Module 5: Critical Thinking

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Critical Thinking

When a system is out of physical RAM, virtual memory acts as an extension of it and helps the computer performance. * While macOS automatically manages virtual memory, Windows users can customize it. Tweaking these settings will affect how well their system performs in handling multitasking and memory-intensive tasks. Table 1 shows the identifying information about my OS.

Table 1: Operating system information

	Spec
Operating System	Windows 11 Pro
Processor	Intel Core i7-12700K (12-core, 20-thread)
RAM	16 GM DDR4
Storage	1 TB NVMe SSD
Virtual Memory	2.5 GB

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Improving and adjusting systems of virtual memory.

I found the virtual memory settings on my Windows 11 computer by referring to Huculak (2024, July 17). Paging files are created and sized automatically using a combination of Windows defaults and system needs. The value is currently set to approximately 2.5GB which, for general users, is adequate.

In an effort to test the consequences of wider range of virtual memory sizes, I modified it's value to double the default (5 GB) (Technical Support, 2024, April 19). With this modification, I found that while running several resource heavy programs such as Adobe Premiere Pro, virtual machines, or games, smoother performance was achieved with heavy RAM usage. This is my experience because my memory is 16GB, so the difference isn’t that considerable.

Completely disabling virtual memory caused quite a bit of lag during simultaneous operations, especially when accessing large spreadsheets and using game engines like Unity.

Programs would freeze or crash after they exhausted all RAM space and were unable to use a page file.

RAM Size and Virtual Memory Recommendations

RAM of 8 GB or lower needs a larger paging file (1.5–2× RAM) in order to prevent slowdowns due to being low on memory. For 16 GB RAM, Windows automatic control is usually sufficient, but having a small paging file (4–8 GB) helps for stability. With 32 GB or higher, virtual memory is minimal, and increasing it gives little benefit. The less RAM contained in a system, the greater it relies on virtual memory, but excessive virtual memory will never enhance performance (geeksforgeeks, 2024, January 15).

Best Virtual Memory Setting Using RAM Size

I have a computer with 16GB of RAM so default Windows management is fine by me. In the case of 8GB or lower systems, increasing the virtual memory size tends to mitigate slow performance. On the other hand, systems with 32GB or more may allocate virtual memory on the lower side, but a certain amount of paging file space must be allocated for proper system working.

Conclusion

Virtual memory tuning can have a significant impact on system performance, particularly in environments with limited RAM. Doubling the virtual memory size allowed performance to be maintained when running many apps at once, but turning it off caused applications that use lots of resources to crash or slow down.” However, Windows’ automatic management usually delivers the best results on systems with enough RAM. While virtual memory helps back up when RAM is full, increasing it won't save you you from requiring physical memory, since SSD-based paging is orders of magnitude slower than actual RAM.

References

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