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                                                DATE:

Week 1 Lab Activity: Resource Allocation and Management on Windows

Objective: Students will learn how to monitor system resources, allocate system resources to specific processes, and evaluate system performance using the Windows operating system. The goal is to familiarize students with tools such as Task Manager, Resource Monitor, and Windows Command Line to manage CPU, memory, and disk usage.

Tools Required:

- Windows Operating System
- Access to Task Manager, Resource Monitor, and Command Prompt

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Lab Instructions:

Part 1: Monitoring System Resources

1. **Open Task Manager**
   - Right-click on the taskbar and select **Task Manager**.
   - Go to the **Performance** tab.
   - Record the current usage of CPU, Memory, and Disk. Observe the number of processes running.
2. **Open Resource Monitor**
   - In Task Manager, click **Open Resource Monitor** at the bottom of the Performance tab.
   - Explore the **CPU**, **Memory**, **Disk**, and **Network** tabs.
   - Identify any process that is using a significant amount of resources.
   - Write down the most resource-consuming process in each category.

Part 2: Allocating Resources Using Command Prompt

1. **Limit CPU Usage for a Process:**
   - Open **Command Prompt** as Administrator (right-click and select "Run as administrator").

Use the following command to find the **PID** (Process ID) of a running process (e.g., Notepad):
tasklist /FI "IMAGENAME eq notepad.exe"

Set the priority of the Notepad process to **low**:
wmic process where "name='notepad.exe'" CALL setpriority 64
Or

Using Task Manager (Manual Alternative)

Open Task Manager → Details tab.

Right-click on notepad.exe.

Choose Set Priority → Low

- Check the new priority in Task Manager under the **Details** tab.
2. **Allocate Memory to a Process:**
   - Launch **Notepad** and keep it running.

Open **Command Prompt** and type:

tasklist /FI "IMAGENAME eq notepad.exe"

- Take note of the **Memory Usage** in the Task Manager under the **Processes** tab.
- Use the **Resource Monitor** to check memory consumption in detail.

Part 3: Analyzing Resource Performance

1. **Monitor Resource Performance:**
   - Run multiple applications like a web browser, Notepad, and a media player.
   - Open **Task Manager** and track how system resource usage changes.
   - In the **Performance** tab of Task Manager, identify spikes in CPU and Memory.
2. **Generate a Performance Report:**
   - Use **Performance Monitor** (Type "perfmon" in the Start menu and press Enter).
   - Go to **Data Collector Sets** > **System** > **System Performance**.
   - Right-click **System Performance** and click **Start** to run a report for 60 seconds.
   - After the report finishes, find it in **Reports** > **System** > **System Performance**.

Part 4: Resource Termination and Cleanup

1. **Terminate a Process:**
   - Identify a process using a high amount of resources (e.g., Notepad).

Open Command Prompt and type:

taskkill /IM notepad.exe /F

- Verify that the process is no longer running in Task Manager.
2. **Check System Performance After Resource Termination:**
   - Recheck CPU and Memory usage in Task Manager after terminating unnecessary processes.
   - Compare system performance before and after the termination.

Answer the following question and provide the needed requirements for each number:

a. What information does Task Manager and Resource Monitor provide and why is this significant?

- Task Manager shows what programs are running and how much CPU, memory, disk, and network they use. Resource Monitor gives a deeper view of these details. These tools are important because they help find why a computer is slow and fix performance problems.

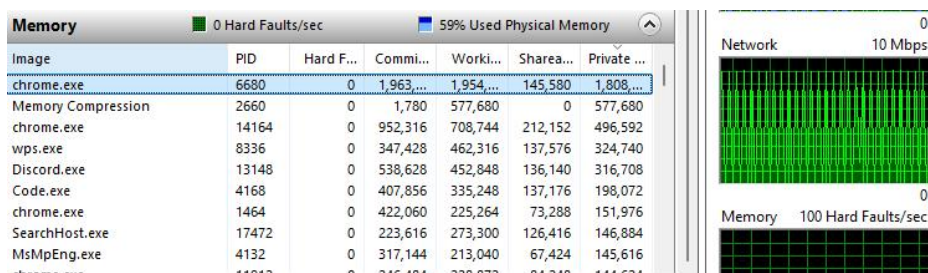 ○ Task Manager showing CPU, Memory, and Disk usage.
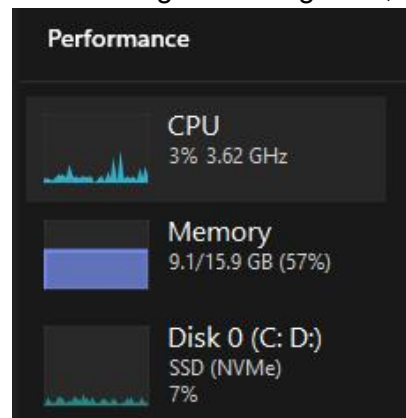
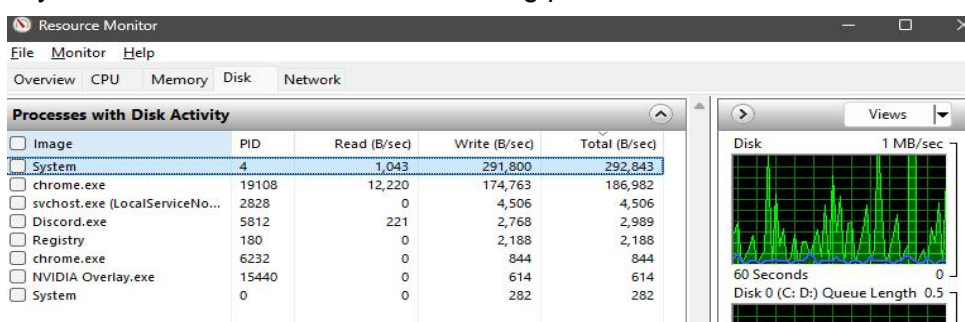 ○ Resource Monitor identifying resource-heavy processes.
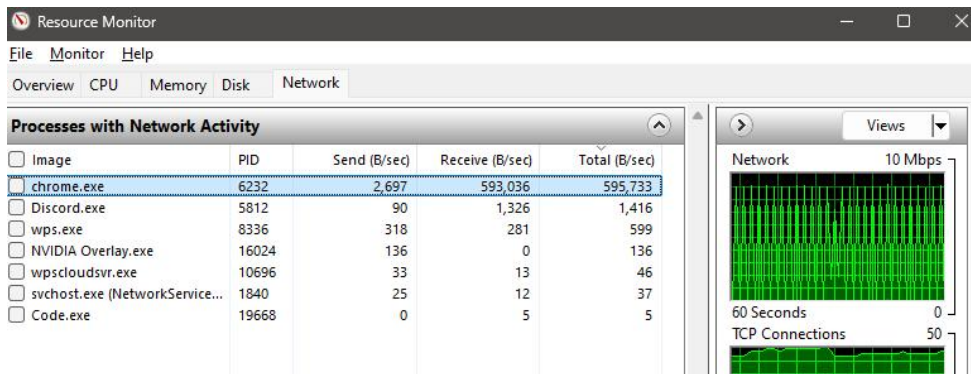System Interrupts is the most resource-consuming process in **CPU**
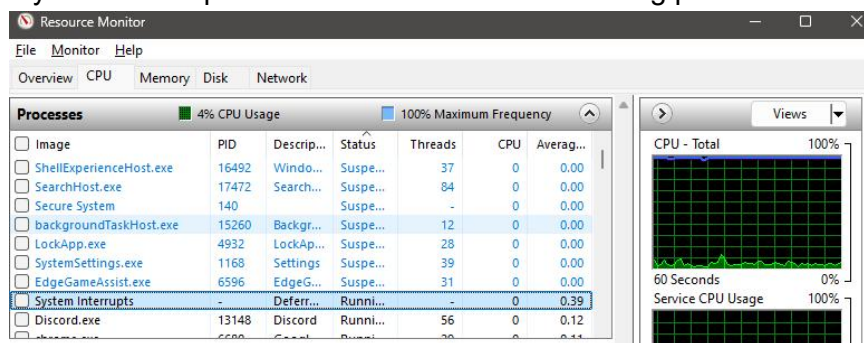
Chrome.exe is the most resource-consuming process in the **Memory**

System is the most resource-consuming process in the **Disk**

Chrome.exe is the most resource-consuming process in the **Network**

b. Why would a system administrator change the priority level of a process? Describe how you used the Command Prompt to modify the Notepad process priority and how this change was reflected in Task Manager.

- A system administrator changes process priority to give more or less CPU to a program. I used the command wmic process where "name='notepad.exe'" CALL setpriority 64 to set Notepad's priority to Low, and Task Manager showed the change.

- ○ Command Prompt showing the change in process priority and process termination.

CHANGE PROCESS PRIORITY:

```
C:\Windows\System32>tasklist /FI "IMAGENAME eq notepad.exe"

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
Notepad.exe                   1972 Console                   10    106,236 K

C:\Windows\System32>wmic process where "name='notepad.exe'" CALL setpriority 64
Executing (\\DESKTOP-J8UGSAV\ROOT\CIMV2:Win32_Process.Handle="1972")->setpriority()
Method execution successful.
Out Parameters:
instance of __PARAMETERS
{
        ReturnValue = 0;
};
```

PROCESS TERMINATION:

```
C:\Windows\System32>taskkill /IM notepad.exe /F
SUCCESS: The process "Notepad.exe" with PID 1972 has been terminated.
```

c. After checking memory usage for Notepad, what did you learn about how applications consume memory? How can this help in system optimization?

- I learned that applications like Notepad use a small amount of memory, while bigger programs use much more. Knowing how much memory each app uses helps in system optimization by finding heavy apps that slow the computer, so you can close or manage them to improve performance.

d. Explain how you generated and interpreted the Performance Monitor report. What patterns did you notice, and what do they indicate about system behavior?

- I used Performance Monitor and started a data collector in System Performance for 60 seconds. The report showed CPU, memory, disk, and network use. I saw which parts were used most, showing how the system was running and if anything was overloaded.

   ○   The Performance Monitor report generated during the lab.
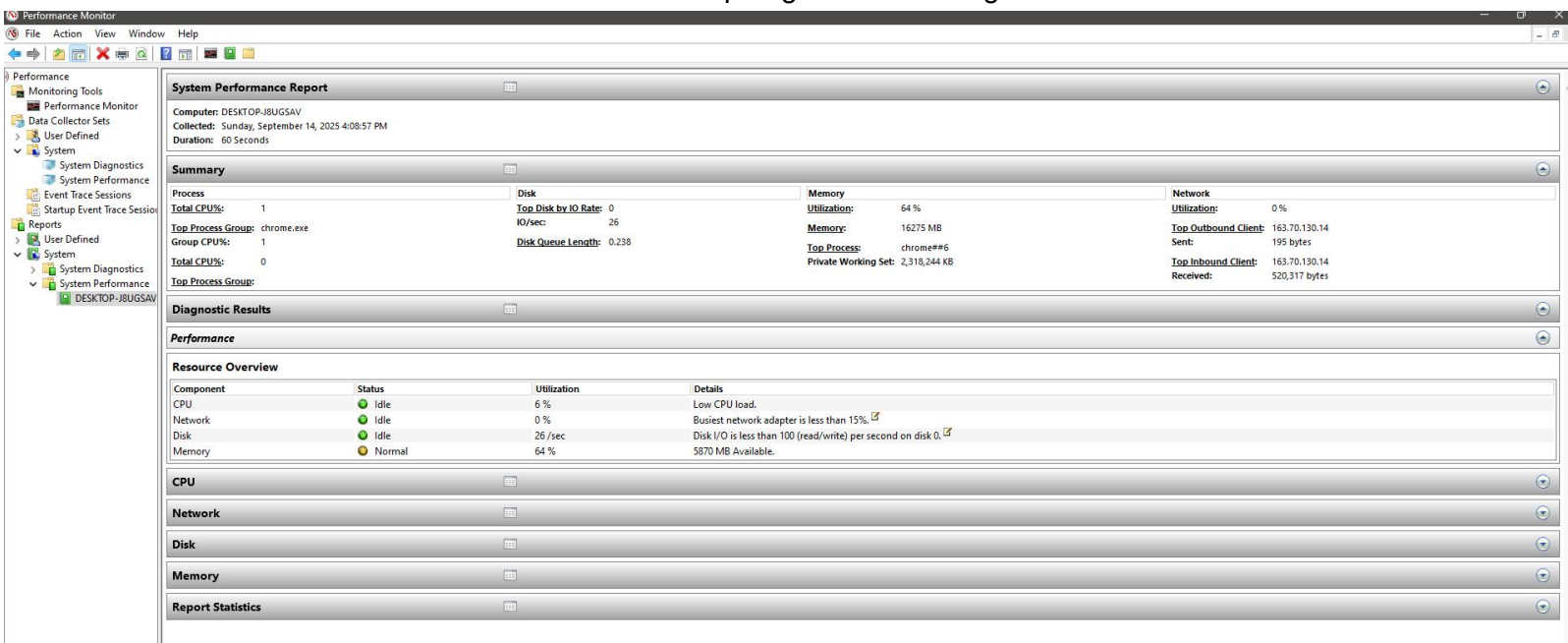
e. Why might terminating a process improve performance? Describe how you end a process using Command Prompt and what changes you noticed in system resource usage afterward.

- Stopping a process can improve computer performance because it frees up CPU and memory for other tasks. I used the command taskkill /IM notepad.exe /F in Command Prompt to close Notepad. After ending it, Task Manager showed lower resource usage, meaning the system had more free memory and CPU power for other programs.


```
C:\Windows\System32>taskkill /IM notepad.exe /F
SUCCESS: The process "Notepad.exe" with PID 1972 has been terminated.
```

f. Based on this lab, how do resource monitoring and allocation tools help in real-world IT system administration?

- Resource monitoring and allocation tools help IT administrators see how programs use CPU, memory, disk, and network. This helps find problems, manage resources, and keep the system running well. They make it easier to fix slow computers, avoid crashes, and give important programs enough resources.