Level 2 – Organized Research

Organize your rough research information to provide more structure 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

o Sub-Topic 1

§ Fact 1

§ Fact 2

§ …

o Sub-Topic 2

§ …

o …

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

o …

**Topic A – Productivity, Entertainment & Other Software Applications**

Sub-Topic: Productivity:

* [Microsoft Entourage](https://en.wikipedia.org/wiki/Microsoft_Entourage)
* [Microsoft FrontPage](https://en.wikipedia.org/wiki/Microsoft_FrontPage)
* [Microsoft InfoPath](https://en.wikipedia.org/wiki/Microsoft_InfoPath)
* [Microsoft MapPoint](https://en.wikipedia.org/wiki/Microsoft_MapPoint)
* [Microsoft Office Picture Manager](https://en.wikipedia.org/wiki/Microsoft_Office_Picture_Manager)
* [Office Assistant](https://en.wikipedia.org/wiki/Office_Assistant)
* [Microsoft Schedule+](https://en.wikipedia.org/wiki/Microsoft_Schedule_Plus)
* [Wunderlist](https://en.wikipedia.org/wiki/Wunderlist)

Sub Topic: Entertainment:

* Video games
  + [Xbox Game Studios](https://en.wikipedia.org/wiki/Xbox_Game_Studios)
  + [Age of Empires](https://en.wikipedia.org/wiki/Age_of_Empires_(series)) series
  + [Forza](https://en.wikipedia.org/wiki/Forza_(series)) series
  + [Gears of War](https://en.wikipedia.org/wiki/Gears_of_War) series
  + [Halo](https://en.wikipedia.org/wiki/Halo_(series)) series
  + [Minecraft](https://en.wikipedia.org/wiki/Minecraft)
  + [Solitaire](https://en.wikipedia.org/wiki/Microsoft_Solitaire_Collection)
  + [Zoo Tycoon](https://en.wikipedia.org/wiki/Zoo_Tycoon) series
* 3D
  + [Direct3D](https://en.wikipedia.org/wiki/Direct3D)
  + [Microsoft Softimage](https://en.wikipedia.org/wiki/Softimage_(company)#1994_-_Microsoft_Softimage)
  + [Paint 3D](https://en.wikipedia.org/wiki/Paint_3D)
  + [trueSpace](https://en.wikipedia.org/wiki/TrueSpace)
  + [View 3D](https://en.wikipedia.org/wiki/View_3D)

Sub Topic: Software Applications:

* [Office 365](https://en.wikipedia.org/wiki/Office_365) Applications
  + [Microsoft Access](https://en.wikipedia.org/wiki/Microsoft_Access)
  + [Microsoft Excel](https://en.wikipedia.org/wiki/Microsoft_Excel)
  + [Microsoft OneNote](https://en.wikipedia.org/wiki/Microsoft_OneNote)
  + [Microsoft Outlook](https://en.wikipedia.org/wiki/Microsoft_Outlook)
  + [Microsoft PowerPoint](https://en.wikipedia.org/wiki/Microsoft_PowerPoint)
  + [Microsoft Project](https://en.wikipedia.org/wiki/Microsoft_Project)
  + [Microsoft Publisher](https://en.wikipedia.org/wiki/Microsoft_Publisher)
  + [Microsoft Word](https://en.wikipedia.org/wiki/Microsoft_Word)
  + [Outlook Web App](https://en.wikipedia.org/wiki/Outlook_Web_App)
  + [Skype for Business](https://en.wikipedia.org/wiki/Skype_for_Business)
* Windows components
  + [Disk Cleanup](https://en.wikipedia.org/wiki/Disk_Cleanup)
  + [File Explorer](https://en.wikipedia.org/wiki/File_Explorer)
  + [Internet Explorer](https://en.wikipedia.org/wiki/Internet_Explorer)
  + [Microsoft Calculator](https://en.wikipedia.org/wiki/Microsoft_Calculator)
  + [Microsoft Command Prompt](https://en.wikipedia.org/wiki/Microsoft_Command_Prompt)
  + [Microsoft Cortana](https://en.wikipedia.org/wiki/Microsoft_Cortana)
  + [Microsoft Edge](https://en.wikipedia.org/wiki/Microsoft_Edge)
  + [Microsoft Paint](https://en.wikipedia.org/wiki/Microsoft_Paint)
  + [Microsoft Speech API](https://en.wikipedia.org/wiki/Microsoft_Speech_API)
  + [Microsoft Store](https://en.wikipedia.org/wiki/Microsoft_Store)
  + [On-screen keyboard](https://en.wikipedia.org/wiki/On-screen_keyboard)
  + [Windows Defender](https://en.wikipedia.org/wiki/Windows_Defender)
  + [Windows Installer](https://en.wikipedia.org/wiki/Windows_Installer)

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

Sub Topic: Windows Controls:

* Windows controls are user interface elements that are used in conjunction with another window (typically a client window or dialog box) to enable the user to interact with an application. Many of the elements that make up the UI of a traditional Windows-based application are Windows controls, including items such as menus, scroll bars, buttons, list boxes, tree views, and so on.

You should use Windows controls if you want to create a traditional UI for an unmanaged Windows-based application that runs on a wide range of Windows versions.

Sub Topic: Visual Styles:

* Visual Styles are specifications for the appearance of controls. For example, a Visual Style can define the overall appearance of controls, and enable software developers to configure the visual interface of those controls to coordinate with an application's appearance. Additionally, Visual Styles provide a mechanism for all Windows-based applications to standardize an application's appearance. You should use Visual Styles if you need to change the appearance of the standard Windows controls and common controls to match the look of your application UI.

Sub Topic: Windows Automation API:

* The Windows Automation API helps developers create applications that are accessible to the widest possible audience, including people with vision, hearing, or motion disabilities. If your application contains custom controls or other custom UI features, you should use the Windows Automation API to ensure that the custom controls and features are fully accessible.

Sub Topic: Speech API:

* The Microsoft Speech API (SAPI) provides a high-level interface between an application and speech engines. SAPI implements all the low-level details needed to control and manage the real-time operations of various speech engines. The two basic types of SAPI engines are text-to-speech (TTS) systems and speech recognizers. You should use SAPI if you want to implement a UI that enables the user to interact with your application through TTS and speech recognition in addition to the standard input devices such as the keyboard, mouse, and display.

Sub Topic: UI Automation for Managed Applications:

* UI Automation is an accessibility framework for Windows, available on all operating systems that support WPF. UI Automation provides programmatic access to most UI elements on the desktop, enabling assistive technology products such as screen readers to provide information about the UI to end users and to manipulate the UI by means other than standard input.

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

Sub-Topic: [HeapAlloc:](https://docs.microsoft.com/en-us/windows/desktop/api/HeapApi/nf-heapapi-heapalloc)

* Although the [GlobalAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/WinBase/nf-winbase-globalalloc), [LocalAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/WinBase/nf-winbase-localalloc), and [HeapAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/HeapApi/nf-heapapi-heapalloc) functions ultimately allocate memory from the same heap, each provides a slightly different set of functionality. HeapAlloc can be instructed to raise an exception if memory could not be allocated.

Sub-Topic: [LocalAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/WinBase/nf-winbase-localalloc):

* LocalAlloc supports allocation of handles which permit the underlying memory to be moved by a reallocation without changing the handle value.

Sub-Topic: [CoTaskMemAlloc:](https://msdn.microsoft.com/en-us/library/ms692727(v=VS.85).aspx)

* The [CoTaskMemAlloc](https://msdn.microsoft.com/en-us/library/ms692727(v=VS.85).aspx) function has the advantage of working well in either C, C++, or Visual Basic. It is also the only way to share memory in a COM-based application, since MIDL uses CoTaskMemAlloc and [CoTaskMemFree](https://msdn.microsoft.com/en-us/library/ms680722(v=VS.85).aspx) to marshal memory.

Sub-Topic: [GlobalAlloc:](https://docs.microsoft.com/en-us/windows/desktop/api/WinBase/nf-winbase-globalalloc)

* Starting with 32-bit Windows, [GlobalAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/WinBase/nf-winbase-globalalloc) is implemented as wrapper functions that call [HeapAlloc](https://docs.microsoft.com/en-us/windows/desktop/api/HeapApi/nf-heapapi-heapalloc) using a handle to the process's default heap. Therefore, GlobalAlloc has greater overhead than HeapAlloc.

Sub-Topic: [VirtualAlloc:](https://msdn.microsoft.com/en-us/library/Aa366887(v=VS.85).aspx)

* The [VirtualAlloc](https://msdn.microsoft.com/en-us/library/Aa366887(v=VS.85).aspx) function allows you to specify additional options for memory allocation. However, its allocations use a page granularity, so using VirtualAlloc can result in higher memory usage.

Subtopic: Management:

* Each process on 32- bit Microsoft Windows has its own virtual address space that enables addressing up to 4 gigabytes of memory. This means that each process on 64-bit Windows has a virtual address space consists of 8 terabytes. All threads of a process can access its virtual address space. Furthermore, 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)**

Sub Topic: The Task Scheduler:

* 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.

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

Subtopic: Windows Updates:

* 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). 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**

Sub Topic: General Information:

* Microsoft Windows employs two major file systems: NTFS, the primary format most modern versions of this OS use by default, and FAT, which was inherited from old DOS and has exFAT as its later extension. In addition, the ReFS file system was developed by Microsoft as a new generation file system for server computers starting from Windows Server 2012.

Sub Topic: FAT (File Allocation Table):

* FAT is one of the simplest file system types, which has been around since the 1980s. It consists of the file system descriptor sector (boot sector or superblock), the file system block allocation table (referred as the File Allocation Table) and plain storage space for storing files and folders.
* Files in FAT are stored in directories. Each directory is an array of 32-byte records, each defining a file or extended attributes of a file (e.g. a long file name). The block allocation table contains an array of block descriptors. The numbers in FAT12, FAT16, FAT32 stand for the number of bits used to enumerate a file system block. This means that FAT12 can use up to 4096 different block references, while FAT16 and FAT32 can use up to 65536 and 4294967296 accordingly.
* FAT12 and FAT16 used to be applied to old floppy disks and do not find extensive employment nowadays. FAT32 is still widely used for memory cards and USB sticks. exFAT was introduced, which doesn't have any realistic limitations concerning the size of files or partitions.

Sub Topic: NTFS (New Technology File System):

* NTFS was introduced in 1993 with Windows NT and is currently the most common file system for end user computers based on Windows. Most operating systems of the Windows Server line use this format as well. The file system is quite reliable because it supports many features, including access control, encryption, etc.
* Each file in NTFS is stored as a file descriptor in the Master File Table and file content. The Master file table contains entries with all information about files: size, allocation, name, etc. The file system uses 48 and 64 bit values to reference files, thus being able to support data storages with extremely high capacity.

Sub Topic: ReFS (Resilient File System):

* ReFS is the latest development of Microsoft introduced with Windows 8 and now available for Windows 10. The file system architecture absolutely differs from other Windows file systems and is mainly organized in a form of the B+-tree. ReFS has high tolerance to failures due to new features included into the system.
* No metadata is modified without being copied; data is not written over the existing data, but into new disk space. With any file modifications, a new copy of metadata is stored into free storage space, and then the system creates a link from older metadata to the newer one. Thus, the system stores significant quantity of older backups in different places providing easy file recovery unless this storage space is overwritten.

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

Sub Topic: New 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. You also get a power button at the top for options such as Hibernate, Standby and Shutdown, while the right column features a selection of live tiles that you can customize, resize and reorganize. Plus, you can have the Start Menu expand to full screen whenever you want, eliminating the need for a Modern UI Start Screen.

Sub Topic: Cortana Integration:

* 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.

Sub Topic: Microsoft Edge Web Browser:

* 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.

Sub Topic: Virtual Desktops:

* 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.

Sub Topic: Universal Apps:

* 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**

Sub Topic: Closed Source:

* Troubleshooting problems with Windows would be so much easier for users and support personnel if only they knew what was actually going on. Unfortunately, only Microsoft has full access to its software's source code, and since no log files are generated its users are left to try and deduce what causes their problems by trial and error alone. At best this is time-consuming, while at worst it can make a program impossible to work with.

Sub Topic: Poor security:

* Compared to other operating systems, Windows security is weak. According to their own developers, their products "just aren't engineered for security." The result is that Windows computers are more likely than other systems to be hijacked and used to distribute everything from spam to hate mail. Even worse, any such activity only points to the computer that was compromised: since Windows does not generate log files, the owner has no way of proving anyone else's involvement. What all this means for businesses is that Windows systems require a lot more time and effort to maintain than other systems. Failure to do so will only result in more lost productivity or worse.

Sub Topic: Virus susceptibility:

* This subject is usually regarded as part Windows's general problems with security. However, the susceptibility of any of Microsoft's operating systems to computer viruses has always been pronounced; nearly all computer viruses target Windows computers and regularly wreak newsworthy havoc. What this means for businesses, is that that they have no choice but to keep investing in anti-virus software for all of their Windows computers, as well as to keep up with the almost daily release of Microsoft security patches.

Sub Topic: Additional expenses:

* After setting up a Windows OS computer, sooner or later, customers find themselves in need of additional software. For example, a virus scanner is mandatory nowadays, but many also believe a spyware blocker is essential as well. If you run a Windows-based website, for instance, you may find yourself investing a lot of money in development tools, most of which are Microsoft products. For example, you can find loads of free scripts and applications to run services such as web boards, chat rooms, web statistics for other OS but you won't find many free applications for Microsoft.

Sub Topic: Backwards incompatible file formats:

* A well-known drawback of using Microsoft applications such as Office (Word, Excel, etc.), is that their file formats are not backwards compatible. For instance, this means that a document created in the MS Word 2002 format cannot be interpreted in any way by someone using Word 97. Microsoft has always maintained that this is because of all the new features that have been added to each new document format. But they chose to do things differently because their method is the one that keeps their customers upgrading. Finally, upgrading the applications often forces you to upgrade the entire operating system as well.

Bibliography:

Topic A:

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

Topic B:

<https://docs.microsoft.com/en-us/windows/desktop/appuistart/user-interface-technologies-for-windows-applications>

Topic C:

<https://docs.microsoft.com/en-us/windows/desktop/memory/comparing-memory-allocation-methods>

Topic D:

<https://docs.microsoft.com/en-us/windows/desktop/taskschd/task-scheduler-start-page>

Topic E:

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

Topic F:

<https://www.ufsexplorer.com/articles/file-systems-basics.php>

Topic G:

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

Topic H:

<http://www.rjsystems.nl/en/3200.php>