

# Managing Information Technology

## WEEK 2 COMPUTER SOFTWARE

# Building Blocks of Information Technology

Hardware

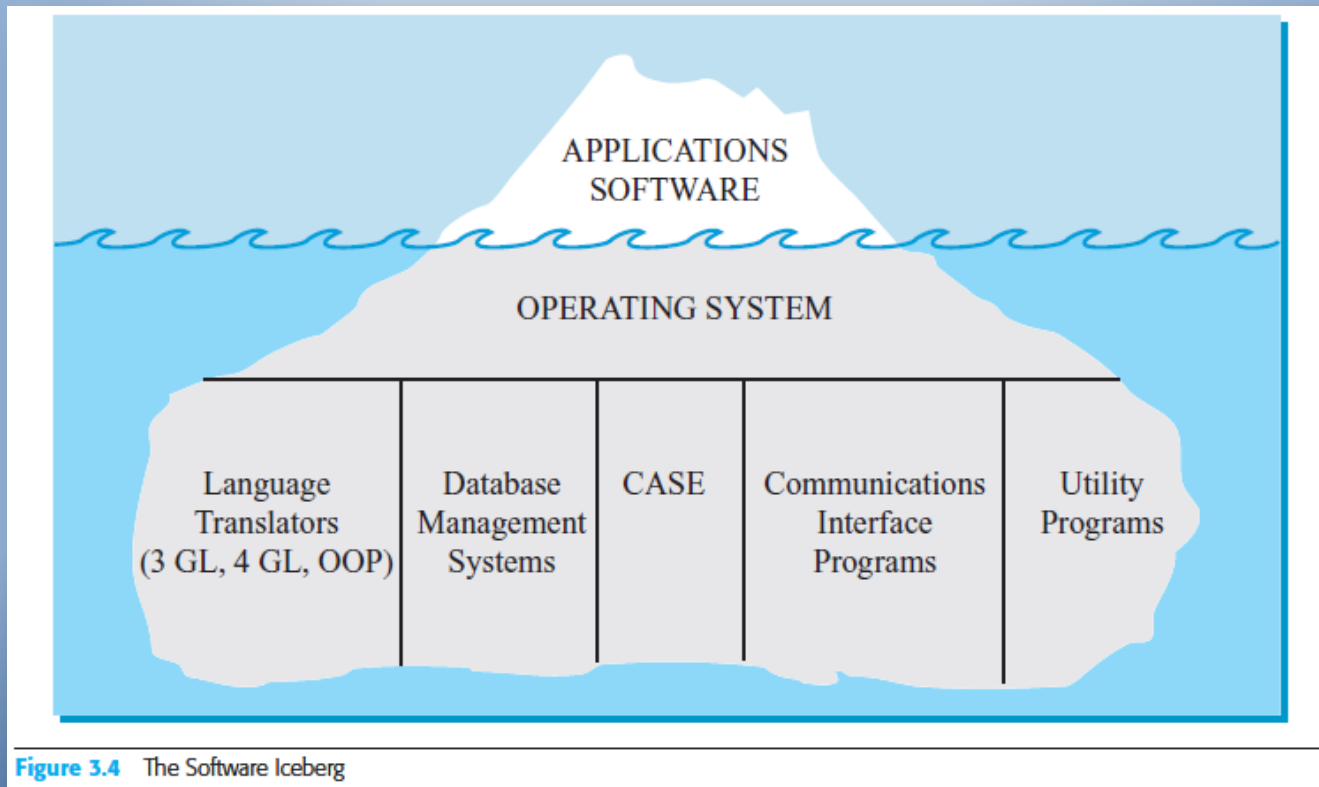
Software

Network

Data

# KEY TYPES OF SOFTWARE

1. Applications software
2. Support software



# APPLICATIONS SOFTWARE

- Programs written to accomplish particular tasks
- Many different types of applications software
- Standard applications products generally purchased from an outside source
- Applications unique to the organization generally developed internally
- Personal productivity software most important to managers

# APPLICATIONS SOFTWARE

## Examples of Application Software

- Peachtree accounting software
  - Commercial accounting package for smaller businesses
  - Includes general ledger, accounts receivable, accounts payable, inventory, payroll, time and billing, job costing, fixed asset accounting, and analysis and reporting tools
  - \$500 for single-user version

# SUPPORT SOFTWARE

- Provides computing environment that is easy and efficient for humans to use
- Enables applications programs to be carried out
- Ensures that computer hardware and software are used efficiently
- Almost always purchased from a hardware vendor or software house

# SUPPORT SOFTWARE

## Operating System

- Most important type of support software
- Complex program that controls operation of computer hardware and coordinates other software
- User communicates with operating system software to control hardware and software resources
- Communication made easier with a graphical user interface (GUI) feature

# SUPPORT SOFTWARE

## Markup Languages

- Employ tags to “mark up” documents
- **HTML**
  - Used to create Web pages
  - Consists of special tags that tell the Web browser how to display various elements on a Web page (e.g., bold-faced or italic text, image location, links to other Web pages)
- **XML**
  - Used to facilitate data interchange among Web applications
  - Metalanguage consisting of tags that identify particular data elements



# SUPPORT SOFTWARE

## Object-Oriented Programming

- Requires more computing power
- Has built-in GUI
- Neither 3GL nor 4GL ... new paradigm
- Creates objects only once and stores for reuse
- Object examples:
  - Text box, check box, entity in an organization
- Languages:
  - Smalltalk, C++, Java, Visual Basic.NET

# SUPPORT SOFTWARE

## Languages for Developing Web Applications

- HTML form is the most common user interface encountered by users
- Server-side programming languages include:
  - Perl
  - Java Servlets and Java Server Pages
  - Microsoft Active Server Pages (ASP, ASP.NET)
  - ColdFusion

# SUPPORT SOFTWARE

## Database Management Systems

- Support software used to create, manage, and protect organizational data
- **Database:** shared collection of logically related data organized to meet organizational needs
- Five basic architectures:
  1. Hierarchical
    - Data are arranged in a top-down organization chart fashion
    - Example: IBM Information Management System (IMS)

# SUPPORT SOFTWARE

## Database Management Systems

- Five basic architectures:
  2. Network
    - Data are arranged like cities on a highway system, often with several paths from one piece of data to another
    - Example: Computer Associates Advantage CA-IDMS
  3. Relational
    - Most common type
    - Data arranged in simple tables
    - Records related by storing common data in each associated table
    - Examples: Microsoft Access and SQL Server, Paradox, DB2, and Ingres

# SUPPORT SOFTWARE

## Database Management Systems

- Five basic architectures:
  4. Object-oriented
    - Data can be graphics, video, and sound as well as simpler data types
    - Attributes and methods are encapsulated in object classes, and relationships between classes can be shown by nesting one class within another
    - Examples: Versant Object Database, Progress ObjectStore, and Objectivity/DB
  5. Object-relational
    - Hybrid approach that can handle complex data types with the simplicity of the relational model
    - Examples: Oracle, IBM's DB2 and Cloudscape, and FFE Software's FirstSQL/J

# SUPPORT SOFTWARE

## CASE Tools

- Computer-aided software engineering (CASE)
- Collection of software tools to help automate all phases of the software development life cycle
- Growth slower than anticipated
- Radically changed nature of systems analyst and programmer jobs

# SUPPORT SOFTWARE

## CASE Tools

- Recent surge in CASE tools for **Unified Modeling Language (UML)**
  - UML is a general-purpose notational language for specifying and visualizing complex software, especially large, object-oriented projects
  - Examples of UML-base CASE tools
    - IBM's Rational Rose
    - Borland's Together
    - Sybase's PowerDesigner

# SUPPORT SOFTWARE

## Communications Interface Software

- Large computers
  - Need to control workstations and terminals
  - Example software: IBM's CICS, TSO, and CMS
- Increasingly important with growth of LANs and WANs
- **Web browsers:** enable users to look around, or “browse,” the Internet
- **Telnet:** permits user to log into remote computer
- **File Transfer Protocol (FTP):** used to transfer files from one computer system to another



# THE CHANGING NATURE OF SOFTWARE

- **Less concern with machine efficiency**
- More **purchased applications**, and, conversely, more use of open source support software, such as Linux
- More programming using **object-oriented languages**
- More emphasis on applications that run on intranets and **the Internet**
- More **user development**
- More use of **personal productivity software** on microcomputers

# THE SOFTWARE COMPONENT OF THE INFORMATION SYSTEMS INDUSTRY

## Major Groups

- Hardware manufacturers
  - IBM, Hewlett-Packard, Sun Microsystems, Hitachi, and Fujitsu
- Software houses
  - Microsoft, Oracle, SAP, Computer Associates, and Symantec
- Consulting firms
  - PricewaterhouseCoopers Consulting (bought by IBM)