Module Overview

IT3525 Cyber Forensic Process

Module Lecturer & Tutor

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Aim

This module introduces students with processes involved in

- **conducting effective cyber forensic practices, preliminary planning, equipment seizing, evidence collection, recording, and safeguarding,**
- **opening and developing a forensic case, forensic anomaly investigation,**
- **reporting and presenting evidence in legal and civil cases.**

Objectives

After completion of this module, you be able to

- Understand the evolution of cyber forensics
- describe the phases in a cyber forensic process
- describe and apply the steps in preliminary planning, equipment seizing, evidence collection, recording, safeguarding process
- describe and apply the steps in examination of data
- describe and apply forensic anomaly investigation process on cyber attacks and espionage
- describe the reporting and presenting process in legal and civil cases
- report and present digital evidence in a case
- describe Singapore laws, legal practices and past court rulings
- describe the setup and processes in a cyber forensic laboratory

Mode of Assessment

Examination	50%
Participation, Practical Submission	10%
Review Questions	5%
Quiz	10%
Practical Test	15%
Practical Assignment	10%
Total	100%

Module Overview

- Evolution of cyber forensics
- Planning and collection of media
- Data extraction, duplication and conversion process
- Forensic investigation and analysis process
- Documentation and reporting of evidence
- Singapore Laws and legal practices
- Presentation of expert forensic evidence in courts
- Cyber forensic laboratory processes

Topic 1
Evolution of Cyber Forensics

- History of forensic science
- Physical and cyber forensics evolution
- Cyber forensic services
- Overview of a cyber forensics process

What is “Forensics”?

- The word forensic comes from the Latin adjective forēnsis, meaning "of or before the forum."

- Now "forensics" = "forensic science" can be considered correct as the term "forensic" is effectively a synonym for "legal" or "related to courts"

What is “Forensics”?

- The word forensic comes from the Latin adjective forēnsis, meaning "of or before the forum."

- In Roman times, a criminal charge meant presenting the case before a group of public individuals in the forum. Both the person accused of the crime and the accuser would give speeches based on their sides of the story.
- The individual with the best argument and delivery would determine the outcome of the case. This origin is the source of the two modern usages of the word forensic – as a form of legal evidence and as a category of public presentation

Pop-Quiz Time

- What does “Forensic” originally mean?

Ans:

- What is the modern meaning of forensics”?

Ans:

Pop-Quiz Time

- What does “Forensic” originally mean?

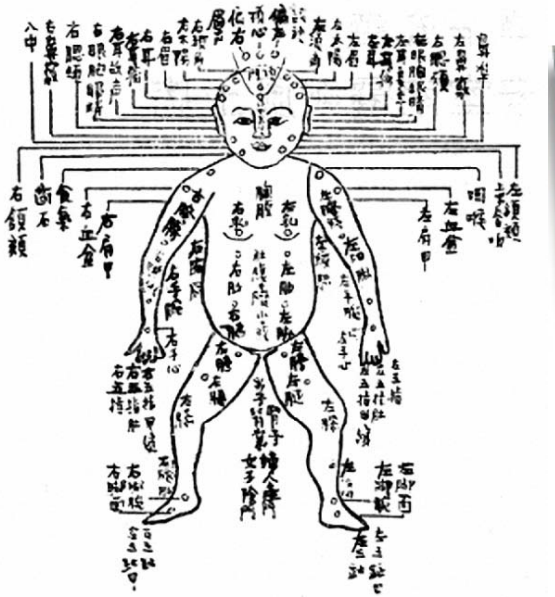
Ans: It means "of or before the forum”

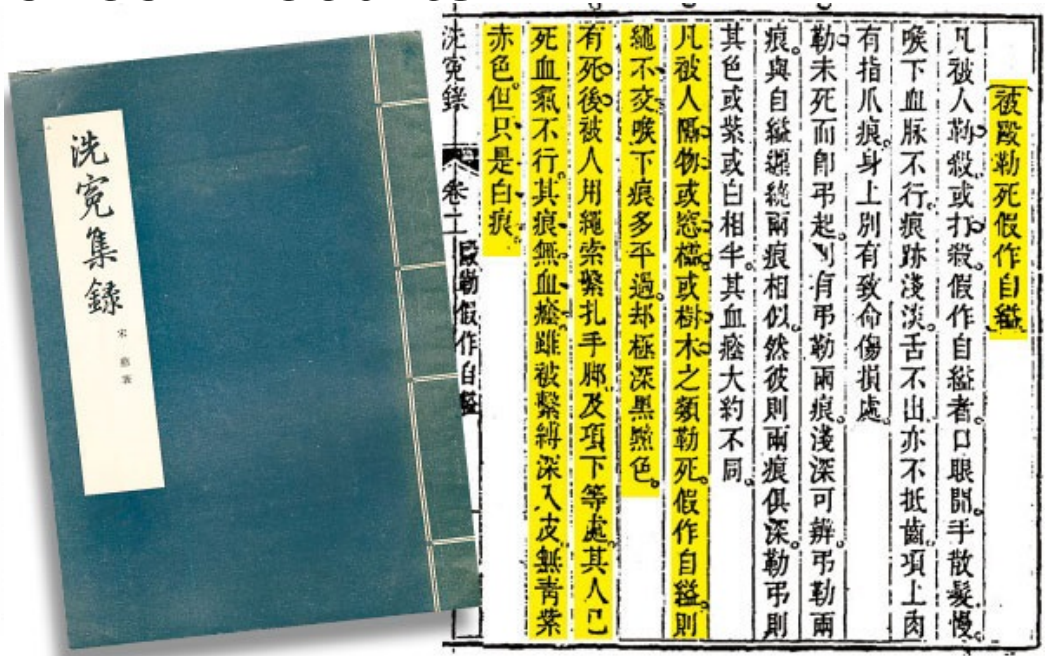
- What is the modern meaning of forensics”?

Ans: The modern meaning of “forensics” is a form of legal evidence and as a category of public presentation

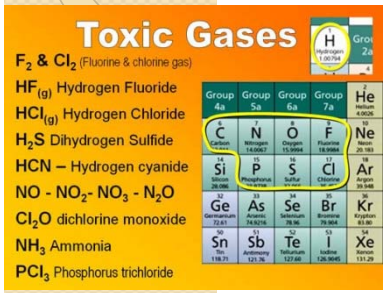
History of forensic science

- The origins of forensic science can be traced back to the 6th century, with legal medicine being practised by Chinese.
- During the next ten centuries advances in both medical and scientific knowledge were to contribute to a considerable increase in the use of medical evidence in courts.





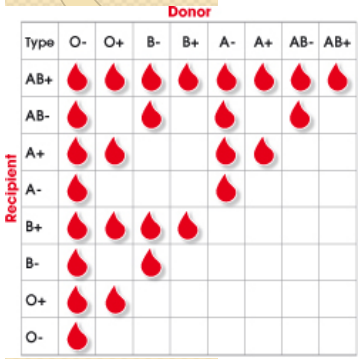
Physical and digital forensics evolution



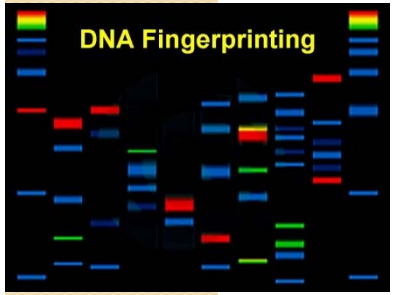
- Toxicology – in 1840 Orfila testified on the basis of chemical tests that the internal organs from a death body contained poisonous chemical which could be the cause of death

- Fingerprint – Sir Edward Henry devised a fingerprint classification scheme for cataloguing and retrieving fingerprint which could be used in forensic investigations

Physical and digital forensics evolution



- Body fluid – in 1900s, blood sample collected from crime scene could be classified into A, B , AB and O blood groups



- In 1980s, application of DNA profiling to criminal investigations started.

Pop-Quiz Time

- **What led the evolution of physical forensics?**

Ans:

- **What are the two questions can be answered by the physical forensics?**

Ans:

Pop-Quiz Time

- **What led the evolution of physical forensics?**

Ans: The advancements in both medical and scientific knowledge

- **What are the two questions can be answered by the physical forensics?**

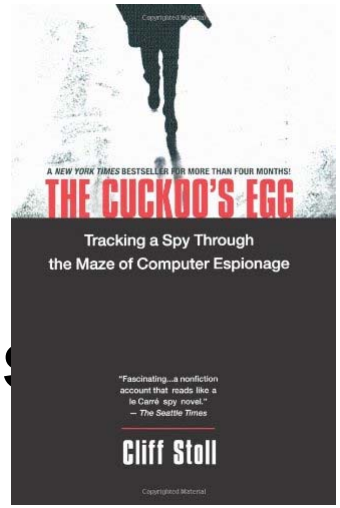
Ans: The two questions are: "What was the cause of death?" and "Who did it?"

Physical and digital forensics evolution

1978 – Computer crime were recognized in Florida Computer Crime Act

1984 – FBI launched a Computer Analysis and Response Team (CART) and setup computer crime department

1986 – computer and network forensic techniques were used to prosecute a hacker Markus Hess



Physical and digital forensics evolution

1993 – Singapore Computer Misuse Act established and Evidence Act amended to accept computer output as evidence.

2000 – The Technology Crime Forensics Branch was officially launched. It conducts investigation and forensic examination into technology-related offences committed under the Computer Misuse Act, such as hacking and unauthorised access to account.

CID

2013 - Computer Misuse Act is renamed as Computer Misuse & Cybersecurity Act to allow Govt to prevent, detect and counter cyber attacks on critical information services & infrastructure

Physical and cyber forensics evolution

- Cyber Forensics
  - Computer Forensics
    - File system forensics
      - Windows Files systems forensics
      - UNIX File systems forensics
    - Database Forensics
    - Applications Forensics
    - Memory Forensics
  - Network Forensics
  - Mobile Devices Forensics
  - Social Media Forensics

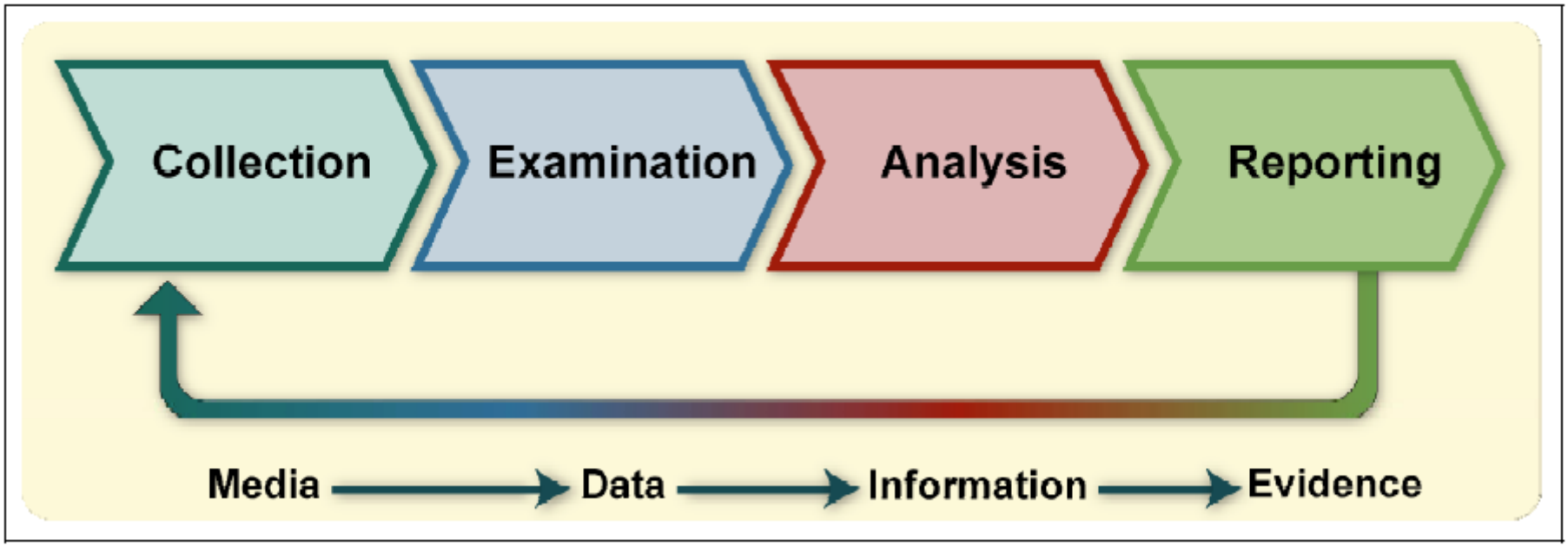
Digital forensic services

FBI provide the following computer forensic services to law enforcement agency

- **Content**
- **Comparison**
- **Transaction**
- **Extraction**
- **Deleted Data Files**
- **Format Conversion**
- **Keyword Searching**
- **Passwords**
- **Limited Source Code**

Get the details in Handbook of Forensic Services at http://www.fbi.gov/about-us/lab/handbook-of-forensic-services-pdf

Cyber Forensics Process

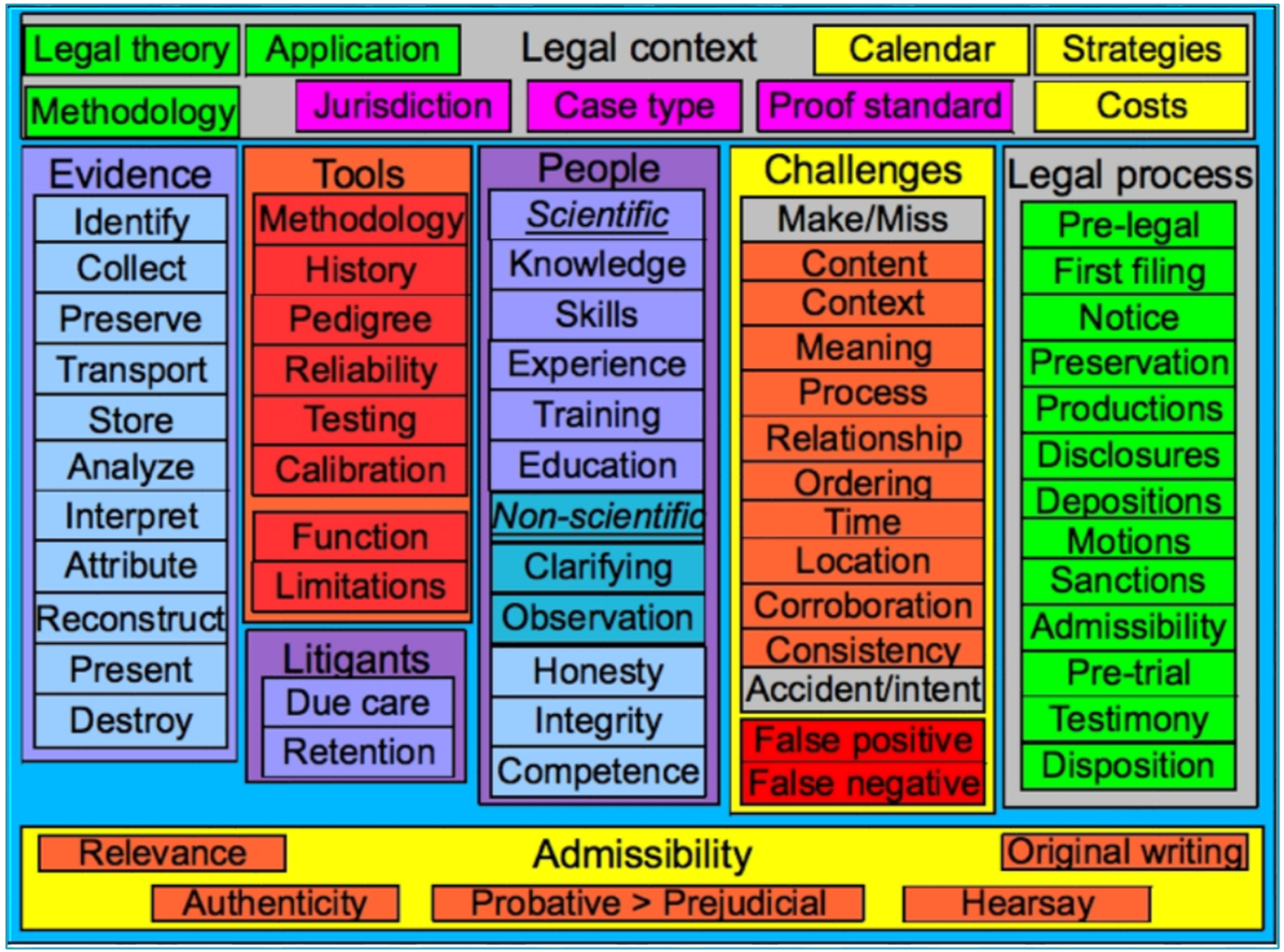


Guide to Integrating Forensic Techniques into Incident Response
SP800-86 NIST (csrc.nist.gov)

Cyber Forensics Process

- **Collection**
  - Collection of media/devices at the scene
  - Identification and Preservation
  - Transportation
- **Examination**
  - Extraction of data
  - Searching/locating data
- **Analysis**
  - Event analysis
  - Timeline analysis
- **Reporting**
  - Reporting and documentation

Digital Forensics Processes



Pop-Quiz Time

- At the crime scene, a cyber forensic examiner collects _____ that may contain evidence.
- In a forensic lab, an examiner extracts _____ from a hard disk.
- Timeline analysis can provide _____ on the past activities in a computer.
- Examiner reports the potential _____ after bookmarking the information related to the case.

Pop-Quiz Time

- At the crime scene, a digital forensic examiner collects media that may contain evidence
- In a forensic lab, an examiner extracts data from a hard disk.
- Timeline analysis can provide information on the past activities in a computer
- Examiner reports the potential evidence after bookmarking the information related to the case.

Summary

- What forensics means
- Evolution of physical and digital forensics
- Digital forensic services
- Digital forensics process and sub-processes

References

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