SECP1513: Technology Information System

Mind Map Chapter 2, 3 & 4

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Faculty of Computing

Prepared by:

Muhammad Thaqif bin Abdul Aziz	SX231702ECJHF04
Aqilah binti Mohamad Kasim	SX231764ECRHF04
Muhammad Munzir bin Mohamed Dauzkaply Nor	SX240286ECRHS04

MINDMAP CHAPTER 2, 3, & 4

TECHNOLOGY INFORMATION SYSTEM

HARDWARE

SOFTWARE

IS & SAD

Evolution

Mainframe & Mini Computers
- **1959:** Start of commercial mainframes. IBM 1401 & 7090.
- **1965:** Supported thousands of remote terminals. IBM 360 Series.
  - **Connection:** Proprietary protocols and dedicated lines.

Personal Computers
- **1980s-90s:** Development of productivity software.
  - **Software Types:**
    - Word processors
    - Spreadsheets
    - Presentation tools
  - **Networking:** Transition from stand-alone to networked PCs in the 1990s.

Client/Server Era
- **Architecture:** Clients connected to powerful servers.
- **Clients:** User interface for applications/data.
- **Servers:** Process and store data.
- **Characteristics:** More powerful than PCs

Enterprise Computing
- **Networking Standards:** Unified enterprise infrastructure sought in early 1990s.
- **Internet Emergence:** Became a trusted platform post-1995.
- **TCP/IP Adoption:** Standard for connecting networks.

Cloud & Mobile Computing
- **2010s:**
  - **Evolution:** From client/server to cloud computing.
  - **Definition:** Shared resources over a network.t
  - **On-Demand Access:** Flexibility and scalability from any device/location.

System Unit

Definition: Housed in a chassis; contains electronic components.

Types
- **Desktop** — Tower units & AIOs.
- **Laptop** — Portable.
- **Tablets** — Touch-based devices.
- **Smartphone** — Enhanced mobile phones.
- **Wearable** — Embedded computers for specific functions.

Key Components
- **System Board** — Controls communication.
- **Microprocessor (CPU)** — The brain of the computer.
- **Memory Types** — RAM (Volatile) ROM (Non-volatile) Flash Memory.

Expansion & Connectivity
- **Expansion Slots** — Additional capabilities.
- **Bus Lines** — Data communication pathways.
- **Ports and Cables** — Connect external devices.

Power Supply: Converts AC to DC; specific designs for different devices.

Data Representation:
- **Expansion Slots** — Additional capabilities.
- **Bus Lines** — Data communication pathways.

Input/Output

Input: Data/instructions for processing.
- **Devices:**
  - Keyboards
  - Pointing devices
  - Scanning devices
  - Card readers

Output: Processed data/information.
- **Types:**
  - Text
  - Graphics/Photos
  - Audio
  - Video
- **Devices:**
  - Monitors
  - Printers
  - Audio-output devices

Combination Devices: Headsets, multifunctional devices, telephones.

Specialized Devices: Drones, robots, and virtual reality systems.

Ergonomics: Fitting tasks to users; addressing discomfort from device use.

Trend

Emerging Trends in Computer Hardware
- **Quantum Computing** Extending Moore's Law.
- **Device & Nanotechnology** Innovations in materials.
- **3D Integrated Circuits** Transition in mobile technology.
- **Universal Memory** Potential changes in architecture.
- **Multicore Processors** Growth in diverse applications.
- **Photonics** Addressing bandwidth & energy efficiency challenges.

Storage

Primary Storage
- **Volatile** Loses content when power is off. (RAM)

Secondary Storage
- **Nonvolatile** Retains data regardless of power.
- **Characteristics** Media, capacity, speed and devices.
  - **Secondary Storage**
    - **Hard Disks** Magnetic data representation.
    - **Solid-State Drives (SSD)** Faster, no moving parts.
    - **Optical Discs** Use light for data storage.
    - **Cloud Storage** Internet-based storage solutions.
    - **Mass Storage Devices** For large data amounts.
    - **Storage Area Network (SAN)** Connects remote storage to computers.

System Software

Manages hardware; Provides foundation for other software.

Operating System
- Windows
- macOS
- UNIX

Utilities
- Antivirus
- Disk Cleanup

Virtualization
- VMware
- Parallels

Programming Software

Tools to develop, compile & debug software.

Compilers
- GCC
- Clang

IDEs
- Visual Studio
- Eclipse

Debuggers
- GDB (GNU Debugger)

Malicious Software (Malware)

Programs designed to harm or disrupt systems.
- **Virus** Macro Virus.
- **Worm** Morris Worm.
- **Trojan** Remote Access Trojan (RAT).
- **Spyware** Keyloggers.

Application Software

Used for specific tasks like document creation, data analysis, and design.

Productivity
- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

Multimedia
- PowerDVD
- PotPlayer

Graphics
- Adobe Photoshop
- Adobe Illustrator

Future Trends in Software

Emerging technologies transforming software development.
- **Artificial Intelligence** ChatGPT
- **Internet of Things** Smart home devices
- **DevSecOps** Integrated security in DevOps pipeline.
- **Blockchain** Decentralized ledgers for secure transactions.

Information Systems

A collection of components that work together to provide information essential to running an organization.

Components
- **People** To make individuals more productive.
  - Creators
  - Developers
  - Supporters
  - Users
- **Procedures** Documented in manuals by computer specialists.
- **Rules or guidelines** For using software, hardware, and data.
- **Software** To convert raw data into meaningful information.
- **Hardware** Physical equipment that processes data to create information.
- **Data** Raw, unprocessed facts.
  - Accurate
  - Timely
  - Specific
  - Organized
- **Internet** Provides connectivity between people and computers.

IS in Organization

Management Levels

Top Management
Executive Support System (ESS)
- Provides immediate access to key performance indicators.

Middle Management
Management Information System (MIS)
- Provides standardized reports.
Decision Support System (DSS)
- Offers flexible analysis of data for non-recurring problems.

Supervisors
Transaction Processing System (TPS)
- Records day-to-day transactions.

Information Flow
- **External Flow** Between the organization & external entities.
- **Horizontal Flow** Between departments or functional areas.
- **Vertical Flow** Between management levels.

System Analysis & Design

System Life Cycle
Preliminary Investigation → Analysis → Design → Development → Implementation → Maintenance