CST-2412: Week 2 Day 1

Data Privacy & Security – CIA Triad & Risk Management

Learning Objectives & Agenda

Objectives & Agenda:

- Describe the CIA triad (Confidentiality, Integrity, Availability).
- Define asset, vulnerability, threat and risk.
- Analyse a breach using risk vocabulary.
- Practise hashing & encoding via an online lab.
- Reflect on ethics through a writing assignment.

Agenda: Review, CIA triad, risk vocab, case study, lab, ethics discussion, wrap-up.

Review of Week 1

- Recalled motivations for privacy & security.
- Explored personal data and PII.
- Introduced Fair Information Practice Principles.
- Discussed emerging threats and ethical responsibilities.

The CIA Triad

- Confidentiality
- Integrity
- Availability

Confidentiality

- Prevent unauthorised disclosure.
- Sensitive data: medical, financial, proprietary.
- Mechanisms: authentication, authorisation, encryption.
- Policies & procedures (training, compliance).

Integrity

- Trustworthiness of data and systems.
- Detect and prevent modification.
- Techniques: hashes, digital signatures, checksums.
- Audit logs and backups for recovery.

Availability

- Accessible when needed.
- Resilient to outages, attacks and failures.
- Strategies: redundancy, fault tolerance, disaster recovery.
- Balancing availability with other security properties.

Risk Management Vocabulary

- Asset – something of value.

- Vulnerability – weakness that could be exploited.

- Threat – potential cause of an incident.

- Risk – likelihood and impact of a threat exploiting a vulnerability.

Case Study: Cloud Storage Breach

- Assets: customer files, tokens, reputation.
- Vulnerability: misconfigured server storing tokens in plaintext.
- Threat: attacker scans and steals tokens.
- Risk realised: unauthorized access, data theft, reputational harm.

Lab: Hashing & Encoding

• Open CyberChef (gchq.github.io/CyberChef).

• Drag ‘SHA-256’ to the recipe area and enter a message or file.

• Observe the hash output and the avalanche effect.

• Add ‘To Base64’ and see reversible encoding.

• Modify input and compare hash changes.

Writing Assignment: Ethical Use of Data

- Read ‘Ethical Use of Data: Scenarios for Discussion’, Scenario 1.
- Identify benefits of predictive analytics in education.
- Reflect on potential harms: privacy, bias, consent.
- Propose safeguards: transparency, audits, minimisation.
- Write 1–2 paragraphs connecting to CIA triad and risk vocabulary.