

## 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.

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### 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.
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#### 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.
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### 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**.
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### 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`

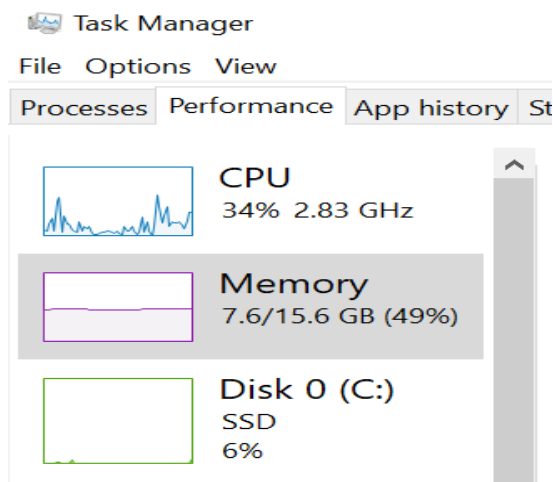
- Verify that the process is no longer running in Task Manager.
  - 2. **Check System Performance After Resource Termination:**
    - Recheck CPU and Memory usage in Task Manager after terminating unnecessary processes.
    - Compare system performance before and after the termination.
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**Answer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

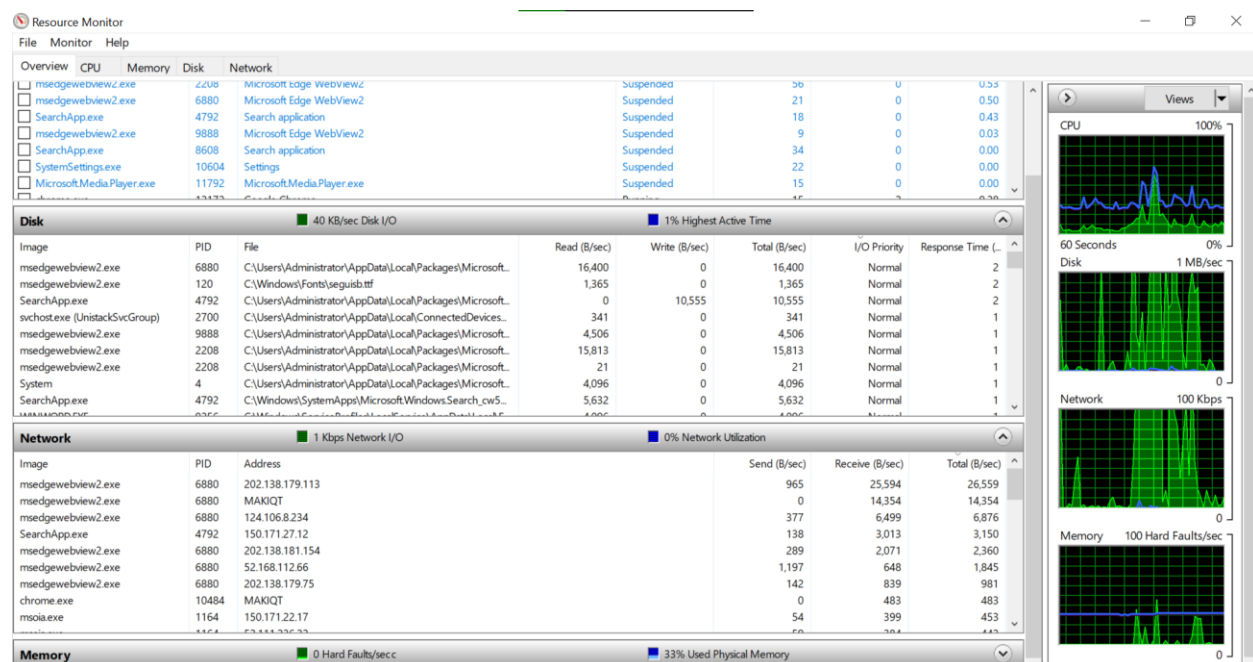
a. What information does Task Manager and Resource Monitor provide and why is this significant?

- Task Manager and Resource Monitor displays two different approach of information. First, the Task manager displays real-time information about the CPU, memory, disk, and network usage from the various processes of software and system applications running in the computer. Task manager is significant because it can help system administrators to quickly check the overall performance of the system and issues. While the Resource Monitor displays a more detailed breakdown of each system processes such as CPU thread allocations, memory faults, disk I/O operations, and network connections. This information is significant because it helps system administrator to identify resource-heavy processes, detection of security threats, more effective troubleshooting and optimization.

- Task Manager showing CPU, Memory, and Disk usage.



- Resource Monitor identifying resource-heavy processes.



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.

- System administrator change the priority level of a process to allocate the distributions of CPU resources efficiently on the system. For example, prioritizing the most critical applications like databases or apps that users are using for the specific task and lowering the priority of background or backup apps to ensure that critical applications to run smoothly.
- I used command **"wmic process where "name='notepad.exe'" CALL setpriority 64"** in the command prompt to modify the priority level of the Notepad to low. After the command successfully executed, Notepad application sets its priority to low in the allocation of CPU resources.
  - Command Prompt showing the change in process priority and process termination.

#### Changing process priority level of the Notepad

```
C:\Users\Administrator>tasklist /FI "IMAGENAME eq notepad.exe"

Image Name                      PID Session Name        Session#    Mem Usage
=====
notepad.exe                    7508 Console             1          14,472 K

C:\Users\Administrator>wmic process where "name='notepad.exe'" CALL setpriority 64
Executing (\\MAKIQT\ROOT\CIMV2:Win32_Process.Handle="7508")->setpriority()
Method execution successful.
Out Parameters:
instance of __PARAMETERS
{
    ReturnValue = 0;
};

C:\Users\Administrator>
```

#### Termination process of the Notepad

```
C:\Users\Administrator>taskkill /IM notepad.exe /F
SUCCESS: The process "notepad.exe" with PID 7508 has been terminated.

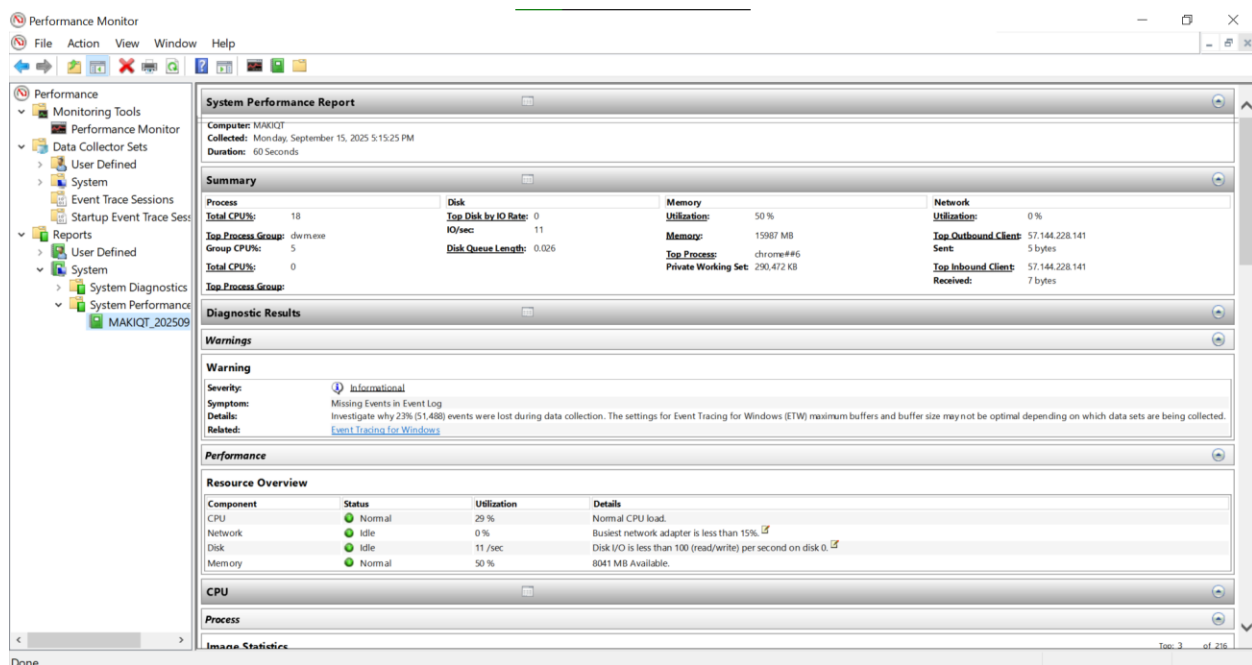
C:\Users\Administrator>_
```

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

- A computer has different size type of applications that may consume the memory of the computer just like Notepad application. Notepad application consumes small amount memory of the system if the Notepad file has no data on it (blank texts or data), but it increases when you try to open many files on the notepad with or without data on it. This indicates that each application reserves memory based on its functions and active tasks. So, through setting of levels priorities of each application in the system will lead the most critical applications to receive more CPU resources to function effectively and smoothly.

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

- First, I opened Performance Monitor by searching perfmon command on the start menu.
- Second, I navigated to Data Collector Sets to System to System Performance to start run a 60 second report generation. Then, viewing the generated reports result from navigating the Reports to System to System Performance that highlights the summary of system performance and processes.
- 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.

- Terminating a process improve performance because it freeing up the CPU and memory resources that are being consumed by unnecessary applications. So termination will improve the performance of critical applications that are being used to run more smoothly and efficiently.

- To terminate the process of the application, I run this command in my command prompt

```
C:\Users\Administrator>taskkill /IM notepad.exe /F
```

Then if the command was successfully executed, a success message will be prompt in the command prompt.

```
C:\Users\Administrator>taskkill /IM notepad.exe /F  
SUCCESS: The process "notepad.exe" with PID 7508 has been terminated.
```

- Then the changes I noticed in the system resource usage afterward is it slightly decreased that reflects the termination of the Notepad application in consuming CPU and memory of the system.

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 in real-world IT system administration because it can manage and monitor possible system or program problems in one computer for example is the consumption of the unnecessary or background applications in the CPU and memory resources of the system that affects the overall performance of the computer or system especially the critical applications that were used in IT operations. Also, it can fix slow performance of the important application by managing level of priorities of applications and check for updated if the computer needs to upgrade its RAM or memory disks to sustain the size of the applications that are being used in their work operations.