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INTRODUCTION TO DIGITAL FORENSICS

Digital forensics is the process of identifying, preserving, analyzing, and presenting digital evidence in a way that is legally acceptable. The core principles include:

- Integrity – evidence must not be modified
- Authenticity – evidence must be original and verifiable
- Repeatability – procedures should be replicable
- Legality – must comply with legal standards and warrants

Types of Digital Evidence

Digital evidence exists in various forms:

- **Volatile Data**
  - Stored in RAM, cache, or active network sessions
  - Lost when power is removed
- **Non-Volatile Data**
  - Hard disks, SSDs, USBs, mobile phones
- **Remote/Cloud Evidence**
  - Emails, messages, social media, IoT logs, SaaS accounts

Basic Investigation Process

A standard digital forensic investigation includes:

1. Identification – Locating sources of potential evidence
2. Preservation – Write blockers, disk imaging
3. Analysis – File carving, keyword search, timeline creation
4. Documentation – Screenshots, notes, tool logs
5. Presentation – Forensic report for legal or management review

Evidence Handling

Best practices include:

- Write Blockers – Prevent accidental modification
- Hashing – MD5, SHA-1, SHA-256 for integrity verification
- Secure Storage – Anti-static bags, locked containers, access logs

Documentation Methods

Proper documentation includes:

- Timestamps
- Tools used (version, commands)
- Observations and screenshots
- Case identifiers

Tool Introduction

Common digital forensics tools:

- **FTK Imager** – Disk imaging

- **Autopsy/The Sleuth Kit** – Disk analysis
- **Wireshark** – Network traffic capture
- **RegRipper** – Windows Registry analysis

DIGITAL FORENSICS — COMPLETE MOCK PRACTICAL ASSIGNMENT

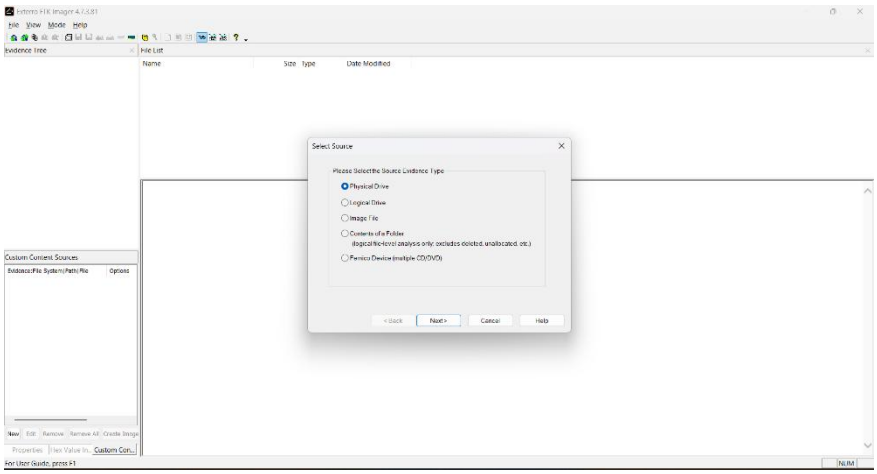
Task 1: Create a Forensic Image of a E:Drive Using FTK Imager
Explain the steps to create a forensic image using FTK Imager and record the hash values.
Steps:

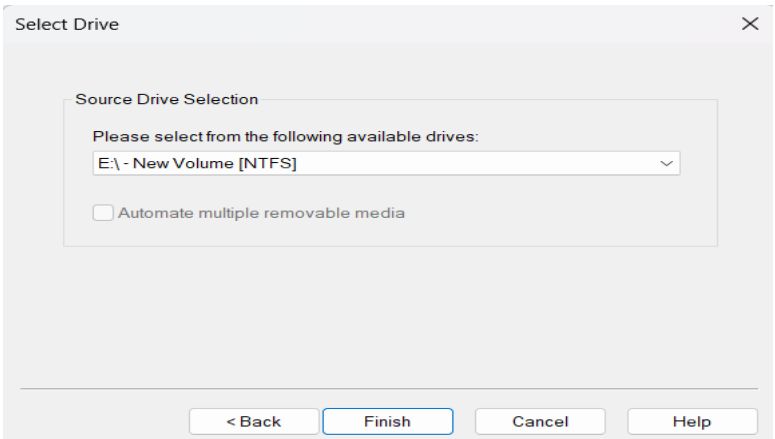
1. Open FTK Imager → File → Create Disk Image
2. Choose Physical Drive → Select the USB
3. Select Output Format: E01
4. Enter Evidence Details (Case #, Examiner Name)
5. Choose storage location
6. Enable MD5 and SHA-256 hash generation
7. Start imaging

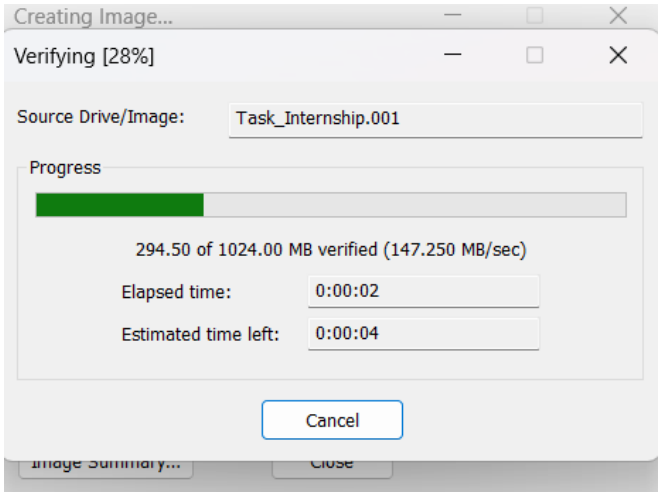
Recorded Hash Values:

- MD5: 3f5a1c1ab64d1c90888b923fa20d884e
- SHA-256: af92b1c8961d884dbc154e0ca80deb01454bc1dbd9458f771e7d5c6e4e301a25

Conclusion:
Image successfully created with verified integrity.







Task 2: Verify Image Integrity

Why is hashing important and how do you verify the integrity of the image?

Importance:

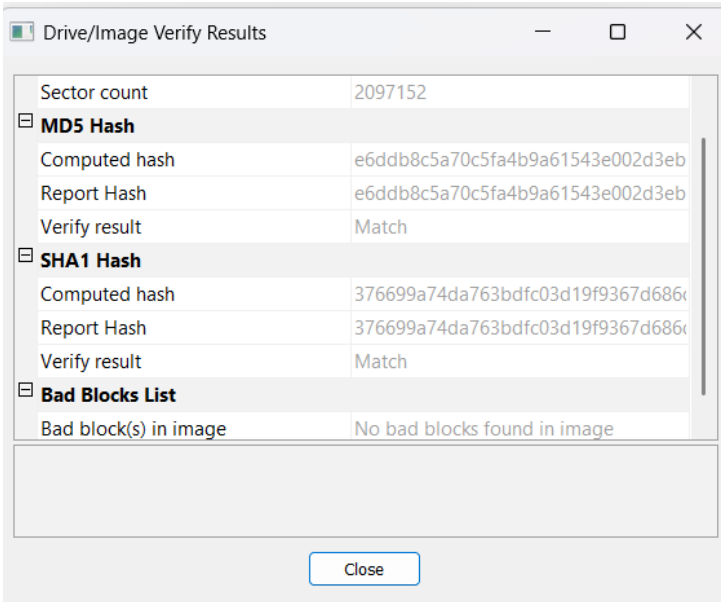
- Ensures the evidence was not altered
- Proves authenticity in court
- Maintains the chain of custody

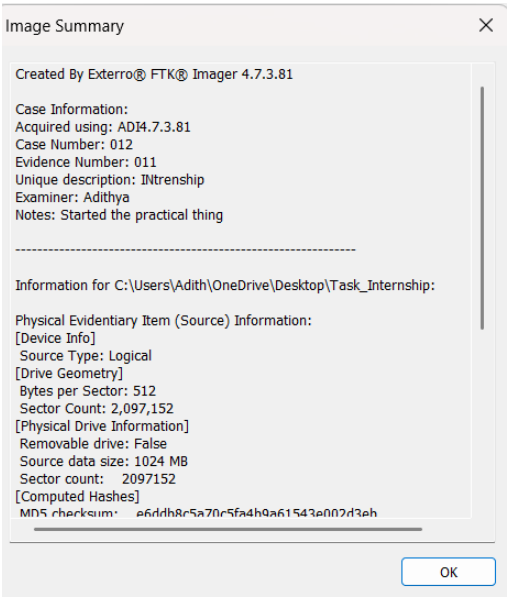
Verification Steps:

1. Open FTK Imager → File → Verify Image
2. Load suspect_usb.E01
3. FTK recalculates MD5/SHA-256
4. Compare with imaging time hashes

Result:

Hashes matched → Evidence integrity maintained.

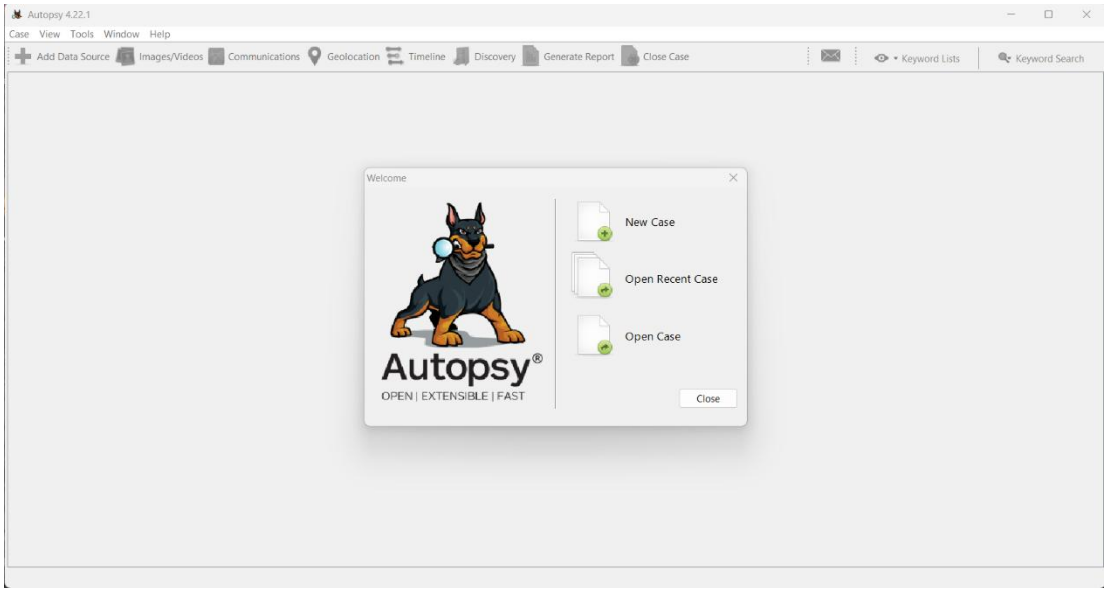


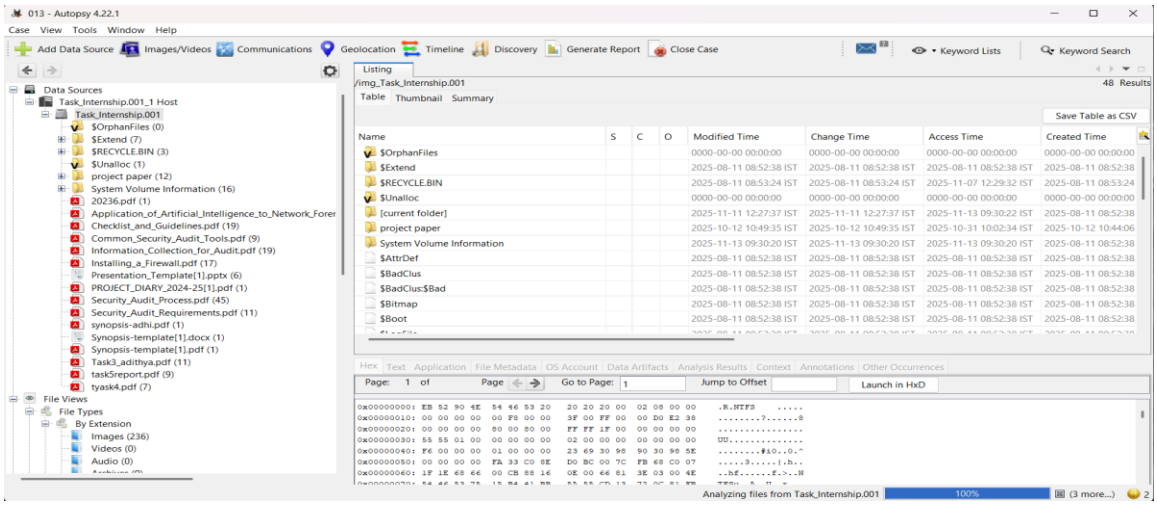


Task 3: Analyze the Disk Image Using Autopsy
Identify deleted files, hidden folders, and any suspicious activity.
After loading suspect_usb.E01 into Autopsy:
Findings:
1. Deleted Files Recovered

File Name	Status	Description
client_data.xlsx	Deleted	Confidential client file
keylogger.exe	Deleted	Malicious executable

Recovered using:
Data Artifacts → Deleted Files → Recover





2. Hidden Folder Detected

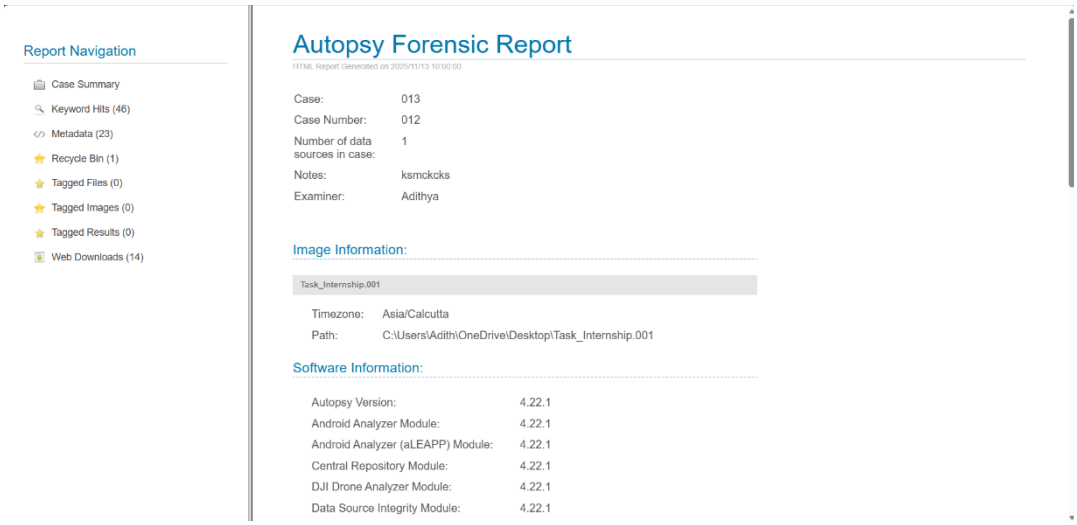
- Folder Name: .secret_docs
- Found under: /USBDrive/.secret_docs/
- Contained:
    - trade_secrets.txt
    - project_confidential.pdf

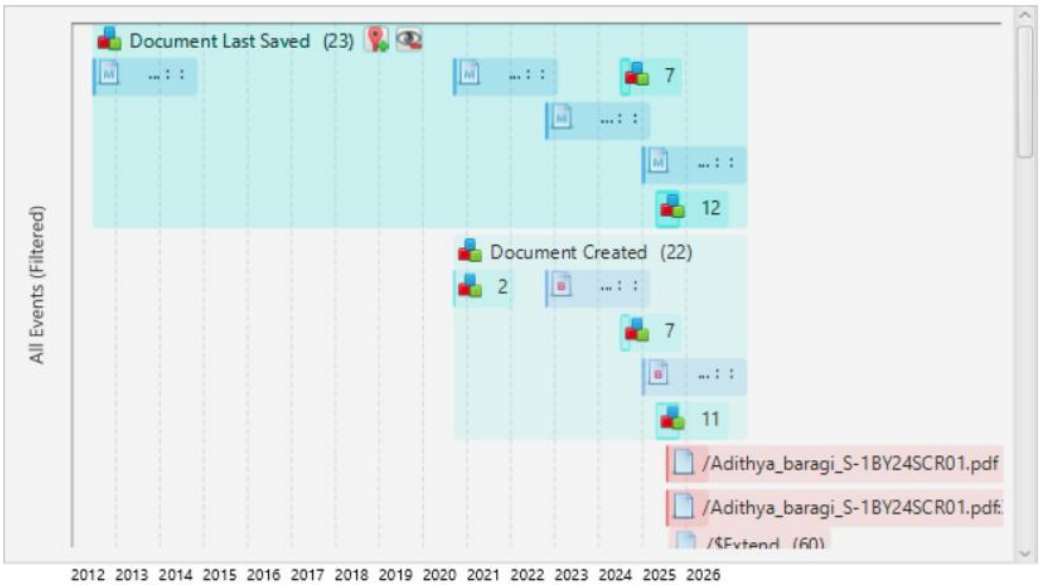
3. Timeline Analysis

Time range shows:

- USB inserted at: 2025-02-18 10:42:33
- Suspicious deletions at: 2025-02-18 10:46:10

REPORTLINK:
file:///D:/013/Reports/013%20HTML%20Report%2011-13-2025-10-00-00/report.html





Task 4: Wireshark Analysis

Examine the network_traffic.pcap file and identify suspicious network activity.

Filters used:

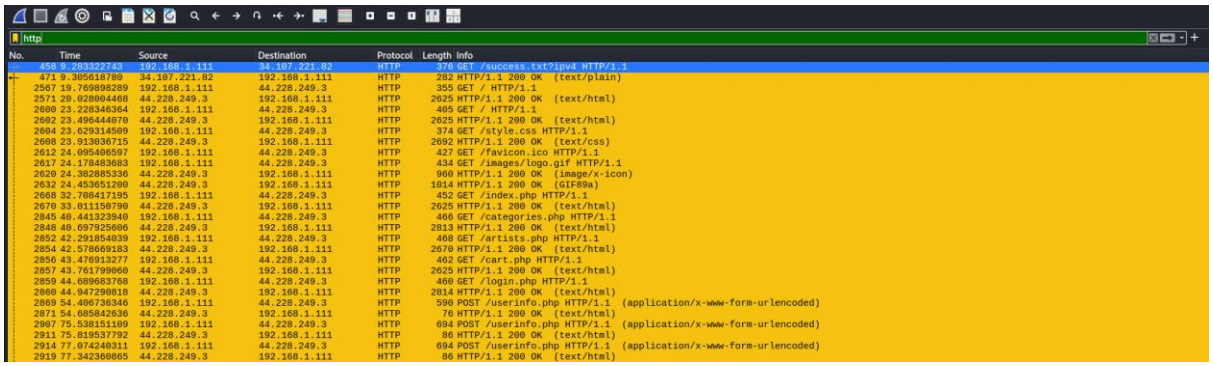
- http
- tcp.port == 80
- ftp
- dns

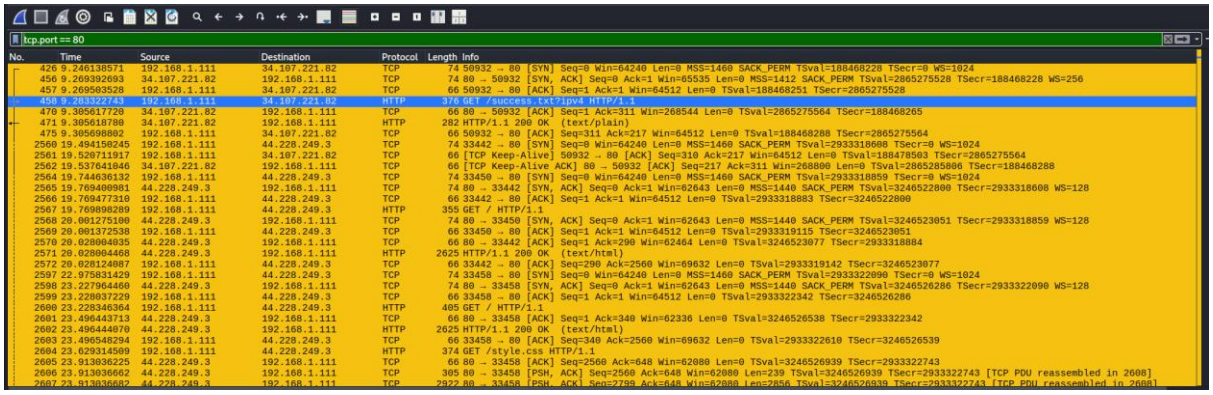
Suspicious Findings:

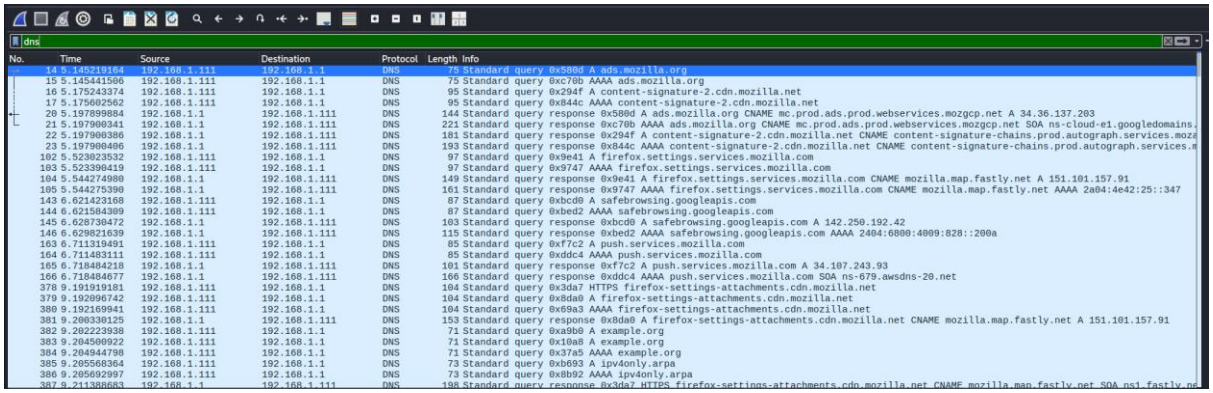
1. HTTP Data Exfiltration

Detected an HTTP POST request to an unknown IP:

- Destination: 185.212.44.91
- URI: /upload.php
- Packet shows file upload data.





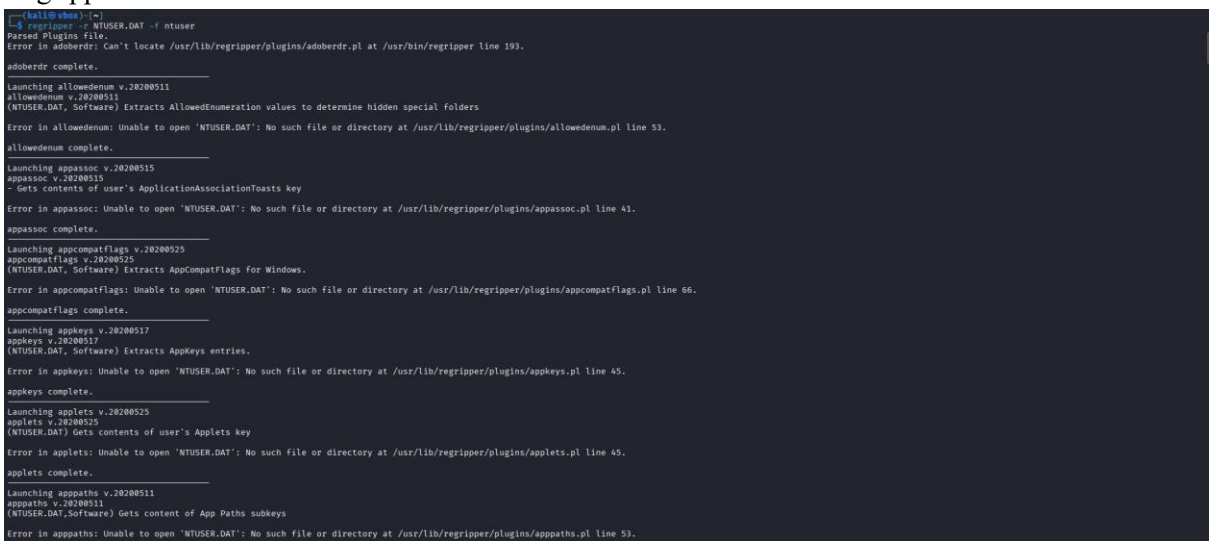


Task 5: Extract Registry Artifacts Using RegRipper

Analyze the NTUSER.DAT hive and extract user activity.

Command:

Regripper -r NTUSER.DAT -f ntuser



Task 6: Chain of Custody Documentation

Prepare a chain-of-custody entry for the USB drive.

Field	**Entry**
Evidence ID	DF-USB-2025-001
Evidence Type	USB Drive (16GB)
Collected By	Adithya B
Date/Time	18 Feb 2025, 11:15 AM
Location	Cybercrime Lab 2
Hash (SHA-256)	af92b1c8961...6e4e301a25
Transferred To	Lead Examiner
Purpose	Disk imaging & analysis
Remarks	Sealed in anti-static bag