



Sayed Afandy Academy

Learn · Code · Build Your Future

The Illustrated Study Notebook

Programming and Artificial Intelligence

Second Year of Secondary School (Language Schools) · First Term · 2026/2027

4 Units

Illustrated Diagrams

Memory Tricks

Answered Questions

Mind Maps

Final Exam

1

IT & Society



2

Cybersecurity



3

Web Apps



4

Web Design



Prepared by: Eng. Sayed Afandy



01030745596



sayedafandy.com

Based on the approved comprehensive memo (Ministry textbook) — illustrated explanations + solving strategies + practice





Contents & How to Use This Notebook

Unit 1: Information Technology and Society

- 1** 1-1 Evolution of IT and Social Transformation · 1-2 How AI Works · 1-3 AI Applications in Daily Life and Industry · 1-4 Ethical Issues of AI

Unit 2: Cybersecurity and Encryption

- 2** 2-1 Encryption and Authentication Techniques (TLS) · 2-2 Network Security Design (DMZ/VPN) · 2-3 Incident Response and Risk Management

Unit 3: Web Applications and Their Structure

- 3** 3-1 General Architecture · 3-2 Communication Methods (HTTP/API/JSON) · 3-3 Front-End Fundamentals (HTML/CSS/JS)

Unit 4: Web Design and Media

- 4** 4-1 Media Types · 4-2 Information Design and UX (CRAP) · 4-3 Website Evaluation · 4-4 Iterative Improvement (PDCA & A/B)

★ Comprehensive Final Exam — the Whole Syllabus

30 MCQ · True/False · Complete & Justify · Essays · Self-assessment card · Top 20 facts



How to study with this notebook

- 1 Read the diagram first** — the picture explains the idea before the words; try to redraw it from memory.
- 2 Memorise with the trick** — the yellow "Memory Trick" box is the fastest way to a term.
- 3 Read the "Exam Trap"** — the red box collects the mistakes students usually make.
- 4 Solve the practice without peeking** — the top button hides/shows the answers.
- 5 After each unit:** review the Key Terms Capsule and the Mind Map, then Test Yourself.
- 6 Before the exam:** do the Comprehensive Final Exam, then read the "Top 20 Facts".

Red Exam Trap

Yellow Memory
Trick

Green Real-Life
Example

Blue Note



Sayed Afandy Academy

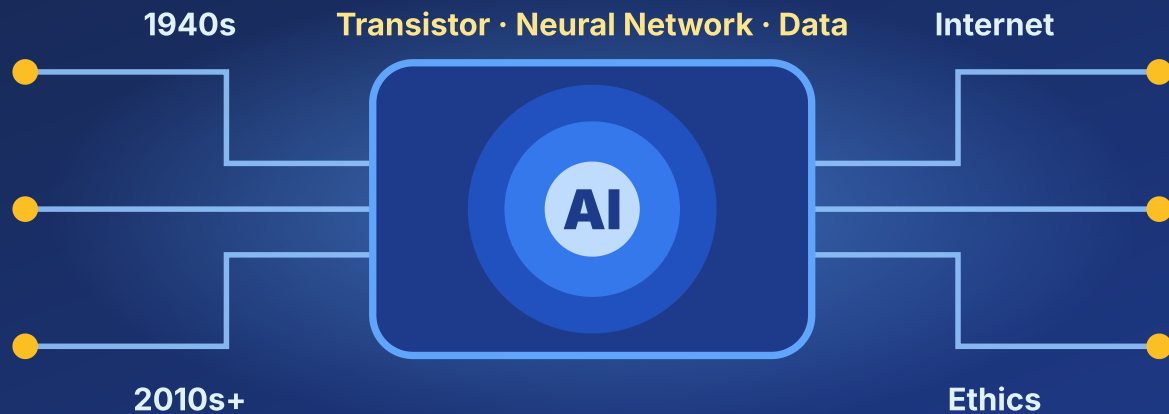
Enquiries & booking: Eng. Sayed Afandy — WhatsApp 01030745596

Website: sayedafandy.com



Unit One

Information Technology and Society



Lesson 1-1 · Evolution of Information Technology and Social Transformation

5 eras · Moore's Law · Cloud & Edge · Quantum ·
AR/VR



Lesson 1-2 · How Artificial Intelligence Works

AI $\supset$ ML $\supset$ DL $\supset$ GenAI · Neural Network ·
Hallucination



Lesson 1-3 · AI Applications in Daily Life and Industry

4 daily services · 4 industrial sectors · Black Box ·
Copyright



Lesson 1-4 · Ethical Issues of Artificial Intelligence

Algorithmic Bias · Privacy · The four principles (FTPA)
· XAI

🎯 What will you learn in this unit?

- Trace the five eras of IT evolution and explain Moore's Law and its limits.
- Tell the difference between Cloud, Edge and Quantum Computing, and between AR and VR.
- Explain the hierarchy AI $\supset$ ML $\supset$ DL $\supset$ GenAI, how a neural network works, and the Hallucination problem.
- Analyze AI applications in daily life and in the four industrial sectors, and understand Predictive Maintenance.
- Analyze Algorithmic Bias and privacy issues, and apply the four ethical principles.

1-1

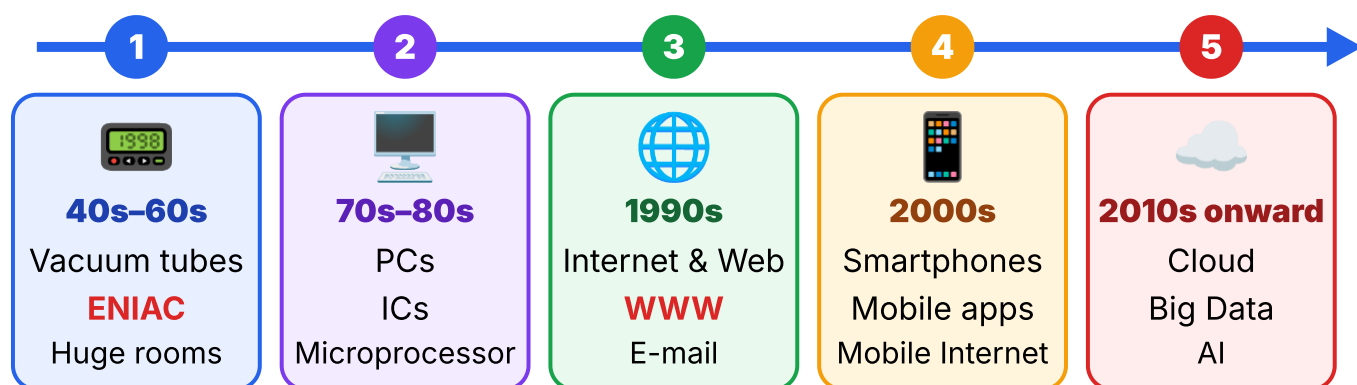
Evolution of Information Technology and Social Transformation

The five eras · Moore's Law and the limits of miniaturization

Lesson Objectives

Trace the five eras of IT, understand Moore's Law and its physical and engineering challenges, and the roles of Cloud Computing (as a service), Edge and Quantum Computing.

The Five Historical Eras of IT



The timeline: each era builds on the one before and brings technology closer to people

Period	Main technologies and events	Direct impact
1 • 1940s – 1960s	The first electronic computers, such as ENIAC , based on vacuum tubes	Military and scientific use only; filled whole rooms and used huge power
2 • 1970s – 1980s	Personal computers (PCs), integrated circuits (ICs) and microprocessors	Computers entered homes, offices and schools, and individuals used them themselves
3 • 1990s	The Internet opened for commercial use; the World Wide Web (WWW) and e-mail took off	Instant global access to information, communication and e-commerce
4 • 2000s	Smartphones such as the iPhone, and mobile apps	The Internet in everyone's pocket; constant, instant communication
5 • 2010s onward	Cloud Computing, Big Data and AI systems	Computing resources are delivered as services over the Internet instead of buying local hardware

Real-Life Example

Grandpa waited days for a letter, Dad got an e-mail in seconds, and you get a WhatsApp video instantly: the five eras speeding up.



Memory Trick

Order the eras with **V-P-I-P-C** = **V**acuum tubes → **P**Cs → **I**nternet → **P**hones → **C**loud. Say it: "Very Polite Internet Phones Chat"



Exam Trap

ENIAC belongs to the **first era (vacuum tubes)**, not the personal computer era. The personal computer is the **1970s–1980s** era, not the 1990s.

Moore's Law and the Physical Limits of Miniaturization

 **Moore's Law** An experimental observation by **Gordon Moore**: transistors on an integrated circuit double about **every two years** as cost falls. It is **not a fixed physical law**.



In the past

Hand-sized

Today

Only nanometers

Quantum tunneling + leakage + heat

Solution: multi-core & parallelism

Point	Approved detail
Challenges	Further shrinking causes Quantum Tunneling , leakage currents and heat
Solution	Multi-core processors and parallel processing instead of relying on shrinking alone

 **Exam Trap (Ministry textbook p. 8)** Moore's Law is **not** binding; it is an **observation and forecast** that meets physical limits.

 **Memory Trick** **Moore ≈ More**: more transistors every 2 years. Unlike gravity, it is an **observation**, not an **obligation**.

Quantum Computing and the Qubit

Classical Bit



OR



Only one state at any moment

Qubit



0 AND 1 together (Superposition)

Concept	Approved definition
Quantum Computing	Based on quantum mechanics ; uses the Qubit and Superposition (0 and 1 at once); quantum entanglement multiplies computing power
Uses	Encryption, complex medicines, extremely complex problems

 **Memory Trick** **Bit = OR** (0 or 1) · **Qubit = AND** (0 and 1). Like a spinning coin: heads and tails until it lands.

 **Exam Trap** Quantum computing does **not** **replace** normal computers; it targets very complex problems, not everything.