**Objectives**

1. Research information about software for a specific operating system (OS) environment. You will be assigned one of the operating systems form the list of: Windows, Mac OS, Linux. You will also be provided with a list of topics to investigate.
2. Organize your rough research information into a list of topics, sub-topics and facts. This process will involve identifying sub-topics, rearranging your rough research notes, and selecting (or highlighting) interesting facts.
3. Report a summary of your research in the form of a “concept map”. Use the PowerPoint template provided as a starting point. The concept map should only include the best and most interesting information from your organized research notes.

Your assigned operating system is:

* Windows
* Mac OS
* Linux
* iOS
* Android

A concept map can be created using the “Smart Ideas” application or PowerPoint or other applications.

**Level 1 – Rough Research**

Research information about the software for your assigned operating system (OS) environment.

* Guide your research according to the suggested topic list below
* Feel free to copy-and-paste as long as you keep track of your bibliographic references.
* Do not be too picky or concerned about formatting as you will organize this information later in step 2
* Select things that look interesting and don’t forget to include graphics images as well
* Upload your rough research notes to your repository when you are done.

Topic A – Productivity, Entertainment & Other Software Applications

* Windows has a variety of productivity applications such as Microsoft Word, Excel, Photoshop and Office. Windows also has photo editing applications such as Adobe Photoshop.
* Windows can browse the internet through browsers such as Microsoft Edge, Mozilla Firefox and Google Chrome for entertainment

Topic B – User Interface (Window Management & Input Devices)

<https://support.microsoft.com/en-ca/help/27936/windows-10-make-input-devices-easier-to-use>

<https://www.tutorialspoint.com/windows10/windows10_gui_basics.htm>

* Input devices for Windows include keyboards for typing and a mouse
* Other options exist such as speech recognition
* Windows has a task bar on the bottom and icons for applications above
* Most Windows versions will feature different icons on the background. An icon is simply a graphic representation of an application or a file. To open or access an icon, just double click on it.
* Once opened the program runs in a window that can be closed by clicking on the ‘x’ at the top right

Topic C – Memory Allocation, Management,& Devices

The default 64-bit Windows Operating System (OS) configuration provides up to 16 TB (2^54) of addressable memory space divided equally between the kernel and the user applications. With 16 TB of physical memory available, 8 TB virtual address (VA) space will be allocated to the kernel and 8 TB VA space to user application memory. The kernel virtual address space is shared across processes. Each 64-bit process has it’s own space while each 32-bit application runs in a virtual 2 GB Windows-on-Windows (WOW).

Topic D – Process / Task Scheduling and Management (System Startup)

The Task Scheduler enables you to automatically perform routine tasks on a chosen computer. The Task Scheduler does this by monitoring whatever criteria you choose to initiate the tasks (referred to as triggers) and then executing the tasks when the criteria is met.

Topic E – Software Security, Updates & System Tools

<https://en.wikipedia.org/wiki/Windows_Defender>

Before Windows 8, Windows Defender only protected users against spyware.[[2]](https://en.wikipedia.org/wiki/Windows_Defender#cite_note-2) It includes a number of real-time security agents that monitor several common areas of Windows for changes which might have been caused by spyware. It also has the ability to remove installed [ActiveX](https://en.wikipedia.org/wiki/ActiveX) software.[[3]](https://en.wikipedia.org/wiki/Windows_Defender#cite_note-3) Windows Defender featured an integrated support for [Microsoft SpyNet](https://en.wikipedia.org/wiki/Microsoft_SpyNet) that allows users to report to Microsoft what they consider to be spyware, and what applications and device drivers they allow to be installed on their systems. Protection against viruses was subsequently added in Windows 8; which resembles Microsoft Security Essentials (MSE). It also uses the same anti-malware engine and [virus definitions](https://en.wikipedia.org/wiki/Virus_definition) from MSE.

In Windows 10, Windows Defender settings are controlled in the [Windows Defender Security Center](https://en.wikipedia.org/wiki/Windows_Defender_Security_Center). In the [Windows 10 Anniversary Update](https://en.wikipedia.org/wiki/Windows_10_Anniversary_Update), a new logo is introduced and a

pop-up notification will appear to announce the results of a scan, even if no viruses are found

<https://searchenterprisedesktop.techtarget.com/definition/Windows-10-Update-Assistant>

Windows 10 Update Assistant is a native update management tool designed to help individual users keep up with OS updates as Microsoft publishes them.

Users can set updates to download automatically and manage the timing of updates with this tool. IT professionals looking to deploy and manage updates across an organization's desktops, however, should look elsewhere, because this tool only works for individual desktops.

Topic F – File System & User Accounts

<https://searchwindowsserver.techtarget.com/definition/NTFS>

NTFS (NT file system; sometimes New Technology File System) is the [file system](https://searchstorage.techtarget.com/definition/file-system) that the [Windows NT](https://searchwindowsserver.techtarget.com/definition/Windows-NT) [operating system](https://whatis.techtarget.com/definition/operating-system-OS) uses for storing and retrieving [file](https://whatis.techtarget.com/definition/file)s on a [hard disk](https://searchstorage.techtarget.com/definition/hard-disk). NTFS is the Windows NT equivalent of the Windows 95 file allocation table ([FAT](https://whatis.techtarget.com/definition/file-allocation-table-FAT)) and the [OS/2](https://whatis.techtarget.com/definition/OS-2) High Performance File System ([HPFS](https://searchwindowsserver.techtarget.com/definition/HPFS-High-Performance-File-System)). However, NTFS offers a number of improvements over FAT and HPFS in terms of performance, extendibility, and security.

When a hard disk is formatted (initialized), it is divided into partitions or major divisions of the total physical hard disk space. Within each partition, the operating system keeps track of all the files that are stored by that operating system. Each file is actually stored on the hard disk in one or more [cluster](https://whatis.techtarget.com/definition/cluster)s or disk spaces of a predefined uniform size. Using NTFS, the sizes of clusters range from 512 [byte](https://searchstorage.techtarget.com/definition/byte)s to 64 [kilobyte](https://searchstorage.techtarget.com/definition/kilobyte)s. Windows NT provides a recommended default cluster size for any given drive size. For example, for a 4 GB ([gigabyte](https://searchstorage.techtarget.com/definition/gigabyte)) drive, the default cluster size is 4 KB (kilobytes). Note that clusters are indivisible. Even the smallest file takes up one cluster and a 4.1 KB file takes up two clusters (or 8 KB) on a 4 KB cluster system.

The selection of the cluster size is a trade-off between efficient use of disk space and the number of disk accesses required to access a file. In general, using NTFS, the larger the hard disk the larger the default cluster size, since it's assumed that a system user will prefer to increase performance (fewer disk accesses) at the expense of some amount of space inefficiency.

When a file is created using NTFS, a record about the file is created in a special file, the Master File Table (MFT). The record is used to locate a file's possibly scattered clusters. NTFS tries to find contiguous storage space that will hold the entire file (all of its clusters).

Each file contains, along with its data content, a description of its attributes (its [metadata](https://whatis.techtarget.com/definition/metadata)).

Topic G – Special Features of your OS

<https://blog.nhlearningsolutions.com/blog/top-5-features-of-windows-10>

* Start Menu
* Microsoft has brought back the Start Menu. Now, when you click on the Start button at the bottom left of the screen, you get two panels side by side, with the left column showing pinned, recently and most-used apps.
* Cortana

Windows 10 will bring Microsoft’s voice-controlled digital assistant Cortana to desktop computers, to make it easier for you to interact with your device without lifting a finger. You will be able to search your hard drive for specific files, pull up photos from specific dates, or launch PowerPoint presentations just by telling your PC to do so. You can even get Cortana to send an email while you’re working on a spreadsheet, making multi-tasking much easier.

* MIcrosoft Edge

Internet Explorer was replaced by Microsoft Edge, which features a new rendering engine called EdgeHTML. Edge also integrates with the Cortana Digital Assistant to provide voice control, search, and personalized info to users.

* Users can also use Edge to annotate web pages, and these annotations are stored on OneDrive and can be used with other users. There is also a “Reading List” function that syncs content between devices and a “Reading Mode” that strips out formatting to allow easier reading on devices. Many of the alterations have been made to keep Edge more in line with rival browsers, such as Chrome and Firefox.
* Multiple Monitor screens

Unless you have a multi-monitor setup it can be easy to run out of screen space. For that reason, Windows 10 provides multiple desktops that you can work in and quickly switch between. The virtual desktops feature in Windows 10 is called “Task View” and is located on the Taskbar. To add a new desktop, all you need to do is click the Plus sign. You create multiple desktops, and switching between them is just a matter of clicking the Task View button again and moving your mouse over the thumbnail of the one you want. Once the workspace is displayed above, click on it (or click the Task View button again) to start using it.

* Applications which use the same code but work on any device you use

To make the transition across devices more seamless, Microsoft is introducing a new category of software called Universal Apps, which use the same code but adapt their interface to the device in your hand. Microsoft is also bundling its own set of Universal apps with the OS, including Photos, Videos, Music, Maps, People & Messaging and Mail & Calendar, which all function the same way on tablets, phones and PCs. The content is stored and synced via Microsoft’s cloud service OneDrive so you can pick up where you left off on another device.

Topic H – Limitations of your OS

<https://www.online-sciences.com/technology/windows-10-advantages-and-disadvantages/>

* Windows 10 can not upgrade oldest windows versions such as Windows 2000, windows 2001 etc, there is more cost for new PCs with Windows 10, There is no update in Windows media player, It is the same as it was earlier.
* Touch-friendly features have been removed from Windows 10, You can no longer close apps by swiping them down from top to bottom, Many [tablet](https://www.online-sciences.com/technology/the-importance-and-uses-of-tablets-in-education/) users are going to face some difficulties in case of the touch control of the operating system.
* You cannot resize windows using the handle-bars which were present in most of the previous versions of Windows, Grabbing edges of the windows is very difficult if you are using a pen, Windows 10 has removed the functionality to change the volume level using the scroll button present in the taskbar.
* If you get fed up with testing Windows 10 and want to revert the PC to the OS you were running before, It won’t be easy, The previous [Windows OS](https://www.online-sciences.com/computer/microsoft-windows-advantages-and-disadvantages/) will have to be reinstalled from the recovery or installation disk—typically a DVD—that came with the PC.
* Installing Windows 10 Technical Preview disables the PC’s ability to play DVDs using [Windows Media Player](https://www.online-sciences.com/computer/windows-media-player-features-advantages-and-disadvantages/), and it removes Windows Media Center from PCs running Windows 8 Pro with Media Center.

**Level 2 – Organized Research**

Organize your rough research information to provide more stricture and meaning.

* Re-read your rough research to identify (highlight) important sub-topics and facts
* Rearrange (cut–and-paste) your rough research so that related sub topics and facts are next to each other.
* Your finished organization should look like the template provided below.
* Upload your rough research notes to your repository when you are done.

Suggested organization template:

* Topic A – Productivity, Entertainment & Other Software Applications
  + Sub-Topic 1:Productivity
    - Microsoft Windows has software for productivity like Microsoft Office
    - Windows has photo editing software like Adobe Photoshop and Microsoft Paint
    - Video editing software such as Sony Vegas Pro
  + Sub-Topic 2:Entertainment
    - For entertainment purposes Windows is able to browse the internet with browsers such as Microsoft Edge and Google Chrome
    - Windows can play video games, movies and music as well for entertainment
* Topic B – User Interface (Window Management & Input Devices)
  + Windows primary input devices are the mouse and keyboard to navigate the operating system but can also be controlled via speech recognition and other compatible devices
  + Windows has a taskbar at the bottom with applications and other things down there being displayed
  + The home screen has application icons to click and use
* Topic C – Memory Allocation, Management,& Devices
  + Sub-Topic 1: Memory Allocation
    - 64-bit operating systems have a maximum of 16TB of RAM
    - The ram is split equally between the kernel (the core of the operating system) and user applications
* Topic D– Process / Task Scheduling and Management (System Startup)
  + Task Scheduling allows users to setup when computers do certain tasks at certain times such as when the computer boots up
    - One example of task scheduling is automatically booting up an application when the computer starts up
  + Process:
    - * Windows can use multiple cores and threads of a CPU to split up the processing.
* Topic E - Software Security, Updates & System Tool
  + Subtopic: Security
    - Windows has a pre-installed antivirus system called windows defender
    - Windows defender has the main function to detect and protect against spyware and other malicious code
  + Sub topic: Updates
    - Windows has the Windows 10 update assistant which when activates, upgrades the user's current version of windows to the most recent version for free, which has a self-updating function to download patches for itself keeping the user’s version of windows to the latest one at all times
* Topic F – File System & User Accounts
  + Sub topic: File systems
    - The windows OS uses the NTFS format
    - NTFS takes files and places them into clusters
    - Instead of focusing on maximizing space, NTFS focuses on maximizing performance, therefore it uses larger clusters by default for largest files, giving less space to users, but a better performance overall
* Topic G – Special Features of your OS
  + Subtopic: Special Features
    - Windows OS has the start menu, which is a small collection of app shortcuts which show all of the apps the user has recently used, along with all available on apps on their device
    - Windows OS has Cortana, an AI assistant with the task of communicating with the user when activated, and support them with whatever task or question she is assigned from the user
    - Windows OS has the task view feature, which allows the user to view all open applications, which can useful for users without multiple monitor setups
* Xbox Live integration
  + - Windows has Microsoft edge, which is an exclusive web browser application which is meant to be optimized to be the fastest browser when using the windows OS platform
* Topic H – Limitations of your OS
  + Subtopic: Limitations
    - windows cannot upgrade to current versions from long discontinued versions
    - Some touch friendly features have been removed from the OS
    - Reverting the OS to an older version is difficult unless the user has a copy of the old OS saved on a recovery disk
    - There are concerns for what data Windows 10 takes from users
    - Forced updates can interrupt users in the middle of work

**Level 3 – Concept Map**

Create a “concept map” as a final report of your organized research.

Use the PowerPoint template provided as a starting point.

You can use PowerPoint or another concept mapping tool of your choice.

Select the best and most interesting information from your organized research.

Summarize and edit your information to fit on the concept map.

Share your finished concept map with Mr. Nestor at p0079141@pdsb.net

A concept map can be created using the “Smart Ideas” application or PowerPoint or other applications. A concept map template can be downloaded from the “Topic A” folder on the class GitHub repository

