

Practical Helpdesk Fundamentals (TCM Security Notes)

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These are my summarized notes from **TCM Security's Practical Helpdesk course**.

The course focuses on IT roles, responsibilities, and real-world technical support workflows.

What is IT?

Information Technology (IT) is a broad term used for different roles and groups of technologies.

The main role of IT is to **manage and support technology required for an organization to function smoothly**.

Key Points

- IT can be outsourced sometimes
 - IT is critical for smooth business operations
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Core Responsibilities of IT

1. Technical Support

- Supporting employees with technical issue
- Training users and setting up systems

2. Security

- Includes **cybersecurity and physical security**
- Protecting systems, data, and infrastructure

3. Data Management

- Managing access to data
 - Ensuring proper data handling and permissions
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IT Roles and Job Positions

IT Director

- Similar to a project manager role
- Oversees large IT projects and strategic planning

IT Manager

- Mostly people and operations management
- Manages IT staff and workflows

Network Engineer / Network Administrator

- Designs and maintains network infrastructure
- Handles routers, switches, and connectivity

System Administrator

- Manages, monitors, and administers servers
- Handles system upgrades and asset management

Application Roles

- Application Manager
- Database Administrator
- Application Analyst
- Solution Architect

Project Manager

- Project planning
 - Resource allocation
 - Budget and timeline management
 - Documentation
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Helpdesk Role (Entry-Level IT Job)

What is Helpdesk?

Helpdesk is **frontline technical support for end users**.

Responsibilities

- Troubleshooting hardware and software issues
- Password management
- Customer service and communication
- Escalating issues to higher-level teams
- Installing and fixing hardware
- Documentation and ticket management

Common Job Title

IT Helpdesk Level 1 / Desktop Support Technician

This is a common entry point into IT and cybersecurity careers.

How Computers Work (Basic Hardware & Logic)

Transistors

- Old processors had around **3,500 transistors**
 - Modern processors contain **billions of transistors**
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Logic Gates

- Logic gates perform calculations using binary input
 - Computers use **0 and 1 represented by voltage levels**
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Processor Input & Instruction Sets

- Instructions are sent using **high and low voltage signals**
 - **Instruction Sets** define what operations a CPU can perform
 - As processors grow complex, instruction sets increase
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Abstraction & Compilers

- High-level programming languages are **abstracted from hardware**

- Compilers translate high-level code into machine instructions
 - Programmers don't directly work with transistor-level logic
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Introduction to Computing & Number Systems

Decimal System (Base 10)

Uses digits **0–9**

Example:

$$163 = 1 \times 10^2 + 6 \times 10^1 + 3 \times 10^0$$

Binary System (Base 2)

Uses digits **0 and 1**

Example:

$$10100011_2 = 128 + 32 + 2 + 1 = 163_{10}$$

Hexadecimal System (Base 16)

Uses **0–9 and A–F**

(A=10, B=11, C=12, D=13, E=14, F=15)

Example:

$$A3_{16} = 10 \times 16 + 3 = 163_{10}$$

Bits, Bytes & Nibbles

- **Bit** = 0 or 1
- **Nibble** = 4 bits
- **Byte** = 8 bits

Example:

1010 0011

→ 1010 = Nibble

→ 0011 = Nibble

→ Together = 1 Byte

ASCII Encoding

- **ASCII** is the first standardized text encoding system
 - Converts:
 - Alphabets
 - Numbers
 - Symbolsinto binary values
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Digital Data Types

- Files contain:
 - Images
 - Strings
 - Binary data
 - Everything is stored as **binary instructions + data**
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Key Takeaway

Computers fundamentally work using **binary logic built from transistors and logic gates**, while programming is possible due to **abstraction layers and compilers**.

Understanding number systems and encoding is essential for **IT, networking, and cybersecurity**.

References: