



Operating System Basics for Studying with Efficiency

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An introduction to managing your applications and files, as well as shortcuts to improve efficiency when studying. Information is given for Windows, Mac and Linux.



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Introduction to Computer Hardware

We do not expect you to have a personal computer, but if you get one, it will help to know about each component.



HDD (Hard Drive Disk) or SSD (Solid State Drive)

- Computer's **long term memory**, so data storage.
- It **stores** the operating system, software (apps), and your files.
- HDD is older technology with moving parts, more prone to failure.
- SSD is newer, is becoming more affordable; much faster than HDD

What Size? 500GB is considered decent among average users.



Processor or CPU (Central Processing Unit)

- **Brain** of the computer.
- Gets instructions from apps, performs tasks and calculations and manages data flow. Influences the overall performance of computer.

Which Processor? Any Intel or AMD x86-64 processor with 2+ cores. More cores is better. e.g. Intel® Core™ i5/i7 or AMD Ryzen 5 or 7



RAM (Random Access Memory)

- Computer's **short-term memory**. Where data is stored that the Processor needs to run your apps and open files.
- Determines how many tasks the computer can do simultaneously.

What Size? At least 8 GB of RAM to cope with modern software. The more you can get, the better. The best modern computers have 16GB.



Graphics Card or GPU (Graphics Processing Unit)

- Works with the CPU to **display images and videos**.
- Having a separate graphics card offloads processing from the CPU, resulting in improved performance and smoother visuals

Which Card? A dedicated card is better than an integrated card, but only needed if you want to do gaming, video editing or 3D modelling. NVIDIA GeForce GTX or AMD Radeon RX series are popular.



Display

- Smaller is more portable, while larger sizes offer better visibility.
- Higher resolutions (e.g., 1920x1080 or 4K) provide better detail.

Which Size? Ranges from 11 to 17 inches, 15" is a popular choice.

It is not an easy decision which computer to buy, so do your own research. There is plenty of [advice online](#). Also note that the Department has computers with dedicated graphics cards for you to use for any 3D modelling work.

- To compare components, www.userbenchmark.com will help.
- Student Discounts may be helpful: e.g. [UniDays](#), [StudentBeans](#), [Dell](#) etc
- You may want to consider the MATLAB [system requirements](#).



Useful Applications

Departmental computers will already have all the software you need, however if you are working on a personal computer, you can get free software to install.

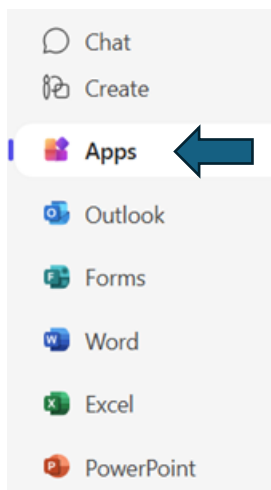
Office 365

Students and staff at the University can access Office 365, which contains many useful applications for University work. The University of Oxford Office 365 system includes a cloud based working environment (called **Nexus365**).

Follow the instructions to get started: <https://help.it.ox.ac.uk/nexus365/getting-started>

	Outlook: The Microsoft app to view your University emails. Set up a Signature with your name, pronouns, college and year of study You may want to learn how to create folders to organise your inbox. You can get the Oxford term dates imported to your calendar..
	One Drive: A cloud based filing system. Use this to backup your files and share files with other people.
	Word: The Microsoft word processor. You can save files as a Word document(.docx) to One Drive or your own computer.
	Excel: The Microsoft spreadsheet. You can save files as an Excel spreadsheet(.xlsx) to One Drive or your own computer.
	One Note: A digital notebook, you can use this for taking notes.
	Powerpoint: Used for creating presentations.
	Teams: Used for videocalls and chat within the University.

If you are new to Office you can see these [Quick Start Guides](#).



Each of the Office365 Apps can be used online, in your browser. Some browsers work better than others so it is worth having **multiple installed** (e.g. [Chrome](#) / [Firefox](#) / [DuckDuckGo](#)).

You can get full functionality by installing the software directly onto your compute. Once logged in to Nexus365 select **Apps** and then **Install Apps** (top right).



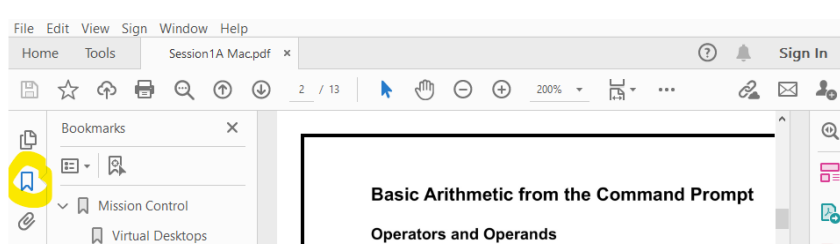
PDF Reader

You will likely read many PDFs when studying. While most browsers can open PDFs directly, the functionality is sometimes limited. Make sure you can:

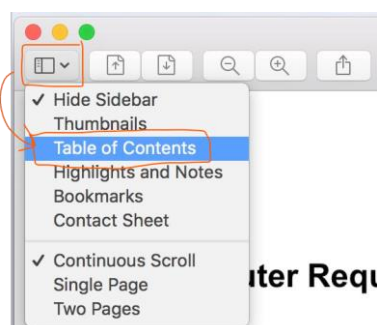
- **Search within PDFs:** With long documents, searching for key terms using the Search bar is much faster than scrolling. **Ctrl+F** or **Cmd+F**
- **Viewing Headings for Navigation:** You can save a lot of time by enabling the navigation pane to click through Headings / Bookmarks.
- **Annotate:** PDFs will be your study notes, you will want to write on them.

[Adobe Acrobat](#) is a good free option (you do not need the paid version).

Open **Bookmarks** on the left and add **annotations** using the Toolbar along the top.



MacOS has [Mac Preview](#). View headings by opening **Table of Contents**:



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Other Applications

There is software available to University students, for free or at a discounted rate, available through the Central IT Pages: www.it.ox.ac.uk/get-software



Sophos Anti-Virus is available for free there.
Ensure your personal computer has anti-virus!

There are other apps not needed for the Engineering course, but may be of interest. e.g. Parallels for Mac or Adobe Creative Cloud which includes Photoshop/Lightroom.



Accounts and Multi-Factor Authentication

There are many different accounts you need at University. The main accounts are:



Departmental Account: For Departmental Computers and engsci WiFi

Username format is **abc0123** same as your SSO.

Password can be reset by Engineering IT Team: thehub@eng.ox.ac.uk



Single Sign On (SSO) – Used to access many services and software

Username format is **abc0123** or for Microsoft use **abc0123@ox.ac.uk**

It has **multi-factor authentication (MFA)**. <https://help.it.ox.ac.uk/mfa>

Password reset by Central IT: help.it.ox.ac.uk/oxford-username-and-ssso



Remote Access Account – For Eduroam WiFi and University VPN

Use to connect to [eduroam](https://eduroam.org/) WiFi around the world

Change your password at <https://register.it.ox.ac.uk/self/index>

They have similar usernames and should all have different passwords. You should:

- [create strong passwords](#) (advice at [Reporters without Borders](https://www.reporterswithoutborders.org/)).
- [Use a password manager](#).
- Password game for something a bit silly: neal.fun/password-game/



Set up **at least two ways** of authenticating your **SSO**:

e.g. your phone and laptop. If you lose one, you still need access!

mysignins.microsoft.com select **Security Info**, then **Add Sign-in Methods**.



Speeding up your Workflow

You will spend many hours working at a computer during University: writing lecture notes, typing up lab results, searching the library databases, writing e-mails to organise tutorials – the list is long! How efficient you are with using your computer can have a big impact on the time taken to complete a task. We will look at:

- Typing Skills
- Managing Applications



Typing Skills

The speed at which you can type (in words per minute **wpm**) will impact how quickly you can work. Use any of the following to test your current typing speed in English:

- monkeytype.com
- 10fastfingers.com/typing-test/english

The average typing speed for someone who doesn't use computers often is 40 wpm. A productive speed is 60 – 70 wpm, whereas experts can type at 120+ wpm.

Improving Your Typing Speed

Learning [Touch Typing with the Home Row Method](#) can save you time with any computer tasks. There are many free resources to learn and practice:

www.typingclub.com	Learn one letter at a time, through videos
www.keybr.com	Jump in with typing words
typing.academy/typing-tutor/lessons www.typing.com/en-gb/student/	Different lessons, from letters to words

There is lots of [advice available on Reddit](#).

Games to Help:

- 🎮 Type Racer play.typeracer.com
- 🎯 Typing Sniper typetest.io/games/typing-sniper
- ⚡ Destroy the letter typetest.io/games/destroy-the-letter
- 🏆 Join the Engineering Leaderboard typing.com/join#68937A3EB1F43

Faster Working by Managing Applications

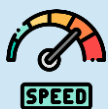
Often you will need to work with multiple applications (apps) open. For example, if you are coding you may need a PDF of instructions open as well as software. Or if you are writing a report you may need an internet browser and a Word document.

This section introduces you to different ways to work with multiple apps. Shortcuts improve efficiency moving between different applications. To start, these shortcuts may seem uncomfortable but it is worthwhile spending some time practising, as it will allow you to perform tasks faster in the long run.

Minimising vs Closing Apps

To get the best from your computer, it is important to only have the applications open that you need for your current task. Having too many applications open at once will cause your computer to be slow. You might think you are quitting applications by minimising and closing, but they will still be open in the background.

- **Minimise** an app by pressing the minimise button -- in the top corner.
- **Close** windows of an app by pressing the close button **X** the top corner.



Quit rather than close/minimise any applications you are not using.

This will free up RAM (a type of computer memory).

Quitting Apps

You can check which apps are still using memory by running in the background, which will slow down your computer. This varies by operating system.

Mac: Use shortcut **Command-Q**, or click the app's name in the menu bar, then Quit.

Windows: Use the **Task Manager** (see next page)

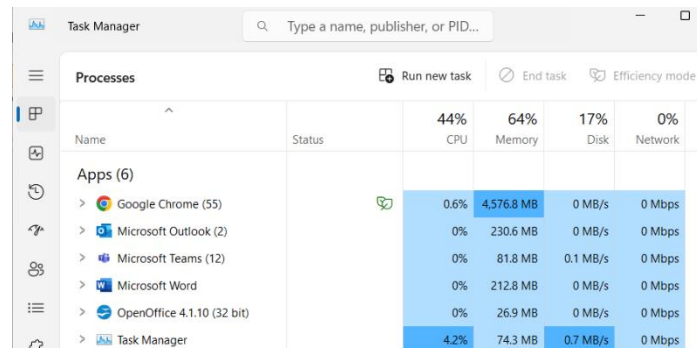
Linux: Use the **System Monitor** (see next page)

Windows: Task Manager

To see what is using up the computer memory, use the **Task Manager**.

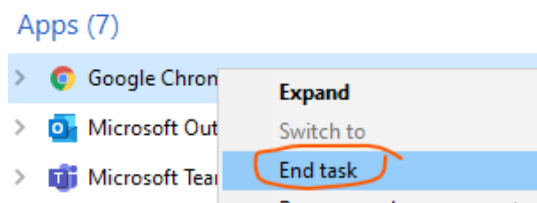
Open it by pressing **Ctrl + Shift + Esc**.

In this example, you can see Chrome is using lots of memory (over 4GB!):



Name	Status	CPU	Memory	Disk	Network
Apps (6)					
Google Chrome (55)		0.6%	4,376.8 MB	0 MB/s	0 Mbps
Microsoft Outlook (2)		0%	230.6 MB	0 MB/s	0 Mbps
Microsoft Teams (12)		0%	81.8 MB	0.1 MB/s	0 Mbps
Microsoft Word		0%	212.8 MB	0 MB/s	0 Mbps
OpenOffice 4.1.10 (32 bit)		0%	26.9 MB	0 MB/s	0 Mbps
Task Manager		4.2%	74.3 MB	0.7 MB/s	0 Mbps

This is why it is best not to keep 30 tabs open at once in your browser. If I decide I want to Quit Chrome, I can force it to quit by Right-clicking and selecting **End Task**.



You can find more tips for speeding up your Windows PC from ex-Microsoft engineer [Kevin Stratvert](#), including disabling some of the startup apps and managing storage.

Linux: Systems Monitor

To check which applications are using memory, use the **Systems Monitor**.

- Open **Applications** then scroll to **Utilities**. Select **Systems Monitor**.

Under the Processes tab you will see a list of all programs running. To stop an unresponsive program, simply select it and right-click. You can then select:

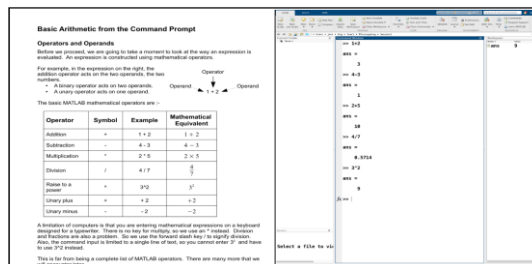
- **Stop** to pause the process
- **End** which will fully close an application safely.
- **Kill** which forces the app to quit, only use if End Process does not work.

For more information, see this [article](#) on how Linux uses memory.



Split Screen View

To work with two applications at once, a simple option is to split the screen. The image below shows a Desktop with notes on the left and an app on the right.



Windows: Windows key + arrows

When using one application, press **Windows key** and **right arrow key** ►. On another application, say some notes, press **Windows key** and **left arrow key** ◀.

MacOS: Select and hold the green button in the top-left corner of an app.

The Desktop splits into two. Drag the application to one half and release. You can drag the divide between the two applications to the left and right.

Linux: Manual Resize

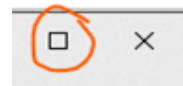
Resize the windows by hovering over the edge of a window, and when an arrow appears resize the window by holding and dragging.



Maximising

The approach of splitting the screen is not useful if you have a small monitor. Often we need to work with an application which has been maximised to fill the screen.

Windows or Linux: Maximize via the top right square icon:



The windows can be resized by dragging any of the corners or sides. Move your mouse until you see an arrow, and then click and drag.

macOS: Click the green button in the top-left corner of an app window.

You can also double-click an app's title bar to maximise the window (if the option to do so is set to "zoom" in [Dock & Menu Bar preferences](#)). When an app is maximised, you can view the banner/menu bar by moving the mouse to the top of the screen.

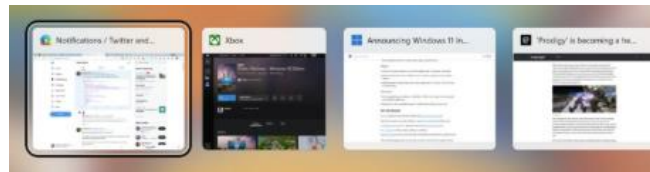
Switching between Windows

If you have windows hidden behind other windows, there are ways to automatically space these out so that you can select which window you want in front.

- In Windows it is called **Task view**.
- In **macOS** it is called **Mission Control**.

Task View in Windows

Task View offers a quick way to switch between multiple applications. Holding **Alt** and then pressing **Tab**  will allow you to see all the open Windows. Pressing **Tab** will move through each window, or you can select one with the mouse or arrow keys. This is a quick way to move between different pieces of software.



Other useful shortcuts include:

- **Windows**  **key** and **M** to **minimise** all windows and see the desktop.
- **Windows**  **key** and **E** to **open the file Explorer**.

If you have Windows 11, [see this video](#) to learn more shortcuts.

Mission Control in macOS

Mission Control offers a quick way to switch between multiple screens, for users of macOS. There are many ways to start [Mission Control](#):

- Press the **Mission Control Key**, as shown on the right. 
- Hold down the **control** key and press the up arrow key, **▲**.
- On a **trackpad**: Swipe up with three fingers. 
Swipe down to leave.

Customising the Dock / Taskbar

You can pin frequently used Apps to the Start Menu or Taskbar (Dock in macOS). It is worth taking some time to arrange these icons in the most useful way to you:

- **macOS**: The dock can be fully customised, see [this video](#).
- **Windows**: Right-click any icon on the taskbar to **Pin or**  **Unpin from taskbar**

Managing your Files

Files and Folders



A **file** is just a lot of ones and zeros stored in a permanent location on the computer. Each file is used to store a particular type of object.

Each file has a name, which may also include ending • ('dot') something. This is the file type, which helps to show what the file contains. For example **.jpg** is an image, **.docx** is a document.



A **folder**, also known as a **directory**, is a location where all the files related to a particular topic are stored. Folders help keep related files together, so they do not get mixed up with other files on the system.

Files and folders may seem basic, but keeping them organised can be a difficult habit to develop.

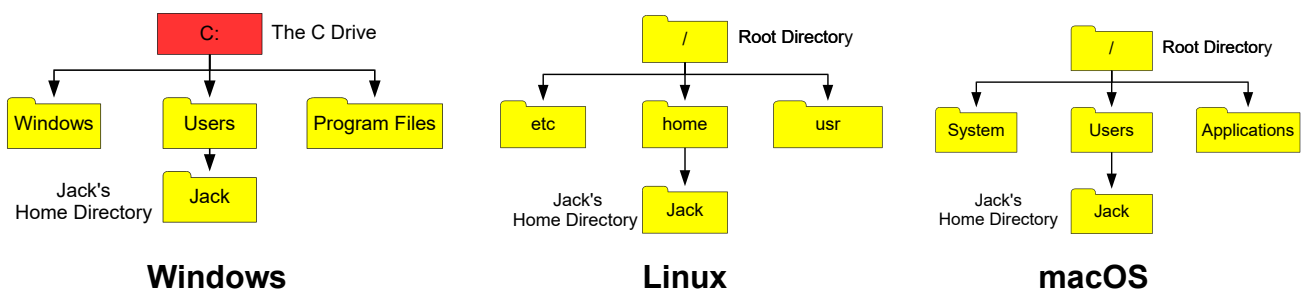


When you download a file, it is usually stored automatically in your **Downloads** folder. If you want to store it long term, **move this file** so it is **stored in a sensible folder elsewhere** in your file system.



A File System

A **hierarchy** of folders within folders creates a **file system**. The diagrams below shows the top of a file system, for Windows, Linux and MacOS. For Windows the top folder has a letter e.g. **C: Drive**, for Linux and macOS it is called the **Root Directory**.





Home Directory

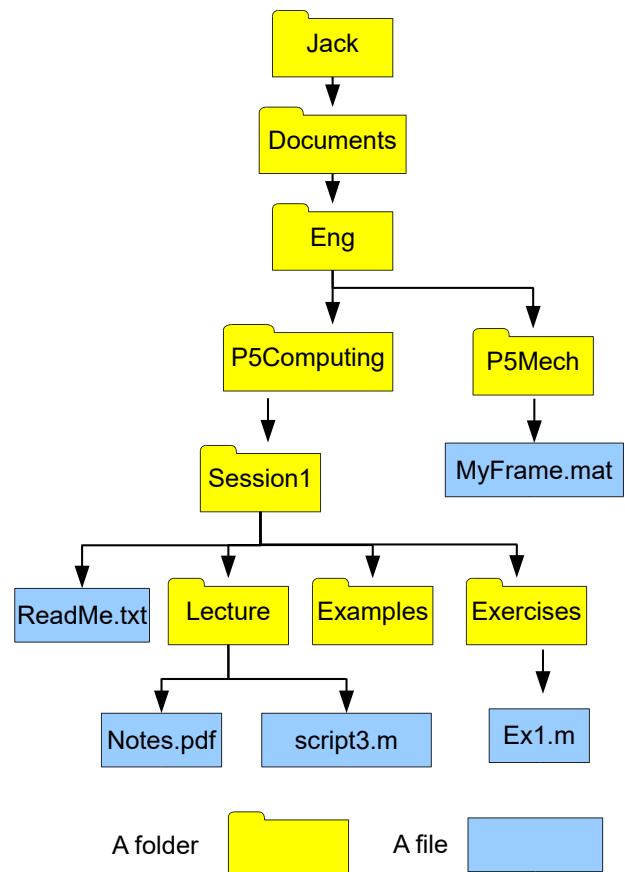
We need to avoid mixing up our personal files with those used by the operating system and even other users. To store their personal files, each user on a system is allocated a **Home Directory**. Here is an example of an organised Home Directory:

The diagram looks a bit like a family tree.

The words **Parent** and **Child** are used in computing to describe the relationship between folders or other objects:

- The **Parent** of **Session1** is **P5Computing**.
- **Lecture** and **Examples** are the **Children** of **Session1**.

There are apps to view your files and folders:



Windows



- Open **File Explorer** using **Windows Key + E**
- **This PC** and then **C:\Users\username** is your **Home Directory**

macOS



- Along the **Dock**, use the application called **Finder** to view your files.
- **Finder** has great preview capabilities to help navigating your files.



- In Finder, your Home is a house icon. If you cannot see it in menu:

Finder > Preferences > SideBar > Tick **home** under **Favourites**

- [This video](#) shows you 10 different ways to move files on your Mac

Linux



- There are different applications on different Linux distributions.
A common one is called GNOME.

Local vs Remote Storage

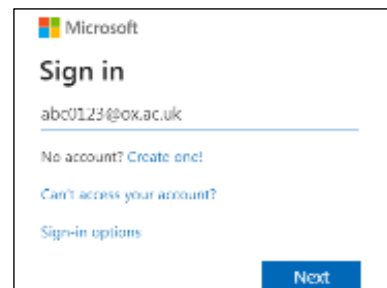
A file system can be stored **locally** on a computer, or stored remotely (such as 'the cloud'). If the files are stored locally, then they only exist on that computer.

If the computer is damaged then there is no way to recover them. Therefore it is best to always store files remotely too.

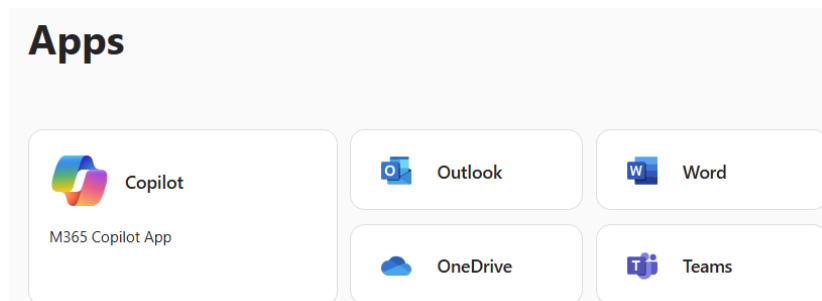
Using OneDrive

As part of your University Single Sign On (SSO) account, you have access to **OneDrive**. This is a file storage area linked to the Microsoft Office Suite available online.

- Visit Office.com and click **Sign In**.
- Use your SSO username
e.g. **abc123@ox.ac.uk**
- Use your SSO username and password.



Once you logged in, select **Apps** and then **OneDrive** to open your file storage:



- Use the **Upload** button to add files/folders to your area, or drag and drop.
- You can also use the **OneDrive application** for macOS or Windows.



Spend 5 minutes organising your [OneDrive](#).

For example you could set up folders for Labs, Tutorials and Lectures.

If you have a personal computer, set up the OneDrive App.



You've finished the Operating Systems Basics document!

Reflect on what you have learnt by [submitting a post here](#).

Oxford Engineering IT Readiness Checklist (2025-26)



Key University Software

- ☐ I can access Office via Nexus365 and use Word, Excel, OneNote, etc
- ☐ I can access my University e-mail via Outlook and set up an e-mail signature of my name, year of study etc.
- ☐ I've set up Outlook or other calendar with term dates
- ☐ I've installed and/or set up OneDrive and organised folders for e.g. Labs, Tutorials, and Lectures
- ☐ I know how to use a PDF reader that supports searching, bookmarks and annotations
- ☐ I know where to get free/discounted software from the IT Services website
- ☐ [If you have your own computer] I have anti-virus software installed (e.g. Sophos)
- ☐ [If you have your own computer] I have installed Word, Excel, OneNote, etc



Accounts & Security

- ☐ I know my log on information for the Departmental Account, SSO, and Remote Access Account
- ☐ I have set up at least two multi-factor authentication (MFA) for my SSO via mysignins.microsoft.com
- ☐ I use strong, unique passwords and a password manager
- ☐ I have connected to both WiFi networks in Thom Building (eduraom and engsci)



Application & Window Management

- ☐ I know how to quit apps (not just minimize them)
- ☐ I've used Task Manager (Windows) or System Monitor (Linux) to check running processes
- ☐ I've practiced split-screen view using shortcuts like Alt+Tab (Windows) or Mission Control (Mac)
- ☐ [If you have your own computer] I've customised my Taskbar/Dock with my most-used apps
- ☐ I've tested my typing speed, and if it needs improving, I have scheduled some weekly practice time



File Management & Backup

- ☐ I understand how a file system works (folders, file types, etc.)
- ☐ On a Departmental Computer, I know where my Home Directory
- ☐ I can move files between folders
- ☐ I've tested uploading and accessing files via OneDrive