IT SUPPORT AND OPERATING SYSTEMS

GUIDE - DR.M.RAJA

By,
T Jyoshna,
9921004721

CONTENTS

OBJECTIVE

- To understand the fundamentals of IT support, including troubleshooting, system maintenance, and user assistance.
- To explore the importance of operating systems in managing hardware, software, and user interactions.
- To compare the features, advantages, and use cases of Windows, Linux, and macOS.
- To discuss key networking concepts such as IP addressing, DNS, DHCP, and cybersecurity measures.
- To investigate virtualization and cloud computing technologies for optimizing IT resources.
- To analyze automation tools like PowerShell and Bash for efficient system administration.
- To explain the significance of system monitoring, log files, and preventive maintenance.
- To assess the role of technical support in ensuring business continuity and security.
- To explore emerging trends in IT support, such as AI, machine learning, and cybersecurity advancements.
- To provide recommendations for effective IT support strategies to maintain system reliability and performance.

ABSTRACT

- IT infrastructure supports communication, data management, and security while ensuring reliability, scalability, and cybersecurity.

- IT support involves diagnosing and troubleshooting hardware and software issues, configuring networks, managing IP addressing, and implementing security measures to enhance productivity and minimize downtime.

- Cybersecurity measures like authentication and encryption protect systems from unauthorized access and cyber threats.

- Operating systems manage hardware, memory, process scheduling, and file systems while providing user interfaces and multitasking capabilities across Windows, Linux, and macOS.

- Virtualization and cloud computing optimize resource usage, improve efficiency, and enable remote access, reducing infrastructure costs.

- Virtual machines and containerization enhance system efficiency and software deployment.

- Emerging trends include advancements in cybersecurity, AI-driven automation, and cloud-based services, which are essential for maintaining a secure and high-performing IT ecosystem.

LITERATURE REVIEW

"Operating System Design: Concepts, Challenges, and Future Trends"

by Jańabaev Islambek Kuanishbaevich, 2025

"Exploring the Future of Operating Systems: Architectural Innovations and Kernel Development Trends"

by Ashish Singh, 2024

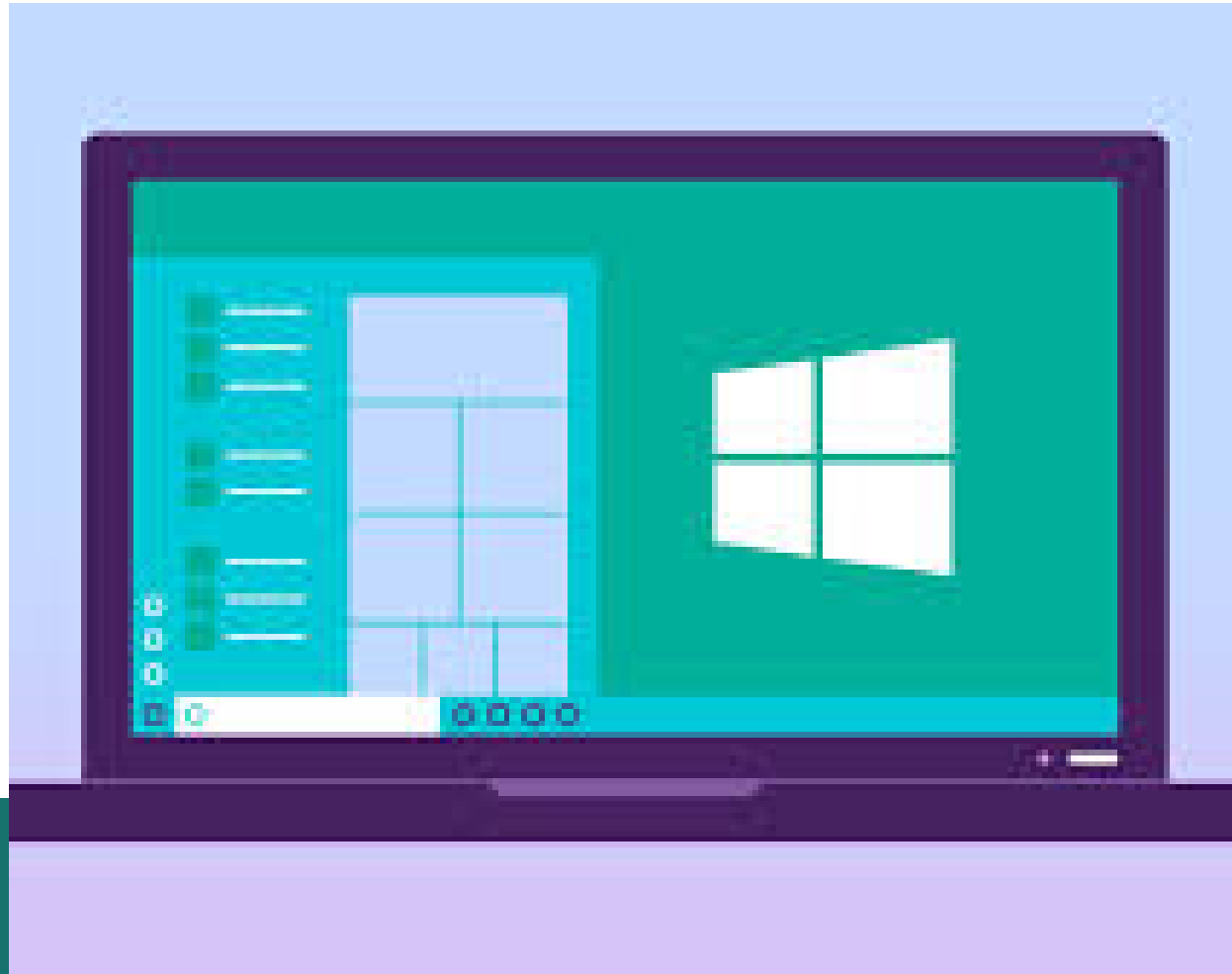"AI and Machine Learning in IT Support: Transforming Troubleshooting and Automation"

by Li Chen, 2023

"Cybersecurity in IT Support: Best Practices and Threat Mitigation Strategies"

by Jańabaev Islambek Kuanishbaevich, 2025

"Virtualization Technologies for IT Support: A Review"

by Mark Reynolds et, 2018

OPERATING SYSTEMS

- An operating system (OS) manages computer resources and provides a platform for running applications.
- It performs process management by scheduling and executing multiple tasks efficiently, ensuring optimal CPU utilization. Memory management allocates and deallocates memory to processes, preventing conflicts and improving performance.
- The OS offers a user interface, either graphical or command-line-based, for user interaction.
- File system management organizes and secures data storage while providing easy access to files.
- Device management uses drivers to facilitate communication between hardware and software.
- It ensures security and access control through authentication, encryption, and permissions to protect user data.
- Additionally, it supports networking and error handling, allowing communication over networks and detecting system errors to maintain stability.

Functions of OS:

- An operating system (OS) manages processes by scheduling and executing tasks efficiently.
- It handles memory management by allocating and deallocating memory to ensure smooth performance.
- The OS organizes and secures files, making data storage and access easy.
- It facilitates communication between hardware and software through device management.
- A user interface, either graphical or command-line-based, allows users to interact with the system.
- Security measures like authentication, encryption, and permissions protect user data.
- The OS also enables networking by supporting communication over networks.
- Additionally, it detects and resolves system errors to maintain stability and reliability.

Process Management:

- Process management in an operating system (OS) is responsible for handling and coordinating multiple processes to ensure efficient execution.
- It schedules processes using algorithms like First-Come-First-Serve (FCFS), Shortest Job Next (SJN), and Round Robin to optimize CPU utilization.
- The OS manages process creation, execution, suspension, and termination, ensuring smooth multitasking.
- It also allocates system resources such as CPU time and memory while preventing deadlocks and resource conflicts.
- Process synchronization and inter-process communication (IPC) enable processes to work together efficiently.
- Overall, process management ensures seamless execution, maximizing system performance and responsiveness.

File Systems:

- A file system in an operating system (OS) is responsible for organizing, storing, retrieving, and managing data on storage devices.
- It defines how files are structured, named, and accessed. Common file systems include NTFS (Windows), ext4 (Linux), and APFS (macOS).
- The OS handles file creation, modification, deletion, and permissions to ensure data security and controlled access.
- It also manages directories, enabling efficient data organization. File allocation methods like contiguous, linked, and indexed allocation determine how data is stored on disks.
- Additionally, file systems support backup and recovery, ensuring data integrity and preventing loss.

Create files and folders:

To create a file or folder, you'll first navigate to the location where you want to create the file or folder. Navigate to the Desktop folder by double clicking on it from File Explorer.

- Inside the desktop folder, which is initially empty, right click anywhere in the white space, select New, and then select Folder.
- File Explorer will provide you with an editable text field, which you can use to name your new folder.
- In this example, let's call our folder,
- "My New Folder".
- Type this name into the editable field.
- After typing in the name, press Enter.
- The new folder is successfully created.

Copy and move files and folders:

Copying, moving, and renaming files and folders works similarly in Windows. To copy a folder to another destination, you first need to access the folder in its current location. Then, use File Explorer to select "copy", navigate to the destination directory, and use File Explorer to select "paste".

- You'll copy the Images folder into the Pictures folder.
- Use File Explorer to navigate to the folder C:\Users.
- In this directory, you'll see a folder named Images and another named Pictures.
- To copy the Images folder to the Pictures folder: Right click on the Images folder and select Copy.
- Navigate into the Pictures directory by double clicking on it.
- Right click on the white space in the Pictures directory, and select Paste.
- The folder will now be copied to the Pictures folder.

Deleting files and folders:

Deleting files and folders is a common task in operating systems, allowing users to remove unnecessary data and free up storage space. The steps vary slightly depending on the OS and whether you use a graphical interface (GUI) or command-line interface (CLI).

- Open File Explorer (Win + E).
- Navigate to the file/folder you want to delete.
- Right-click on the file or folder and select "Delete".
- The item moves to the Recycle Bin (not permanently deleted yet).
- To permanently delete it, open the Recycle Bin, right-click the file/folder, and choose "Delete Permanently" or click "Empty Recycle Bin".
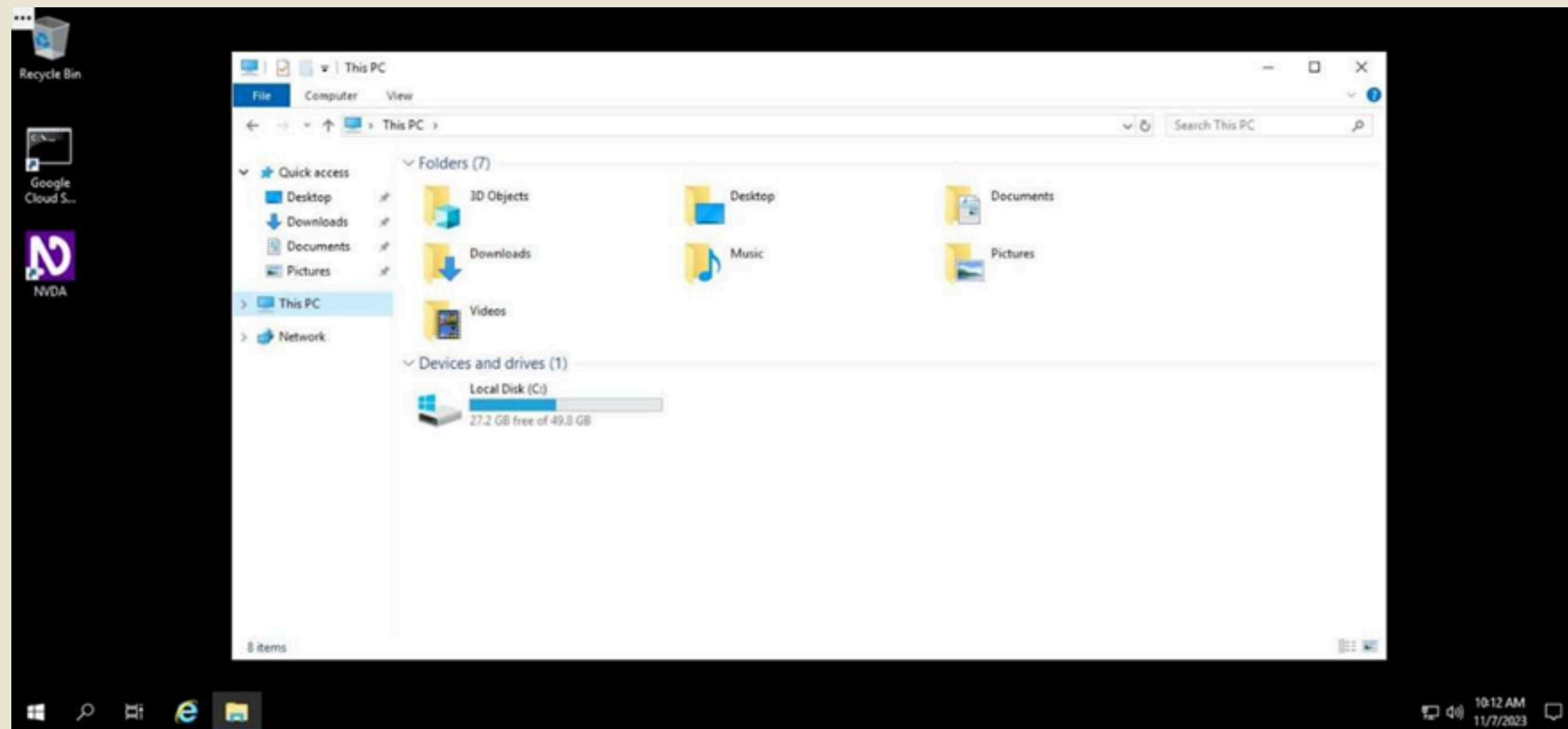
Searching through files:

Searching for files efficiently is an essential feature in any operating system (OS). Most modern OSs provide graphical user interfaces (GUI) and command-line interface (CLI) tools to help users locate files quickly.

- Open File Explorer (Win + E).
- Navigate to the folder where you want to search.
- Type the file name or keyword in the search bar (top-right corner).
- Press Enter, and Windows will display matching files.
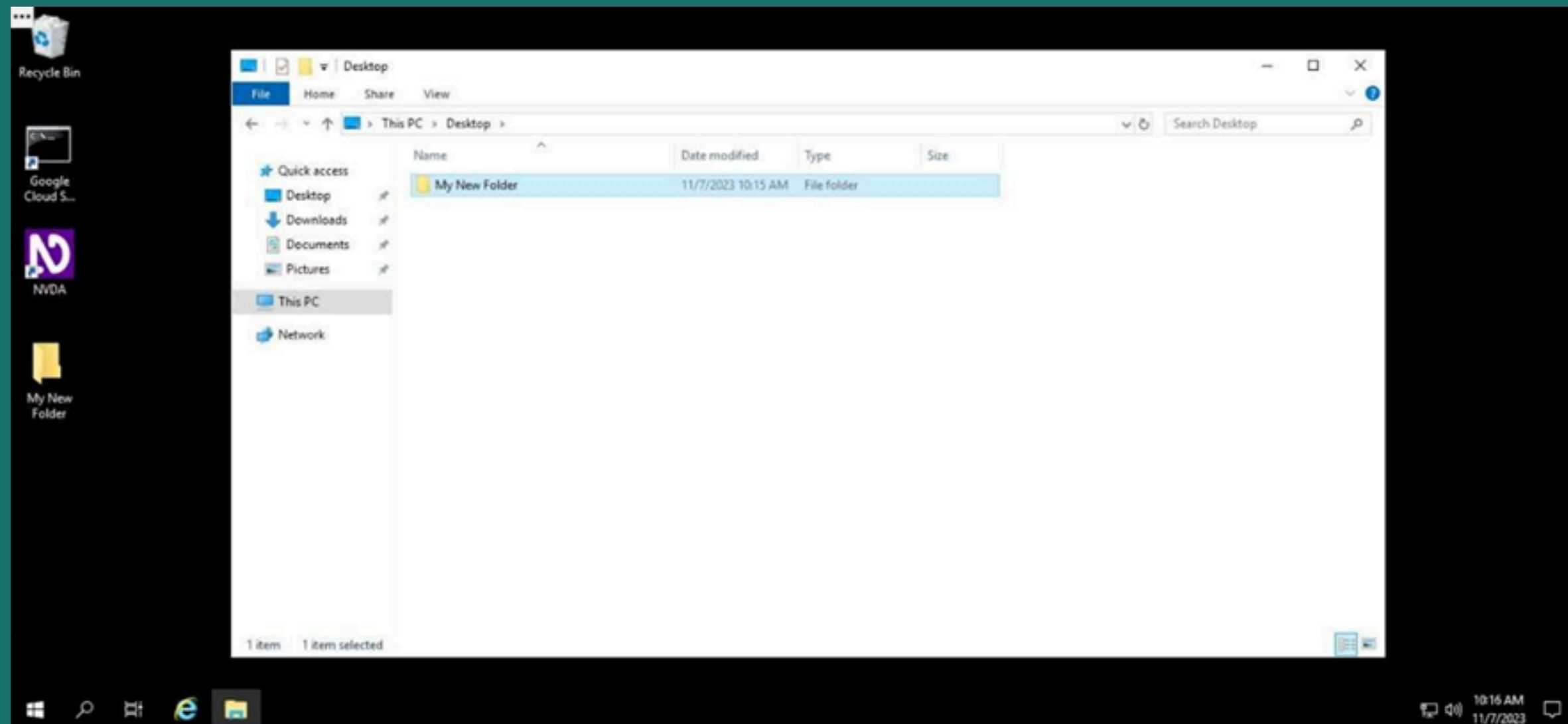- Use filters like Date modified, Type, and Size to refine results.
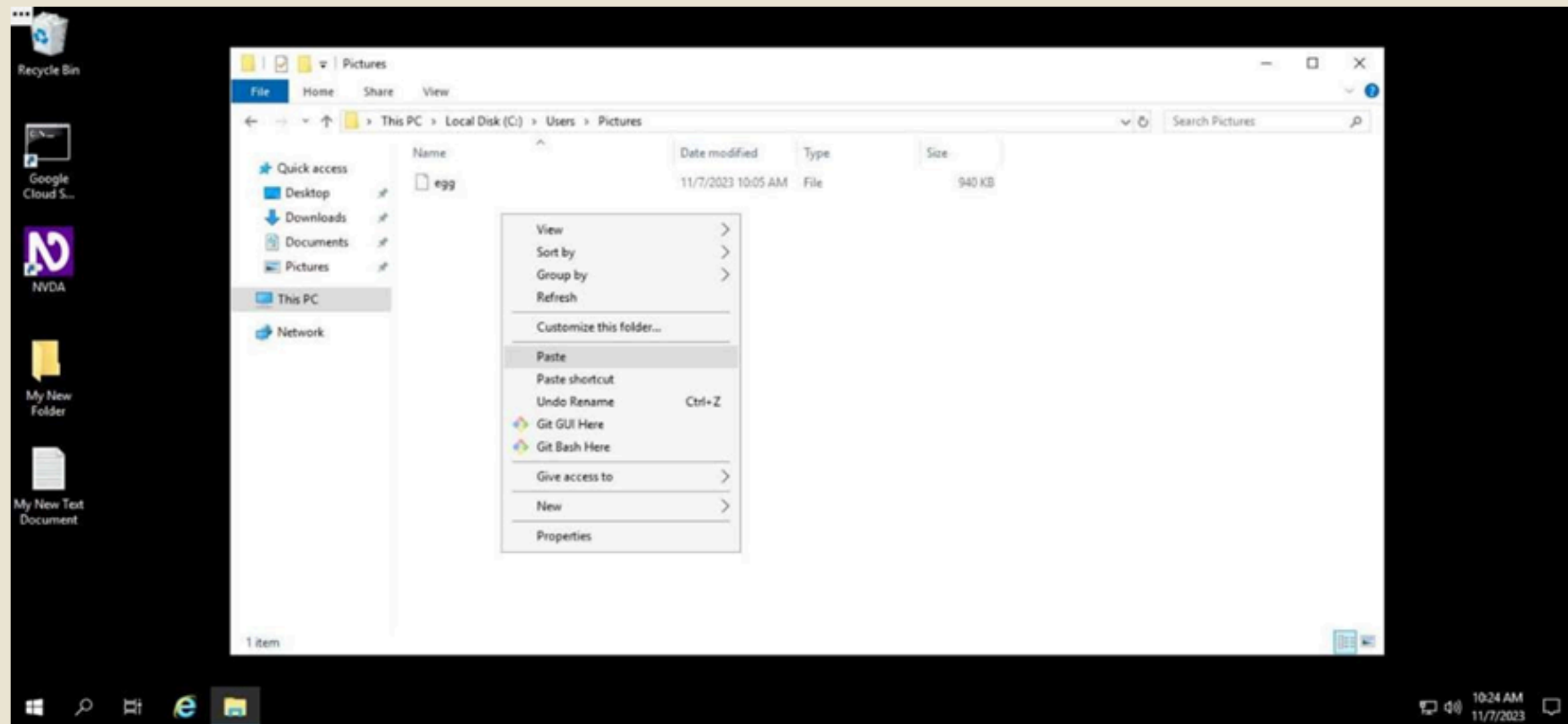
RESULTS
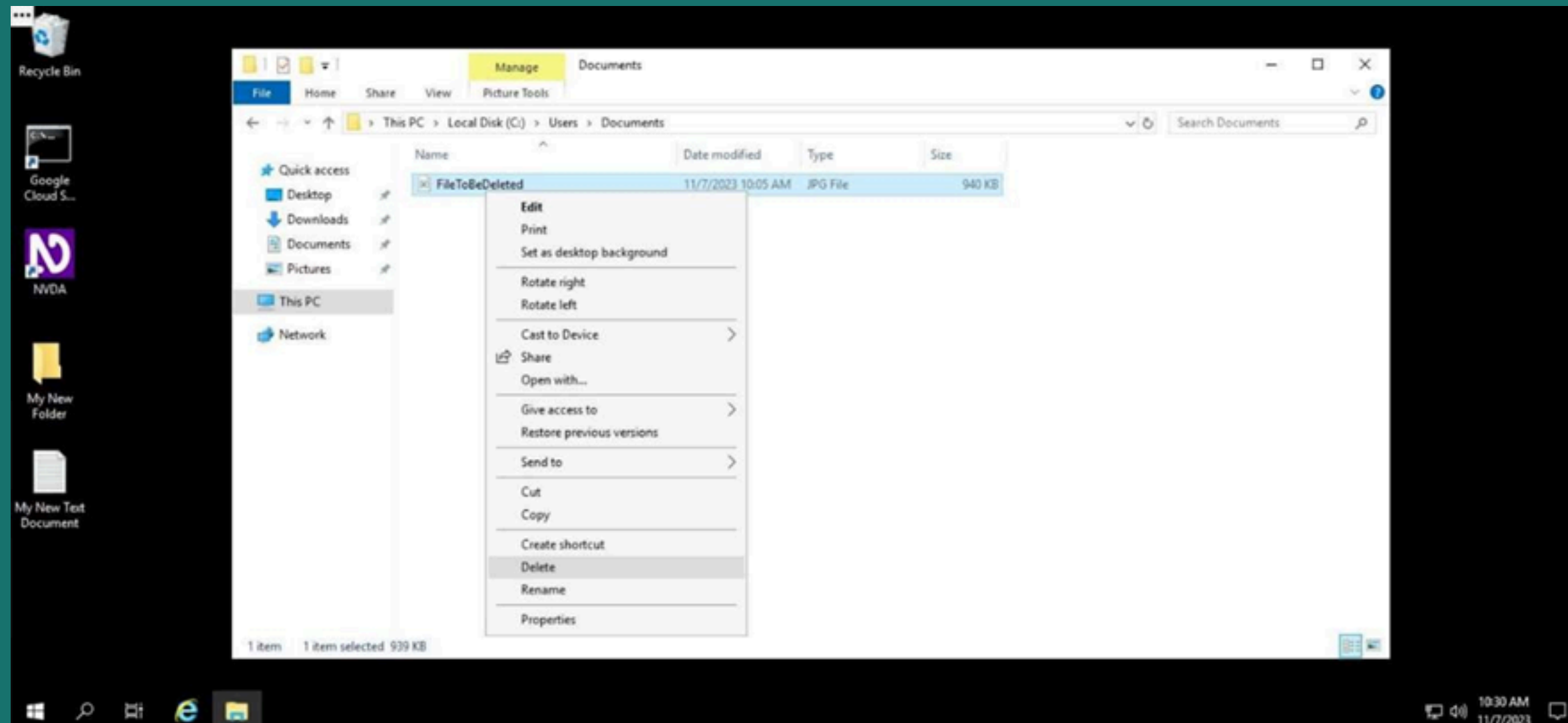

Opening file explorer

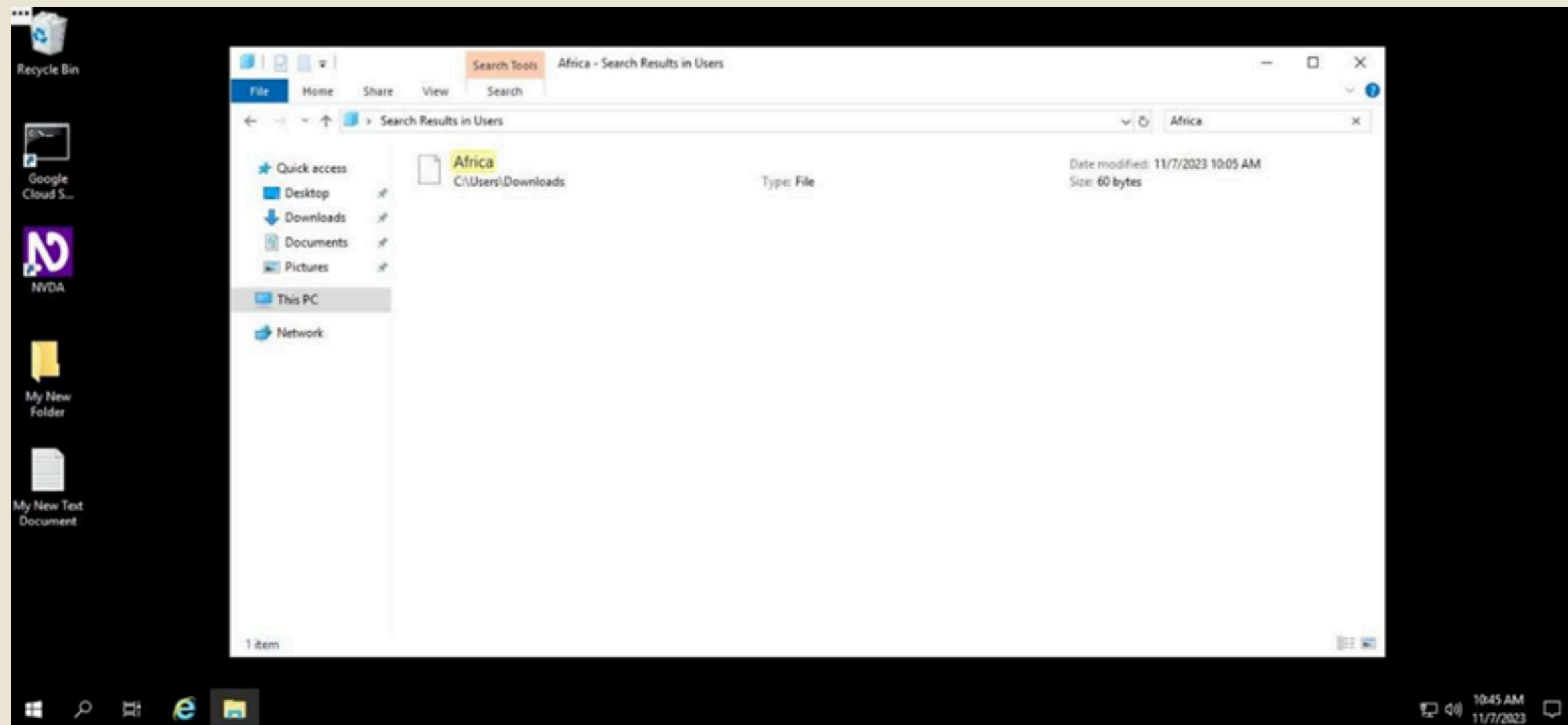# RESULTS

Creating File

RESULTS

Copy and Pasting File

RESULTS

Deleting File

RESULTS

Searching Through File

CONCLUSION

Operating systems have undergone significant transformations over the years, adapting to the evolving needs of users and technological advancements. The emergence of cloud computing, AI, IoT, edge computing, virtualization, and enhanced security measures has significantly impacted OS development. These advancements aim to improve performance, scalability, security, and user experience while ensuring efficient resource utilization across various platforms. Modern operating systems now cater to a wide range of computing environments, from personal devices to large-scale enterprise systems and embedded IoT solutions. As technology continues to evolve, OSs will remain at the core of digital ecosystems, ensuring seamless integration between hardware, software, and user applications.

FUTURE SCOPE

The future of operating systems will be shaped by continuous innovation and adaptation to emerging trends. AI-powered operating systems will become more self-sufficient, automating system optimizations, predictive maintenance, and user personalization. Quantum computing is expected to introduce entirely new OS architectures designed to handle quantum based processing, significantly enhancing computational power for scientific research and cryptography. Security enhancements will remain a critical focus, with future OSs incorporating zero-trust security models, blockchain authentication, and AI-driven cybersecurity solutions to prevent advanced cyber threats. Additionally, edge computing and 5G networks will enable real-time data processing, reducing latency for applications like autonomous vehicles, smart cities, and industrial automation.

REFERENCES

- Ávila, J., Gomes, R., & Sá, M. (2021). An IT Service Management Literature Review: Challenges, Benefits, Opportunities and Implementation Practices. MDPI. Retrieved from https://www.mdpi.com/
- Chen, L., et al. (2023). AI and Machine Learning in IT Support: Transforming Troubleshooting and Automation. IEEE Xplore. Retrieved from https://ieeexplore.ieee.org/
- Heiser, G., et al. (2015). The Role of Virtualization in IT Support and Operating Systems. ACM Computing Surveys. Retrieved from https://dl.acm.org/
- Kuanishbaevich, J. I. (2025). Operating System Design: Concepts, Challenges, and Future Trends. Springer. Retrieved from https://link.springer.com/
- Nightingale, E. B., et al. (2019). Helios: Heterogeneous Multiprocessing with Satellite Kernels. USENIX Annual Technical Conference. Retrieved from https://www.usenix.org/
- Reynolds, M., et al. (2018). Virtualization Technologies for IT Support: A Review. Elsevier. Retrieved from https://www.sciencedirect.com/
- Singh, A., et al. (2024). Exploring the Future of Operating Systems: Architectural Innovations and Kernel Development Trends. Journal of Advanced Computing. Retrieved from https://journals.stmjournals.com/
- Smith, R., et al. (2022). Cybersecurity in IT Support: Best Practices and Threat Mitigation Strategies. Journal of https://www.journals.elsevier.com/ Cybersecurity Research. Retrieved from
- Tanenbaum, A. S., & Bos, H. (2017). Modern Operating Systems (4th ed.). Pearson Education.
- Stallings, W. (2018). Operating Systems: Internals and Design Principles (9th ed.). Pearson.

References

THANK YOU