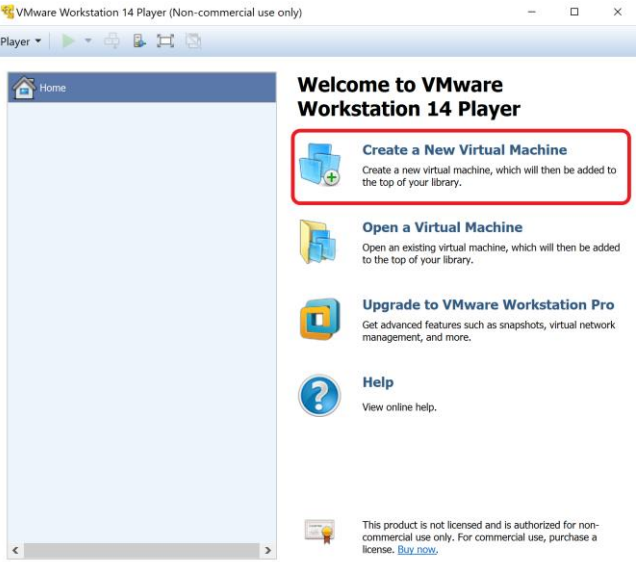
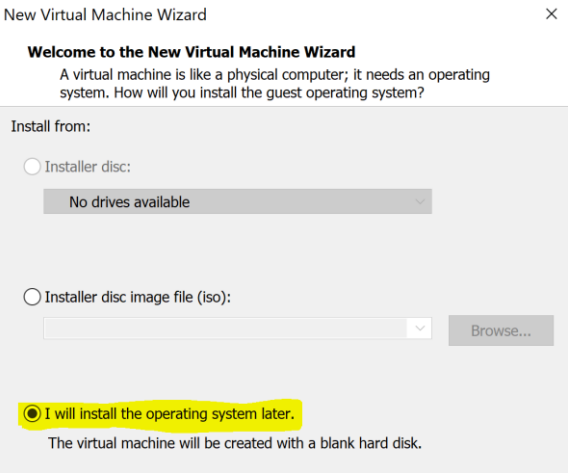
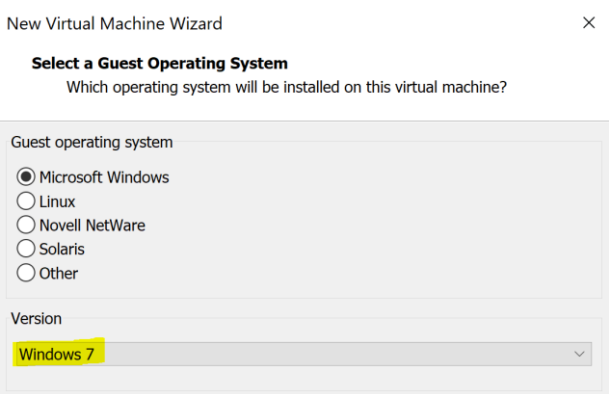
We are using VMware Player to install another operating system onto the local computer's hard disk. The local machine will be Windows 10 and the Virtual Machine will be Windows 7.

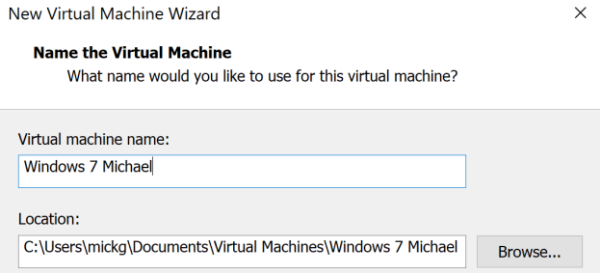
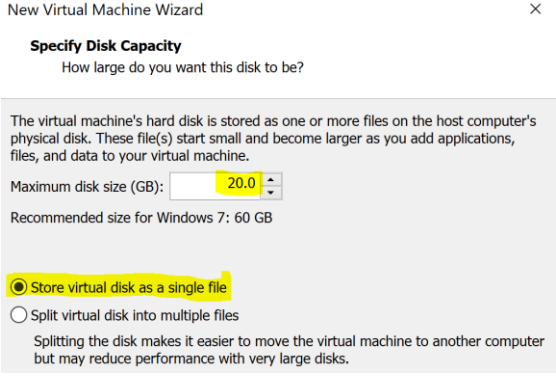
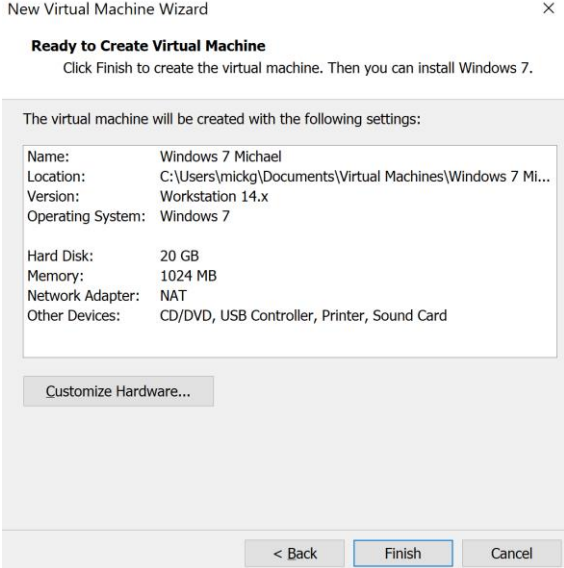
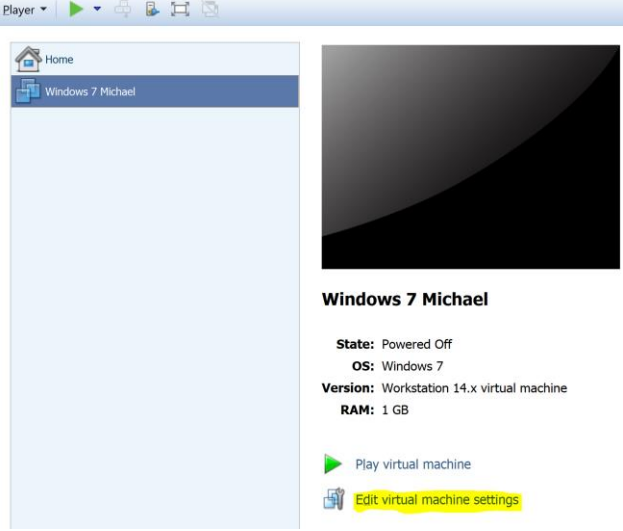
- The new copy of Windows 7 runs as a virtual machine. Once installed using the VMware Player we will do some basic configuration on our newly installed operating system.
- Our new Windows 7 VM can only be booted and run through the Hypervisor (VMware Player).
- Any changes that you make to the computers in the lab will be lost once the computer is rebooted. This is OK because for your next lab session you will be using your vSphere Client account which will already have a VM pre-loaded onto it for you.
- Your vSphere Client account is on the colleges VMware server and this account will be yours for the year.
 - Any changes you make to this account will not be lost.
 - More info on the vSphere Client VMware accounts and the server in the next lab sheet.

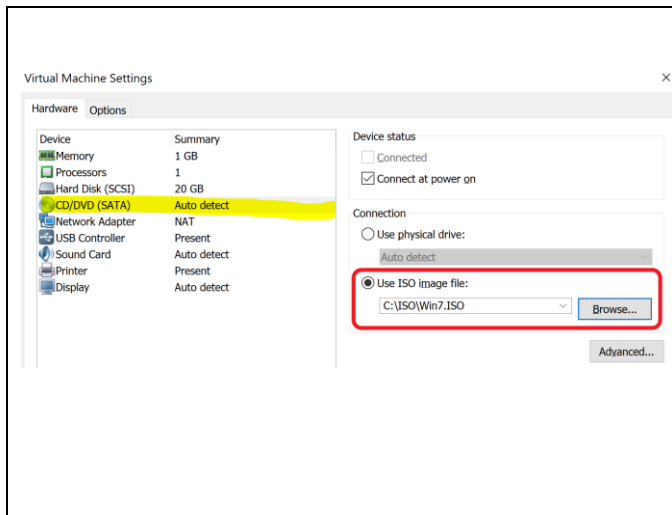
Task 1

Explain in what a Hosted Hypervisor is: _____

Install Windows 7 on VMware Player

Image	Steps
 <p>VMware Workstation 14 Player (Non-commercial use only)</p> <p>Player</p> <p>Home</p> <p>Welcome to VMware Workstation 14 Player</p> <p>Create a New Virtual Machine Create a new virtual machine, which will then be added to the top of your library.</p> <p>Open a Virtual Machine Open an existing virtual machine, which will then be added to the top of your library.</p> <p>Upgrade to VMware Workstation Pro Get advanced features such as snapshots, virtual network management, and more.</p> <p>Help View online help.</p> <p>This product is not licensed and is authorized for non-commercial use only. For commercial use, purchase a license. Buy now.</p>	<p>Start VMware Player</p> <ul style="list-style-type: none"> You will get an image like this Select the option to Create a New Virtual Machine
 <p>New Virtual Machine Wizard</p> <p>Welcome to the New Virtual Machine Wizard</p> <p>A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?</p> <p>Install from:</p> <p><input type="radio"/> Installer disc: No drives available</p> <p><input type="radio"/> Installer disc image file (iso): Browse...</p> <p><input checked="" type="radio"/> I will install the operating system later. The virtual machine will be created with a blank hard disk.</p>	<p>Install From</p> <ul style="list-style-type: none"> Here we will select to 'install later' We will do this so we can configure our VM
 <p>New Virtual Machine Wizard</p> <p>Select a Guest Operating System</p> <p>Which operating system will be installed on this virtual machine?</p> <p>Guest operating system</p> <p><input checked="" type="radio"/> Microsoft Windows</p> <p><input type="radio"/> Linux</p> <p><input type="radio"/> Novell NetWare</p> <p><input type="radio"/> Solaris</p> <p><input type="radio"/> Other</p> <p>Version</p> <p>Windows 7</p>	<p>Guest OS</p> <ul style="list-style-type: none"> Here we decide what OS to install We will install Windows 7

	<p>Name the VM</p> <ul style="list-style-type: none"> This is the name that the hypervisor (VMware Player) will give to internally identify the VM Use Windows 7 + Name (or similar) <p>What is the default location of the VM file?</p> <hr/>
	<p>Disk Capacity</p> <ul style="list-style-type: none"> Provide the size of the Hard Disk for the VM Give the VM 20G Choose the option Store virtual disk as a single file
	<p>Summary</p> <ul style="list-style-type: none"> Confirm all details are correct Click Finish
	<p>You should now see a screen similar to this.</p> <ul style="list-style-type: none"> You have created an empty virtual machine template that can have a Windows 7 operating system installed in it <p>You now need to install Windows 7</p> <ul style="list-style-type: none"> Edit Virtual Machine Settings



Select the Boot Disk

- Here, attach the Windows 7 ISO file to the Virtual CD/DVD ROM device
- Choose “Use ISO image file”.

Click the Browse button

- Navigate to the folder where the Windows 7 ISO file is located
- **The C:\ISO folder**

If you cannot find this file check Blackboard or ask your Lab Tutor.

You now have two Operating Systems

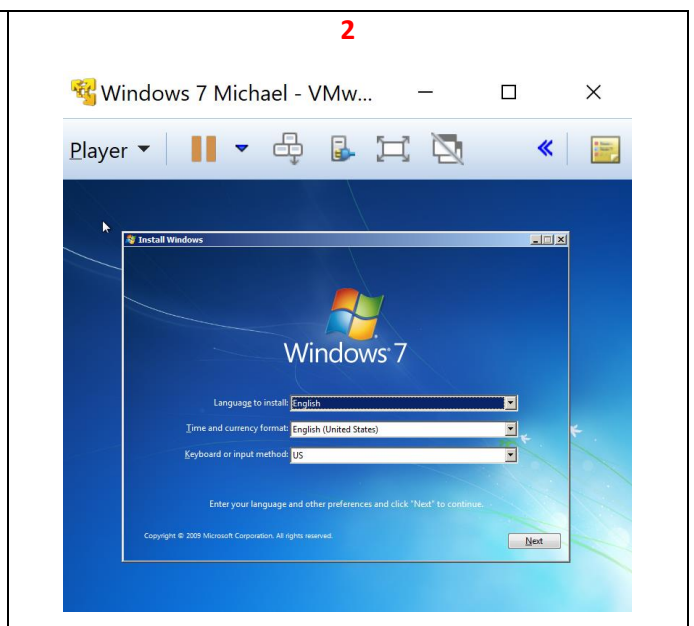
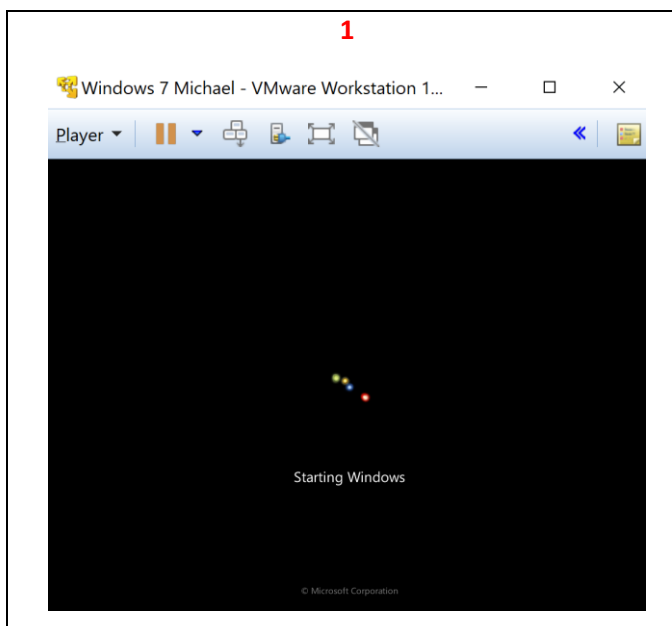
- Your workstation (physical Lab PC) and a
- Virtual OS (accessed through VMware Player software)

Moving between your two OS (VMware Player and the local workstation)

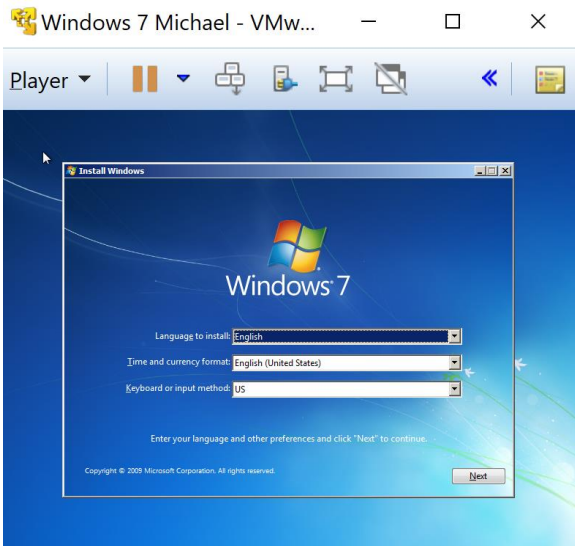
- You will need to press CTRL + G or click on the VMware Player in order to interact with it.
- You will need to press CTRL + ALT to move between the virtual machine and the local computer.

You then choose to “Play Virtual Machine”

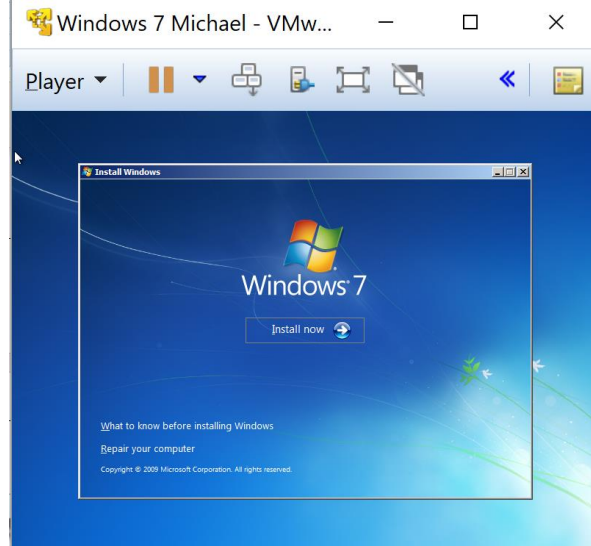
- Your virtual machine should now restart from the Windows 7 ISO image file.
- It will then start to install Windows 7 from the ISO image file onto the virtual machine.
- Proceed through the install process, **as per images below/following pages**



3



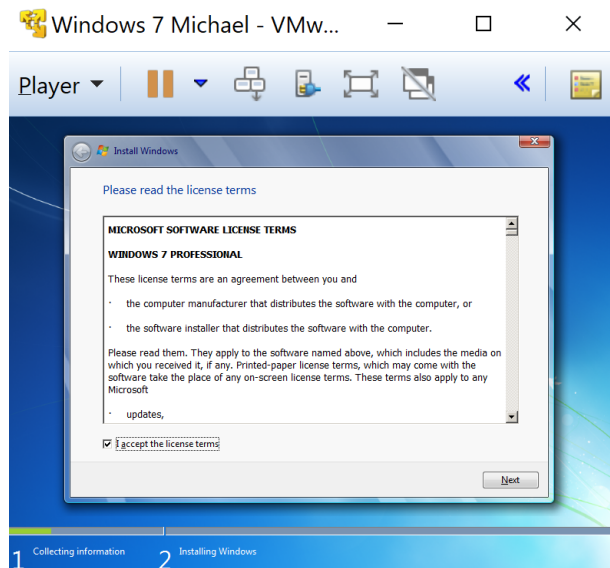
4



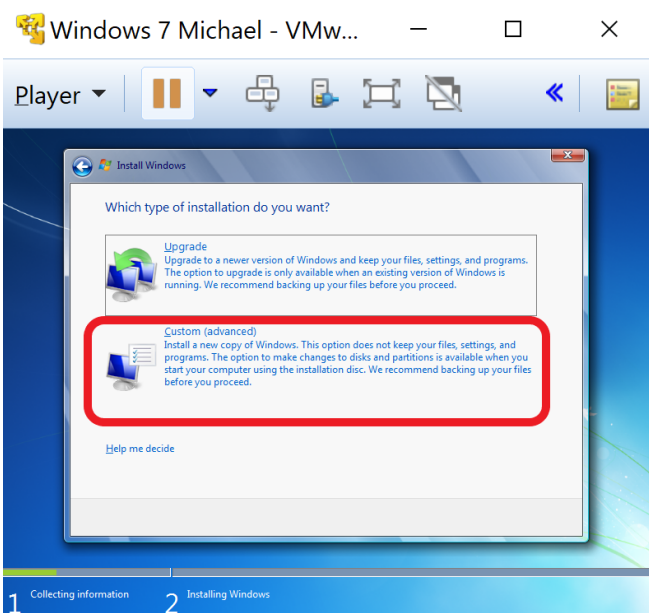
5



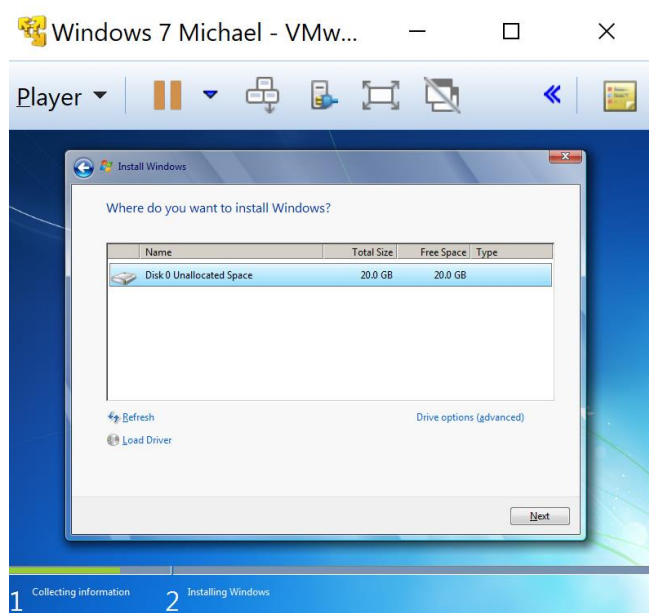
6

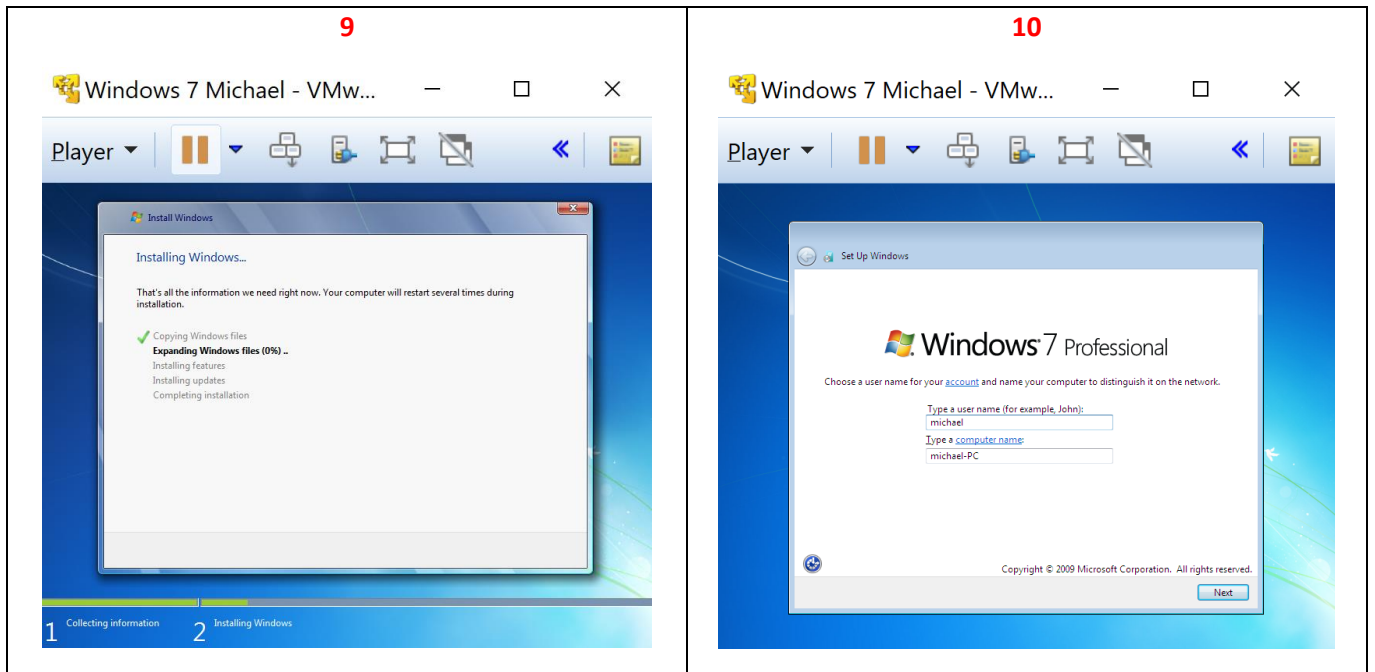


7



8





A few minutes later Windows will restart automatically.

- You are prompted for a username and a computer name
- Enter the password: **TESTINSTALL**
- Choose recommended settings and choose “Work Network”
- You can now start to use your new VM with Windows 7 installed on it.

Task 2

Imagine you have a local computer with an empty/blank C hard drive. What would you do in order to install Windows 10 or Linux etc. onto it?

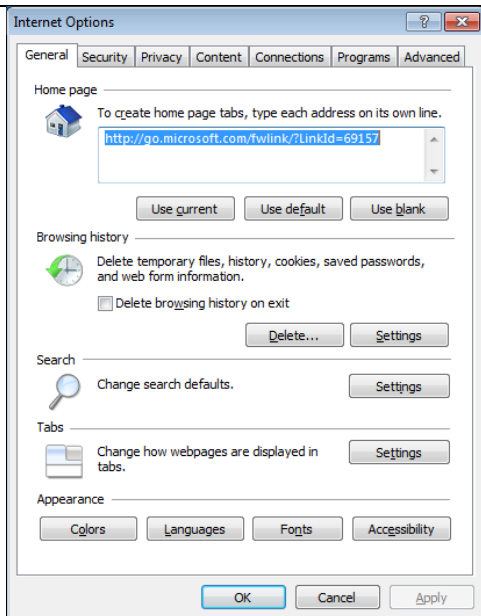
Compare the difference between installing an OS on a local PC versus a virtual machine.

Compare the difference between installing an OS from an ISO image versus a CD/DVD.

Setting up a Proxy Connection (Note: depending on the lab setup this may or may not be required)

On your new VM, we will now set up the proxy server connection so you can access the internet.

1. Start Internet Explorer
2. Hold Down the Alt key and press the letter T. This brings up the tools menu.
3. Click "Internet Options"
4. A screenshot like the one below appears.



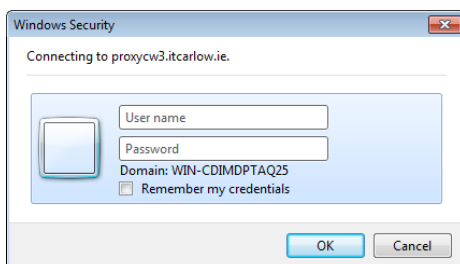
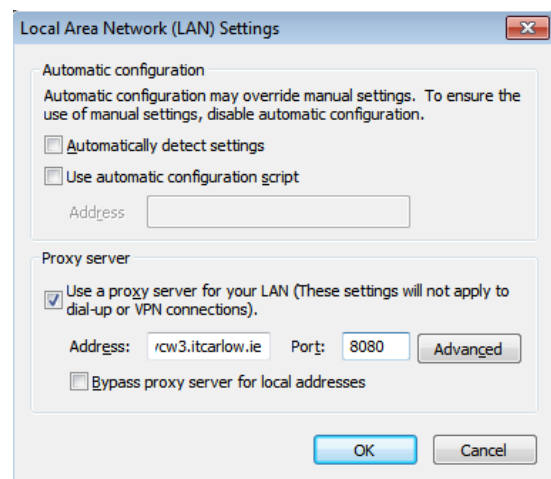
5. Click on the "Connections" tab.
6. Click the Lan Settings Button.
7. A screen like the one below appears

Change the settings to the ones that you see in the screenshot here →

The Address field is: **proxycw3.itcarlow.ie**

The Port field is: **8080**

8. Click ok
9. Close down internet explorer and restart it.
10. You will be asked for username/password



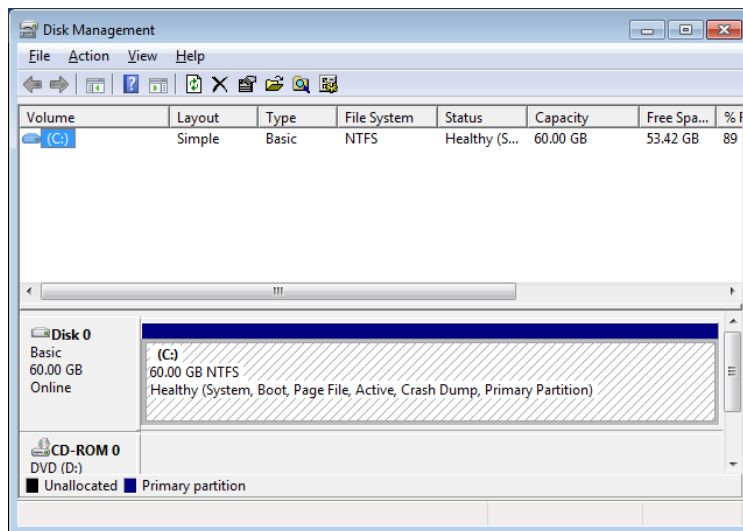
Username: **itcarlow\c00??**

- [replace the c00?? with your student id]

Password: **[your college/email password]**

Examining how your disk is laid out

Click the Start button, type in **diskmgmt.msc** and press enter. A screen similar to the one below will appear. Examine the data presented on the screen.

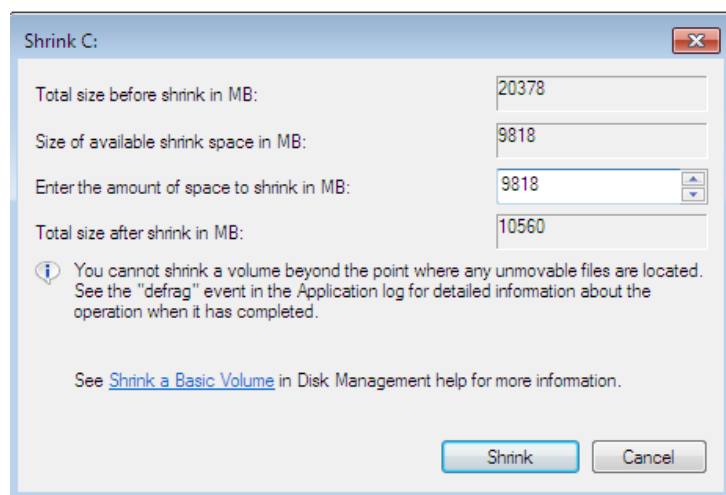


Shrinking a Volume

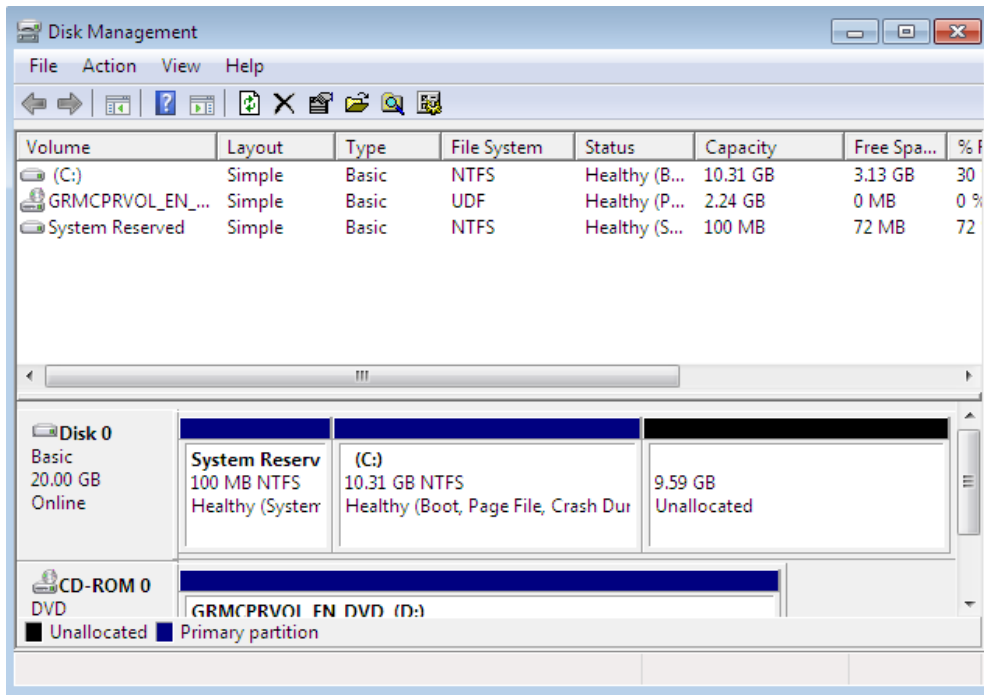
What does shrinking a volume do?

We will shrink the size of the volume to create space for a new partition. Firstly, see the instructions on how to do this from: <http://technet.microsoft.com/en-us/magazine/gg309169.aspx>

Shrink the volume by 10000MB (as per screenshot below)..what's that in GB? _____



After the shrink the following screen is displayed (Note: the **unallocated space**)

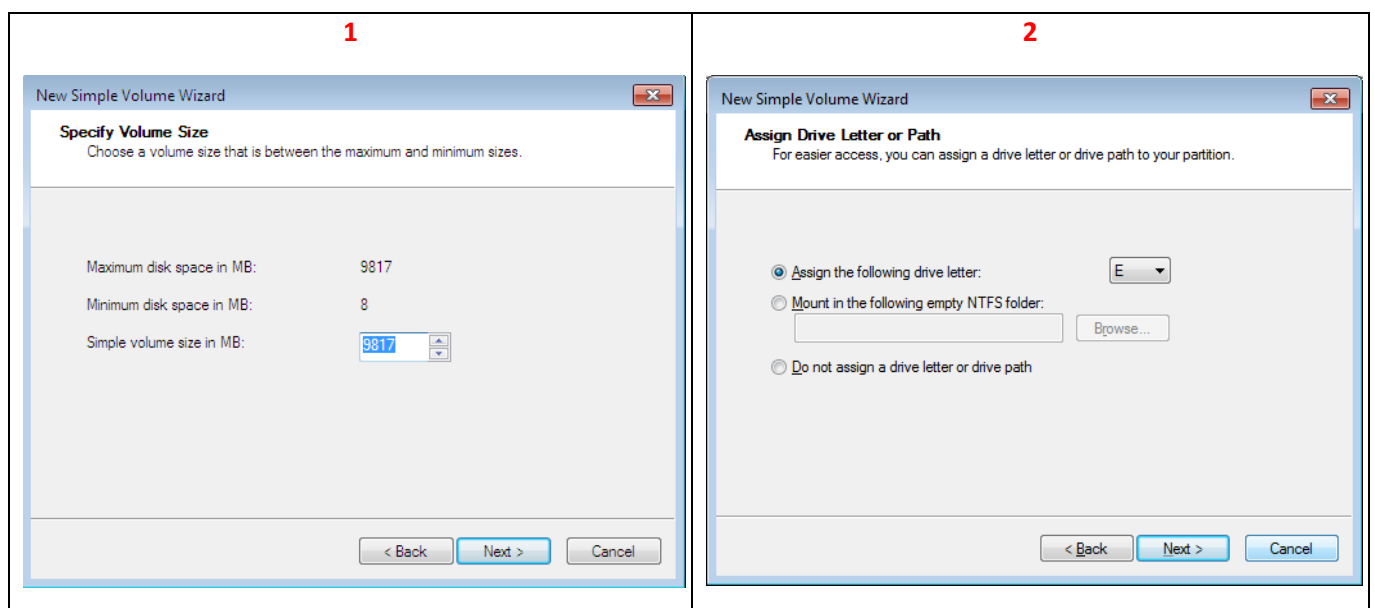


Creating a partition out of the unallocated space

Firstly, see the instructions on how to do this from: <http://technet.microsoft.com/en-us/magazine/gg309170.aspx>

Task 3

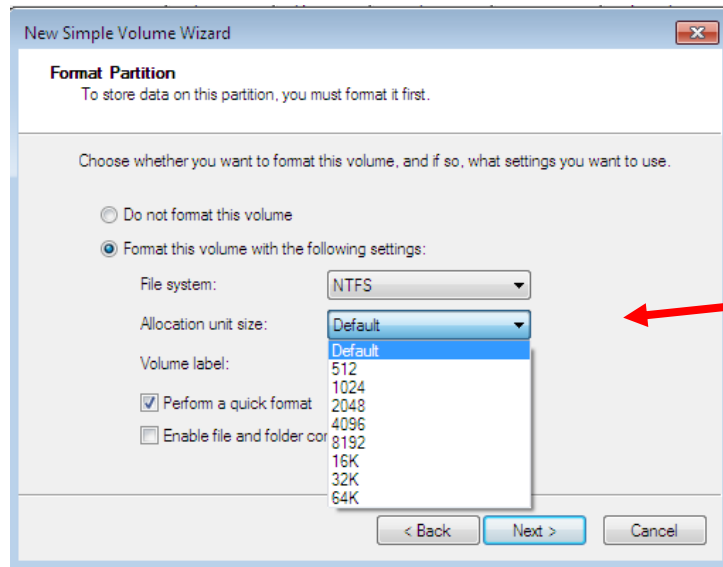
Create a new volume of 9817 MB using the instructions in the link above. Note: When you are creating the New Partition your screen should look like the one here and you can assign the letter E to the new partition.



The **file format** you choose should be **NTFS**.

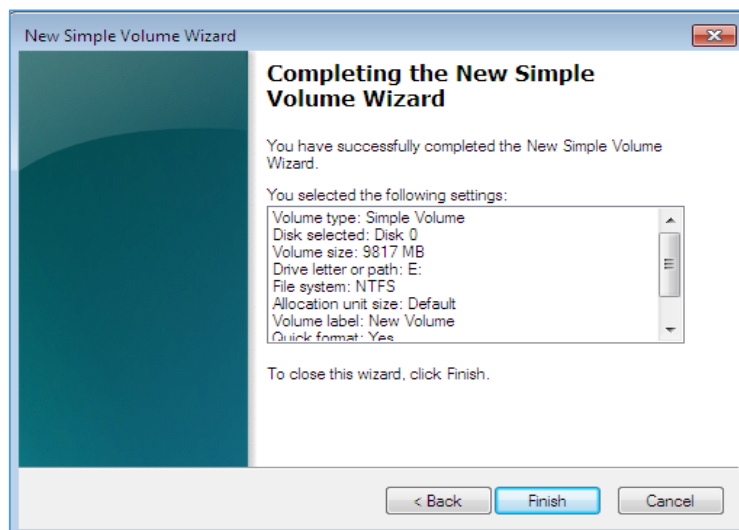
The **allocation unit size** should be set to **Default**.

The allocation unit size could be set to one of the following:

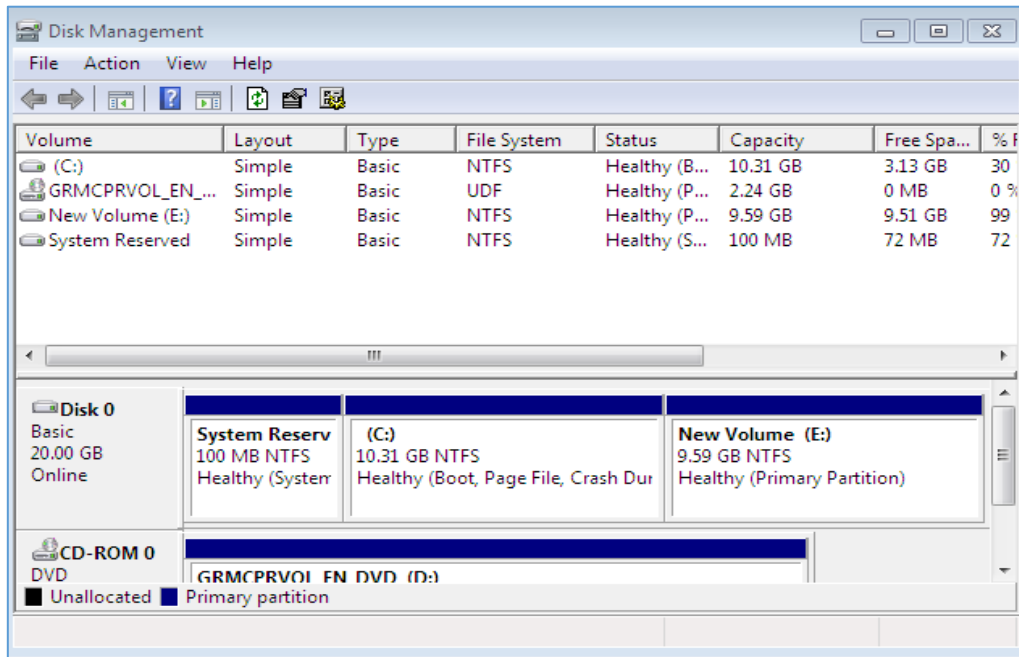


What is the allocation unit size and what is it used for in an operating system? [\[Online Research\]](#)

Then click next and the confirmation screen below appears. Click Finish.



Now, a screen like the one below should appear:



We asked for a 9817 MB Partition. Why does it say 9.59 GB in the screen above? [\[Online Research\]](#)

Viewing the new partition in Windows Explorer

Close all open windows...Start Windows Explorer, you should see a drive C and a Drive E.

Right click on the drive letter for your newly formatted drive. What drive letter? _____

Choose properties and determine the capacity as reported by Windows Explorer.

Capacity: _____

What is the name of the filesystem (as reported by Windows Explorer)

File system: _____

What is the significance of the drive letter C or any other drive letters?

Deleting a Partition

You can delete partitions when they are no longer needed. What will this do to the data stored there?

Delete your new partition. Were you able to delete it? _____

Before the disk space of the deleted partition can be used again, you must first create another partition there.

Formatting Your Drive

Remember, when we created a new partition above, it went through a formatting stage. Format actually means to prepare a storage medium, usually a disk, for reading and writing. A brand new hard drive cannot be used until it has been formatted.

- When you choose to run a **Full Format** on a volume (or partition), files are removed from the volume that you are formatting, and the hard disk is scanned for bad sectors. The scan for bad sectors is responsible for the majority of the time that it takes to format a volume.
- When you choose to run a **Quick Format** on a volume (or partition), format removes files from the partition, but does not scan the disk for bad sectors. Only use this option if your hard disk has been previously formatted and you are sure that your hard disk is not damaged.

There is another important difference between Full format and Quick format in Windows.

A full format will wipe clean your drive just like a new hard drive. This involves writing zeroes to every data byte on every track, obliterating any previously recorded data. This is not done in a quick format.

If you format your drive using the quick format, can the data files be recovered from the disk? _____

Why? _____

If you format your drive using the full format, can the data files be recovered from the disk? _____

Why? _____

Do you need to format other disks before you use them? DVDs , USB keys etc..? _____

Why? _____

Note: To format the primary partition of your C drive you need to boot (start up) from another device.

Why? _____

If you decide to upgrade and install a second hard drive, how would you format it?

What is a disk image? http://en.wikipedia.org/wiki/Disk_image

What is an **iso** file? <http://www.fileinfo.com/extension/iso>

Find out how much space is the operating system using and how much space is free for other applications.

Find out how much RAM is available on the system.

Partitions

[Online Research] Find out what a partition is. Use the following web site as an initial source of information.

- http://en.wikipedia.org/wiki/Disk_partitioning

Provide a brief explanation in your own words here:

End of Windows Lab 6

Page left intentionally blank for notes.

Windows Lab 7

VMware vSphere Client VMs

Objective: To use a dual hosted hypervisor

At the end of this lab, you will be able to:

- Use an industry standard dual hosted hypervisor
- Understand the difference between a hosted hypervisor and a native hypervisor
- Customise Windows 10
- Install OpenSource Software
- Partition and format your drive
- Using your memory stick on the virtual machine
- Mount an ISO files on the virtual machine



Instructions

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Tips for using the vSphere Client software below:

1. When you have it up and running, adjust the screen resolution to 800 by 600 so you can see the wholescreen when using VMware.
2. Stop the screen flicking in VMware by minimising the outer VMware application window rather than the console. (Your lecturer will advise through a demo if you are unsure).

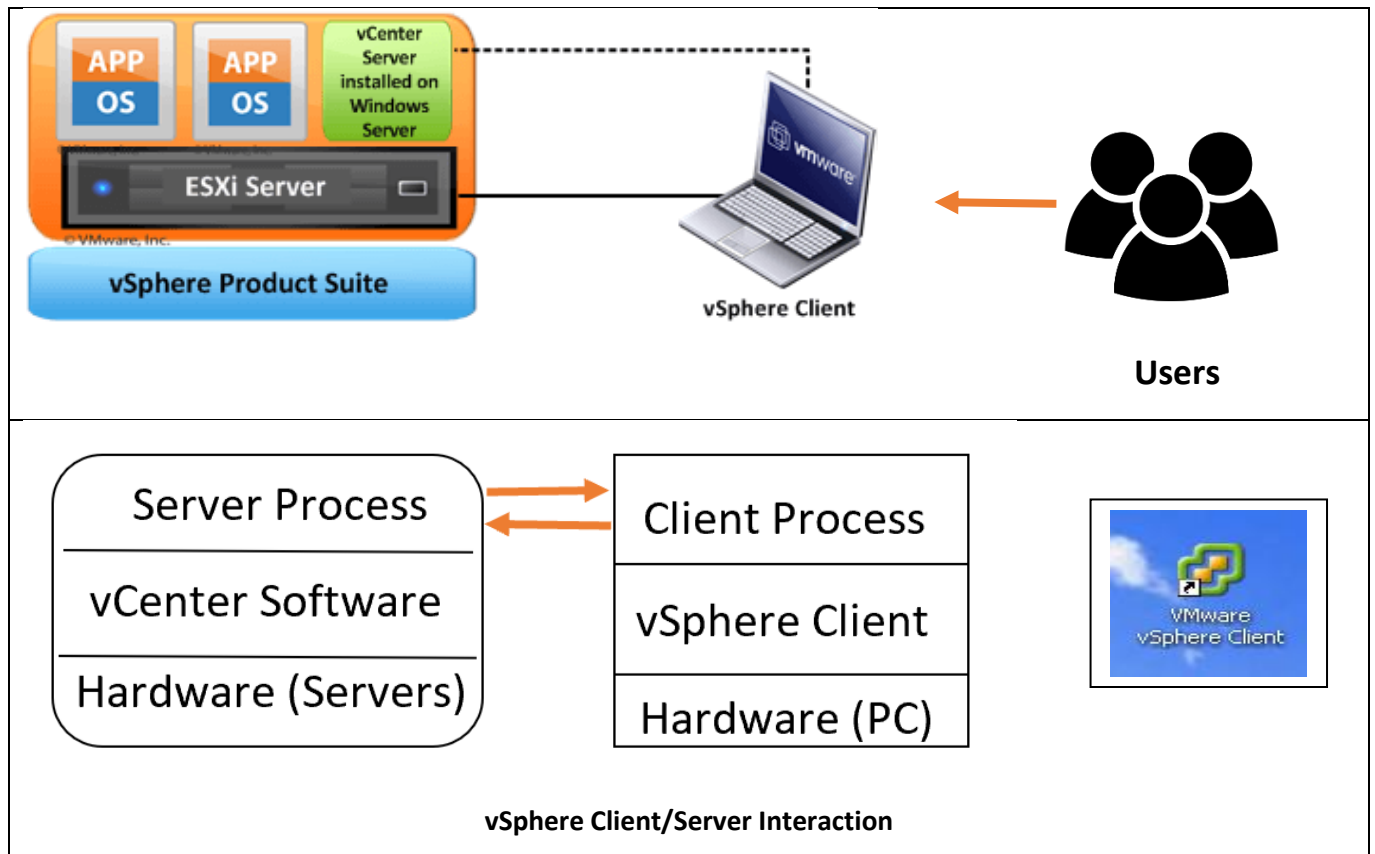
Review

In Lab 6, you created your own virtual machine using **VMware Player** on a local computer. You then created a **virtual machine (VM)** and installed **Windows 7** on it. You are now going to use a virtual machine that has been set up for you on **VMware server**. The VMare server runs on powerful dedicated hardware with lots of RAM , disk space and multiple CPU's. You will use the vSphere Clinet to remotely access a your own private Virtual Machine that sits on a hardware (servers) that are phycially located elsewhere (in this instance, the hardware is in the Library).

How does this work?

The local machines (PC's) in lab are connected (via cables, switches etc.) to the network. This allows you to connect to **VMware server**. A virtual machine has been set up for each student on this course on the VMware server. Software has been loaded on to all the PC's in the lab to connect to the server. This software is called **vSphere client** client software and a shortcut to this program is on your desktop or via the Start Menu. You can connect to the server by running and logging into this VMware vSphere client software.

How a Lab PC connects to the VMware server



When you log into the vSphere client software, you are logging into and using your account on the server. A certain amount of the servers resources are allocated to each student account, when it is set up on the server. For example you will be allocated a certain amount of disk space on the server's hard disk, around **13 GB**. You will be allocated access to the servers RAM (primary memory), approx 1GB max of RAM for each virtual machine etc.

What you can use your VMware vSphere Account for?

You can use the account to access and configure a pre-installed version of **Windows 10**. Unlike the previous Windows 7 OS that we installed, this VM is persistent. Later on in the year, we will be using a version of Linux with your VMware account.

[Online Research] In relation to VMs, what does the term persistence mean?

Hint: <https://www.vmadmin.co.uk/resources/53-view/401-persistent-vs-non-persistent-virtual-desktop-non-technical-explanation>

What is happening?

The operating system that is installed and pre-configured to your VMware account is installed on the server and **NOT** the local machine. When you login to your VMware account you are running the operating system on the server machine **NOT** the local machine. Therefore, you can access your VM from any Lab PC.

The term "Virtual Machine" is used to describe the fact that it looks like the different operating systems are running on your local machine when in fact they are running on the server.

Programs and Files

Any programs that you load and any files that you create and save on the VM are loaded and saved on the server machine. They will remain there until your account is removed from the server.

Access to the Local Computers Drives:

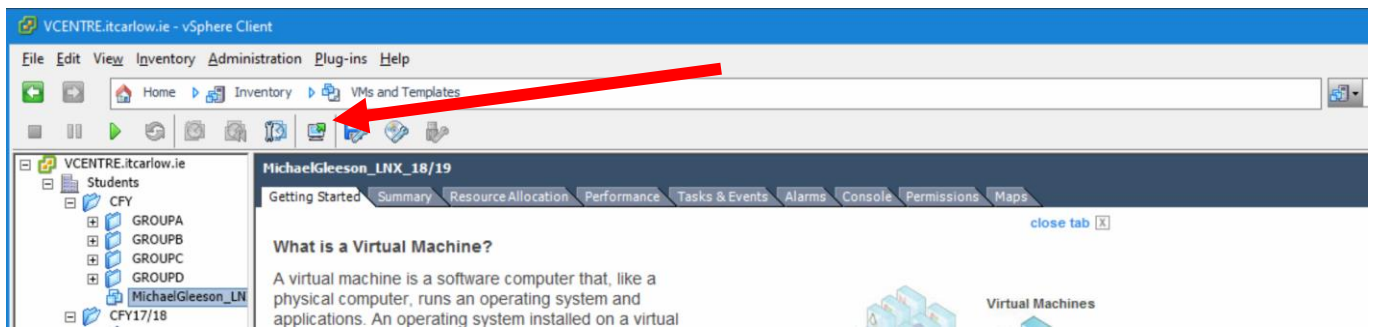
You can access the local computers CD ROM drive from the VM. You can therefore install programs to your Virtual system by using the local USB (or CD ROM if present). ~~You can also access your local floppy drive through the virtual machine (Floppy HAHA).~~

Note: there is a **difference** between the virtual machine you created through VMware Player as opposed to your vSphere VM account on the server.

Task 1: Identify 3 differences

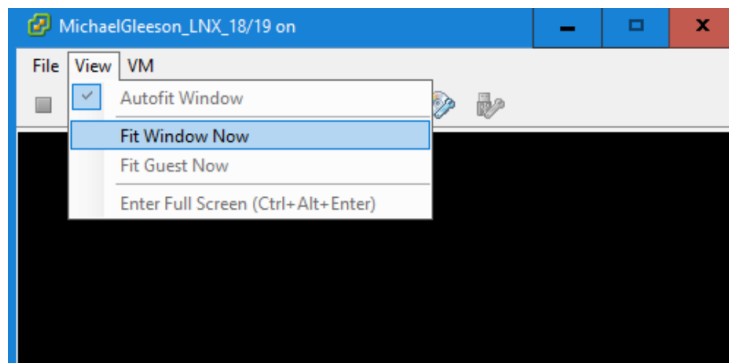
Task 2: Switch on your Virtual Machine and launch your console window

To view your virtual machine in a separate console window, choose this option from the menu.



Task 3: Switch to full screen view.

Choose appropriate option in the View menu



How do you switch back? _____ Try this out.

Task 4: Customise the Windows settings of your VM, for yourself – i.e.

- Change the background image
- Change the screen saver
- Change the resolution

Task 5: Display the 'My Computer', 'User Files', 'Network', 'Recycle Bin' and 'Control Panel' icons on the Desktop.

- Use the instructions from link below to add the My Computer icon to the desktop:
<https://support.microsoft.com/en-us/help/4027090/windows-show-desktop-icons-in-windows-10>

Task 6:

What is the resolution of your screen and what does it mean?

Record the lowest resolution of your monitor: _____

Record the highest resolution of your monitor: _____

Change the resolution of your machine to 800 by 600 if you have not already done so.

Task 7: Install Libre Office on your Virtual machine

LibreOffice is an Open Source software application with similar functionality to that of Microsoft Office. LibreOffice includes several applications that make it the most powerful Free and Open Source office suite on the market, download it from: <https://www.libreoffice.org/download/download/>

- Then install this free office software package.

Task 8: Check that all the applications work.

Task 9: Operating System and Applications.

How much hard disk space did **Libre Office** take? _____

What applications do you have loaded on the machine? _____

Can you use the CD, floppy disk drive and other drives? _____

If so, how do you use them? _____

How do you check the computer's hardware and driver software of the computer hardware?

- **Hint:** Right-click the **My Computer** icon you have previously added to the desktop and then click on "System Properties".

Task 10: Finding out/checking the resources of the local computer and your Virtual Machine

	Local Machine	Virtual Machine
What is the name of your computer?		
How much RAM does the machine have?		
How big is the hard disk and how full is it?		
What version of Windows is running?		
Does it have a service pack loaded?		
What is the CPU make on the machine how fast is it in Ghz?		
Does it have a DVD drive or does it have a CD RW drive or CD R drive?		
What drivers are being used for the CD ROM and Video card?		

Task 11:

Pin the calculator application to the **taskbar**. How did you do this?

Start the calculator application by clicking on the point on the taskbar you pinned it to.

- Now unpin the calculator application from the taskbar. How did you do this?

Repeat for the Notepad application but this time pin to the Start Menu.

Task 12:

How would you uninstall a program in Windows 10?

- State what menus you access in order to carry this out
 - You do not need to carry out the uninstall only state how you would do it
-
-
-

Partitioning your drive

No matter the capacity of your PC's hard drive, chances are that it's set up to function as one giant data dump. To manage and organise the data better, dividing your drive into multiple *partitions* (additional drive letters) can make life easier: A disk can be split into one or more partitions (also called volumes in Windows). Typically, each disk in a system contains a least one partition which is the structure in which files and directories reside. In systems which have more than one partition, each partition can be used to provide several separate areas within one disk, each treated as a separate storage device. At the least, keeping all your data--such as documents, worksheets, and images--in a partition separate from the operating system and applications simplifies backups and can increase your PC's performance.

And if you plan on using multiple operating systems (adding Windows 7 or even installing Linux), then you'll absolutely need multiple partitions. Think of a partition as a container for data, like one drawer of a filing cabinet.

- Each partition uses a **file system** (directories and files) to store and name data.

Primary Drive and Logical Drives

Partitioning a hard drive is *not* complicated once you understand the basic idea behind it. What we need to understand is the way the partitions are laid out on the drive. Consider this example : we have a 20 GB hard drive and want to divide it into 4 partitions which the PC will now see as four independent drives 'C', 'D', 'E', 'F'. Each drive (partition) we want sized as follows:

'C' partition = 8 GB

'D' partition = 4GB

'E' partition = 4GB

'F' partition = 4GB

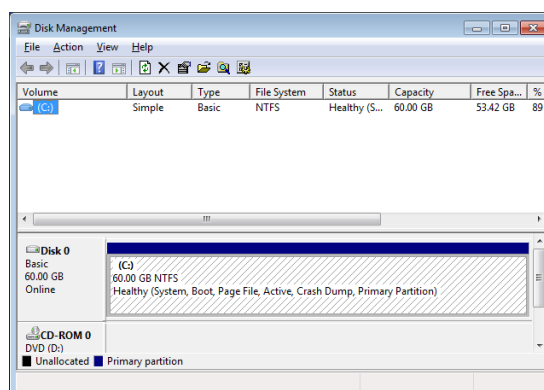
No matter how many partitions you split the drive into, it is first divided into only two, a **primary drive** and an **extended drive**. The primary drive (C:) will be the first partition and then all further partitions will reside within the extended partition as '**logical drives**' (D:, E:, F:)

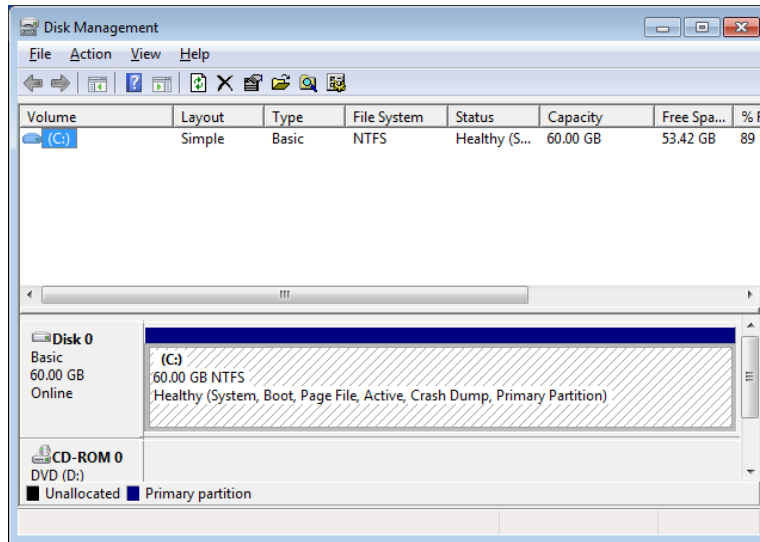
Examining how your disk is laid out.

1. Click the start button
2. Key in **diskmgmt.msc** and press enter

A screen similar to the one across will appear:

- Answer the questions on the following page





What size is the volume? _____

What file system is it using? _____

How much space is free on the volume? _____

Examine the layout of the hard disk on your vSphere VM

Your drive has the **primary** partition already set up.

What is a primary partition?

What size is the hard disk? _____

How many partitions are there? _____

What drive letter is the primary partition ? _____

What size is it ? _____

Do you have an unallocated partition and if so what size is it? _____

What is the default allocation unit size (cluster size) of a Windows 10 computer system?

Task 13: Create a partition

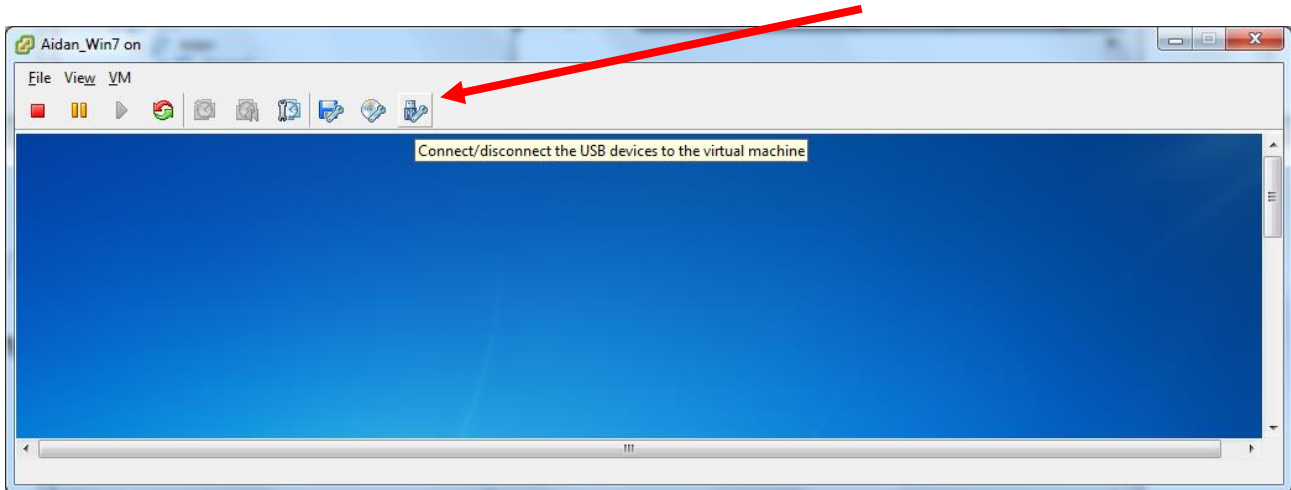
Create a **second** partition. It will be a smaller partition of 1.5 GB. It could be used to store user data.

What network drive letter did you assign to the new partition? _____

Do you now have an unallocated partition and if so what size is it? _____

Task 14: Using your memory stick on the virtual machine

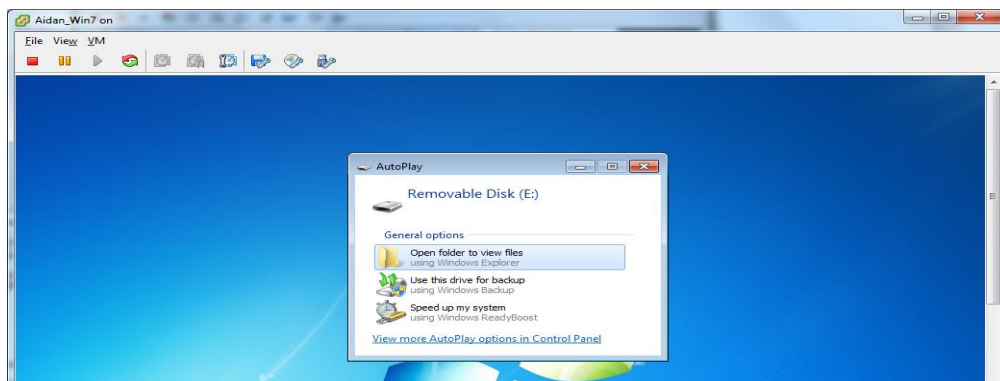
- Insert your USB memory stick to the Lab PC
- Click the connect/disconnect USB devices button
(rightmost button on the list of icons you see in the screenshot below)



- Choose Connect to USB device and then Transcend USB Mass Storage Device.



- Click the ok button on the next screen.
- Click "Open Folder to view files" as on the screenshot below:



- Your memory stick is now accessible in Windows Explorer.

End of Windows Lab 7

Page left intentionally blank for notes

Windows Lab 8

System and Disk Utilities

Objective: To use the full range of system and disk utilities available

At the end of this lab, you will be able to use utilities such as:

- File History (Windows 10)
- Backup and Restore (Legacy Win 7)
- System Restore
- Schedule Backups
- Service Packs and Updates
- Disk management
- Chkdsk
- Disk defragmentation

Instructions

Log into your VMware account to carry out this lab sheet, don't attempt it on the local machine.

Remember to press Ctrl +Alt to get out of the VM and return to the menus and local machine.

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Windows 10 Backup and Recovery Tools

Windows 10 includes several different types of backup and recovery tools. And we're going to take a look at all of them.

Sometimes, bad things happen to good computers. Fortunately, Windows includes a number of tools you can use to make sure your files are properly backed up and to recover your computer should you need to. On the backup side of things, File History is the primary backup tool in Windows 10. It offers not just full backups, but also a way to restore previous versions of files.

- Microsoft also includes the old Windows 7 Backup and Restore in Windows 10 and it works the same way it always has, allowing you to perform selective or even full image-based backups.

On the Recovery side of things, Windows offers a full recovery environment you can use for troubleshooting and recovery, as well as the ability to fully reset your PC to its default settings.

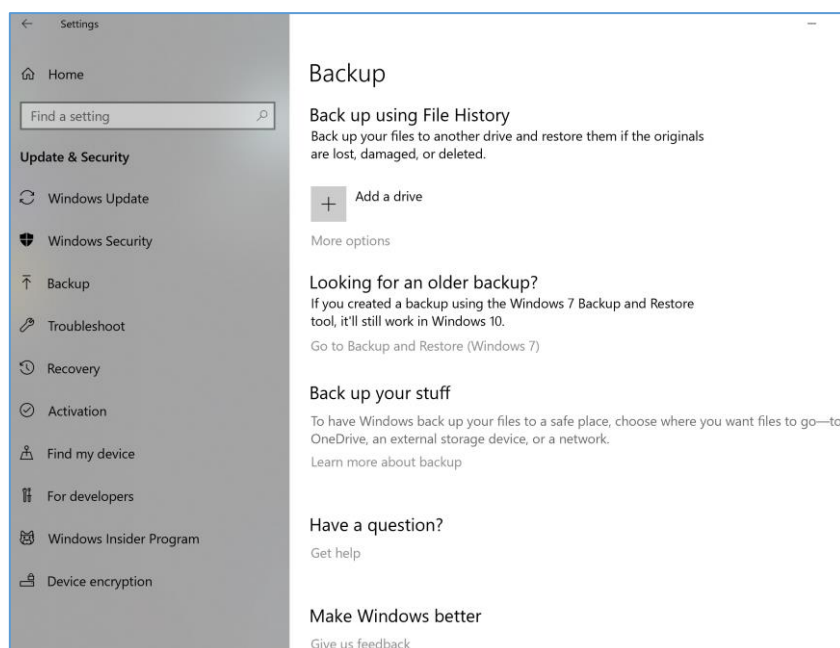
Section 1: Built-In Backup Tools in Windows

You've heard the advice a million times, but it's still surprising how many people don't take the time to make sure their files are adequately backed up. As a computer science student, you need to back up your files, your assignments, code any data you might require – **BACK IT UP!** Windows itself provides some pretty solid tools to get the job done. Note that it's not only about backing up to an external hard drive. You also should be creating offsite backups—or at the very least, storing a copy of your backups in a different location. You have no excuse not to, you're the expert now!

File History (Windows 10)

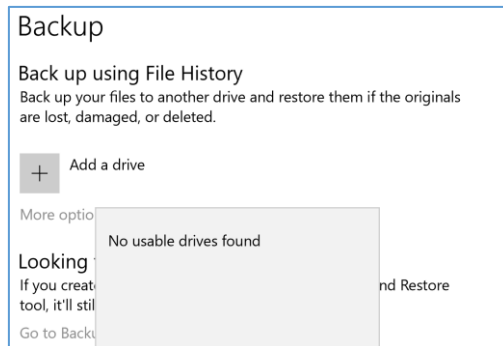
File History was first introduced in Windows 8 and continues to be the primary built-in backup solution in Windows 10. File History doesn't create a full backup of your entire PC. Rather, it focuses on making sure that your personal files are backed up. You set up File History to back up all your files to an external location drive and then you just let it do its job. It not only regularly backs up files, it also retains previous versions of files that you can easily restore.

To access go to Settings -> Update & Security -> Backup Tab



Task 1:

Once you click on Backup using File History, you will need to enable your USB drive (or OneDrive) for File History, this may or may not be possible with the vSphere system but try regardless.



Read the following and configure your VM to enable File History and try to do this with either OneDrive or a USB Drive. Record your notes on the success or failure of this task.

- <https://www.howtogeek.com/74623/how-to-use-the-new-file-history-feature-in-windows-8/>

Backup and Restore (Windows 7)

Microsoft also kept the old Backup and Restore feature from Windows 7 around. The Backup and Restore (Windows 7) tool allows you to restore any of your old Windows 7 backups onto your Windows 10 computer, likely why the tool is still around but you can also use it to back up your Windows 10 PC in the exact same way you'd back up a Windows 7 PC.

Unlike the newer File History backup solution, you can use Backup and Restore to more easily create a backup of practically everything on your hard drive. However, it also does not feature File History's ability to maintain older versions of your files.

You can find the tool by hitting Start, typing "backup," and then selecting "Backup and Restore (Windows 7)."

[Online Research] List some advantages and disadvantages of each of the new 'File History' or the old 'Backup and Restore' utilities.

File History	Backup and Restore

Video on backups: Watch in your own time (15 mins) <http://www.youtube.com/watch?v=QmtXx16uSQA>

Backup: What is a backup?

Restore : What does restoring mean?

Task 2: Why are backups important?

Why is it important to backup the data that resides on each of the following media?

Hard disk: _____

Memory stick: _____

Task 3: Open up Windows 7 **Backup & Restore** utility. Where did you find it?

Task 4: Create two word documents called **report1.odt** and **report2.odt (Libre Office)** and save them to a folder in the root of the C: drive called **Reports**. Type your name in one of the files and your address in the other.

Using Windows 7 Backup and Restore utility:

You will need to setup the Backup if this is the first time you have used this utility.

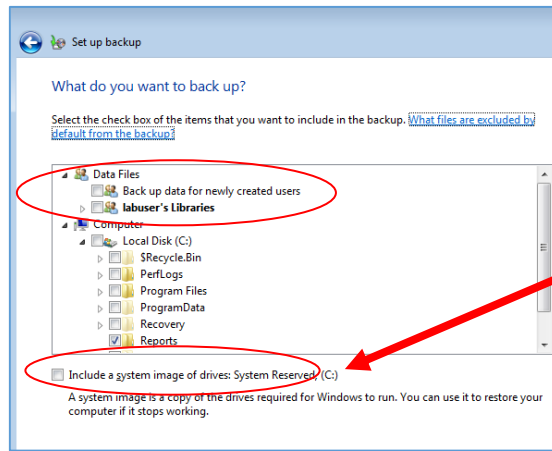
- See the following website for details on how to use the Windows Backup and Restore utility:
- <http://www.howtogeek.com/howto/1838/using-backup-and-restore-in-windows-7/>

Task 5: Use the Windows backup utility to perform a Backup of the **Reports** folder and save it to the **Partition** that you created in Windows Lab 7.

Note: the partition must be **greater than 1GB** in order for it to be used with the Windows backup utility. You should create a suitable partition if you don't already have one (See Lab Sheets 6 or 7)

IMPORTANT: These two files should be backed up within the one backup file.

Be **careful** to make sure you **untick** the option to create a **system image** of the C drive or that you are not backing up any **library files**. See diagram following.



What were the steps you took?

Check the details of the backup.

To check the backup details, double click the option "Manage Space" option.

It gives you some summary information about the backup file. You can see the individual backup files if you click the "View backups" button.

Can you see the details about the backup file you have just created? _____

What information does it tell you about it?

Look at the backup file you have just created. What is it called? _____

What size is it, having backed up the 2 files listed above? _____

- You can also choose to delete the backup if you want.

Task 6: Delete the 2 report files from the C: drive. Use the Backup Utility to **restore** them to their original locations. Check it has done it correctly.

Did it work?

Task 7: Create another folder on your C drive called **All Pictures**. Copy 2 picture files to it. Change the settings of the Backup to copy this folder also along with Reports folder.

- Run the Backup again and check that both folders have been backed up.

Delete **one** of the pictures from the All Pictures folder. Use the **restore utility** to restore it. Use the search on filename facility in the restore utility to find the file in the backup file. Choose to restore this file **only** to its original place. Check that the file was restored.

Did this work?

Task 8: You can use the Backup utility to create a **system image**. **Don't try this, just document it!**

What is a system image and why would you create one?

Where in the Backup utility can you create a system image?

Task 9: You can use the Backup utility to create a **system repair disk**. **Don't try this, just document it!**

What is a system repair disk used for?

Task 10: Where in the Backup utility can you create a system repair disk?

Scheduling of backups

Task 11: How would you schedule the last backup you created, to back up the files on the 1st of each month at 1am? Describe the settings used to do this.

Section 2: System Restore

Sometimes, the installation of a program or a driver can cause an unexpected change to your computer or cause Windows to behave unpredictably. Usually, uninstalling the program or driver corrects the problem. If uninstalling does not fix the problem, you can try restoring your computer's system to an earlier date when everything worked correctly.

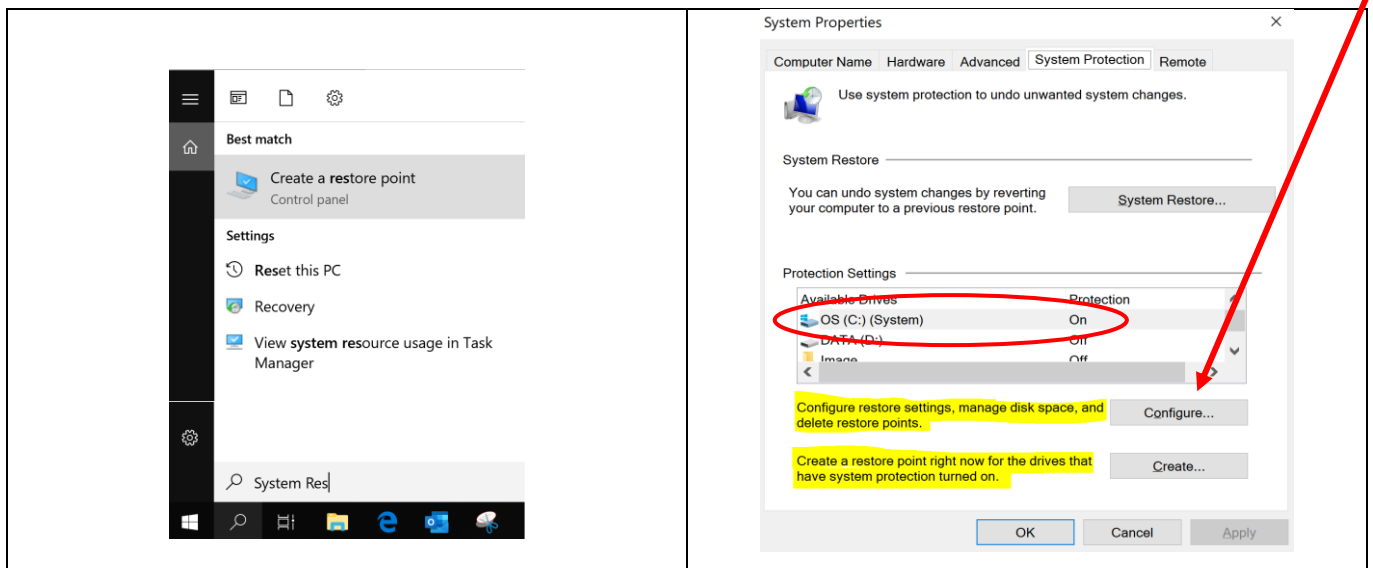
System Restore uses a feature called System Protection to regularly create and save **restore points** on your computer. **These restore points contain information about registry settings and other system information that Windows uses.** You can also create restore points manually.

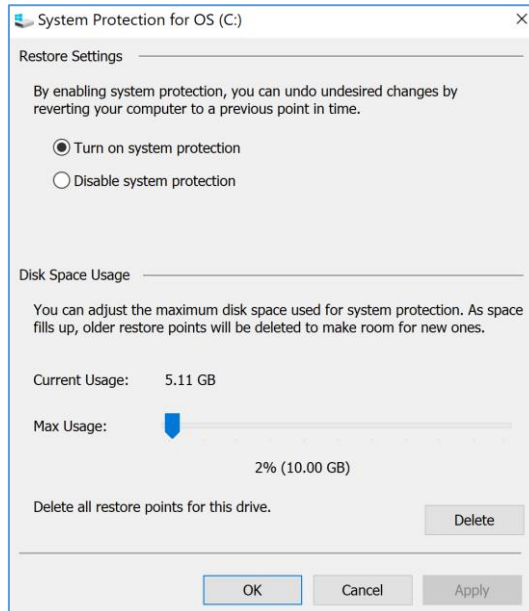
- Ref: <http://windows.microsoft.com/en-ie/windows7/restore-system-files-and-settings>

Task 1: What is a “System Restore” in Windows 7 and why would you create one? In your OWN words only.

- Run the System Restore utility. Can you find it? In Windows 10 you can search for programs by typing in the name in search
- You may need to **turn on** the System Restore on your computer system.

Choose C: drive and Configure





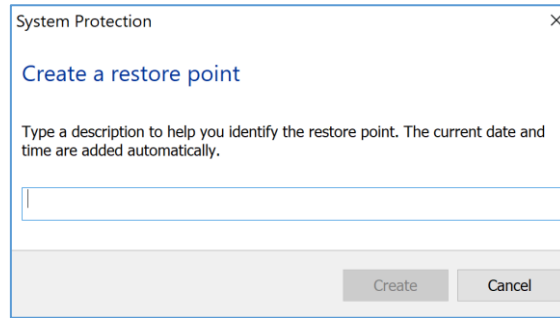
Task 2: What does it mean to Turn on System Protection?

Task 3: What does 'Disk Space Usage' mean?

Task 4: What is the minimum amount of disk space you have to allocate to set up restore points?

Task 5: Can it be increased and to how much?

Your system may not have any system restore points already created. So you will need to create some.



Task 6: Create a Restore Point and call it **RestorePoint1**. How did you do this?

Task 7: Create a text file in Notepad called **Test.txt** and save it on your C: drive. Type in your name and address into this file.

Download and install any piece of software. For example: the PDF reader application called **Tidy View** from the following website and install it on your VMware computer.

- <http://www.downloadcollection.com/freeware/customer-reviews-on-tidy-view-pdf.htm>

Task 8: Restore your computer system to the restore point created earlier: **RestorePoint1**. Carry this out on your **vSphere VM only**. Check to see what programs and settings are affected by the restore before you carry it out. What does it say?

Did it work? _____ Is Tidy View still there? _____ Is the file Test.txt still there _____

Task 9: Summarise your findings.

Task 10: What problems if any, might you encounter after a system restore?

Task 11: If you accidentally delete user files i.e. personal data files or pictures, could you use a restore point to recover them? Explain!

Section 3: Service Packs and Updates

Task 1: What is a **Service Pack**? [Online Research]

Task 2: [Online Research]

How many service packs have been released for Windows 7? _____

How many service packs have been released for Windows 10? _____

Are Service Packs still released for Windows XP? _____

What is the implication of this? _____

What service pack is currently running on your **vSphere VM** and how did you find out?

Task 3:

You could set up your computer to **automatically** install the most up-to-date updates. Don't make this change to your VMware machine but find the menu to do so. What are the advantages and disadvantages of doing this?

Task 4: What other ways can you set up the computer to alert you to operating system updates?

Section 4: Utilities

Disk Management is a utility for managing [hard disks](#) and the [partitions](#) or [volumes](#) that they contain. With Disk Management, you can initialize new disks, create volumes, and format volumes with the [FAT](#), [FAT32](#), or [NTFS](#) file systems.

Chkdsk is a utility creates and displays a status report for a disk based on the file system. It also lists and corrects errors on the disk

Defragmentation is a utility which rearranges files stored on a disk to occupy contiguous storage locations in order to increase access speed.

Disk Management

How do you start the disk management utility? _____

Task 1: Write down the drives, partitions and other information that the **disk management system** sees about your vSphere VM system.

Is your machine partitioned? _____

How do you know this?

Chkdsk

Task 2: Chkdsk can be run as a **GUI** utility. Where can you find this GUI version?

How would you get it to scan for and attempt recovery of bad sectors?

Task 3: Go out to the command prompt. Look up help on the **chkdsk** utility.

What is it used for?

Task 4: Run the **chkdsk** command from the command prompt on your primary drive.

What happened?

Note: Windows 10 has been implemented with security in mind, any process is launched under restricted mode to prevent users from performing tasks which is against their user rights and permissions. This feature may be extremely useful for normal users but for computer experts this feature can be annoying.

If you want to run an administrator type program at the command prompt or install something on your Windows 10 and you see a prompt with message "This Setup Must be Launched from an Elevated Command Prompt", you need to launch the command prompt with full admin rights and permissions.

[Online Research] Find out how to start the command prompt in elevated (administrator) mode.

Task 5: Start the command prompt in elevated mode, how did you do this? and run the chkdsk command again. Did it work this time?

Task 6: Run the chkdsk command again. Did it work this time?

Task 7: Check out what switches are available for the chkdsk command.

/F

/R

Disk Defragmentation

Task 8: How can file access speed be increased by defragmenting your medium?

Task 9: Does your hard disk require defragmentation? _____

How did you check this?

Disk Cleanup

This program is great utility to **free up space** on your computer's hard disk.

Task 10: Run this software to analyse the C:\ drive of your computer (both local and virtual machine). How much space can it free up?

Note: There is NO need to actually run the utility to free up the space on the local C drive.

- Local PC: _____
- vSphere VM: _____

Task 11: How does it free up space on your computer's hard disk? [Online Research]

End of Windows Lab 8

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Windows Lab 9

Windows Security: Firewalls and Anti-Virus

Objective: To examine, configure and implement Firewall utilities and Anti-Virus software

At the end of this lab, you will be able to:

- Implement software based Firewalls
- Allow permitted traffic through firewalls
- Use Remote Desktop Protocol (RDP)
- Install and manage AntiVirus Software
- Configure pop-up blockers and counteract phishing

Instructions

Log into your VMware account to carry out this lab sheet, don't attempt it on the local machine.

Remember to press Ctrl +Alt to get out of the VM and return to the menus and local machine.

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Firewalls and Windows 10

A firewall is a system designed to prevent unauthorised access to or from a network. You can implement a firewall using physical hardware firewall devices or software based, or a combination of both.

Firewalls prevent unauthorised internet/network users from accessing private networks connected to the internet. All messages entering or leaving the intranet (the local network to which you are connected) must pass through a firewall, which examines each message and blocks those that do not meet the specified security criteria.

In most Operating Systems, a firewall is built in to the OS. In Windows 10 the inbuilt Firewall is called Windows Defender Firewall and it is software based. In protecting private information, a firewall is considered a first line of defense – it is not to be considered the only such line, it must be used in tandem with other security measures.

Task 1: Find a suitable video (<5/10 mins) on Firewalls and summarise its content by writing down a brief description **in your own words**.

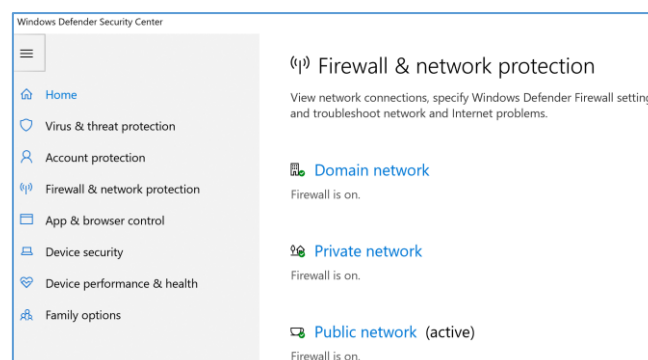
Task 2: Turn on the firewall in Windows 10, if it's not already on. How did you do this?

Refer to:

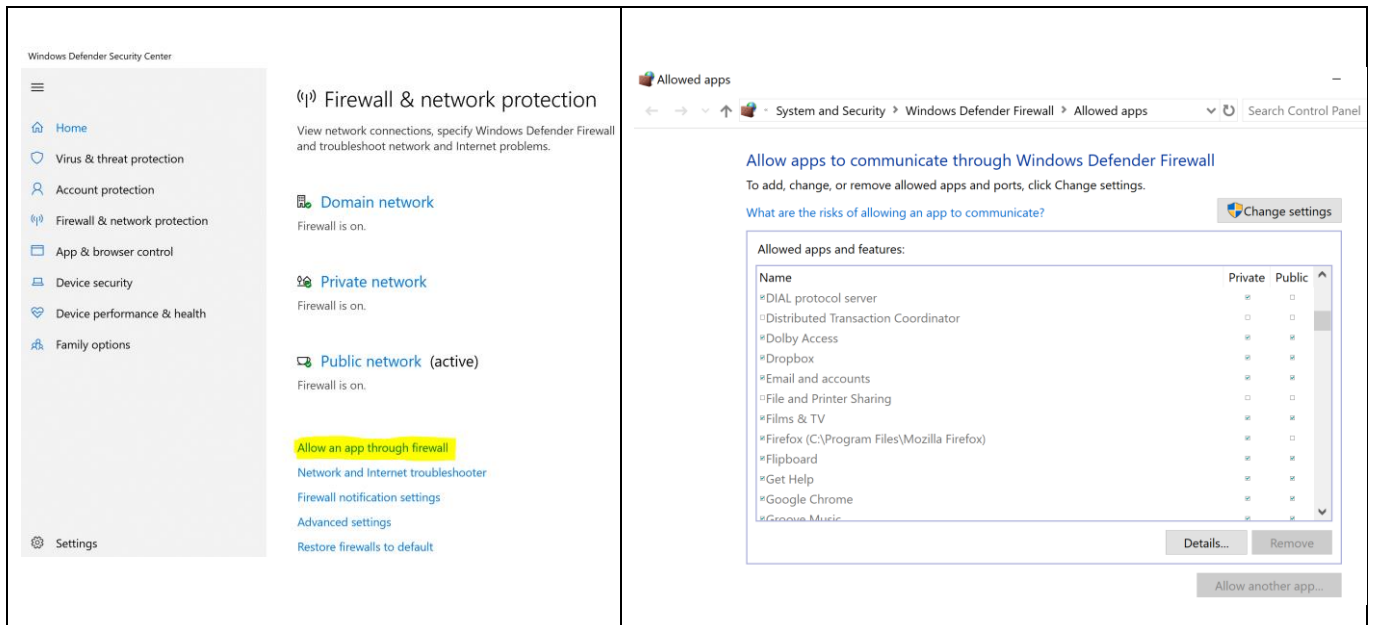
<https://support.microsoft.com/en-us/help/4028544/windows-10-turn-windows-defender-firewall-on-or-off>

You can have different security settings for your computer on different types of networks:

- Your Domain
 - In our case we are on the ITCARLOW domain
- Your home/work (**private**) network
 - This is typically for your Home network, or work (if not on a domain)
- Your **public network**
 - Public would be using your computer when on a train or in a cafe or hotel.



Allow Apps/Programs communicate through the Firewall



Task 3: What is the exceptions list of a firewall used for? How do you use it?

- Ref: <https://www.thewindowsclub.com/block-program-firewall-windows-10>

Task 4: Add Windows Media Player to the exception list, if it is not already done. How did you do this?

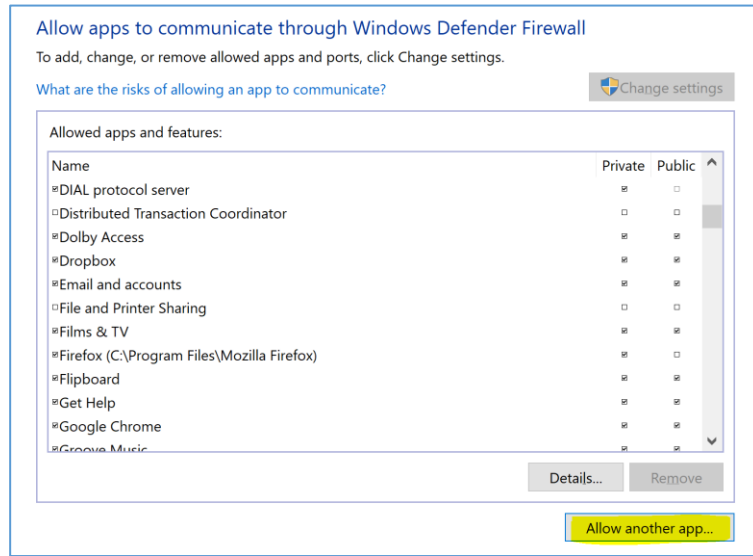
[Online Research] What are the risks of allowing a program to communicate?

- See: <https://www.sevenforums.com/tutorials/542-windows-firewall-add-remove-exception.html>

Now, **remove** Windows Media Player from the exception list.

Task 5: Add a program/app when it is not on the list of “Allowed Programs and Features”

This time we will add an app/program whereby it is NOT on the list of “Allowed Apps and Features”. Click on the “Allow another app”



(Let’s use Windows Media Player again, just for demo purposes). Find the path to the application.

How did you find this? _____

Typically for Windows Media Player it is: C:\Program Files\Windows Media Player\wmplayer.exe. Use this path to add an exception to the firewall. How did you do this?

Remote Desktop Software

Task 6: What is **Remote Desktop Software** used for?

Task 7: In order to let someone connect to your machine, you will need to put a password on your login account.

Goto Control panel/User accounts/Select your account called? _____

Set the password of this account to; **itcarlow**

Task 8: Now you can proceed.

In order to let users connect to your machine, you must first enable **Remote Desktop Connection**. How do you do this?

- **Ref:** <https://www.groovypost.com/howto/setup-use-remote-desktop-windows-10/>

Note: When you have enabled this, examine the firewall exception list again. An extra exception has been checked. What is this exception?

Task 9: Next, you are going to attempt to connect to the Virtual machine of the student beside you using remote desktop.

- To connect, you will require their IP address, Username (labuser) and Password (itcarlow).

Now run the RDS program by clicking

- The **Start** button, then **All Programs**, then **Accessories** and then **Remote Desktop Connection**

OR

- **Windows key + r** (to run a program) followed by **mstsc.exe** (and press enter).

What do you see when the connection is complete?

Task 10: Remove the exception in your firewall that allows for the remote desktop connection to take place and ask for another student to connect to your computer using the **Remote Desktop Software**.

- What do you expect to happen?

- What actually happened?

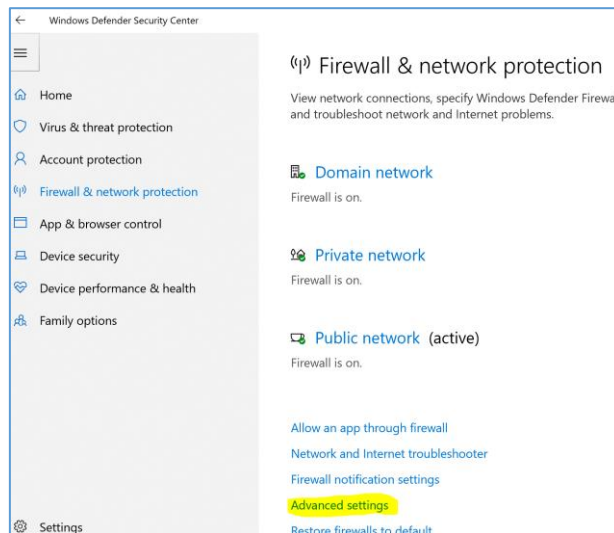
An exception in your firewall allows network traffic access to your computer for the particular exception. Re-enable the exception for the **Remote Desktop Connection** on your computer and ask your class mate to remote desktop into your machine.

- Does it work? _____

Types of Traffic Blocked

Task 11: Adding an exception to the firewall is unblocking an **incoming connection**. Outgoing connections can also be blocked/unblocked.

Access the Advanced settings feature (as per image below)



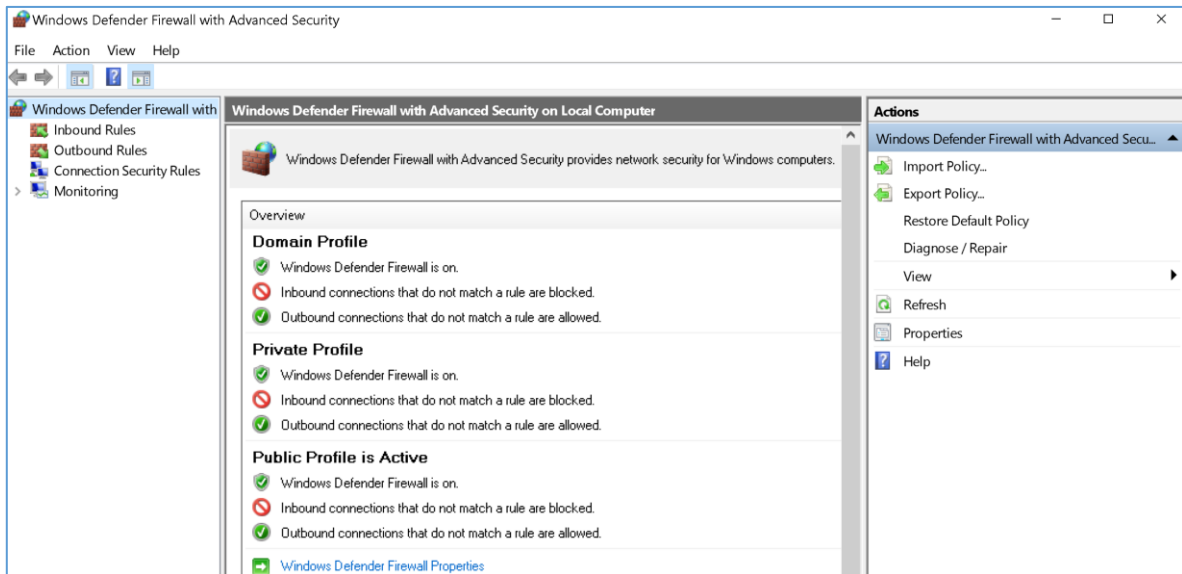
Examine the link: <https://www.faqforge.com/windows/windows-10/how-to-create-advanced-firewall-rules-in-windows-10-firewall/>

Briefly describe the implications of Incoming and Outgoing connections.

Network Profiles

Task 12: There are 3 types of Network profile settings: Domain, Private and Public

What is the difference between them?

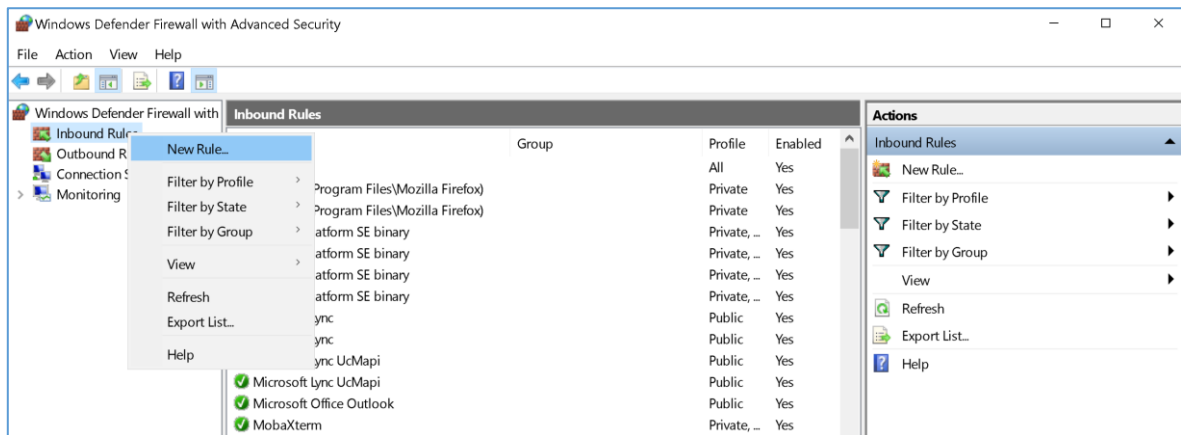


Domain Profile

Private Profile

Public Profile

Task 13: You can block or allow incoming and outgoing connections to a network. Change the setting to Block all Inbound connections on the **Public** network. How did you do this?



Firewall Log Files

Task 14: A log file can be kept for any communication through the firewall **[Online Research]**

What is the name and location of this log file? _____

Is it created by default? _____

What two settings can be set on the firewall? _____

Is there a maximum size for this file and what is it? _____

Ref: <https://www.howtogeek.com/220204/how-to-track-firewall-activity-with-the-windows-firewall-log/>

Task 15: Set up your log file so that it logs if someone tries to connect to your computer and are successful. How did you do this?

Test that this works by getting someone to connect to your computer. Then check if it is logged in the log file. Try to read the log file in Notepad.

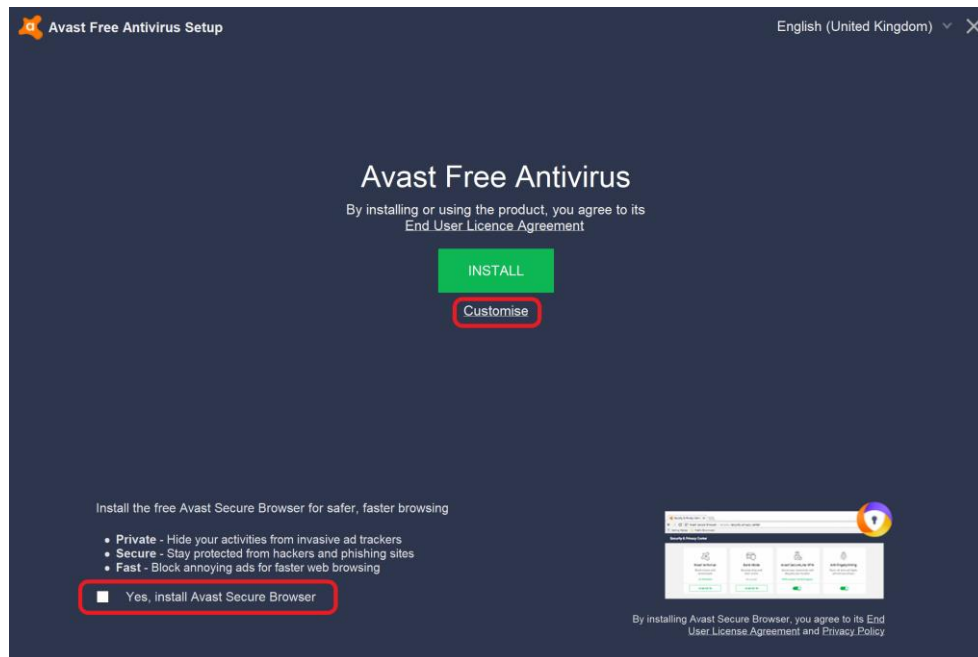
Read this [http://technet.microsoft.com/en-us/library/cc753781\(v=ws.10\).aspx](http://technet.microsoft.com/en-us/library/cc753781(v=ws.10).aspx) to help interpret the log file.

Reset the log file settings to what they were before, when finished.

Computer Security: Antivirus

Task 1: Download and install the trial version of anti-virus software **Avast Free Antivirus**.

- <https://www.avast.com/free-antivirus-download>



Make sure to untick at the bottom left hand side, so you don't install the Avast Secure Browser (not needed) also chose the Customise option and view the different options associated with this software.

Now start the software checking your C drive. Stop it after a minute.

How would you **update** the software with the latest new virus information so that it is able to detect and isolate them? Note: there is no need to run the update.

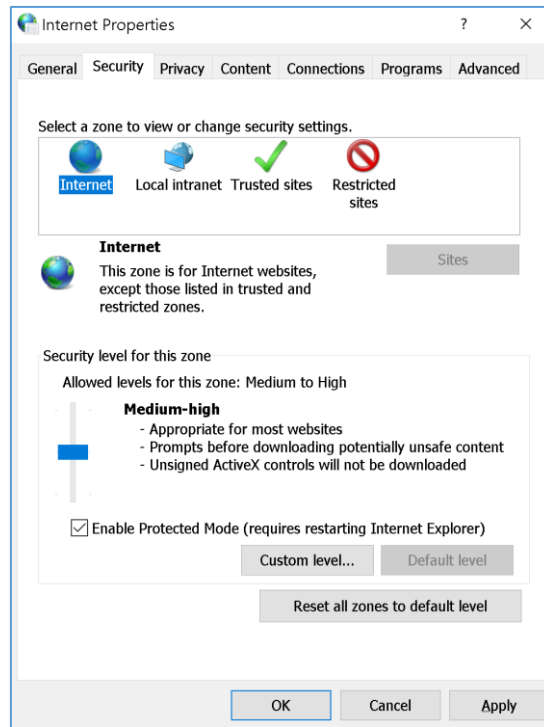
What other software can you get packaged with this Antivirus software.

[Online Research] From a security perspective, why is it important to force windows to show file extensions?

Task 2: How would you set up your OS to display file extensions when displaying file details?

Computer Security: Internet Security Levels

To access Internet Security Levels in Windows 10, select Control Panel -> Network and Internet -> Internet Options -> Security Tab.



Task 3: What security setting is your Internet browser set to and how could it be changed?

Computer Security: Popup Blocker and Phishing Filter

[Online Research] What is a Popup Blocker? Write down a brief description in your own words in the space provided.

[Online Research] What is *Phishing*? And describe what a Phishing Filter/SmartScreen Filter does? Write down a brief description in your own words in the space provided.

Task 5: How do you get into the *Popup Blocker* settings?

In Windows 10

- Ref: <https://www.askdaveytaylor.com/how-to-block-pop-up-windows-in-windows-10/>

[Online Research] What about Internet Explorer, Chrome, Firefox, Safari?

What is the real implication of popup blocker and the range of different browsers? How would you secure your system (if you were an administrator of the system)?

Task 6: How do you turn on the *Smart Screen Filter*?

Note: Phishing Filter has been updated and replaced by SmartScreen Filter in Internet Explorer 8.

- Ref: <https://www.auslogics.com/en/articles/what-is-smartscreen-and-why-is-it-running-on-my-pc/>

End of Windows Lab 9

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Windows Lab 10

Windows User Accounts and File Sharing

Objective: To create and manage user accounts and enable file sharing

At the end of this lab, you will be able to:

- View the current user set up
- Manage Users Folders and Public Folders
- Create a New User Account, both Standard and Administrator
- Check out user capabilities to the C:\Users folder
- Enable and revoke Sharing
- Enable/Disable Fast User Switching
- Perform Windows 10 User Management

Instructions

Log into your VMware account to carry out this lab sheet, don't attempt it on the local machine.

Remember to press Ctrl +Alt to get out of the VM and return to the menus and local machine.

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Task 1: View the current User configuration of the OS

Your VM (and most workstations) have been set up to be used by **one** person. They therefore have only one user account. That account has full administration rights to all the files and control setting of the operating system. They can if they wish delete **any** file they want, including essential operating system files.

Login to your VM account. What is your username? _____

What user type are you? _____

Where did you find this information out? _____

What other user accounts are on your computer? What is their account type?

You have a password on this account from Lab 9. Write down the password here: _____

If this hasn't been done, put a password on the account now!

Task 2: Users and Public Folders

What is in C:\Users folder?

List the folders contained in **C:\Users\Public** folder ?

- Create a folder called reports in the **Public Documents** folder on **Public**.
- Put a file in this folder called report1.txt. We will use and view this later.

Task 3: Create a New User Account

If sharing your PC with others, it is a good idea to set up a user account per user. Having two or more people share a single account often leads to problems. You might not want to share all your files with other people. In what other situation would you need separate user accounts?

Creating a new User Account: Administrator

Create a new user called **Sam**, make the account type **Administrator**. Put a password on this account.

After you create a new account, you must log into the new account to initialise it. This is very important to do as it sets up the permissions on the account and their Users folder.

- **Login as Sam:** You can logout as yourself (labuser) or you can use the switch user facility.

There are **two types** of user accounts, what is the difference between them?

Administrator:

Standard User:

Creating two new User Accounts: Standard

- **Login as yourself (labuser)**

Create a **standard user Lisa** in your computer which has **standard** access.

- No need to put a password on this account yet.
- **Login as Liza**
 - By using 'Switch User' feature.

Note: Liza's account will now be initialised i.e. Users folder set up etc.

Create another **standard user Tom**.

- Login as Tom to initialise his account.
- Change the desktop **background image** for these new accounts and the **screen savers**.

Task 4: Check out user capabilities to the C:\Users folder

A. Check out Standard user capabilities to the C:\Users folder

Login as Lisa and view the files you have access to as **Lisa** in Windows Explorer.

- You will see the **C:\Users** folder associated with the account you have logged into.

What is this folder called? _____ Hint: has a little lock on it.

As a **standard** account, can she see the **C:\Users** folder associated with the other user accounts?

As a **standard** account, can she access the **C:\Users** folder associated with the other user accounts?

What happens?

Explain why?

As a **standard** account, can she access the **C:\Users\Public** folder? _____

Open the file Report1.txt and write your name into it and save it. Was Lisa able to do this?

B. Check out Administrator user capabilities to the C:\Users folder

Login as Sam (Administrator user)

- Change the desktop background image for this new account and the screen saver.

View the files you have access to as **Sam** in Windows Explorer. You will see the **C:\Users** folder associated with the account you have logged into.

Can Sam see and access the **C:\Users** folder associated with the other user accounts?

- C:\Users\Lisa folder Y/N? _____
- C:\Users\labuser folder Y/N? _____

Explain why?

Task 5: Sharing with Everybody, Somebody or Nobody

What access does Lisa have to the folders and files created on the C drive i.e. can she see and modify them by default?

What access does Sam and labuser have to the folders and files created on the C drive i.e. can they see and modify them by default?

Login as Liza.

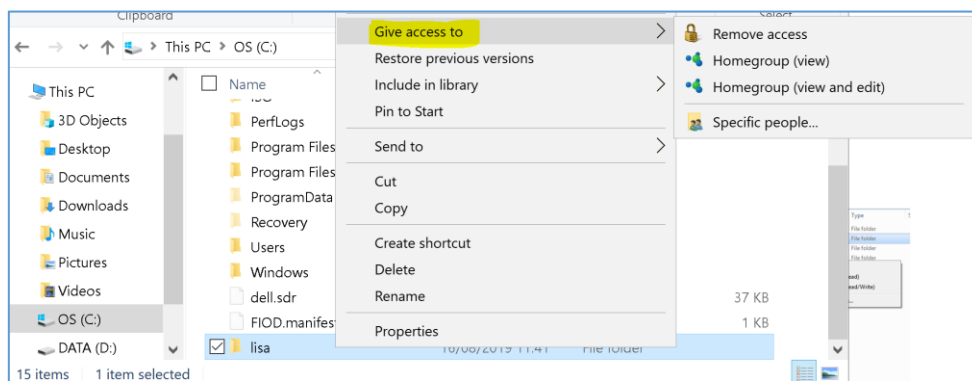
- Create a folder on root **C: drive** called **lisa** folder. Create a text file in this folder called **lisasfile.txt**

Checking Default Access

Login as Tom.

- What access does Tom have to Lisa's file by default?
 - Can he read it? Can he modify it?
-
-
-

How to change the permissions?



Login as Lisa.

Right Click **C:\lisa folder**, choose Share with and choose last option, Specific people... (as per image above)

- Enter **Tom** and set permission:
 - **Read** and save by clicking share
 - What security measure does it now ask you to do?
-
-

Note: You need administrator permission to be able to set sharing rights.

Continue by typing in one of the Administrator users passwords, also set Network Discovery to Yes.

What does **Read/Write** permission mean? _____

What does **Read** permission mean? _____

Login as Tom.

Can he access **C:\lisa folder**? _____

Can he create a folder in **C:\lisa folder**? _____

Can he create a file in **C:\lisa folder**? _____

Open the file, **lisasfile.txt**. Type in your name and save it.

▪ What happens? _____

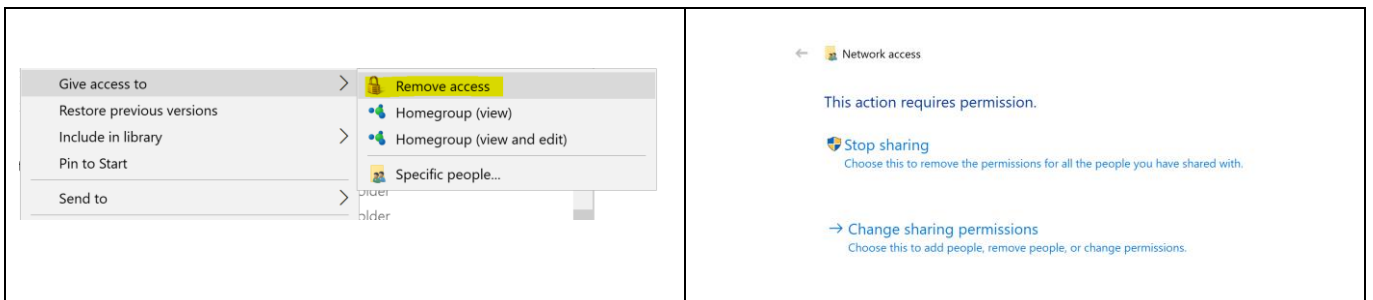
▪ Why? _____

▪ What does the Read permission mean? _____

○ Can Tom modify and save changes to **lisasfile.txt**? _____

Task 6: Remove Access

- Login as Lisa and select Remove Access
- There are two options open to you
 - Investigate both by trying them
 - Login as different users (with and without admin privileges)
 - In the space below summarise your findings
 - Explain what happened, why it happened etc.



In Summary of previous task:

(a) When a user has **Read** permission on a file

Can they open the file? _____

Can they type into the file? _____

Can they save the file? _____

(b) If a folder permission is set to **Sharing with Nobody**

Can an Administrator user open the folder? _____

Can a Standard user open the folder? _____

(c) Is it possible to set sharing options on a file? _____

Task 7: Using Fast User Switching

You have been using the Fast User Switching feature of 7. What is the **Fast User Switching** feature?

Why is it important?

Note: DO NOT shutdown machine when testing this on VM, just log off.

What are the memory implications of using the **Fast User Switching** feature?

Enable/Disable the Fast User switching according to below weblink

- Ref: <https://www.isunshare.com/windows-10/2-ways-to-enable-disable-fast-user-switching-windows-10.html>

Write down the steps used to Disable the Fast User switching

- Now, Re-enable the Fast user switching.

Task 8: Investigate How Windows 10 manages User Accounts

Since the release of Windows 8 in 2012, Microsoft has been moving its operating system towards a cloud-first philosophy. This has a big effect on how you log in to your Windows 10 PC. Authenticating on Windows 10 takes on two primary methods: a Microsoft Account or a Local Account. Each account can also be configured with different login credentials, privileges, and preferences.

Read the following article and summarise its content by answering the following questions *in your own words* only:

- Ref: <https://www.windowscentral.com/how-manage-local-users-windows-10>

What is a 'Local Account'? _____

What is a Microsoft Account? _____

What is the difference? _____

What is the implication of this new Windows 10 feature for a system? (Think security, policies, setting up accounts, personal devices and personal accounts, control and management).

End of Windows Lab 10

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Windows Lab 11

Windows Batch Files

Objective: To automate tasks on a Windows 10 computer system using Batch Files

At the end of this lab, you will be able to:

- Create and run basic batch files
- Call batch files from within other batch files
- Use replaceable characters
- Apply correct paths
- Perform additional error checking
- Author advanced batch files

Instructions

Log into your VMware account to carry out this lab sheet, don't attempt it on the local machine.

Remember to press Ctrl +Alt to get out of the VM and return to the menus and local machine.

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

What is a Batch File?

Simply, a Batch file is a file that contains a list of commands that will be executed in sequence.

- All commands within the file are executed when you run a batch file. The commands execute one by one. A command within a batch file can be used to start/run another application, for example you could start MS Word.

Why batch files are useful?

A batch file could be used to execute frequently run commands, deleting a series of files, moving files, copying files etc. A simple batch file does not require any special programming skills and can be done by users who only know DOS commands.

Batch files are useful for system administrators. They could write a batch file to create and configure user accounts. Instead of creating each user account individually through the GUI, they could run the batch file and create the accounts automatically. This will save a lot of time and effort.

- Take the example of creating all the CFY network accounts within the college, how long would it take to create these using the GUI? Over 100 students? What if you could automate this task?

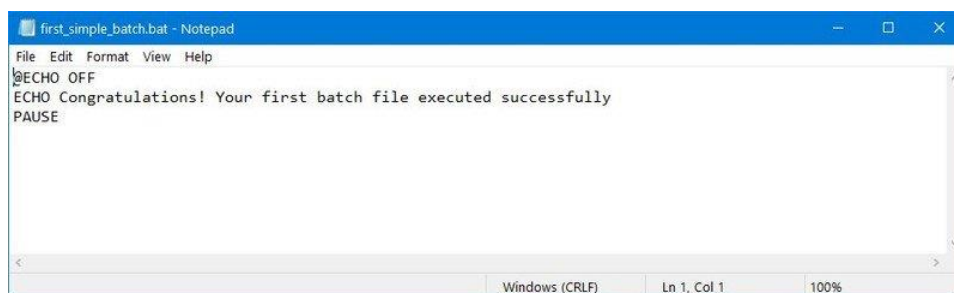
The Main Advantages to Using Batch Files:

- Fewer keystrokes required to perform computer operations
- Less chance of making typing errors
- One command can execute an extended chain of complicated operations
- Major time savings

Task: Take a look at these links to preface what we are going to cover in this lab:

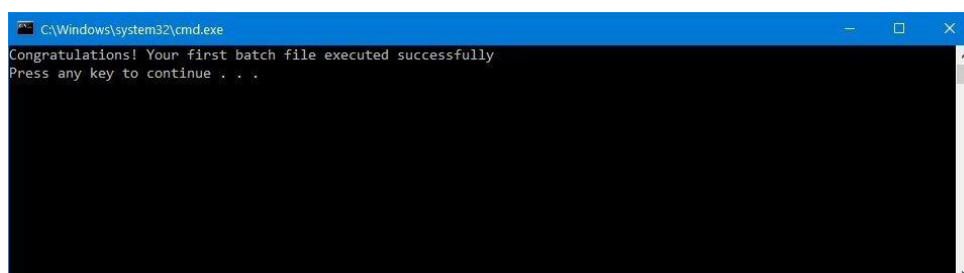
- <https://www.windowcentral.com/how-create-and-run-batch-file-windows-10>
- <http://www.trytoprogram.com/batch-file>

Example of a Batch File (input):



```
first_simple_batch.bat - Notepad
File Edit Format View Help
@ECHO OFF
ECHO Congratulations! Your first batch file executed successfully
PAUSE
Windows (CRLF) Ln 1, Col 1 100%
```

And a Batch File output:



```
C:\Windows\system32\cmd.exe
Congratulations! Your first batch file executed successfully
Press any key to continue . . .
```

Exercise 1: Create your first batch file

1. Open an MS-DOS command window.
2. Create a directory called **BatchFiles** on the root of **C:\ drive**. You can use this directory to save your batch files.
3. Create a notepad file called **EX1.bat** in the BatchFiles folder.
4. Type in the following lines into the file and Save (each of the lines below is a command)

```
cls
ver
pause
dir c:\windows
```

5. Before continuing, can you remember what the effect of each of the 4 commands that you have typed into the file? If not, look them up in the help.
6. Make sure you are in the **BatchFiles** folder.
7. Key in DIR and **MAKE SURE** you see a file called EX1.BAT
8. At the prompt, type in the name of the batch file i.e. EX1 and press **Enter**.
9. Interpret and ensure that you understand the outcome (the output you see).
10. Put the command **@ECHO OFF** as the first line into EX1.bat
11. Run the batch file again. What is effect of this statement?

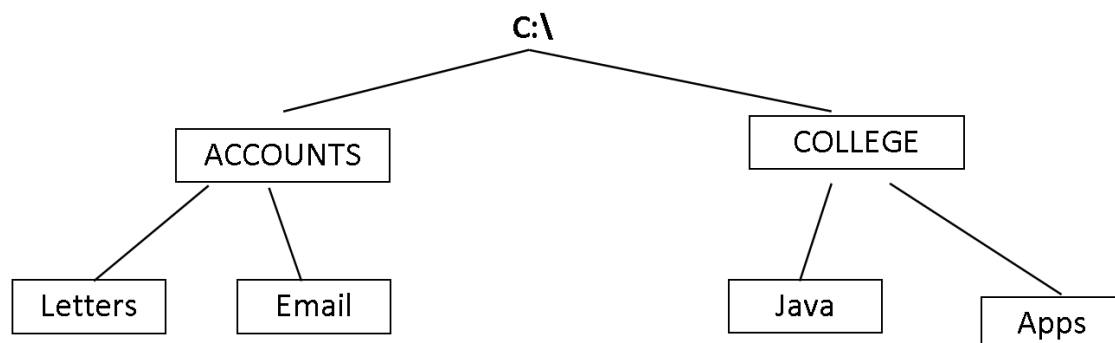
Mini Exercises: Use your prior knowledge of DOS commands and Online Research to complete these

- Create a batch file called FIRST.BAT that displays the current time and date.
- Create a batch file called SECOND.BAT that first clears the screen and then displays the contents of the current directory in order by the size of the files.

Important: Save all your files to the BatchFiles folder

Exercise 2: Create a Directory structure

Write a batch program called **EX2.BAT** that creates the following directory structure on drive C.



Once you have completed the batch file, run it and check either in Explorer or at the prompt that the directory structure shown above has been created.

Add comments to all your batch files using **REM** command at start of the line. **All** of your Batch Files should include the following comments:

- Program purpose
- Author
- Date written

Run the batch file EX2.BAT. Are you now in a different folder to the one you were in before you ran the batch file?

You should not move directory as a result of running a batch file unless that is part of the batch file.

Exercise 3: Wildcards example

Write a batch program called EX3.BAT that lists all files which:

- Start with the letter M
- and have the extension of .EXE
- and are on drive C:\

It should search from the root down through all the subdirectories.

NB: If you want to terminate a batch file during execution, press Ctrl + C.

Exercise 4: Wildcards example

Write a batch program called EX4.BAT that lists all files that match **any** of the following criteria within the Windows folder of the C drive and down through its subdirectories:

- Files with an extension of COM and have 4 letters in the filename (examples: chcp.com, mode.com)
- EXE files whose 2nd letter is *I* (examples: WINHELP.EXE, DIAGS.EXE)

Make sure the output does not scroll up the screen too quickly, put a pause command in between both parts.

Batch Commands

Just like all MS-DOS commands, all batch file commands are not case sensitive.

- However, in the table on the following page we have listed all commands in all caps to help you identify what is a command and what is not.

This table will be beneficial for completing subsequent exercises.

@	Does not echo back the text after the @ symbol. This is most commonly used as @ECHO OFF to prevent any of the commands in the batch file from being displayed, just the information needed.
%1	The percent followed by a numeric value, beginning with one, allows users to add variables within a batch file. Here is an example of what can be used in a batch file. echo Hello %1 When the above one-line batch file is created, add your name after the batch file. For example, typing myname (being the name of the bat file) and then your name: (at the command prompt) myname bob would output: Hello bob Note: This can be extended to %2, %3, and so on.
:LABEL	By adding a colon in front of a word, such as LABEL , you create a category, more commonly known as a label. This allows you to skip to certain sections of a batch file such as the end of the batch file. Also see GOTO .
CALL	Runs a second batch file and then returns control to the first batch file
CLS	Clear Screen
ECHO	Will echo a message in the batch file. ECHO "Hello World" will print Hello World on the screen when executed. Note if you have not typed @ECHO OFF at the beginning of the file this will also print "ECHO Hello World" and "Hello World". If you would just like to create a blank line, type ECHO. (adding the full stop creates an empty line.)
EXIT	Exits out of the DOS window if the batch file is running from Windows.
GOTO LABEL	Used to go to a certain label, such as LABEL. An example of GOTO would be to GOTO END. For an example of this see running different programs.
IF	Used to check for a certain condition if the condition exists. If that condition exists it will perform that function.
PAUSE	Prompts the user to press any key to continue.
REM	Allows you to place comments into the batch file without displaying or executing that line when the batch file is run.
SHIFT	Changes the position of replaceable parameters in a batch program.

Exercise 5: Copy from one drive to another

You will be using the C drive and a different partition on the drive in this batch file. This example uses partition E. You will need to create another partition on your vSphere VM if you have not already done so.

Write a batch program called **EX5.BAT**. It should carry out the following tasks:

- Copy all files with an extension of **ps1** from **Drive C to Drive E**.
 - Use either the **copy** command or the **xcopy** command
 - For example files like profile.ps1 or types .ps1

- **Before** the files are copied across use the **echo** command to tell the user you are doing so.

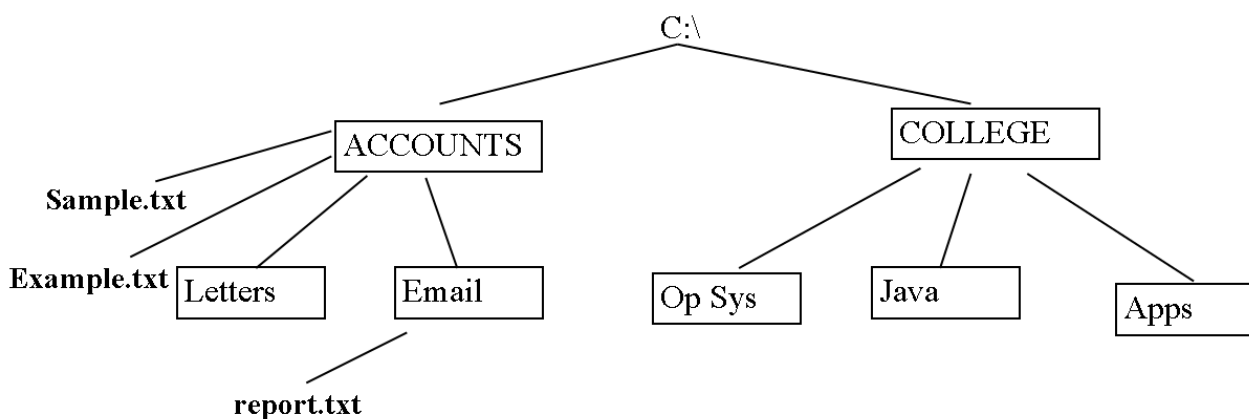
Run the batch program: As an aside, which command (copy or xcopy) is better to use here? Why?

Modifications

Add the **pause** command to your batch file. This line should be inserted before the copy is carried out. What effect does this have on the program?

Exercise 6: Creating a directory structure

Write a batch program called EX6.BAT that creates the following directory structure on drive C. You have already created all folders except the folder called Op Sys. **You should not create the files in the batch file.**



Check either in Explorer or at the prompt that the directory structure shown above has been created.

Create the three files shown in the diagram above using the _____ command.

Exercise 7: Write a batch program called **EX7.BAT** that does the following:

- Copy the file **Sample.txt** to the folder **Letters** and rename it **Sample2.txt**
- Then moves the file **Sample2.txt** to the **Email folder**

Exercise 8: Copying and moving files

Take it that you will be in the DOS prompt at the root directory of Drive C when you run the batch file. Write a batch program called **EX8.BAT** that will:

- Change directory to the **Accounts** folder.
- There are two files **Example.txt** and **Sample.txt** in the directory **Accounts**, write the DOS command(s) to copy the two files to the directory called **Java**
- Delete the file **Example.txt** from the **Accounts** folder and prompt the user to confirm before deleting the file.
- Write the DOS command to move the file **Report.txt** to the folder **Apps** and call it a different name **ReportOld.txt**.

Exercise 9: Removing directories

Write a batch program called **EX9.BAT** that **removes** the **Accounts** directory and all its subdirectories in the previous directory structure.

- Check that it successfully removes all the directories as per the requirements.

Exercise 10: Using the ECHO COMMAND

Write a batch program called **EX10.BAT** that produces the following output to the screen.

- No snowflake feels guilty in an avalanche.
- Not everything that is important can be measured.
- Not everything that can be measured is important.

Ensure the screen is cleared and that there is a blank line under each line of output, recall:

ECHO OFF (turns echoing of commands off).

ECHO. (prints a blank line to the screen).

CLS (clears the screen).

Exercise 11 – Using the call command

Write a batch program called **EX11a.BAT** that contains the following statements:

```
cd..
dir
```

Save it.

What will be the effect of these commands? _____

Create another program called **EX11.bat** which will:

- Change to the Apps folder
- Calls program EX11a.bat
- Echo your name to the screen

What will be the effect of this program? _____

Did it execute the DOS commands in both batch files? _____

What directory are you in now ? _____ How did you get there? _____

Mini Exercises (Continued from Exercise 1)

- Create a batch file called FIRST.BAT that displays the time and date (already done)
- Create a batch file called SECOND.BAT that first clears the screen, calls the batch file FIRST.BAT and then displays the contents of the current directory in order by the size of the files.

Task: Read up on replaceable parameters in Windows Batch Files here

- <https://wishmesh.com/2015/01/replaceable-parameters-in-batch-file/>

Exercise 12: Replaceable parameters

Parameters are special pieces of data that you type after the name of the batch program. This data is used by the batch program to execute commands. This is a way give additional information to the program. They are like variables. It is called 'passing a parameter' to the batch file.

Programs can accept **replaceable parameters** at the prompt, the replaceable parameters are referenced as %1 through to %9

- Write a batch file called **EX12.Bat** which accepts one parameter; the parameter is a person's name. The program will then display the word "Hello" followed by the person's name.
- For example you should be able to run the program as follows from the DOS prompt:

EX12 David

What will be the effect of this given command? _____

What is the current value of the parameter %1? _____

- Modify **EX12.Bat** so that it outputs Hello followed by person's name on one line and message 'Have a good day' followed by person's name on next line.

Exercise 13

Create a batch file called **EX13.bat** that accepts one parameter; a directory name. The program will then create that directory on the C: drive and change into it. For example you should be able to run the program as follows from the DOS prompt:

EX13 Notes

What will be the effect of this given command? _____

Exercise 14

Create a batch file called **EX14.bat** that accepts two parameters, which represents two directory names. The program will create a directory represented by the first parameter on the C: drive. It will then create a sub-directory within this directory, whose name is represented by the second parameter. For example; you should be able to run the program as follows from the DOS prompt:

EX14 Reports IBM

What will be the effect of this given command? _____

Explain why: _____

Exercise 15

Write a batch program called **EX15.Bat** that accepts two parameters – first is the directory name and the second is a file name, it then proceeds to:

- Creates a directory with the same name as the first parameter at the root of the C drive.
- Copies a file with the same name as the second parameter to this folder.

Note: You must create the file first on the C: Drive.

For example; you should be able to run the program as follows from the DOS prompt:

EX15 IBM report.txt

Paths

***** BE CAREFUL when you attempt to change the path, ensure that you do it correctly *****

Use the PATH command to tell MS-DOS which directories to look into when an executable file is not in the current directory. Specific directories where executable programs are located and the path specifies the search path.

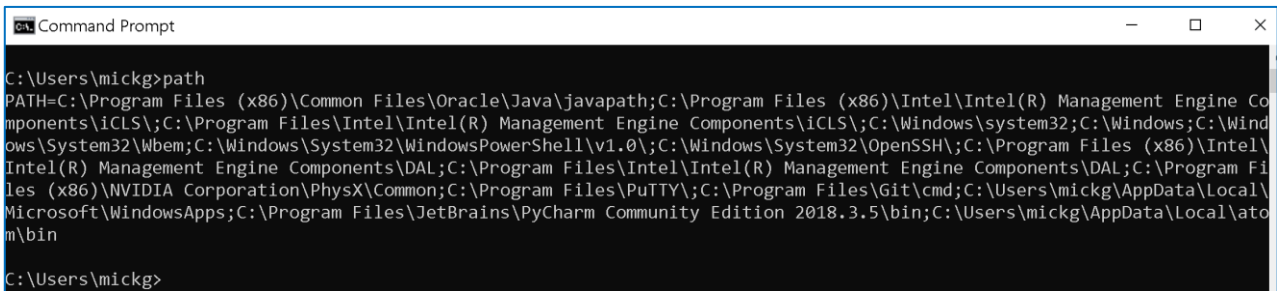
When you enter a line of text at the MS-DOS prompt that is neither a recognized command nor an executable filename in the current directory, MS-DOS will then search through the directories in your PATH for a filename that matches the text you entered. Ref here:

- <https://www.windows-commandline.com/set-path-command-line/> and
- <https://www.robvanderwoude.com/path.php>

There are two ways to add a directory to the path in Windows 10

At the command line (MS DOS)

- At the MS-DOS prompt type: **path**
- An example of what could be shown:

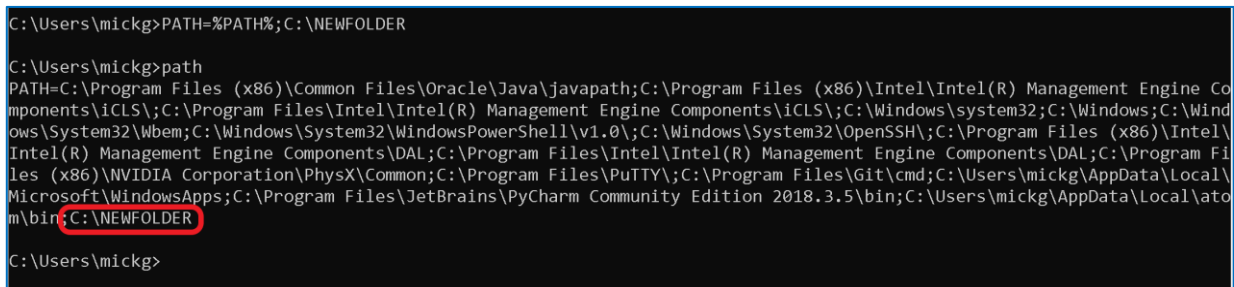


```
C:\Users\mickg>path
PATH=C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\iCLS\;C:\Program Files\Intel\Intel(R) Management Engine Components\iCLS\;C:\Windows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\Windows\System32\WindowsPowerShell\v1.0\;C:\Windows\System32\OpenSSH\;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\Program Files\PuTTY\;C:\Program Files\Git\cmd;C:\Users\mickg\AppData\Local\Microsoft\WindowsApps;C:\Program Files\JetBrains\PyCharm Community Edition 2018.3.5\bin;C:\Users\mickg\AppData\Local\atom\bin
C:\Users\mickg>
```

How to add a directory to the system path at command line:

- `PATH=%PATH%;C:\NEWFOLDER`

Here, the %PATH% represents the existing path, this example command would add C:\NEWFOLDER to the path.



```
C:\Users\mickg>PATH=%PATH%;C:\NEWFOLDER
C:\Users\mickg>path
PATH=C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\iCLS\;C:\Program Files\Intel\Intel(R) Management Engine Components\iCLS\;C:\Windows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\Windows\System32\WindowsPowerShell\v1.0\;C:\Windows\System32\OpenSSH\;C:\Program Files (x86)\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files\Intel\Intel(R) Management Engine Components\DAL;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\Program Files\PuTTY\;C:\Program Files\Git\cmd;C:\Users\mickg\AppData\Local\Microsoft\WindowsApps;C:\Program Files\JetBrains\PyCharm Community Edition 2018.3.5\bin;C:\Users\mickg\AppData\Local\atom\bin;C:\NEWFOLDER
C:\Users\mickg>
```

Through the GUI in Windows 10

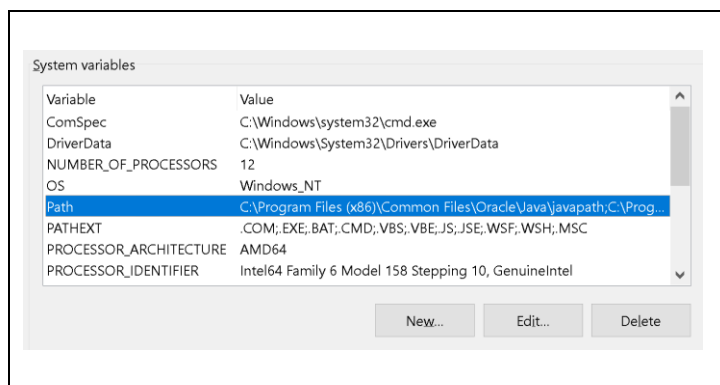
The path is managed in Windows 7 as Environment variables.

Right Click 'This PC'

- Select Properties -> Advanced system settings -> Environment Variables button (at the bottom)

Highlight the **Path** variable in the Systems Variable section (lower section) and click **Edit**. Each different directory is separated with a semicolon as shown below. You can add or modify the path lines with the paths you wish the computer to access.

- Example: `C:\Program Files;C:\Windows;C:\Windows\System32`

	<p>What is the path that you see? (First two locations only required):</p> <hr/> <hr/>
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

Exercise 16: Paths

- Add the directory to the path to allow your batch files to be run from any directory at the command prompt.

How did you do this? _____

Test it:

- Change to a different directory to the one which contains your batch files.
- Now try to run the batch file.

Were you able to run the batch file from a different directory to the one the batch file is stored in? _____

Why or Why not? (If this did not work successfully retry until it works!!)

Error Checking

IF (Condition)	permits the conditional execution of a DOS command - format: if string==string command eg. IF '%1'=='Fred' Echo Don't forget your keys!
IF (Condition) ELSE	eg. IF '%1'=='Fred' (Echo Hi Fred) ELSE (echo Not Fred) The ELSE clause must occur on the same line as the command after the IF
IF NOT (Condition)	allows you to execute a command if a condition is not met - format: if not string==string command eg. IF NOT '%1'=='Wendi' Echo Have a nice day!
IF EXIST (Condition)	- format: IF EXIST filename command eg. if exist hello.bat echo File Hello.Bat is present on system

- Also see: <http://www.trytoprogram.com/batch-file-if-else/>

Exercise 17

Create a batch program called EX17.bat that checks to see if a file (entered by the user as a parameter) exists. If it does not exist, send a message to the user. If it does exist, rename it (second parameter entered by the user).

Exercise 18: Error Checking

- Create a batch file called **EX18.bat** that accepts one parameter; a directory name. The program will then create that directory on the C: drive and change into it.
- Add error checking
 - It should print an error message, if it parameter has not been supplied.
 - If parameter is specified, it will create a directory with that name.

Use the code snippets below to help you, this code checks whether the user has supplied the parameter.

Using IF	Using IF... ELSE
<pre>@echo off if "%1" == "" GOTO No-Directory Echo. Echo Directory Specified Echo. GOTO End :No-Directory Echo. Echo No Directory Specified Echo. :End</pre>	<pre>@echo off if NOT "%1" == "" (Echo. Echo Directory Specified Echo.) else (Echo. Echo No Directory Specified Echo.)</pre>

Exercise 19: Add error checking to Exercises 14 and 15.

- Modify both these batch programs to perform error checks.

For EX14, what error checks should be included?

For EX15, what error checks should be included?

End of Windows Lab 11

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Windows Lab 12

Windows Process Management

Objective: To understand and manage Windows processes

At the end of this Lab you will be able to:

- View processes via the Task Manager
- Visualise Process Management
- Use the tasklist and taskkill commands
- View running programs and monitor CPU usage

Instructions

Log into your VMware account to carry out this lab sheet, don't attempt it on the local machine.

Remember to press Ctrl +Alt to get out of the VM and return to the menus and local machine.

It is important that you complete this and other lab sheets even though you feel you are familiar with the content.

Use the Help option and the internet to find out information on doing the following tasks.

Complete each task in this document and record the answers (in your own words).

This completed sheet will then be useful for later use.

Processes:

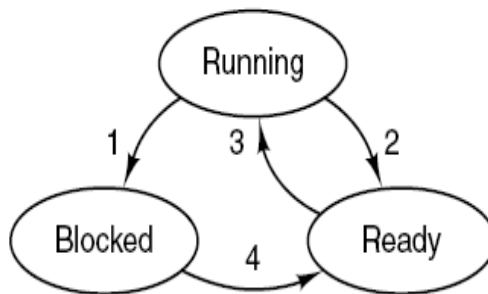
Windows, like most modern operating system, is multitasking, which means that it can execute many programs simultaneously. A program that is currently executing is called a **process**. A Windows system consists of several dozen active processes at any time.

Some of these processes are system processes that perform important “behind the scenes” tasks and some are user processes corresponding to programs like Internet Explorer or MSWord.

(Basic) Process States:

- **Ready:** in queue, Ready to execute, waiting on the CPU to become free
- **Running:** Actually using the CPU
- **Blocked/Waiting:** Not ready to execute, but waiting on some event to occur before it will be ready again (e.g. maybe data from a file)

Process State Diagram:



Theory Review Questions:

A process changes states throughout its lifecycle, what do the transitions 1-4 above represent.

1. _____
2. _____
3. _____
4. _____

On the diagram above, Label A and B as appropriate:

Label A: Where a new process enters the lifecycle and **Label B:** Where a terminated process leaves.

What is the difference between a program and a process? Give an example to explain your answer?

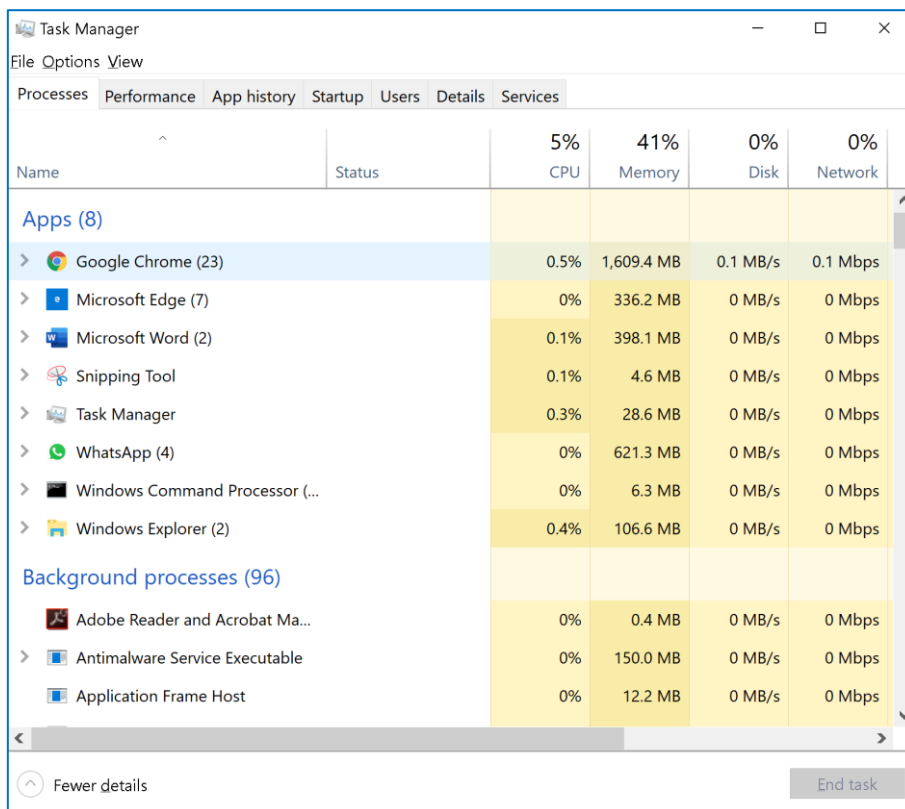
Process Management:

Task 1: Starting the Task Manager GUI in Windows 10. Use **Ctrl + Alt + Insert** to start the Task Manager in the vSphere VM. How do you start it normally?

What is the Task Manager in Windows 10 used for? Write down a brief description **in your own words** below.

Start **Microsoft Word, Notepad** and **Internet Explorer**.

- In the Task Manager view the applications that are currently running on the machine. Explore the GUI.



Task 2: What information is given about the processes running on the computer?

Select the Process Tab, what **columns** of information are visible and what do each mean?

Task 3: Kill the Microsoft Word process.

What will happen to any word document you had not saved when you kill Microsoft Word, would it be lost?

Task 4: Approximately how many processes are running on the computer? Why are there so many processes when you only have a few user applications running on the machine?

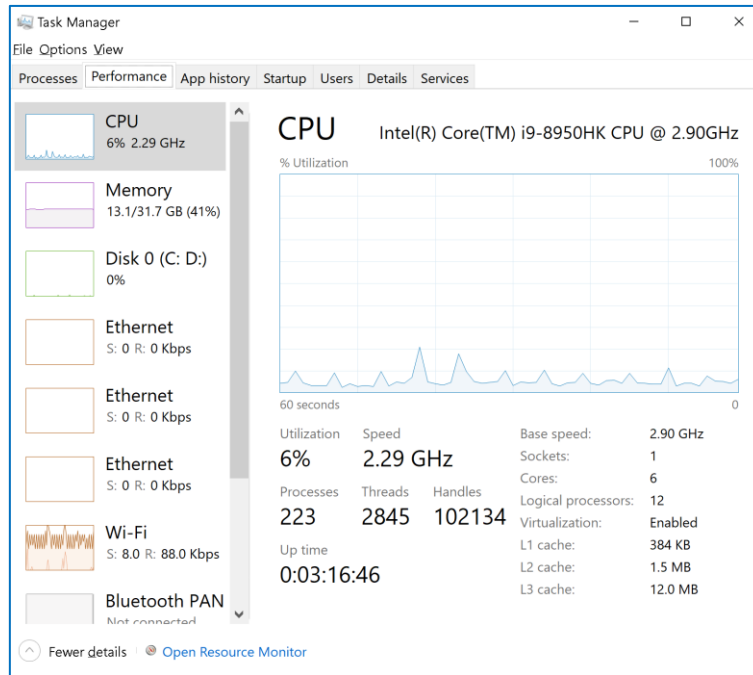
How many processes are actually executing on **one** CPU at a given instant in time?

Is it typically necessary to change the priority of a process? Why/Why not?

Is it possible to change the priority of a process? How?

Why might you need to change the priority? (if it is possible)

Task 5: The performance tab shows you several graphs, all updated in real time. Used to monitor performance of the system. What use is this data to you? What information can you tell about my PC here?



Task 6: Tasklist and Taskkill Commands

Change to the command prompt.

- Type in the command **tasklist**
- What does this command display?

Get the full listing of the tasklist command from DOS help (Do you remember how??)

```
C:\Users\mickg>tasklist /?

TASKLIST [/S system [/U username [/P [password]]]]
          [/M [module] | /SVC | /V] [/FI filter] [/FO format] [/NH]

Description:
  This tool displays a list of currently running processes on
  either a local or remote machine.
```

What details are displayed about each process? _____

What does PID stand for? _____

What does the **/v** switch for tasklist command do? _____

Type in **tasklist /svc** to get a table relating Process Name, PID, and Services. This is very useful to know the relationship between a process and the services that are running on a system.

- What is a *service*?

Task 7: Filtering Processes

Processes can be filtered using ProcessName (image name), PID, MemUsage, Status, Username and WindowTitle. For Example, type command:

```
tasklist /fi "status eq not responding"
```

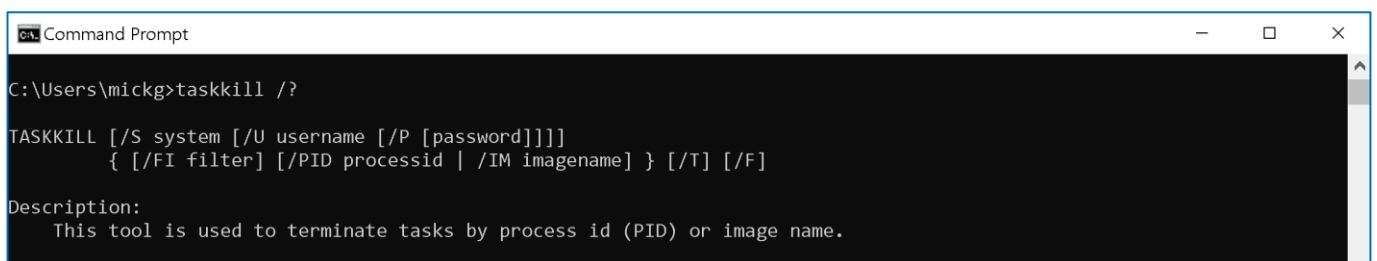
...is used to find processes that are not responding.

See **tasklist /?** for all options

- Ref: <https://www.computerhope.com/tasklist.htm>
- Some useful information here: username = nt authority\system
- **Note:** You need to run the command prompt in **administrator mode** in order to see the system processes.

Write the command to list all running non-system processes: _____

Task 8. Investigate the **taskkill** command (Ref: <https://www.computerhope.com/taskkill.htm>)



```
Command Prompt
C:\Users\mickg>taskkill /?

TASKKILL [/S system [/U username [/P [password]]]]
          { [/FI filter] [/PID processid | /IM imagename] } [/T] [/F]

Description:
  This tool is used to terminate tasks by process id (PID) or image name.
```

Find out how to use it to kill an instance of notepad. Write the command here: _____

Can it kill processes with a specific PID? _____

Write the command to **forcefully shut down** all the processes that are not responding.

Task 9: Running programs and CPU Usage

We are going to use batch files to execute some small programs, create the following Windows batch file and call it **nums.bat**

```
@echo off
for /l %%i in (1, 1, 1000000) do (
    echo This is iteration %%i
)
:end
echo That's it!
```

Briefly summarise what this code does:

- Run the batch program **nums.bat**
 - The program prints the numbers 1 to 1000000 and then finishes.
 - **(Press CTRL+C at any point during its execution to stop it).**

- Run the program and examine the CPU usage graph for this program in the task manager.
 - The program you are looking for is called **cmd.exe**
 - You will find it in the processes tab on the task manager

- You can also sort by any of the fields at the top e.g. CPU usage by clicking on the column labelled CPU.

Create a second batch file called **nums2.bat**, containing the following code:

```
echo off
for /l %%i in (1, 1, 1000000) do (
    echo This is iteration %%i
    if %%i==9000 call :getname
)
GOTO end
:getname
set /p name=What is your name?
echo Hello %name%
pause
:end
echo That's it!
```

Briefly summarise what this code does:

- Run program and examine the CPU usage (Performance tab) for this program in the task manager. What happens to the CPU usage figure when the user is asked **“What is your name”**

- What **state** is the process in when the user is asked **“What is your name”** _____
- Explain why it is in this state.

Task 10: Two programs running:

Open up **two** command prompts and run **nums.bat** in each one.

- Go into the task manager and sort by the column labelled CPU.
- Scroll until you see cmd.exe - you should see two of these (as you have two command prompts open).

What do you notice about the CPU figure for each?

Is the CPU single or dual core on the vSphere VM machine? How did you find out this information?

End of Windows Lab 12

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