Software

Understanding the Programs That Power Our World

System Software

Application Software

Programming Languages

What is Software?

The instructions that tell hardware what to do

Software is a set of programs, instructions, and data that tell a computer how to perform tasks. Unlike hardware, software cannot be touched — it is intangible.

📋 Instructions

Step-by-step commands written in programming languages that the CPU executes.

💾 Stored in Memory

Software is saved on storage devices (HDD/SSD) and loaded into RAM to run.

🔄 Works with Hardware

Software controls hardware components and enables users to interact with them.

Types of Software

Two major categories

System Software

- Operating Systems (Windows, macOS, Linux)
- Device Drivers
- Utility Programs
- BIOS / Firmware

Application Software

- Word Processors (MS Word)
- Spreadsheets (MS Excel)
- Web Browsers (Chrome)
- Games & Multimedia

System Software

The backbone that keeps a computer running

Operating System

Manages hardware resources, provides user interface, and runs application software. Examples: Windows 11, macOS Sonoma, Ubuntu Linux.

Device Drivers

Small programs that allow the OS to communicate with hardware peripherals such as printers, graphics cards, and USB devices.

Utility Programs

Maintenance tools such as antivirus software, disk defragmenters, backup tools, file managers, and compression utilities.

BIOS / Firmware

Permanent software stored in ROM. Initializes hardware during the boot process before the OS loads. Also called firmware.

Application Software

Programs designed for end-user tasks

✍️ Word Processing

MS Word, Google Docs, LibreOffice Writer

📊 Spreadsheets

MS Excel, Google Sheets, LibreOffice Calc

📽️ Presentations

MS PowerPoint, Google Slides, Canva

🗄️ Database Software

MS Access, MySQL, Oracle, PostgreSQL

🌐 Web Browsers

Chrome, Firefox, Safari, Edge

🎨 Graphic Design

Adobe Photoshop, Illustrator, GIMP

🔒 Security Software

Norton, Kaspersky, Windows Defender

🎮 Games & Media

VLC Media Player, Steam, Spotify

Proprietary vs Open Source

Two models for distributing software

Proprietary Software

Ownership:	Owned by a company or individual
Source Code:	Hidden — users cannot view or modify
Cost:	Usually requires purchase or subscription
Support:	Official support provided by vendor
Examples:	Microsoft Office, Adobe Photoshop, macOS

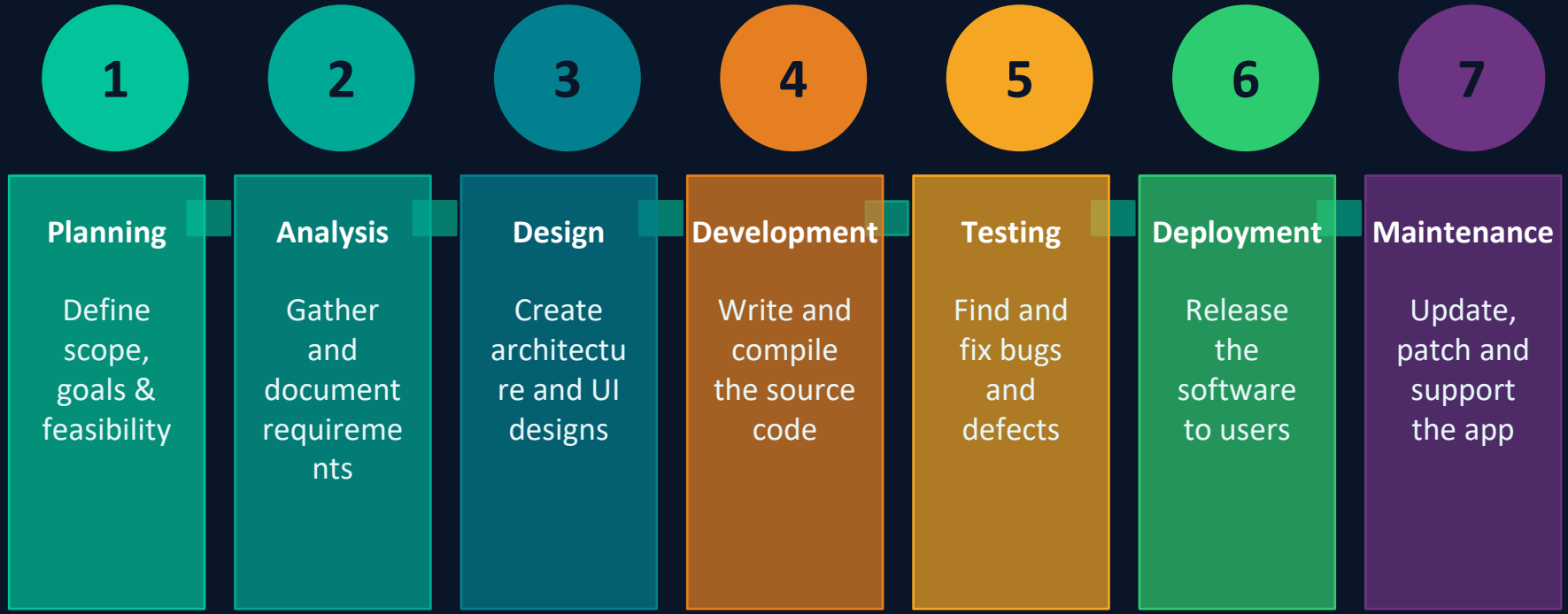
VS

Open Source Software

Ownership:	Community-owned or publicly licensed
Source Code:	Publicly available to view & modify
Cost:	Free to download and use
Support:	Community forums and volunteers
Examples:	Linux, LibreOffice, GIMP, Firefox

Software Development Life Cycle (SDLC)

How software is built from idea to product



Programming Languages

The languages used to write software

1GL	Machine Language — Binary code (0s and 1s). Directly understood by CPU.
2GL	Assembly Language — Uses mnemonics (MOV, ADD). Converted by assembler.
3GL	High-Level — Human-readable. Examples: Python, Java, C++, C#.
4GL	Very High-Level — Domain-specific. Examples: SQL, MATLAB, R.

Popular Today: Python • Java • C++ • JavaScript • SQL • C# • Swift • PHP

Software Licensing

Legal agreements governing how software can be used

💰 Commercial

Must be purchased. One or more licenses per user/device. E.g. Microsoft Office.

🆓 Freeware

Free to use but source code is not available. No payment required. E.g. Adobe Reader.

⏳ Shareware

Try before you buy. Limited features or time. E.g. WinRAR.

📖 Open Source

Source code freely available. Can be modified and redistributed. E.g. Linux, LibreOffice.

🌍 Public Domain

No copyright restrictions. Free to use for any purpose without restriction.

☁️ SaaS

Software as a Service. Subscription-based cloud access. E.g. Google Workspace, Salesforce.

Malware & Software Security

Threats to software and how to stay protected

⚠ Common Threats

Virus:	Attaches to files and spreads when files are shared
Worm:	Self-replicating; spreads over networks automatically
Trojan:	Disguised as legitimate software; opens a backdoor
Ransomware:	Encrypts files and demands payment to unlock
Spyware:	Secretly collects user information and sends it
Adware:	Displays unwanted advertisements on the device

Protection Tips

- ✓ Install reputable antivirus software
- ✓ Keep OS and software updated regularly
- ✓ Use strong, unique passwords
- ✓ Avoid clicking suspicious links/emails
- ✓ Only download from trusted sources
- ✓ Back up important data regularly
- ✓ Use a firewall to monitor traffic

Key Takeaways

01 Software = Instructions. It is intangible, stored on disk, loaded into RAM to run.

02 Two main types: System Software (runs the machine) and Application Software (serves users).

03 Licensing matters: Commercial, Freeware, Shareware, Open Source, Public Domain, SaaS.

04 Software is created using programming languages — from low-level Machine Code to high-level Python.

05 The SDLC (Planning → Analysis → Design → Dev → Test → Deploy → Maintain) guides development.

06 Stay secure: use antivirus, keep software updated, and back up your data regularly.