

Management Information Systems

Information Systems: Computer Software

Dr. Shankar Sundaresan

(Adapted from Introduction to IS, Rainer and Turban)

Computer Software Outline

Significance of Software
Systems Software
Application Software
Software Issues
Programming Languages

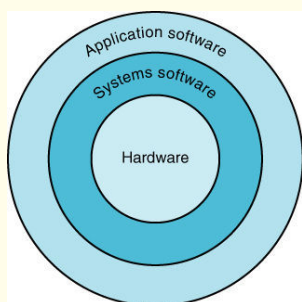
LEARNING OBJECTIVES

- Differentiate between the two major types of software.
- Describe the general functions of the operating system.
- Describe the major types of application software.
- Describe the major software issues that organizations face today.
- Discuss the advantages and disadvantages of open-source software.
- Explain how software has evolved and consider trends for the future.

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

Significance of Software (continued)



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.

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.

Functions of the Operating System

- 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 Support Programs

- System support programs
- System utilities
- System performance monitors
- System security monitors

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.
- **Package**
 - is a commonly used term for a computer program (or group of programs) that have been developed by a vendor and is available for purchase in a prepackaged form.

Software Issues

- Software defects
- Software evaluation and selection
- Software licensing
- Open systems
- Open source software
- Software-as-a-Service

Programming Languages

- **First-generation language or Machine Language**
 - The lowest level programming language; composed of binary digits; only programming language understood by CPU.
- **Second-generation language or Assembly language**
 - more user friendly than first generation language; uses mnemonics for people to use.
- **Third-generation language or Procedural language**
 - requires the programmer to specify, step-by-step, exactly how the computer must accomplish a task.

Programming Languages

- Fourth-generation language or Non-procedural language
 - allows the user to specify the desired result without having to specify step-by-step procedures
- Visual programming languages
 - use a graphical environment with mouse; icons and symbols on the screen, or pull-down menus to make programming easier.

Object-Oriented Languages

- **Object-Oriented Languages**
 - Programming language that encapsulate a small amount of data with instructions about what to do with data.
- **Methods**
 - the instructions about what to do with encapsulated data objects.
- **Object**
 - the combination of a small amount of data with the methods.
- **Encapsulation**
 - 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.

Hypertext Markup Language and Extensible Markup Language

- Hypertext
- Hyperlinks
- Hypertext document
- Hypertext markup language (HTML)
- Extensible markup language (XML)

Comparison of HTML and XML

English Text
MNGT 3070
Introduction to MIS
TITLE:
3 semester hours
Professor Smith

HTML
<TITLE>Course Number</TITLE>
<BODY>

Introduction to MIS
3 semester hours
Professor Smith
</BODY>

XML
<Department and course="MNGT 3070">
<COURSE TITLE>Introduction to MIS</COURSE

<HOURS UNIT="Semester">3</NUMBER OF HOURS>
<INSTRUCTOR>Professor Smith</INSTRUCTOR>

English Text MNGT 3070 Introduction to MIS <TITLE> 3 semester hours Professor Smith	
---	--

HTML <TITLE>Course Number</TITLE> <BODY> Introduction to MIS 3 semester hours Professor Smith </BODY>	
---	--

XML <Department and course="MNGT 3070"> <COURSE TITLE>Introduction to MIS<COURSE> <HOURS UNIT="Semester">3</NUMBER OF HOURS> <INSTRUCTOR>Professor Smith<INSTRUCTOR>	
---	--

fig_02_02

Personal Application Software

Category of Personal Application Software	Major Functions	Examples
Spreadsheets	Use rows and columns to manipulate primarily numerical data; useful for analyzing financial information, and for what-if and goal-seeking analyses.	Microsoft Excel Corel Quattro Pro
Word Processing	Allows users to manipulate primarily text with many writing and editing features.	Microsoft Word Corel WordPerfect
Desktop Publishing	Extends word processing software to allow production of finished, camera-ready documents, which may contain photographs, diagrams, and other images combined with text in different fonts.	Microsoft Publisher QuarkXPress 7
Data Management	Allows users to store, retrieve, and manipulate related data.	Microsoft Access FileMaker Pro
Presentation	Allows users to create and edit graphically rich information to appear on electronic slides.	Microsoft PowerPoint Corel Presentations
Graphics	Allows users to create, store, and display or print charts, graphs, maps, and drawings.	Adobe PhotoShop Corel DRAW
Personal Information Management	Allows users to create and maintain calendars, appointments, to-do lists, and business contacts.	IBM Lotus Notes Microsoft Outlook
Personal Finance	Allows users to maintain checkbooks, track investments, monitor credit cards, bank and pay bills electronically.	Quicken Microsoft Money
Web Authoring	Allows users to design Web sites and publish them on the Web.	Microsoft FrontPage Macromedia Dreamweaver
Communications	Allows users to communicate with other people over any distance.	Novell Groupwise Netscape Messenger

table_02_01

Software Selection Factors

Factor	Considerations
Size and location of user base	□ Does the proposed software support a few users in a single location? □ Can it accommodate large numbers of geographically dispersed users?
Availability of system	□ Does the software offer tools that monitor system usage? □ Does it maintain a list of authorized users and provide the level of security needed?
Costs—initial and subsequent	□ Is the software affordable, taking into account all costs, including installation, training, and maintenance?
System capabilities	□ Does the software meet both current and anticipated future needs?
Existing computing environment	□ Is the software compatible with existing hardware, software, and communications networks?
In-house technical skills	□ Should the organization develop software applications in-house? □ Should the organization purchase applications off the shelf or contract software out of house?

table_02_02

Programming Languages

Category	Characteristics
First-Generation Language (Machine)	Consists of 0's and 1's; extremely difficult to use by programmers.
Second-Generation Language (Assembly)	More user friendly than machine language; uses mnemonics for people to use, such as ADD for add, SUB for subtract, and MOV for move.
Third-Generation Language (Procedural)	Requires the programmer to specify, step by step, exactly how the computer must accomplish a task. Examples include C, Basic, FORTRAN, and COBOL.
Fourth-Generation Language (Nonprocedural)	Allows the user to specify the desired result without having to specify step-by-step procedures; simplify and accelerate programming process. Examples include SAS, SPSS, and APL.
Visual Programming Languages	Employed within a graphical environment and uses a mouse, icons, symbols on the screen, or pull-down menus to make programming easier. An example is Visual Basic.