Web development fundamental

ICT club

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Second semester of 2017 E.C.

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Chapter 1: Computer System

Chapter 1:

1.1 What is a Computer System?

A computer system is a combination of hardware (the physical parts) and software (the programs) that work together to perform tasks—like writing essays, browsing the internet, or playing games.

1.2 Hardware (HW): The Physical Components

Hardware refers to the parts of the computer you can touch and see:
Input Devices: Tools like the keyboard, mouse, and microphone that send data to the computer.
Output Devices: Devices like the monitor, speakers, and printer that show or deliver information from the computer.
Processing Unit: The CPU (Central Processing Unit) is the computer’s brain—it carries out instructions.
Memory & Storage:
RAM: Temporary memory that stores data while you're working.
Hard Drive/SSD: Permanent storage for your files and programs.

1.3 Software (SW): The Invisible Brain

Software is a set of instructions that tells the computer what to do. There are three major types:
1. Application Software
Purpose: Helps you do specific tasks.

Examples:
Microsoft Word – for writing.
Google Chrome – for browsing.
Fortnite – for gaming.

2.Utility Software
Purpose: Helps the computer run better.

Examples:
Antivirus – protects against threats.
Disk Cleanup – removes unwanted files.

3. Programming Languages
Purpose: Used by developers to build software.
Examples:
Python – beginner-
JavaScript – used for interactive websites.
C++ – used for high-speed applications.

Analogy: Think of hardware as a car’s engine, and software as the driver that controls it.

1.4 How Hardware and Software Work Together
1. You press a key on the keyboard (hardware).
2. The operating system (software) reads the input.
3. The CPU (hardware) processes the information.
4. The monitor (hardware) shows the result—like the letter appearing on screen.

1.5 Practice Exercise ()

A. True or False

1. The CPU is a type of software that controls input devices.
2. Application software helps users perform specific tasks like writing or gaming.
3. RAM is used to permanently store data on a computer.

B. Multiple Choice Questions

1. Which of the following is an input device?
A) Monitor
B) Keyboard
C) Speaker
D) Printer

2. What does the CPU do?
A) Stores long-term data
B) Outputs sound
C) Executes instructions
D) Displays images

3. Which is NOT an example of application software?
A) Microsoft Word
B) Disk Cleaner
C) Google Chrome
D) WhatsApp

4. Which type of software is used to write other software?
A) Application software
B) Utility software
C) Programming languages
D) Operating system

5. What is an example of output hardware?
A) Mouse
B) Scanner
C) Monitor
D) Microphone

Chapter 2:

Chapter 2: Programming Languages

Programming languages are formal systems used to write instructions that computers can execute. They act as a bridge between human thinking and machine operations, helping developers build software, websites, games, apps, and more.

A Short History of Programming Languages

Early Languages (1950s–1960s):
Assembly Language: A low-level language made of instructions specific to a computer's hardware.
Fortran (1957): The first widely used high-level language, created for scientific and engineering tasks.

Mid-Era Languages (1970s–1980s):
C (1972): A powerful language used for writing operating systems and software.
C++ (1985): Built on C, it introduced object-oriented programming for better code organization.

Modern Languages (1990s–Now):
Java (1995): Known for being able to run on any device; used in Android apps and business tools.
Python (1991): Easy to read and write; popular in AI, data science, and automation.
JavaScript (1995): Runs in web browsers; makes websites interactive.

Types of Programming Languages

1. Low-Level Languages
These languages are close to machine code. They give the programmer more control over hardware, but are harder to write and understand.
Examples:
Machine Code: The binary language that computers understand directly.
Assembly Language: Slightly more readable, but still very close to hardware instructions.

2. High-Level Languages
These are easier for humans to read and write. They are translated into machine code using compilers or interpreters.
Examples:
Python: Great for beginners and widely used in many fields.
Java: Often used in Android development and business software.

C++: Used in games, simulations, and software needing high speed.

Popular Languages and Their Use Cases

Python is used in AI, data science, web development, and scripting.
Java is used in Android apps, large business software, and cloud applications.
C++ is used in video games, operating systems, and simulations.
JavaScript is used in websites for making pages interactive.
C is used in hardware-level programming and embedded systems.
Ruby is mainly used to build websites quickly using Ruby on Rails.
Swift is used to build apps for iPhones and MacBooks.

Conclusion

Each programming language has its own purpose. Some are better for speed, others for simplicity or compatibility. Learning the right language for your project makes programming easier and more effective.

Practice Questions

A. True or False

1. Assembly language is a high-level language used for web development.
2. Python is known for its simplicity and is often recommended for beginners.
3. JavaScript can only be used for frontend (client-side) web development.
4. Machine code is the only language that a computer can directly understand.
5. C++ is used in high-performance applications like video games.

B. Multiple Choice

1. Which programming language is most commonly used in artificial intelligence and data science?
a) Java
b) Python
c) C++
d) HTML

2. Which of the following is a low-level programming language?
a) JavaScript
b) Assembly
c) Ruby
d) Python

3. Which language is known for its use in web browsers and creating interactive websites?
a) Python
b) Swift
c) JavaScript
d) C

4. What type of language is used to automate small tasks, like managing files or running scripts?
a) Low-level language
b) Scripting language
c) High-level language
d) Visual language

5. Which language is primarily used to build apps for Apple devices like iPhones and Macs?
a) Swift
b) Java
c) C++
d) Bash

Chapter 3: Web Development

Chapter 3:

Web development is a type of computer programming that focuses on building websites and web applications that people access through a browser like Chrome, Firefox, or Safari. It includes both the design (what you see) and the logic (how things work behind the scenes).

What Is a Website?

A website is a collection of linked web pages hosted on a server and accessed through the internet. Examples include:
Google.com – A search engine
Facebook.com – A social media platform
YouTube.com – A video-sharing site
YourSchool.edu – An educational website

Types of Web Development

1. Front-End Development (The Visible Part)
This is what users see and interact with on the screen. Front-end developers design layouts, buttons, colors, and animations.
Key Technologies:

HTML (HyperText Markup Language) – Builds the structure of a web page.
CSS (Cascading Style Sheets) – Styles the content (colors, fonts, spacing).
JavaScript – Adds behavior (menus, forms, image sliders).

Examples:
A colorful signup form
Responsive navigation menus
Interactive image galleries

2. Back-End Development (The Hidden Brain)
This is everything that happens on the server. It manages how data is stored, sent, and processed.
Languages & Tools:

Node.js – JavaScript for server-side logic
Python – Popular for backend APIs and data processing

PHP – Often used in WordPress sites
Databases – Store information (e.g., user names, passwords, posts)

Examples:

Logging into a website
Submitting a comment and saving it to a database
Getting personalized results from a search engine

3. Full-Stack Development (The All-in-One)

A full-stack developer works on both front-end and back-end. They understand how to connect the user interface with server logic.

Example Projects:
A complete blog site with login, post creation, and comment system
A personal portfolio with contact form and message storage

What Can You Build with Web Development?

With web development skills, you can create:
Portfolios to showcase your work
E-commerce websites to sell products
Educational platforms like online classrooms or quiz apps
Games that run in the browser
Media players for music and video
Social media platforms

Why Web Development Is Important

It's a high-demand skill in the modern digital world.
It allows creativity and logic to work together.
It opens doors to freelancing, business, and jobs in tech.
It helps you solve real-world problems by building useful tools online.

Practice Questions

True or False

1. Web development is a type of computer programming.
2. HTML is used to add logic and behavior to websites.
3. Back-end development is responsible for the visual layout of a website.
4. CSS is used to style and design a web page’s appearance.
5. JavaScript is only used for back-end development.
6. Full-stack developers work on both the front-end and back-end.
7. Web development can be used to build e-commerce and portfolio sites.
8. Node.js is a front-end technology.
9. A database is used to store data like usernames and passwords.
10. Websites are accessed using web browsers like Chrome or Firefox.

Multiple Choice

1. Which language is mainly used for structuring web pages?
A) CSS
B) HTML
C) JavaScript
D) PHP

2. What does CSS mainly control in a webpage?
A) Data storage
B) Server logic
C) Style and layout
D) User login

3. Which language is commonly used for front-end interactivity?
A) Python
B) HTML
C) JavaScript
D) SQL

4. What does the back-end of a website usually handle?
A) Images and colors
B) User input and display
C) Server operations and databases

D) Website design

5. Which of these is a full-stack development skill?
A) HTML only
B) CSS only
C) Both front-end and back-end
D) None

6. Which of the following is used for server-side development?
A) HTML
B) Node.js
C) CSS
D) JavaScript (browser)

7. Which of the following is not a front-end language?
A) HTML
B) CSS
C) JavaScript
D) Python

8. A portfolio website is used to:
A) Host games
B) Store passwords
C) Showcase personal projects
D) Teach programming

9. Which tool is most suitable for managing data on the server?
A) JavaScript
B) HTML
C) Database
D) CSS

10. What type of developer works on both user interface and server logic?
A) Front-end developer
B) Back-end developer
C) Game developer
D) Full-stack developer