**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 Entertainment Pack is a collection of 16-bit casual computer games for Windows. There were four Entertainment Packs in the original series. Many of the games were later released in the Best of Microsoft Entertainment Pack. These games were somewhat unusual for the time, in that they would not run under MS-DOS. Microsoft Store (formerly known as Windows Store) is a digital distribution platform sponsored by Microsoft. It started as an app store for Windows 8 and Windows Server 2012 as the primary means of distributing Universal Windows Platform (UWP) apps. With Windows 10, Microsoft merged its other distribution platforms (Windows Marketplace, Windows Phone Store, Xbox Video and Xbox Music and eventually Xbox Store) into Microsoft Store, making it a unified distribution point for apps, digital videos, digital music, console games, and e-books (until category removal in 2019).[1] As of 2015, there were over 669,000 apps available on the store. Categories containing the largest number of apps are "Games", "Entertainment", "Books and Reference", and "Education". The majority of the app developers have one app. As with other similar platforms, such as the Mac App Store and Google Play, Microsoft Store is curated and apps must be certified for compatibility and content. In addition to the user-facing Microsoft Store client, the store also has a developer portal with which developers can interact. Microsoft takes 30% of the sale price for apps. Prior to January 1, 2015, this cut was reduced to 20% after the developer's profits reached $25,000.

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

Describes features that enable the user to interact with an application, through devices such as the keyboard, mouse, and touch screens. Describes the elements of an application with a Windows-based graphical user interface. The user interface presents the user with the options available to configure the installation and obtains information from the user about the pending installation process.

**Topic C – Memory Allocation, Management, & Devices**

Each process on 32-bit Microsoft Windows has its own virtual address space that enables addressing up to 4 gigabytes of memory. Each process on 64-bit Windows has a virtual address space of 8 terabytes. All threads of a process can access its virtual address space. However, threads cannot access memory that belongs to another process, which protects a process from being corrupted by another process.

**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.

The Task Scheduler can be used to execute tasks such as starting an application, sending an email message, or showing a message box. Tasks can be scheduled to execute:

* When a specific system event occurs.
* At a specific time.
* At a specific time on a daily schedule.
* At a specific time on a weekly schedule.
* At a specific time on a monthly schedule.
* At a specific time on a monthly day-of-week schedule.
* When the computer enters an idle state.
* When the task is registered.
* When the system is booted.
* When a user logs on.
* When a Terminal Server session changes state.

Task Manager, previously known as Windows Task Manager, is a task manager, system monitor, and startup manager included with Microsoft Windows systems. It provides information about computer performance and running software, including name of running processes, CPU load, commit charge, I/O details, logged-in users, and Windows services. Task Manager can also be used to set process priorities, processor affinity, start and stop services, and forcibly terminate processes. The program can be started in recent versions of Windows by pressing ⊞ Win+R and then typing in taskmgr.exe, by pressing Ctrl+Alt+Delete and clicking Start Task Manager, by pressing Ctrl+⇧ Shift+Esc, or by right-clicking on the Windows taskbar and selecting "Task Manager". Task Manager was introduced in its current form with Windows NT 4.0. Prior versions Windows NT, as well as Windows 3.x, includes the Task List application, is capable of listing currently-running processes and killing them, or creating a new process. Windows 9x has a program known as Close Program which lists the programs currently running and offers options to close programs as well shut down the computer.

**Topic E – Software Security, Updates & System Tools**

Windows 10 provides the latest antivirus protection with Windows Security. Your device will be actively protected from the moment you start Windows 10. Windows Security continually scans for malware (malicious software), viruses, and security threats. In addition to this real-time protection, updates are downloaded automatically to help keep your device safe and protect it from threats. Some features will be a little different if you're running Windows 10 in S mode. Because this mode is streamlined for tighter security, the Virus & threat protection area has fewer options. But don't worry—the built-in security of this mode automatically prevents viruses and other threats from running on your device, and you'll receive security updates automatically.

Windows Update is a [Microsoft](https://en.wikipedia.org/wiki/Microsoft) service for the [Windows 9x](https://en.wikipedia.org/wiki/Windows_9x) and [Windows NT](https://en.wikipedia.org/wiki/Windows_NT) families of operating system, which automates downloading and installing [Microsoft Windows](https://en.wikipedia.org/wiki/Microsoft_Windows) [software updates](https://en.wikipedia.org/wiki/Software_update) over the [Internet](https://en.wikipedia.org/wiki/Internet). The service delivers software updates for Windows, as well as the various Microsoft [antivirus products](https://en.wikipedia.org/wiki/Antivirus_software), including [Windows Defender](https://en.wikipedia.org/wiki/Windows_Defender) and [Microsoft Security Essentials](https://en.wikipedia.org/wiki/Microsoft_Security_Essentials). Since its inception, Microsoft has introduced two extensions of the service: Microsoft Update and Windows Update for Business. The former expands the core service to include other Microsoft products, such as [Microsoft Office](https://en.wikipedia.org/wiki/Microsoft_Office) and [Microsoft Expression Studio](https://en.wikipedia.org/wiki/Microsoft_Expression_Studio). The latter is available to business editions of [Windows 10](https://en.wikipedia.org/wiki/Windows_10) and permits postponing updates or receiving updates only after they have undergone rigorous testing.

As the service has evolved over the years, so have its client software. For a decade, the primary client component of the service was the Windows Update [web app](https://en.wikipedia.org/wiki/Web_app) that could only be run inside [Internet Explorer](https://en.wikipedia.org/wiki/Internet_Explorer). Starting with [Windows Vista](https://en.wikipedia.org/wiki/Windows_Vista), the primary client component became Windows Update Agent, an integral component of the operating system.

The service provides several kinds of updates. *Security updates* or *critical updates* mitigate vulnerabilities against [security exploits](https://en.wikipedia.org/wiki/Exploit_(computer_security)) against Microsoft Windows. *Cumulative updates* are updates that bundle previously released updates. Cumulative updates were introduced with [Windows 10](https://en.wikipedia.org/wiki/Windows_10) and have been backported to [Windows 7](https://en.wikipedia.org/wiki/Windows_7) and [Windows 8.1](https://en.wikipedia.org/wiki/Windows_8.1).

Microsoft routinely releases updates on the second Tuesday of each month (known as the [Patch Tuesday](https://en.wikipedia.org/wiki/Patch_Tuesday)), but can provide them whenever a new update is urgently required to prevent a newly discovered or prevalent exploit. System administrators can configure Windows Update to install critical updates for Microsoft Windows automatically, so long as the computer has an Internet connection.

**Topic F – File System & User Accounts**

Any computer file is stored on a storage medium with a given capacity. In actual fact, each storage is linear space for reading or both reading and writing digital information. Each byte of information on it has its offset from the storage start known as an address and is referenced by this address. A storage can be presented as a grid with a set of numbered cells (each cell is a single byte). Any file saved to the storage gets its own cells.

Generally, computer storages use the pair of a sector and in-sector offset to reference any byte of information on the storage. **A sector** is a group of bytes (usually 512 bytes), a minimum addressable unit of the physical storage. For example, byte 1040 on a hard disk will be referenced as a sector #3 and offset in sector 16 bytes ([sector]+[sector]+[16 bytes]). This scheme is applied to optimize storage addressing and to use a smaller number to refer to any portion of information located on the storage.

To omit the second part of the address (in-sector offset), files are usually stored starting from the sector start and occupy whole sectors (e.g.: a 10-byte file occupies the whole sector, a 512-byte file also occupies the whole sector, at the same time, a 514-byte file occupies two entire sectors).

Each file is stored in “unused” sectors and can be read later by its known position and size. However, how do we know which sectors are occupied and which are free? Where are the size, position and name of the file stored? This is exactly what **the file system**is responsible for.

**Topic G – Special Features of your OS**

(These are all in my own words)

* Cortana personal assistant
* Universal apps
* Virtual desktop
* Microsoft Edge web browser
* Windows Start menu
* Easy to use (simple OS)
* Support for new hardware
* Games

**Topic H – Limitations of your OS**

(These are all in my own words)

* Poor security
* High maintenance cost
* Easier to hijack
* Expensive licensing
* Poor technical support
* Costly to stay up to date
* Poor support for older hardware
* High total cost of ownership

**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

* Entertainment Pack
* Collection of 16-bit casual computer games for windows
* Four entertainment packs in the original series
* The most popular games were released in the “Best of Microsoft Entertainment pack
* Windows Store
* Windows store is the host where you can download many different applications which are compatible with windows
* Xbox app was merged into the Microsoft store
* As of 2015 they are 669,000 available apps in the Microsoft store.
* The category with most apps is games and entertainment
* Apps must be certified for compatibility and content
* Microsoft takes 30% of the sale price for apps

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

* User Interface
* Keyboards, mouse, touchscreens can be plugged into your computer to use with your OS
* Allows the installation of applications
* Windows-based graphical user interface

Topic C – Memory Allocation, Management, & Devices

* Memory Allocation
* Each process on 32-bit Microsoft Windows has its own virtual address space
* Each process on 64-bit Windows has a virtual address space of 8 terabytes
* Threads cannot access memory that belongs to another process

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

* Task Schedular
* The task schedular can be used to perform tasks such as opening an application or sending an email.
* Tasks can be scheduled at a specific time, date, or when a user logs on.
* Tasks can also be scheduled when the system is booted, when the task is registered, or when the computer enters an idle state.
* Task Manager
* Task Manager is included with Microsoft Windows Systems
* It provides information about computer performance and running software
* It also provides information about name of running processes, CPU load, commit charge, I/O details, logged-in users, and Windows services
* Task Manager can also be used to set process priorities, processor affinity, start and stop services, and forcibly terminate processes

Topic E – Software Security, Updates & System Tools

* Software Security
* Windows 10 provides the latest antivirus protection with Windows Security
* Windows Security continually scans for malware, viruses, and security threats
* Updates are downloaded automatically to help keep your device safe and protect it from threats
* Updates
* Microsoft Update can update applications automatically or manually
* Updates improve the quality of the application
* Updates perform automatically for security applications to keep the OS safe from threats and viruses

Topic F – File System & User Accounts

* File Systems
* Computer storages use the pair of a sector and in-sector offset to reference any byte of information on the storage
* **A sector** is a group of bytes (usually 512 bytes), a minimum addressable unit of the physical storage
* Each file is stored in “unused” sectors and can be read later by its known position and size.

Topic G – Special Features of your OS

* Cortana personal assistant
* Universal apps
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* Windows Start menu
* Easy to use (simple OS)
* Support for new hardware
* Games

Topic H – Limitations of your OS

* Poor security
* High maintenance cost
* Easier to hijack
* Expensive licensing
* Poor technical support
* Costly to stay up to date
* Poor support for older hardware
* High total cost of ownership

**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

