Objective:
• To observe the behaviour of processes using Task Manager

Task manager is one of the tools that can be used to manage system processes and applications. Task manager is a program used to provide information about the processes and programs running on a computer, as well as the general status of the computer. It can also be used to terminate processes and programs, as well as change the processes' priority.

Depending on the version of Windows you have, each of the features discussed may vary. So try and find its counterpart on your own if necessary.

In Windows operating systems, the task manager is a program named "Windows Task Manager" (taskmgr.exe).

(Depending on your windows version this process might be slightly different)
Task Manager can be started with:
1. Press Ctrl+Shift+Esc
2. Press Ctrl+Alt+Del, and then select the Task Manager button
3. Enter **taskmgr** into the Run utility or a command prompt
4. Right-click on the taskbar and select Task Manager from the pop-up menu

There are three important tabs in Task Manager Window (For Windows 10, click on **MORE DETAILS** if it does not display the tabs):
1. Application/Details
2. Processes
3. Performance

1. **Details/Application**
   It shows the status of the programs that are currently running on the system. Application ***status*** tells you if the application is running normally or if the application has gone off into the ozone.

   A status of **Not Responding** is an indicator that an application may be frozen and you may want to end its related task.

   If you click on a process, you can use the options available of this tab as follows:
   - **End Task:** Stop an application
   - **Switch To:** Switch to an application and make it active
   - **New Task:** Start a new program and then enter a command to run the application. (in Windows 10, click file -> new task)

   You will also notice in the Details tab here there are process listed along with their process id (PID), the fraction of the total processor (CPU) time it has recently used, the CPU time the process has used since it was created and the process's current memory utilization.

2. **Processes**
   It shows the processes that are currently running. Each process is listed, along with their status, percentage of CPU utilization, Memory utilization, Disk and Network usage.

   In Windows 10, you can see that processes are divided into categories such as Apps (user program), Background Processes (active programs running in the background) and Windows Processes (critical programs to make sure your OS is operational)

3. **Performance**
   Task Manager's Performance tab provides an overview of CPU, memory and network usage. This information provides a quick check on system resource usage. You can also click on the RESOURCE MONITOR to view more detailed information regarding each resources on your computer.

   The graphs on the Performance tab provide the following information:
   • **CPU Usage**: The percentage of processor resources being used
   • **Memory Usage**: The amount of main memory currently being used on the system
   • **Disk Usage:** The amount of time your secondary memory is being accessed

EXERCISE (Requires submission to my e-mail after you have finished):

In order to answer the question, you might have to do your own fact finding online and exploration on your computer

1. Go to **Processes tab**, click on the **memory** column to see which process is using the most memory. Screenshot the result. Is it a background process? A windows process or a user App? Explain why you think the process on top of the list is using the most memory on your computer.
2. What is the difference between Background Process and Windows Process? Which one is more critical? Why?
3. Run Word for windows. Check the memory size of winword.exe process. Compare it with the size of the actual winword.exe file in the hard disk (on Windows 10, you can just right click on winword.exe and Open File Location to see it on the hard disk). Why are they of different size?
4. Inside the **Performance** tab, click on the **resource monitor**. Find Winword.exe again. How many threads does the winword.exe process have? In your opinion, what can be the functions of each thread that are running? Explain your point.
5. Right click on Winword.exe and click on **analyze wait chain**. Screenshot your finding. What is winword.exe currently waiting for? Why do you think it is waiting for that process?
6. Still on the resource monitor, click on the **memory** tab. Screenshot your finding. What is the difference between all the color indicators of the memory use? Explain the meaning of each.
7. Under physical memory box, there is a cached memory and available memory. What is the use of **cached memory**?
8. On the performance tab under memory category, what is the difference between Paged Pool and Non-paged pool? Why is it of different value?

9. Run the following applications in order: Windows explorer, calculator, notepad, command prompt, telnet, another copy of Windows explorer. Observe the number of applications, processes and their threads and memory usage in the task manager (Do a print screen and write your observation). Exit each application in reverse order and observe the changes each time you exit the application. Explain your observation.
10. Logoff your computer and reboot. Run the task manager as soon after you logon. (Do a print screen and include it in your observation). Observe all the information under processes tab and the memory usage under performance tab. Explain the difference compared to what you observe in (9)

Write your answers in Word and e-mail it to me with the subject title : **OS_LAB5_SectNo_StudentID.**