TG2

Computer Software
Chapter Outline

- Significance of software
- System software
- Application software
- Software issues
- Programming languages
- Enterprises software
Learning Objectives

- Differentiate between the two major types of software.
- Describe the general functions of the operating system.
- Differentiate among types of operating systems and describe each type.
- Identify three methods for developing application software.
- Describe the major types of application software.
- Describe the major software issues that organizations face today.
- Explain how software has evolved and trends for the future.
- Describe middleware and enterprise software.
TG2.1 Significance of software

- **Computer program.** The sequences of instructions for the computer, which comprise software.

- **Stored program concept.** Modern hardware architecture in which stored software programs are accessed and their instructions are executed (followed) in the computer’s CPU, one after another.

- **Documentation.** Written description of the functions of a software program.
Different types of software:

- **System software**: The class of computer instruction that serve primarily as an intermediary between computer hardware and application programs; provides important self-regulatory functions for computer systems.

- **Application software**: The class of computer instructions that direct a computer system to perform specific processing activities and provide functionality for users.
TG2.2 Systems software

**System control programs:** Software programs that controls the use of the hardware, software, and data resources of a computer system.

**Operating system:** The main system control program, which supervises the overall operations of the computer, allocates CPU time and main memory to programs, and provides an interface between the user and the hardware.
Multitasking/multiprogramming: The management of two or more tasks, or programs, running concurrently on the computer system (one CPU).

Multithreading: A form of multitasking that runs multiple tasks within a single application simultaneously.

Multiprocessing: simultaneous processing of more than one program by assigning them to different processors (multiple CPUs).
Virtual Memory: A feature that simulates more main memory than actually exists in the computer system by extending primary storage into secondary storage.

Graphical user interface (GUI): system software that allows users to have direct control of visible objects (such as icons) and actions, which replace command syntax.

Social interface. A user interface that guides the user through computer applications by using cartoonlike characters, graphics, animation, and voice commands.
Operating environment. A set of computer programs that add features that enable developers to create applications without directly accessing the operating systems; function only with an operating system.

Plug-and-Play. Feature that enables the operating system to recognize new hardware and install the necessary software (called device drivers) automatically.
Linux: A powerful version of the UNIX operating system that is open source software (publicly and freely available).

Java operating system (Java OS): Operating system designed to execute programs written in Java, for Internet and Intranet applications, embedded devices, handheld products, and thin-client computing.
System support programs: Software that supports the operations management and users of a computer system by providing a variety of support services (e.g. system utility programs, performance monitors, and security monitors).

System utilities: Programs that accomplish common tasks such as sorting records, locating files, and managing memory usage.
**System performance monitors:** Programs that monitor the processing of jobs on a computer system and monitor system performance in areas such as processor time, memory space and application programs.

**System security monitors:** Programs that monitor a computer system to protect it and its resources from unauthorized use, fraud, or destruction.
TG2.3 Application Software

- Proprietary application software. Software that addresses a specific or unique business need for a company; may be developed in-house or may be commissioned from a software vendor.

- Contract software. Specific software programs developed for a particular company by a vendor.

- Off-the-shelf application software. Software purchased, leased, or rented from a vendor that develops programs and sell them to many organizations; can be standard customizable.
Personal application software

- **Spreadsheets.** Software that uses a grid of coded rows and columns to display numeric or textual data in cells.

- **Macros.** Sequences of commands used in spreadsheet software that can be executed with just one simple instruction.
Integrated packages. Spreadsheet packages that offer data management and graphical capabilities in addition to regular spreadsheet functionality.

Data management. Software that supports the storage, retrieval, and manipulation of related data.

Word processing. Software that allows the user to manipulate text using many writing and editing features.
**WYSIWYG.** Acronym for ‘what you see is what you get’ (pronounced ‘wiz-e-wig’, indicating that text material is displayed on the computer screen just as it will look on the final printed page.

**Desktop publishing software.** Software that enables microcomputers to combined photographs and graphic images with text, to produce a finished, camera-ready document.
Graphics software. Software that enable the user to create, store, and display or print charts, graphs, maps, and drawings.

Presentation graphic software. Software that enables users to create graphically rich presentations by “pasting” graphic images into a textual presentation.

Analysis graphic software. Software that provides the ability to convert previously analyzed data into graphic formats (e.g. bar charts, pie charts).
Computer aided design (CAD) software

Software that allows designers to design and build production prototypes in software, test them, compile parts lists, outline assembly procedures, and then transmit the final design directly to machines.
Multimedia software: Software that combines spatially based media (text and images) with time based media (sound and video) for input or output of data.

Communications software. Software that allows computers, wherever they are located, to exchange data via cables, telephone lines, satellite relay systems, or microwave circuits.
Speech-recognition software: recognizes and interprets human speech, either one word at a time (discrete speech) or in a stream (continuous speech).

Groupware: Software that facilitate communication, coordination, and collaboration among people.
TG2.4 Software Issues

- Software defects
- Alien software
- Software evaluation and selection
- Software licensing
- Software upgrades
- Open systems
- Open source software
Alien Software

- Pestware. Clandestine software that becomes installed on your PC through duplicitous channels; also called malware or scumware.
- Adware. Software that is designed to facilitate the propagation of pop-up advertisements on your screen.
- Spyware. Software that records your keystrokes and/or your password.
- Spamware. Software designed to use your computer as a launch pad for spammers.
## Software selection factors

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<th>Factor</th>
<th>Consideration</th>
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<td>Size and location of user base</td>
<td>Does the proposed software support a few users in a single location? Or can it accommodate large number or geographically dispersed users?</td>
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<td>Availability of system</td>
<td>Does the software offer tools that monitor system usage? Does it maintain a list of authorized users and provide the level of security needed?</td>
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<td>Administration tools</td>
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<td>Cost: initial and subsequent</td>
<td>Is the software affordable, taking into account all costs, including installation training, and maintenance?</td>
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<td>System capabilities</td>
<td>Does the software meet both current and anticipated future needs?</td>
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<td>Existing computing environment</td>
<td>Is the software compatible with existing hardware, software and communications network?</td>
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<td>In-house technical skills</td>
<td>Should the organization develop software applications in-house, purchase off the shelf, or contract software out of house?</td>
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TG2.5 Programming Languages

- **Machine Language.** The lowest level programming language, composed of binary digits.

- **First-generation language.** Machine language; the level of programming languages actually understood by CPU.
Assembly language. A lower-level programming language that is slightly more user-friendly than machine language.

Second-generation language. Assembly language; requires that each statement be translated into machine language through use of an assembler.

Assembler. A system software program that translates an assembly language program into machine language.
- **Procedural languages.** User-oriented programming languages, which require programmers to specify step by step how the computer must accomplish a task.

- **Third-generation languages.** The first level of higher-level programming languages, which are closer to natural language and therefore easier for programmers to use.

- **Compiler.** Software program that translates an entire high-level language program into object code at once.
**Interpreter.** A compiler that translates and executes one source program statement at a time.

**Nonprocedural languages.** A type of high-level language that enables user to specify the desired result without having to specify the detailed procedures needed for achieving the result.

**Fourth–generation language (4GLs).** A type of high-level programming languages, which can be used by nontechnical users to carry out specific functional tasks.
Virtual Programming languages: use a mouse, icons, symbols on the screen, or pull-down menus to make programming easier and more intuitive.

Hypertext. An approach to data management in which data are stored in a network of nodes connected by links and are accessed through interactive browsing.

Hyperlinks. The links that connect data nodes in hypertext.

Hypertext document. The combination of nodes, links, and supporting indexes for any particular topic in hypertext.
Hypertext markup language (HTML). The standard programming language used on the Web to create and recognize hypertext documents.

Dynamic HTML. lets users interact with the content of richly formatted pages without having to download additional content from the server.

Cascading style sheet (CSS). An enhancement to HTML that adds page layout features to web documents.
Extensible Markup Language (XML). A programming language designed to improve the functionality of web documents by providing more flexible and adaptable data identification.

Componentware. A term used to describe component – based software applications.

Software components. The “building blocks” of applications, which can be used again and again by the applications.
Virtual reality modeling Language (VRML). Programming language that can describe three dimensional interactive worlds and objects; used on the web to create three dimensional representations of complex scenes.

Object- oriented programming (OPP) languages. Programming language that encapsulate a small amount of data with instructions about what to do with data.
Methods. In object-oriented programming, the instructions about what to do with encapsulated data objects.

Object. In object-oriented programming the combination of a small amount of data with the data.

Encapsulation. In object-oriented programming the process of creating an object.
Reusability feature. Feature of object-oriented languages that allows classes created for one purpose to be used in a different object-oriented program if desired.

Java. Object-oriented programming language, that gives programmers the ability to develop applications that work across the Internet.

Applets. Small Java applications that can be included in an HTML page on the Internet.
Unified modelling language (UML)

A programming language that provides a common set of notations for object-oriented software system
TG2.6 Enterprise software

- Middleware. Software designed to link application modules developed in different computer languages and running on heterogeneous platforms.
- Enterprise software. Software programs that manage the vital operations of an organization (enterprise).
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