Introduction to Operating Systems

Objectives.

1. To understand how windows task manager works.
2. To introduce windows command prompt

Tasks.

1. Windows Task Manager

The Task Manager enables users the ability to easily close everyday processes and applications in one click and lets more advanced users optimise the CPU for better performance.

Open Windows Task Manager. You can right click on the Windows task bar, use Ctrl+Shift+Esc, or there are many other ways. When you open the Task Manager, press the ‘fewer details’ button at the bottom (if present). This now displays just opened applications and two buttons: 'More details' and 'End Task'. Each of the application can be closed by selecting it and then pressing the 'End Task' button. Press the "More details" button, this switches to the Advanced Task Manager panel. The applications are shown at the top of the screen, while background processes occupy the middle & Windows processes the bottom. While suspended, processes consume 0 amounts of CPU power and less RAM. Resource-usage statistics are color-coded – the darker the colour, the more resources used.

You can expand an app (using the >) to see its windows, if the app has multiple windows – expand something like Google Chrome or Word. The Task Manager provides information about programs running on your computer and displays the most commonly used performance measures. You can use Task Manager to monitor key indicators of your computer's performance. You can see the status of the programs that are running and end programs that have stopped responding. You can also assess the activity of running processes using as many as fifteen parameters, and see graphs/data on CPU and memory usage.

Right click on the top row, the one with “Name”, “CPU” etc. in it, and select the columns you wish to display. The Task manager can also be used to manage running processes. For example - you can change the priority of a process, or the “affinity” of that process for a particular CPU. However, the simplest management is to stop applications or processes. On the Processes tab, if you select an application and click “End Task” a request will be sent to gently quit the application. All processes can be “killed” or, taking the example of Windows Explorer, restarted. Restart option automatically does the job of killing and then starting the service back. The restart button will appear in the bottom-right corner, after you select a process.

This exercise is intended to show that Windows, like most modern software, is made from identifiable components, each of which has a specific job. If you kill a single component, it may not take out the rest of the system. It doesn’t here. Kill some more processes, including Windows processes – don’t be scared of hurting the machine. What processes are essential? Task manager won’t allow you to end some processes.

System Statistics : The Performance tab shows graphs of your system information. You can analyse the CPU, the RAM Memory, storage area and most of all, networking traffic. If you are connected to a network, you can view network status and see how your network is functioning. Both Wireless and Ethernet options are available. Clicking on either of these will display detailed information.
You can still open the Resource Monitor application, but shows even more information than the Task Manager does. This utility provides a granular view of file-system and disk activity, processor usage, and network connections. What can you learn about the machine hardware from looking at the information under the performance tab? How much RAM is there? How many CPU cores?

App History : The Processes tab only shows each process's current resource usage. The "App history" tab shows how much CPU + RAM they consume and network bandwidth each app has used. It's very helpful for those trying to speed up the computer, in a few minutes a user is able to analyse what is slowing the PC down.

Startup Programs : The Startup tab shows the applications that automatically start with your computer. Windows also measures just how long each application is delaying your startup, so you can make informed decisions (such as disabling them – using the button or right click).

Users : If you have more than one user connected to your computer, you can see who is connected, what they are working on, and you can send them a message. The Users tab breaks down your system's resource usage by user account. You can expand a user's name to view that user's processes.

Advanced Process Details : This tab doesn't have a pretty interface. There are advanced options not found on other tabs, including process priority and CPU affinity.

Services : The Services tab includes an option to quickly restart services.
You can click the Open Services link to use the Services application, which contains the advanced options you won't find in the Task Manager.
This version of the Task Manager is a huge step up, both in features and presentation. Take a look at the following for more details:
https://www.online-tech-tips.com/windows-10/windows-10-task-manager-overview-part-i/
https://www.online-tech-tips.com/windows-10/windows-10-task-manager-overview-part-ii/
For those of you who really want to get to grips with Windows 10, download the following book: https://blogs.msdn.microsoft.com/microsoft_press/2016/02/08/free-ebook-introducing-windows-10-for-it-professionals-technical-overview/

2. The command prompt

We don't have to use a GUI to communicate with the OS. Get used to a few basic command at the command prompt.
Start a command prompt – type “comm” at the Start menu. At the Command prompt type: ‘ *cd* \ ‘ . This will take you to the root C: directory. Then type: *‘cd users\(your username)\Documents’.* This will move you to your Documents directory. To see what is there type ‘*dir’.*
Start a program typing ‘*notepad hello.txt’.* You may have to agree to create it (and to save it to your Documents). Insert some (any) text into the file and then use the file menu to save and exit. Now check the file is there by listing the directory again ‘dir’. Now type ‘*dir > hello.txt ‘.* Nothing seems to have happened. Actually, you have redirected the output of *dir* (the stream we will call "stdout") to the file *hello.txt*. Now edit *hello.txt* again by typing ‘notepad hello.txt‘.
Lastly type the following to end the Command prompt ‘exit’.
It is well worth being familiar with the command line interface in both Linux and Windows.
The semantics of Linux and Windows are almost identical, though the syntax is slightly different. What that means is that in the Windows command prompt you see the contents of a folder you type *dir*, whereas on Linux you would type *ls*. The syntax is different, the semantics (what they actually do) are the same.

3. **Caching** (not in CPU cache, in “slow” RAM)

Load a program which is memory hungry, say, Visual Studio and time how long it takes to load. Close it then load it again; it should load faster the second time, why? This is because in the first case the application is loaded from main memory which is slow, while in the second case from cache, which is faster.