CYBER ENRICH TRAINING PROGRAM | MODULE II

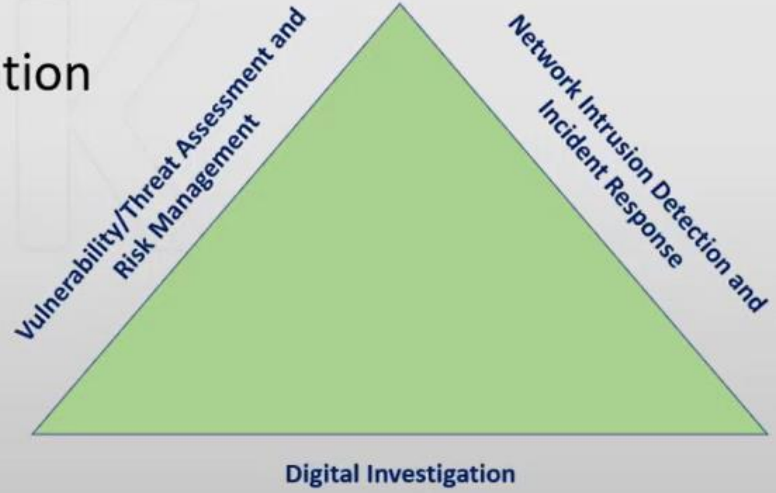
Digital Forensics and Investigation - Overview

What is Digital Forensics?

- Computers as a source of crime/evidence
- Application of scientific methods on computers to extract digital evidence
- Determining the past actions
- Involves identification, collecting, preserving, analyzing computer-related evidence
- Digital forensics vs data recovery

What is Digital Investigation?

- A part of the computing security triad
- Public sector and private sector investigation
- Criminal and Civil investigation


Vulnerability/Threat Assessment and Risk Management
Network Intrusion Detection and Incident Response
Digital Investigation

What is Digital Evidence?

- Any information that can be extracted from a computer
- Must be in human-readable format
- The Forensic Examiner is not biased
- Digital Systems
  - Open Computer Systems
  - Communication Systems
  - Embedded Computer Systems

Need of Digital Investigation

- Many crimes involve digital devices to
  - Store information
  - Communicate with colleagues
  - Navigate
  - Threat someone
  - Launch cyber attack against an organisation

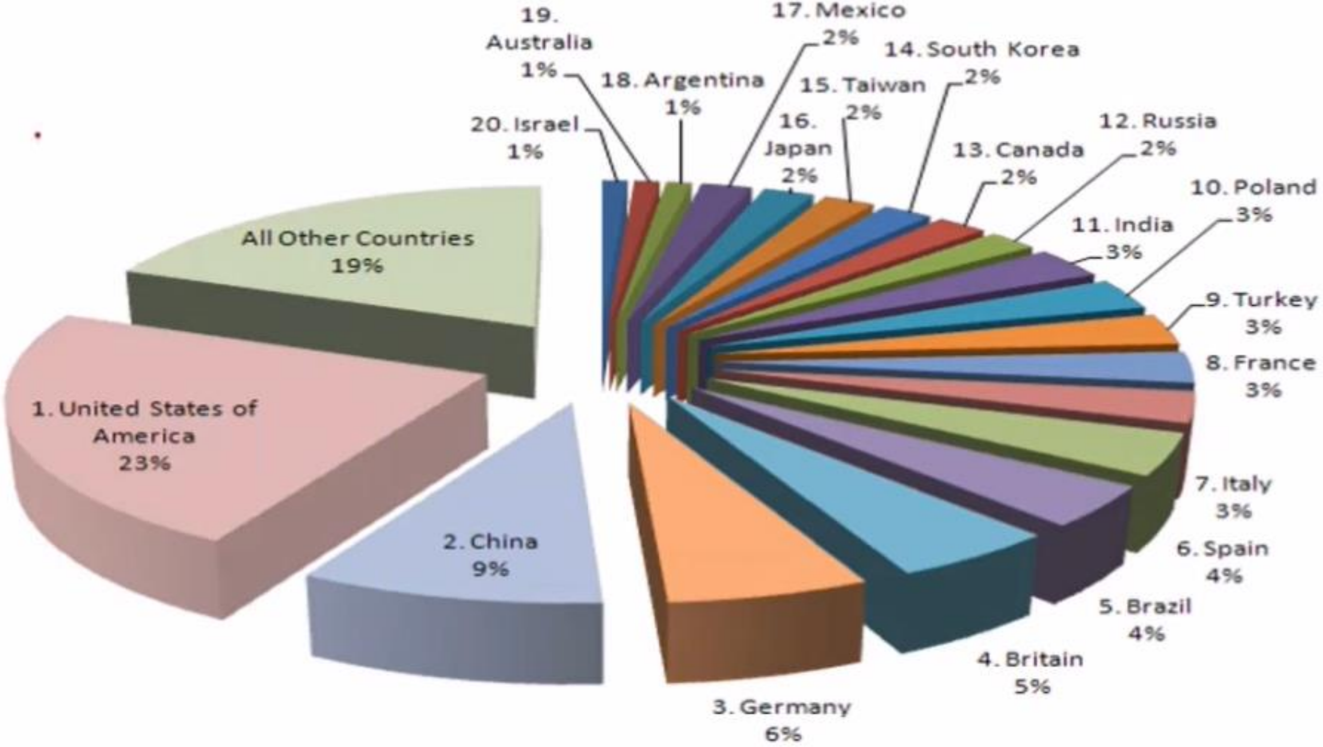
Who Uses Digital Forensics?

- Law Enforcement Officials
- Private Corporations
- Criminal Prosecutors
- Individual/Private Citizens
- Civil Litigations
- Insurance Companies

Who are the Victims?

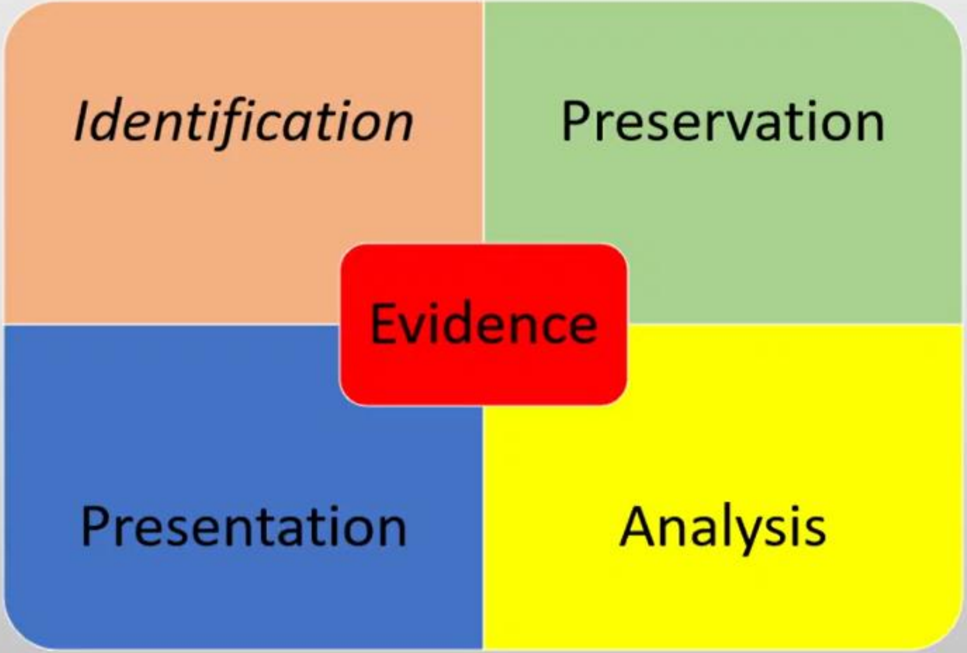
- Private Business
- Government
- Private Individuals

Cybercrime: Top 20 Countries



Cybercrime: Top 20 Countries

Phases of Digital Investigation



Identification

Preservation

Evidence

Presentation

Analysis

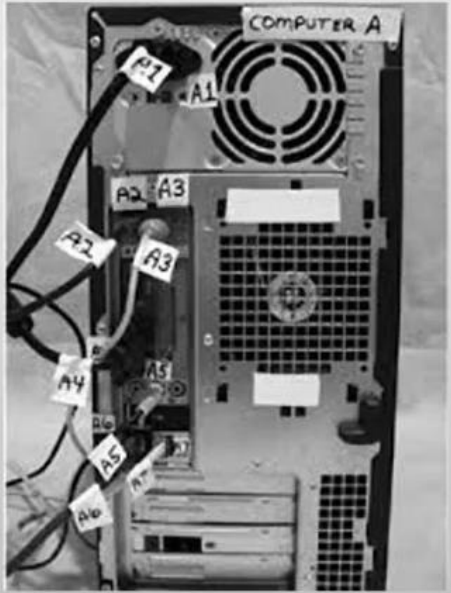
Identification

Identify and seize potential sources of digital device in a forensically sound manner

- Hardware
- Software
- Removable Media(s)
- Relevant Documents
- Password/Telephone Number
- Photographs

Identification

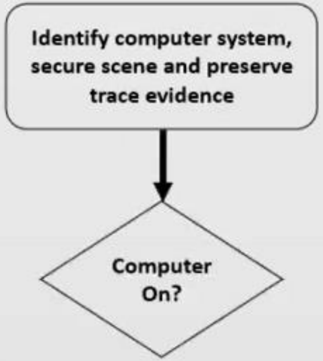
Identify and seize potential sources of digital device in a forensically sound manner



Identification

Identify computer system, secure scene and preserve trace evidence

Identification



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Computer On?

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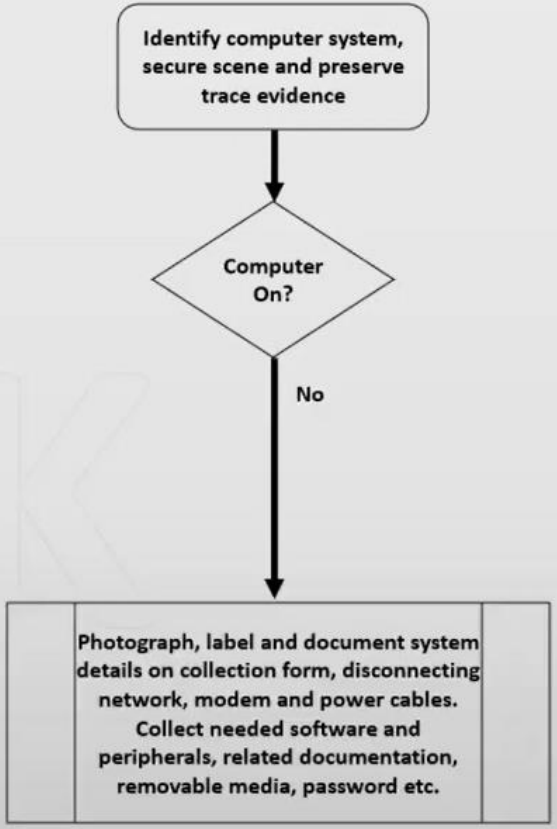
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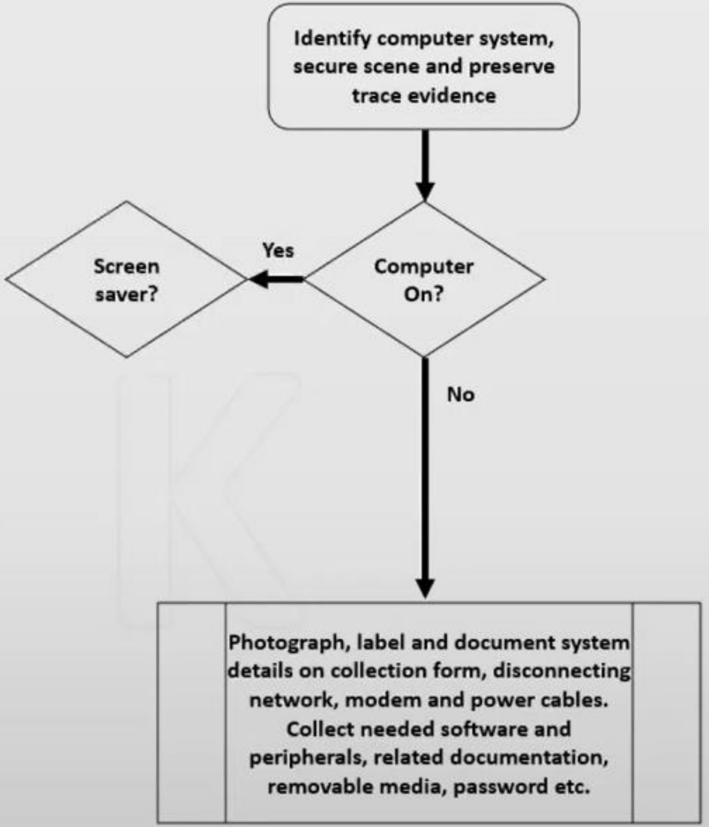
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Screen saver?

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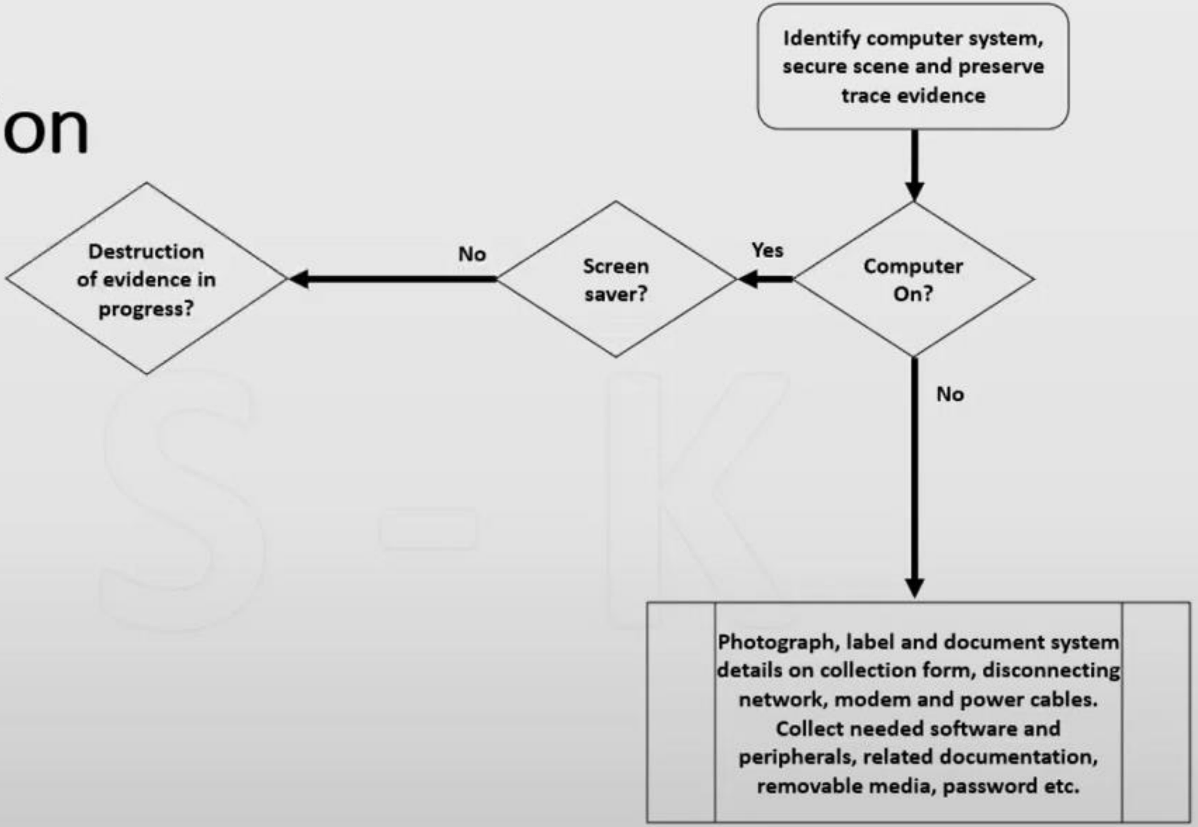
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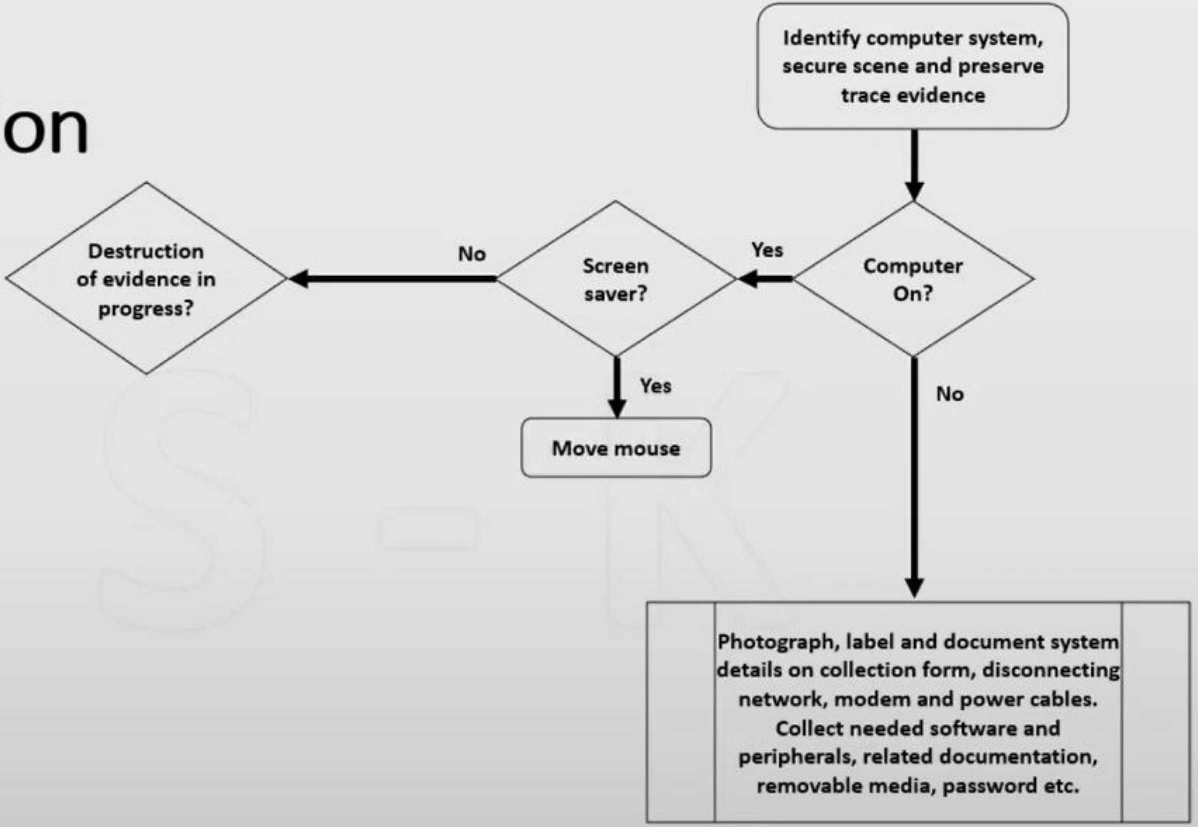
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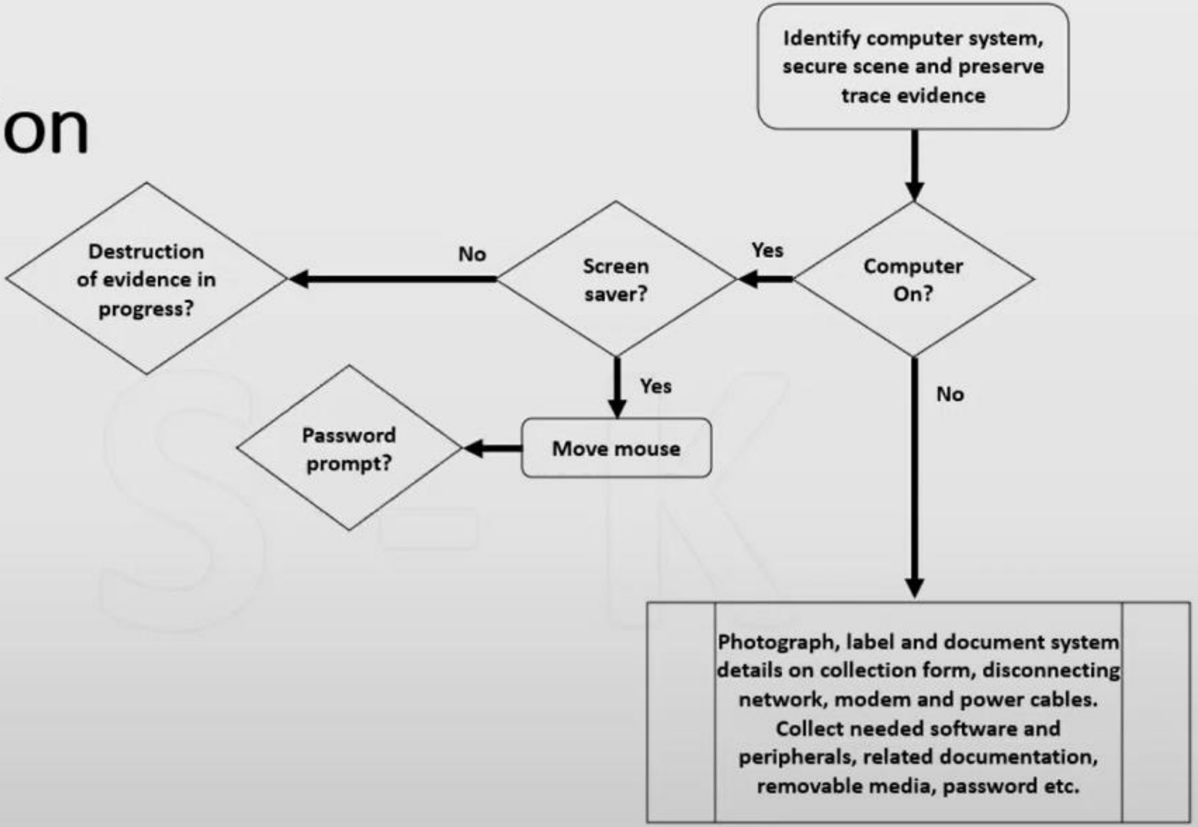
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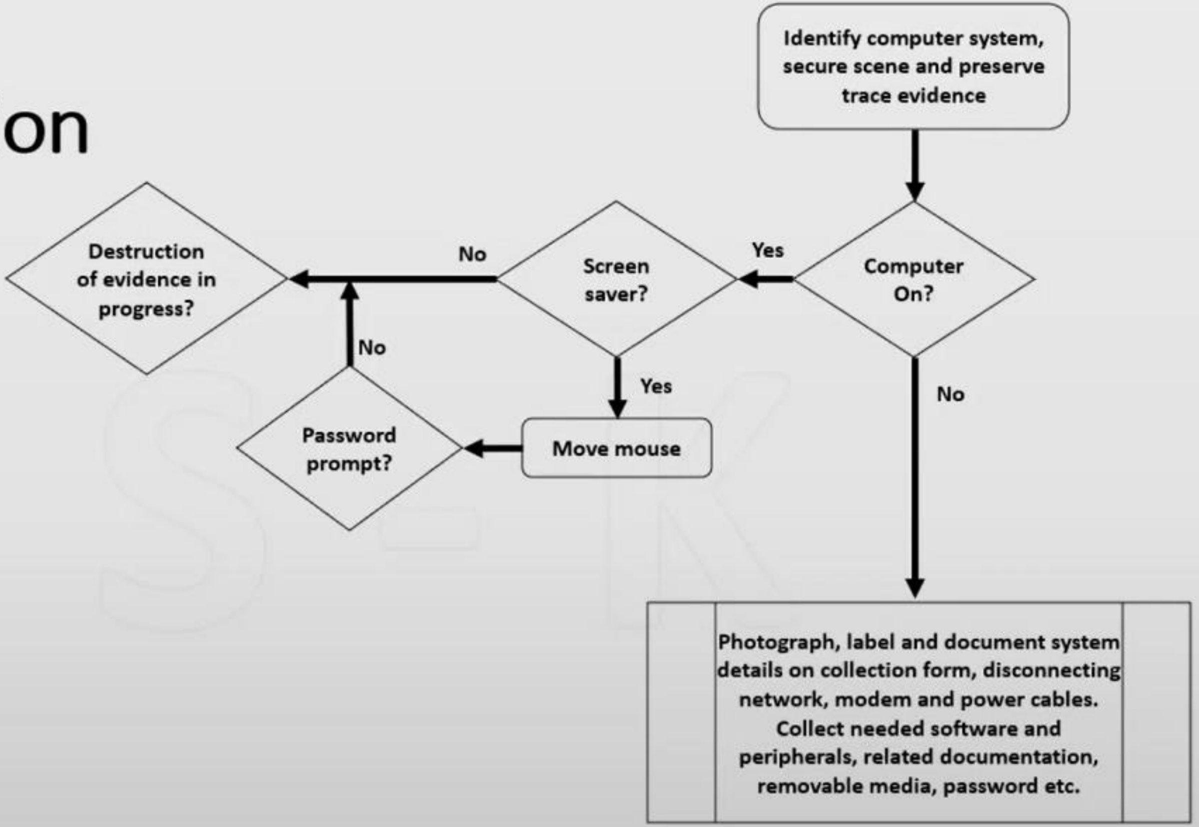
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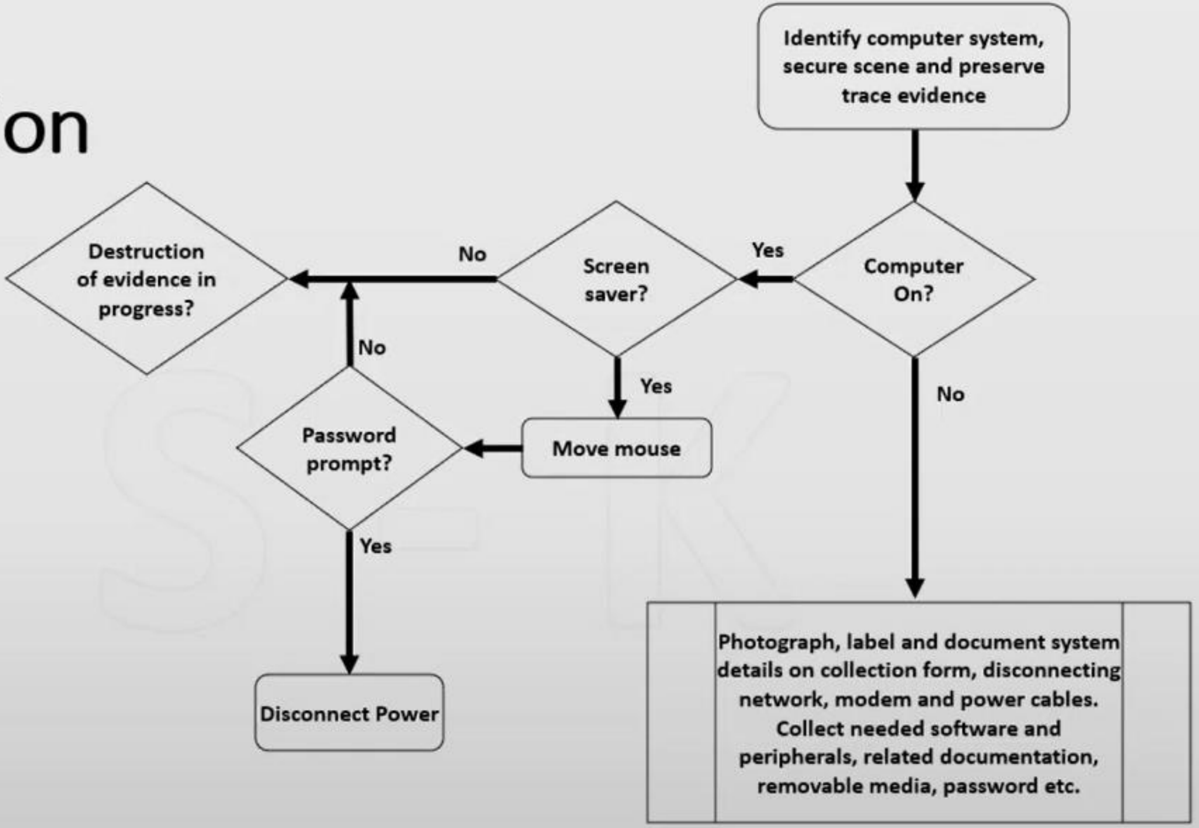
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Computer On?
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Screen saver?
No
Yes
Destruction of evidence in progress?
Move mouse
Password prompt?
No
Yes
Disconnect Power
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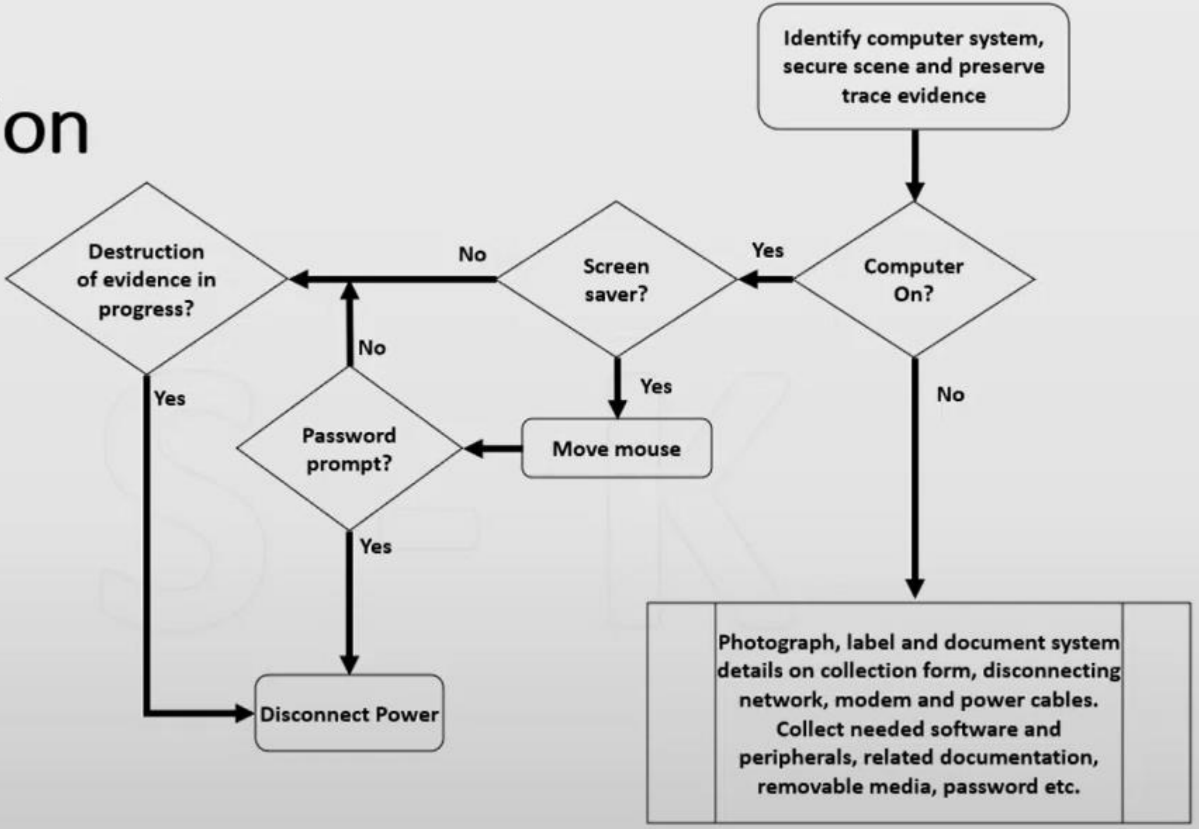

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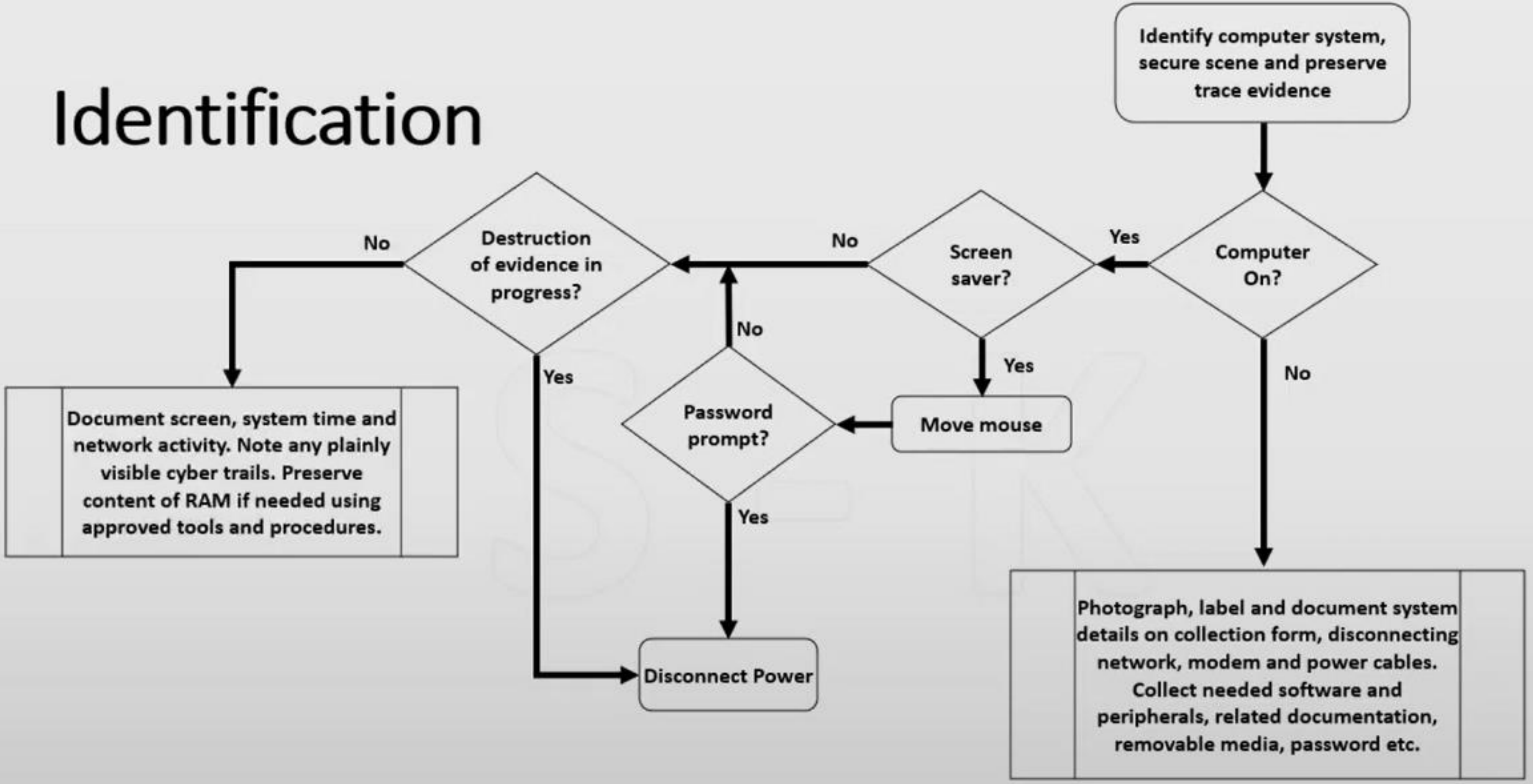
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Screen saver?
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Password prompt?
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Destruction of evidence in progress?
No
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Document screen, system time and network activity. Note any plainly visible cyber trails. Preserve content of RAM if needed using approved tools and procedures.
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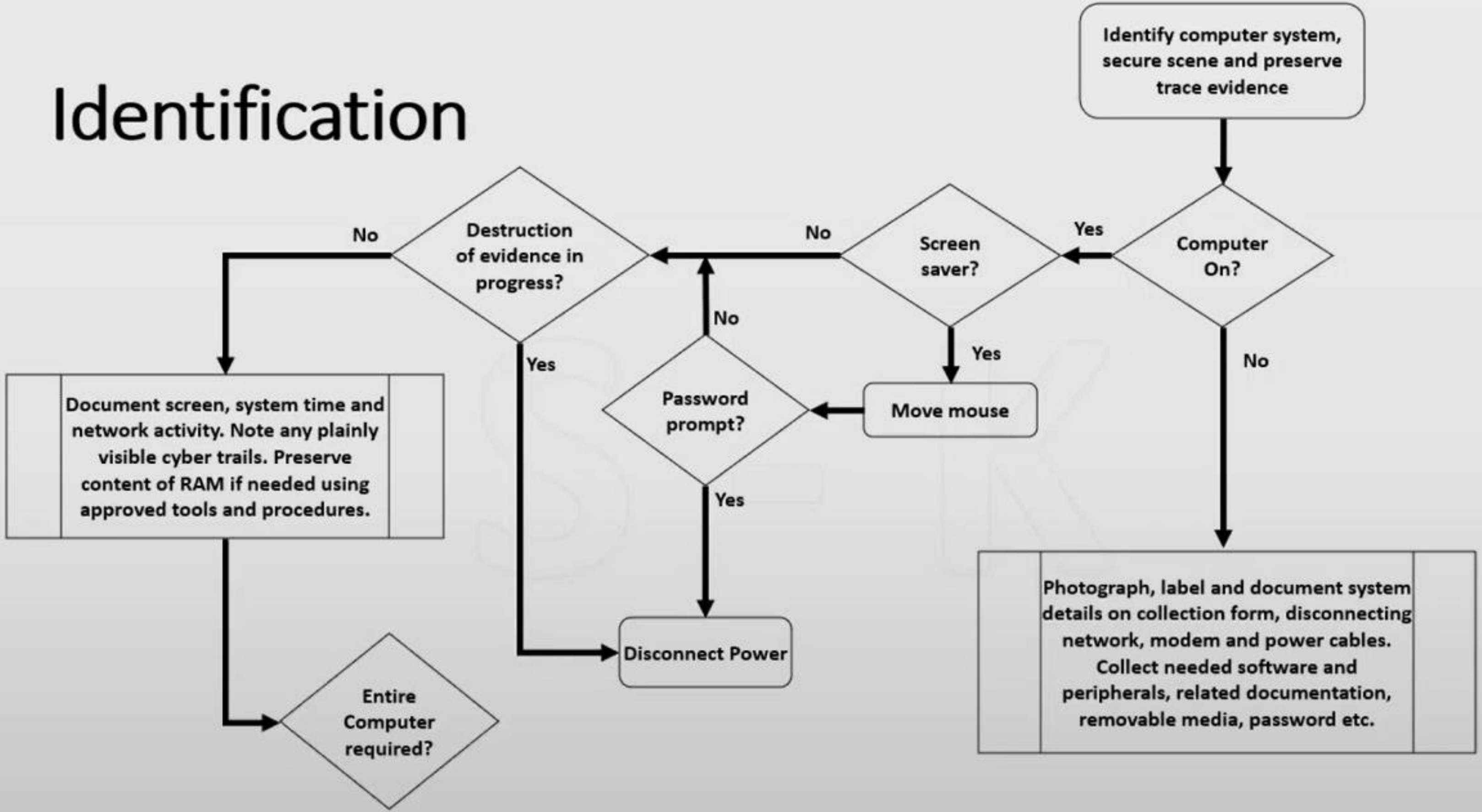

Identify computer system, secure scene and preserve trace evidence

Computer On?

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Screen saver?

No

Destruction of evidence in progress?

No

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Entire Computer required?

Yes

Disconnect Power

Yes

Move mouse

Password prompt?

No

Yes

No

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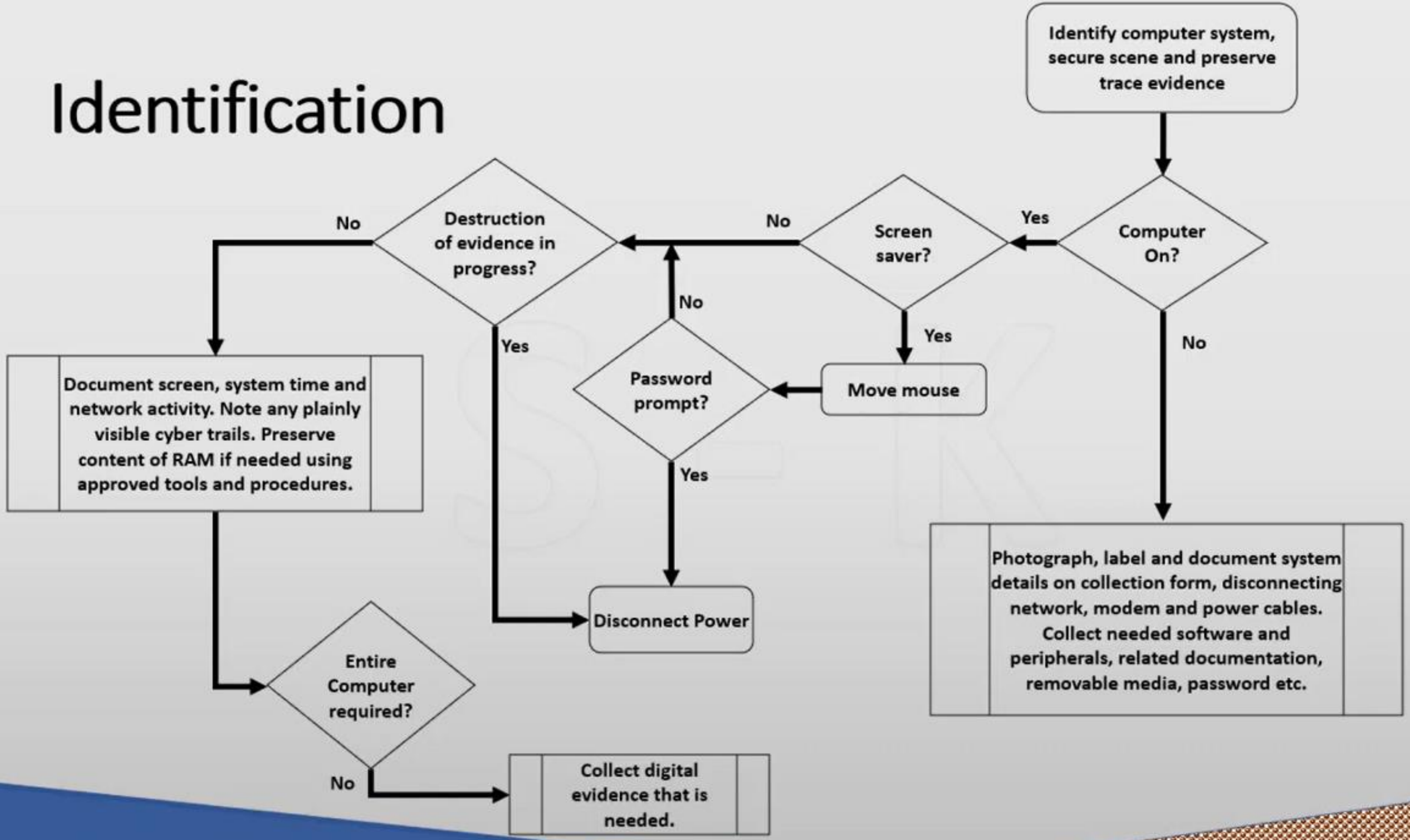

Identify computer system, secure scene and preserve trace evidence

Computer On?

Screen saver?

Move mouse

Password prompt?

Destruction of evidence in progress?

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Entire Computer required?

Collect digital evidence that is needed.

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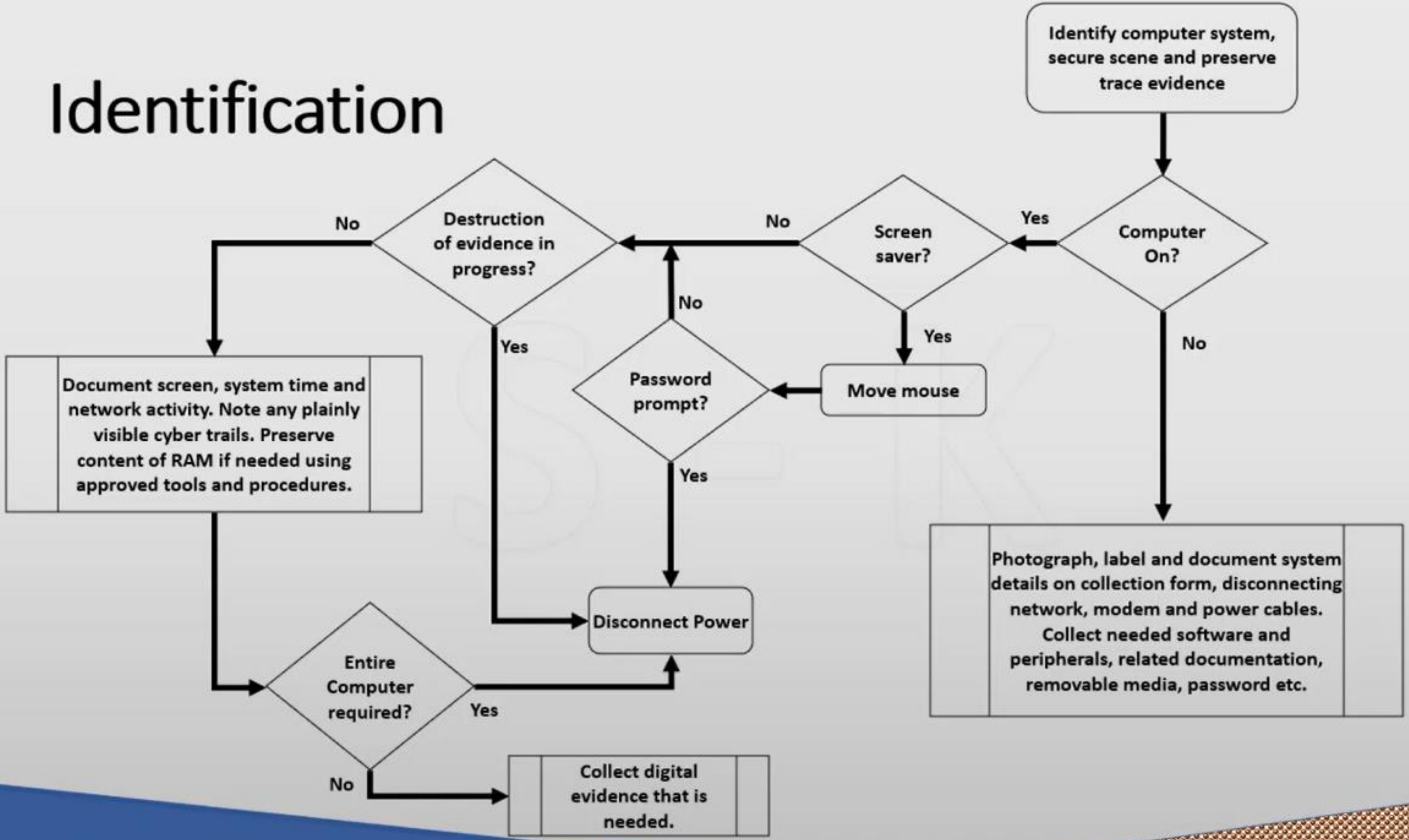

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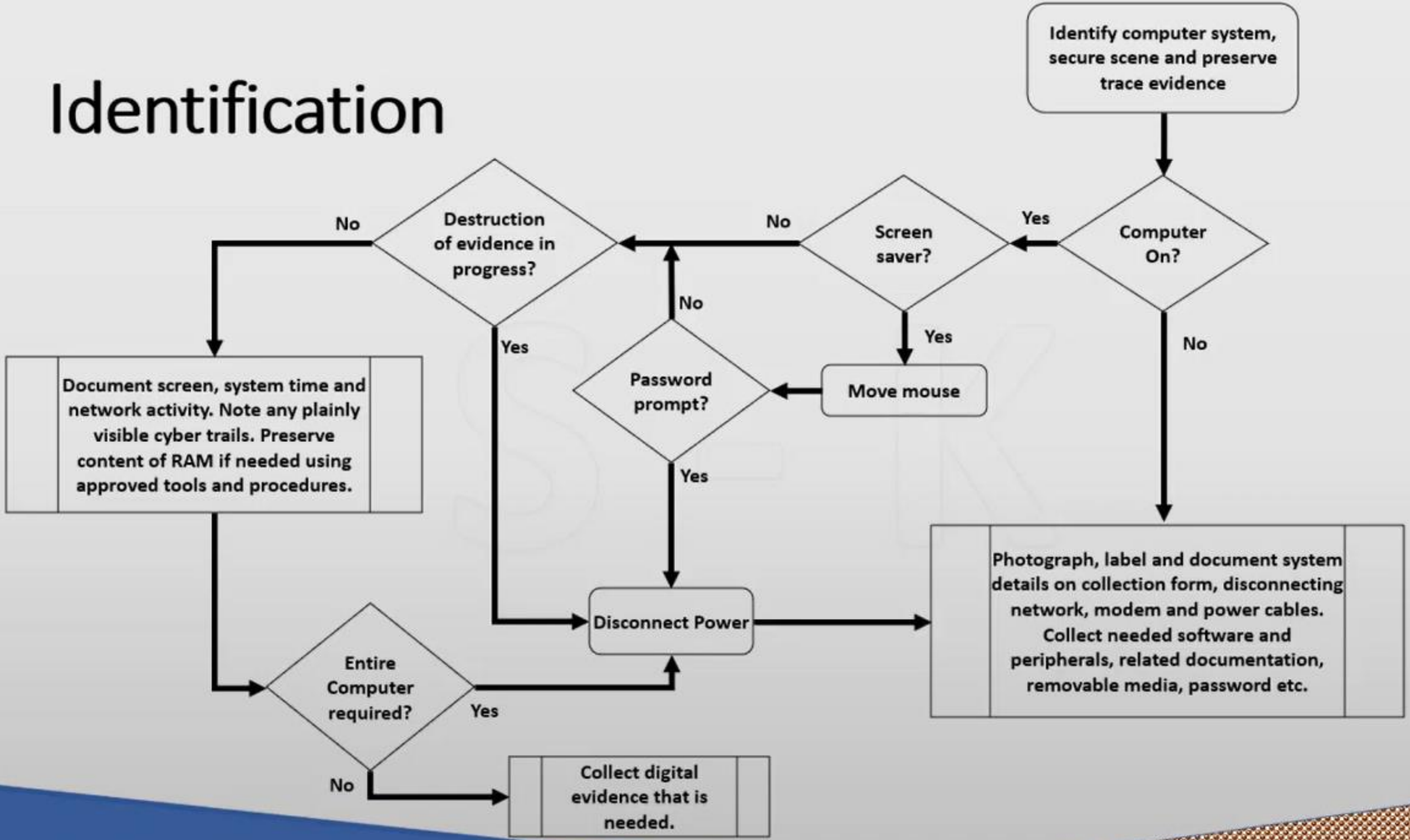

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Password prompt?

No

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Collect digital evidence that is needed.

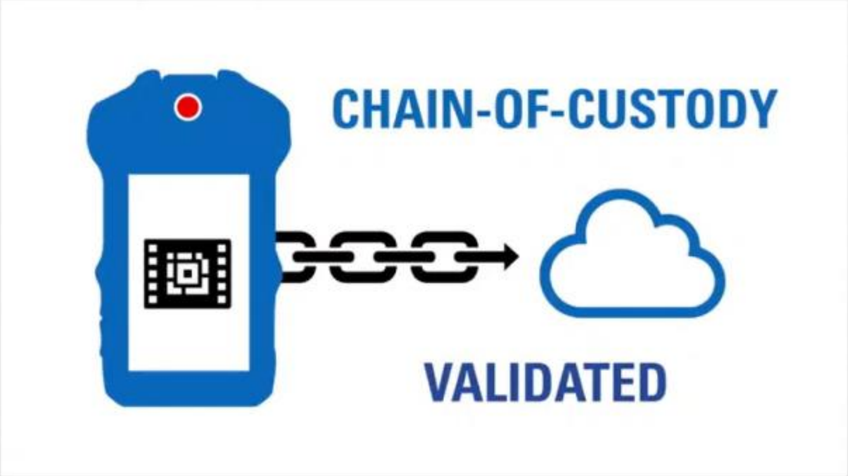
Preservation

- Bagging and tagging
- Secure storage
- Protect the evidence
- Forensic Duplication of evidence
- Calculate Hash (MD5, SHA-1)

Preservation

Chain of custody:

- Where, when, how, and by whom was the evidence
  - **discovered and collected**?
  - **handled or examined**?
  - **Transferred or shipped**?
- Who had **custody of the evidence?**
- How was it stored?



Analysis

- Longest phase
- Levels of Examination
- Preparation for Examination
- Often outsourced
- Apply a scientific method
- Preservation required also

Analysis

EC-council cites 4 ways a digital forensics investigator can use to analyse an evidence:

- Time-frame analysis
- Application and file analysis
- Ownership and possession analysis
- Data-hiding analysis

They are not necessarily performed in isolation during an investigation

Presentation

- A report containing a thorough and unbiased presentation of your findings.
- Must have a clear and logical structure
- Content:
  - Issues of relevance to the case
  - Provide evidence of the facts
  - State the source of the evidence
  - Opinions must be based on facts
  - The report must be understood by the court.