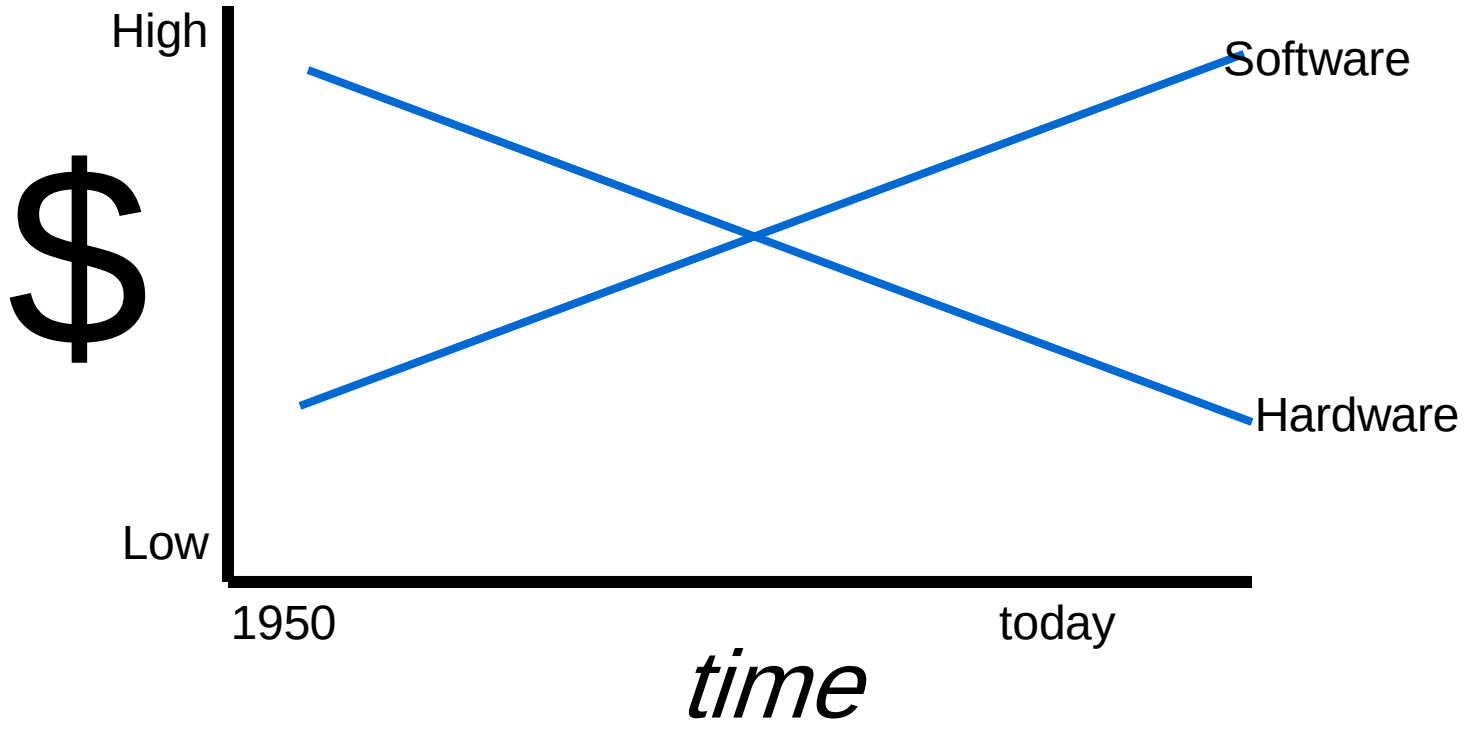
Computer Software Packages

The Importance of Software in Business



An Overview of Software

What is ‘Software?’

Classes of Software

- Systems software
  - Set of programs that coordinates activities and functions of the hardware and various other programs
- Application software
  - Programs that help users solve particular computing problems

Spheres of Influence

- Personal
  - Information systems that serve the needs of an individual user
- Workgroup
  - Two or more people who work together to achieve a common goal
- Enterprise
  - Information systems that support the firm in its interaction with its environment.

Issues and Trends

- Software licensing
  - Protection by software vendors to prevent unauthorized use
- Software upgrades
  - A revised version of software that usually includes fixes of known problems, plus enhancements to existing capabilities
- Global software support
  - Software that is distributed around the globe may require unique support mechanisms due to local political and economic conditions

Ownership

- Freeware
- Shareware
- Public-domain software

Freeware

Copyrighted software given away for free by the author.

Although it is available for free, the author retains the copyright, which means that you cannot do anything with it that is not expressly allowed by the author.

Usually, the author allows people to use the software, but not sell it.

Ownership

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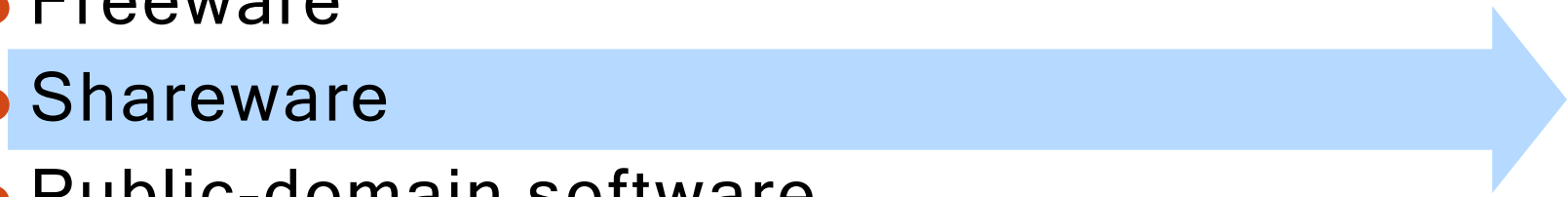
- Public-domain software



Shareware ((1

Software distributed on the basis of an honor system.

Most shareware is delivered free of charge, but the author usually requests that you pay a small fee if you like the program and use it regularly. By sending the small fee, you become registered with the producer so that you can receive service assistance and updates.

You can copy shareware and pass it along to friends and colleagues, but they too are expected to pay a fee if they use the product.

Shareware ((2

Shareware is inexpensive because it is usually produced by a single programmer and is offered directly to customers. Thus, there are practically no packaging or advertising expenses.

Note that shareware differs from public-domain software in that shareware is copyrighted. This means that you cannot sell a shareware product as your own.

Ownership

- Freeware
- Shareware
- Public-domain software

Public-domain Software

Refers to any program that is not copyrighted. ح0اقوق**0**رشنل

Public-domain software is free and can be used without restrictions.

The term public-domain software is often used incorrectly to include freeware, free software that is nevertheless copyrighted.

Systems Software

- System software…
  - Is an interface or buffer between application software and hardware
  - Controls the computer hardware and acts as an interface with applications programs

Systems Software

Users

Application software

Operating and systems software

Hardware

Operating System Functions

- Perform common computer hardware functions
- Provide a user interface
- Provide a degree of hardware independence
- Manage system memory
- Manage processing tasks
- Provide networking capability
- Control access to system resources
- Manage files

User Interface

- User interface
  - A function of the operating system that allows individuals to access and command the computer
- Command-based user interface
  - A particular user interface that requires text commands be given to the computer to perform basic activities
  - E.g., unix, DOS
- Graphical user interface (GUI(
  - A user interface that uses pictures (icons) and menus displayed on the screen to send commands to the computer system
  - E.g. Windows, MAC OS

Systems Software Concepts

- Hardware independence
  - Operating system (OS) provides hardware independence for application software
  - Application software interfaces with the operating system which interfaces with the hardware
  - When the hardware is changed, the operating system is changed so that the application software is not required to be changed

Software Concepts

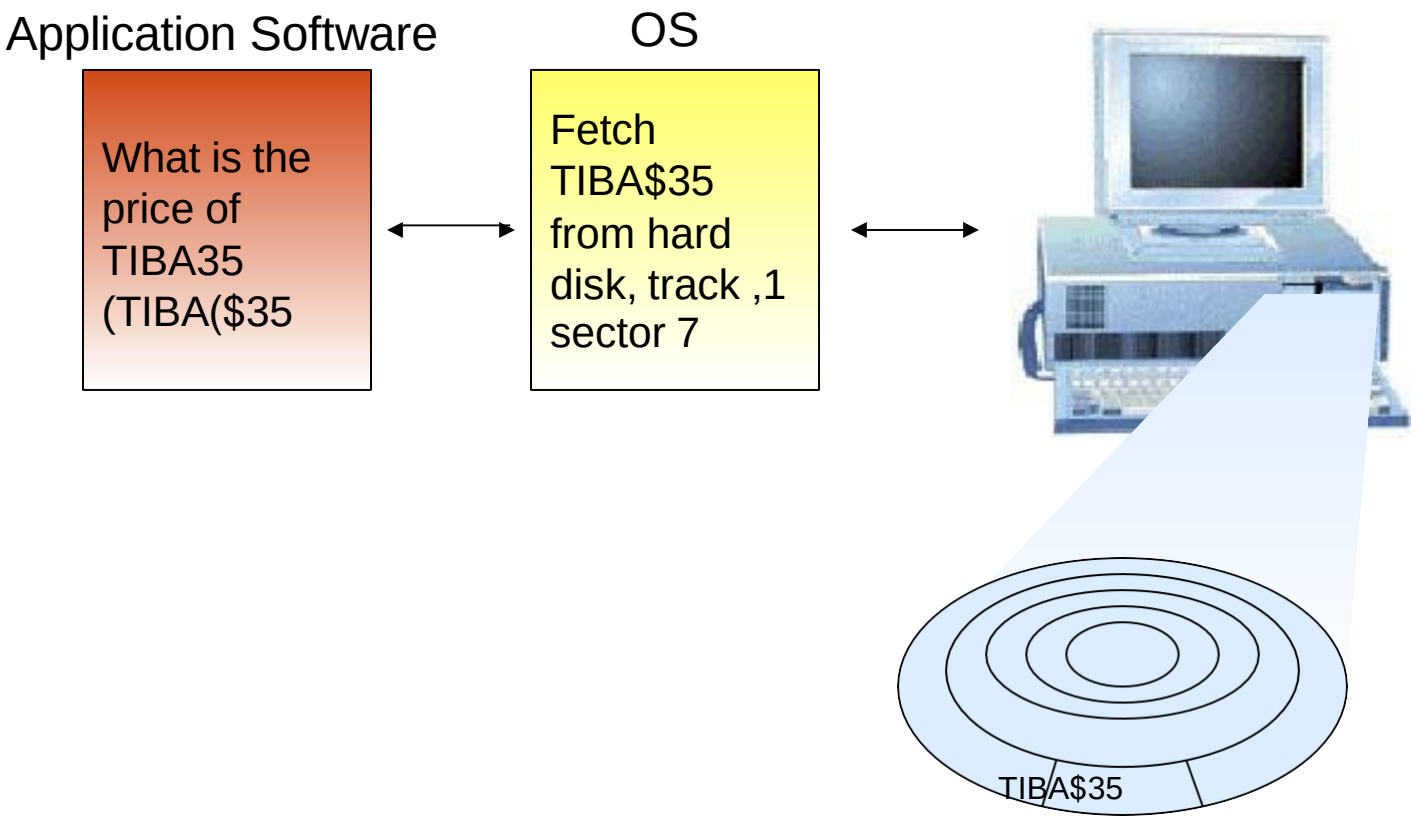
- Memory management
- Virtual memory & paging
- Multitasking
- Multithreading
- Timesharing

Memory Management

- Memory management…
  - Controls how memory is accessed and maximizes available memory and storage

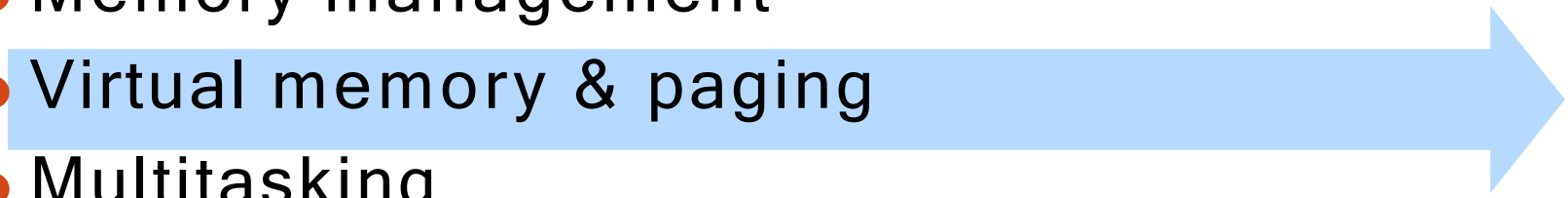
Schematic

Memory Management



Software Concepts

- Memory management
- Virtual memory & paging
- Multitasking
- Multithreading
- Timesharing

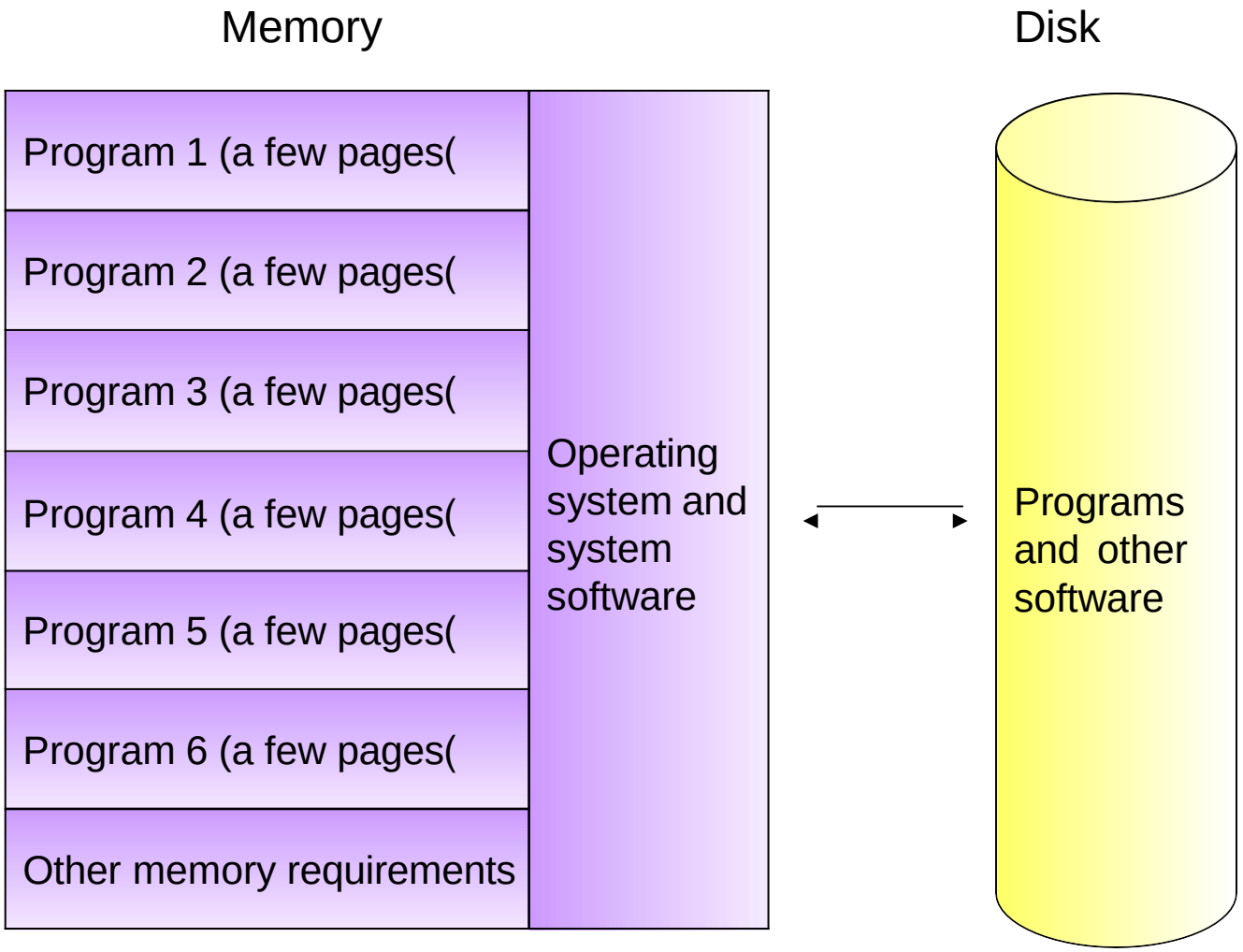


Virtual Memory & Paging

- Virtual memory
  - Memory that allocates space in secondary storage to supplement the immediate, functional memory capacity of RAM
  - Paging
    - A function of virtual memory allowing the computer to store currently needed pages in RAM while the rest of the pages wait in secondary storage

Schematic

Virtual Memory & Paging



Virtual Memory ‘Discussion’ ((1

An imaginary memory area supported by some operating systems (for example, *Windows* but not *DOS*) in conjunction with the hardware.

You can think of virtual memory as an alternate set of memory addresses.

Programs use these virtual addresses rather than real addresses to store instructions and data. When the program is actually executed, the virtual addresses are converted into real memory addresses.

Virtual Memory ‘Discussion’ ((2

The purpose of virtual memory is to enlarge the address space, the set of addresses a program can utilize. For example, virtual memory might contain twice as many addresses as main memory.

A program using all of virtual memory, therefore, would not be able to fit in main memory all at once. Nevertheless, the computer could execute such a program by copying into main memory those portions of the program needed at any given point during execution.

Virtual Memory ‘Discussion’ ((3

To facilitate copying virtual memory into real memory, the operating system divides virtual memory into pages, each of which contains a fixed number of addresses.

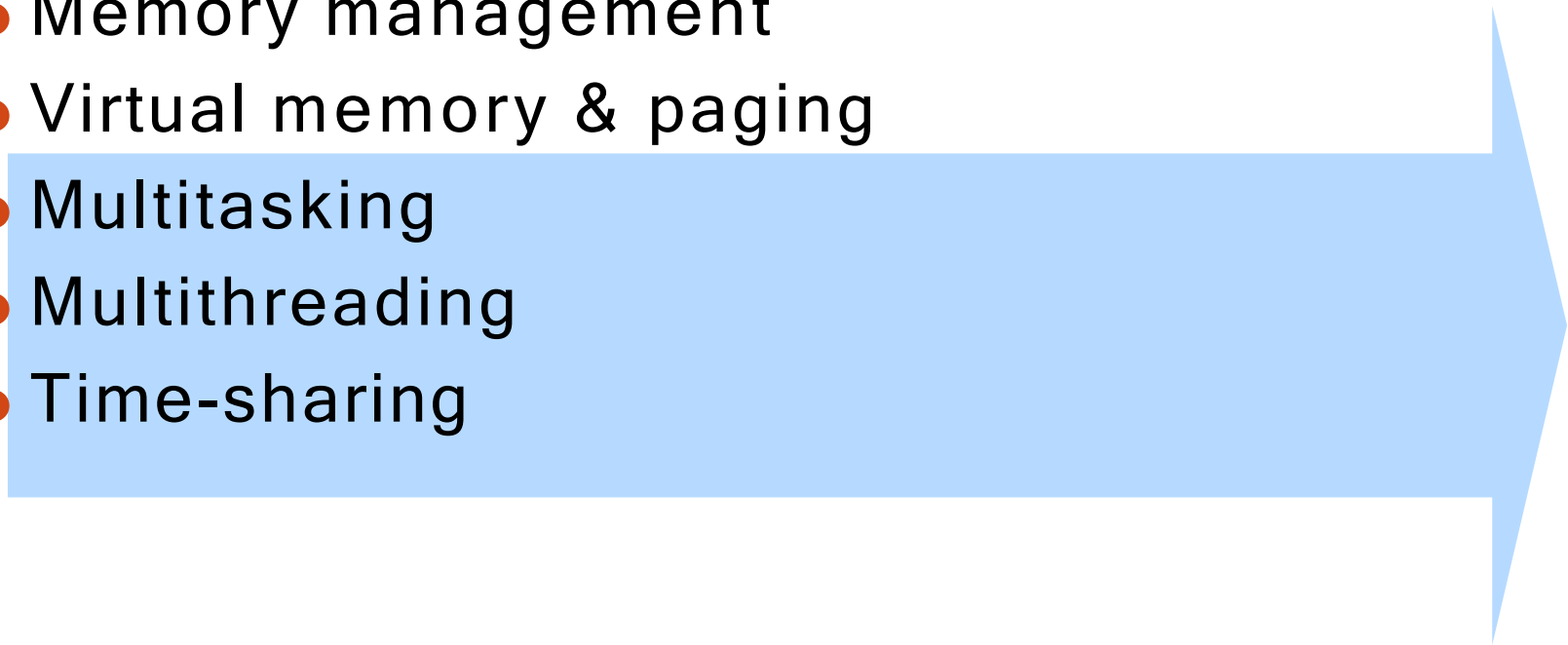
Each page is stored on a disk until it is needed. When the page is needed, the operating system copies it from disk to main memory, translating the virtual addresses into real addresses.

The process of translating virtual addresses into real addresses is called **mapping**.

The copying of virtual pages from disk to main memory is known as **paging** or **swapping**.

Software Concepts

- Memory management
- Virtual memory & paging
- Multitasking
- Multithreading
- Time-sharing



Multitasking, Multithreading, Time-sharing

- Multitasking
  - A processing activity that allows a user to run more than one application at the same time
- Multithreading
  - A processing activity that is basically multitasking within a single application
- Time-sharing
  - A processing activity that allows more than one person to use a computer system at the same time

Software Concepts

- Network capability
  - Aids in connecting the computer to a network
- Access to system resources
  - Provides security for unauthorized access
- File management
  - Ensures that files in secondary storage are available when needed, and they are protected against unauthorized usage

Utility Programs

- Utility programs…
  - Programs used to merge and sort sets of data, keep track of computer jobs being run, compress files of data before they are stored or transmitted over a network, and perform other important tasks

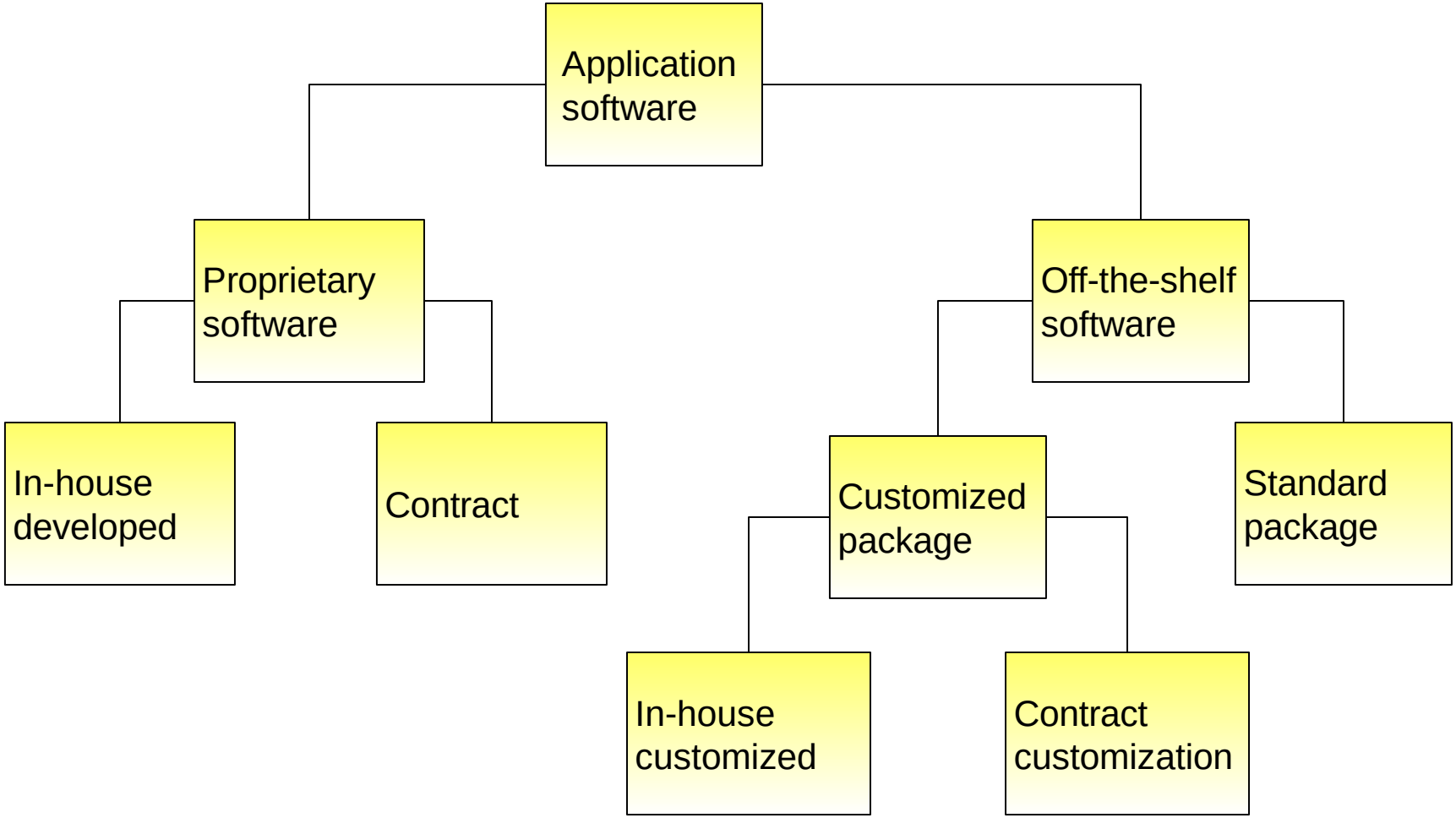
Types of Application Software

- Proprietary
  - Designed to solve a unique and specific problem
- In-house
  - Development of application software using the company's resources
- Contract
  - Developed for a particular company
- Off-the-shelf
  - An existing software program that can be used without considerable changes expected

Sources of Software

- Customized package
  - Blend of external and internal software development
    - In-house customized
    - Contract customization

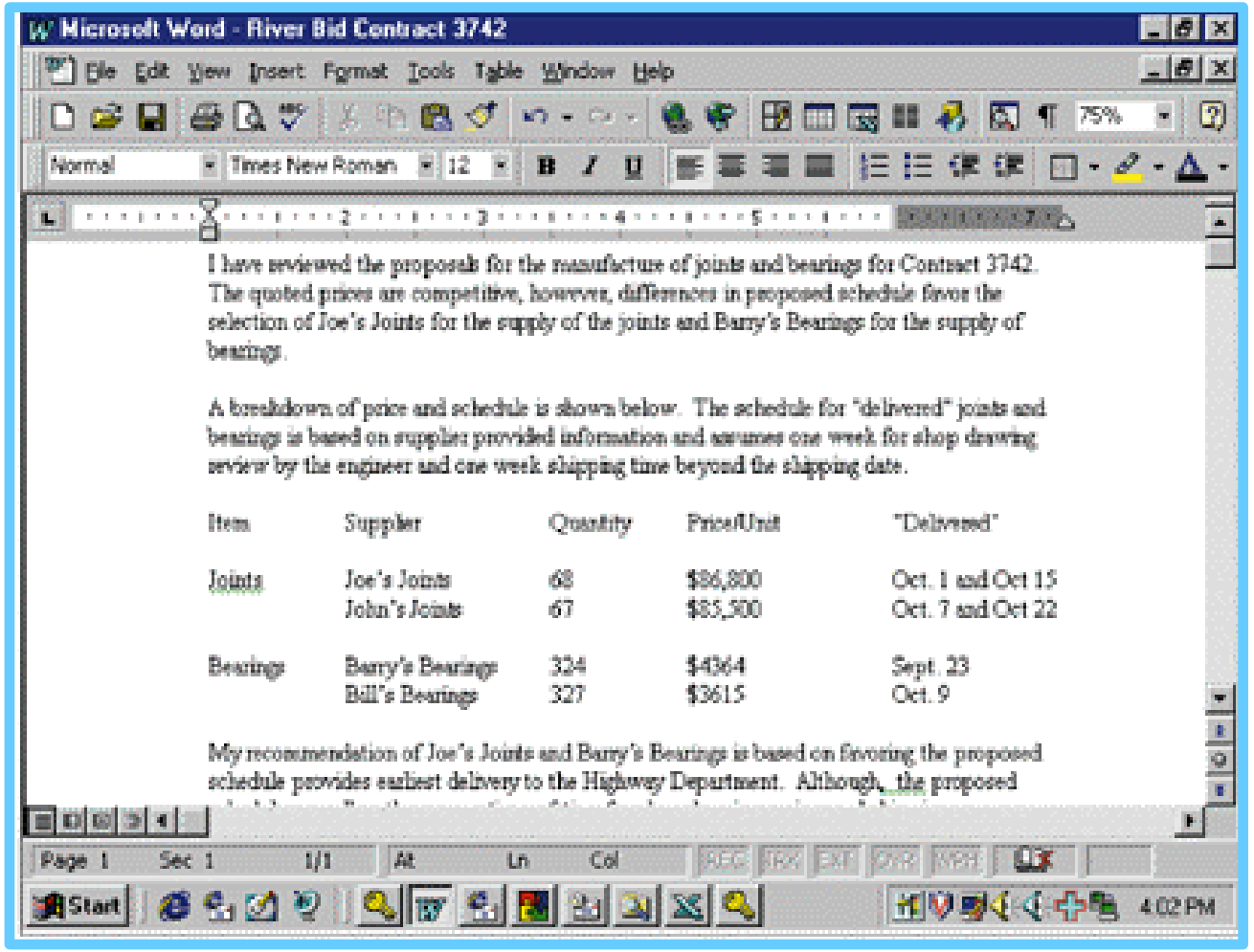
Schematic


Application software
Proprietary software
Off-the-shelf software
In-house developed
Contract
Customized package
Standard package
In-house customized
Contract customization

Examples

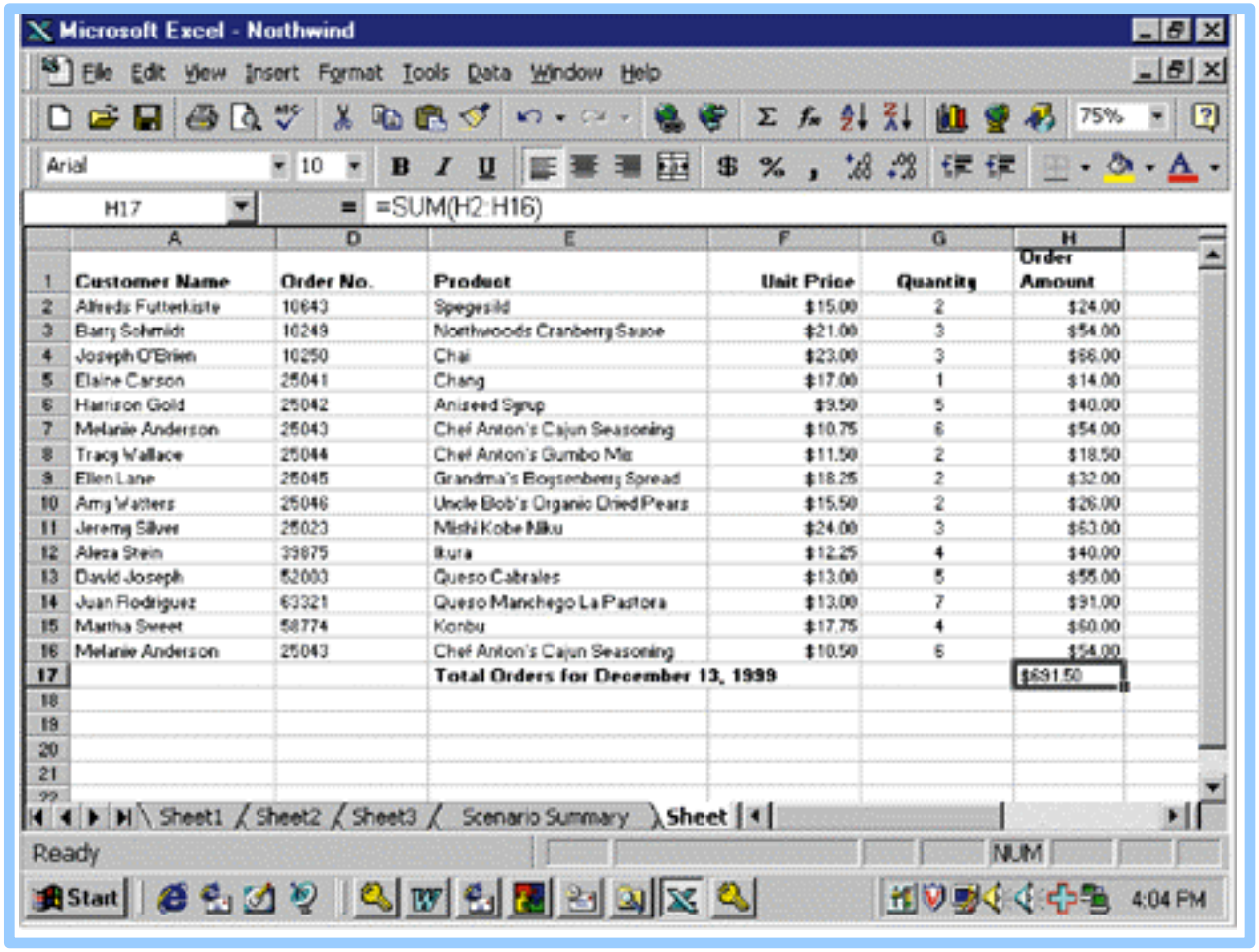
Word Processing

Word Processing
Provides assistance in formulating, formatting, and printing documents such as letters and papers.



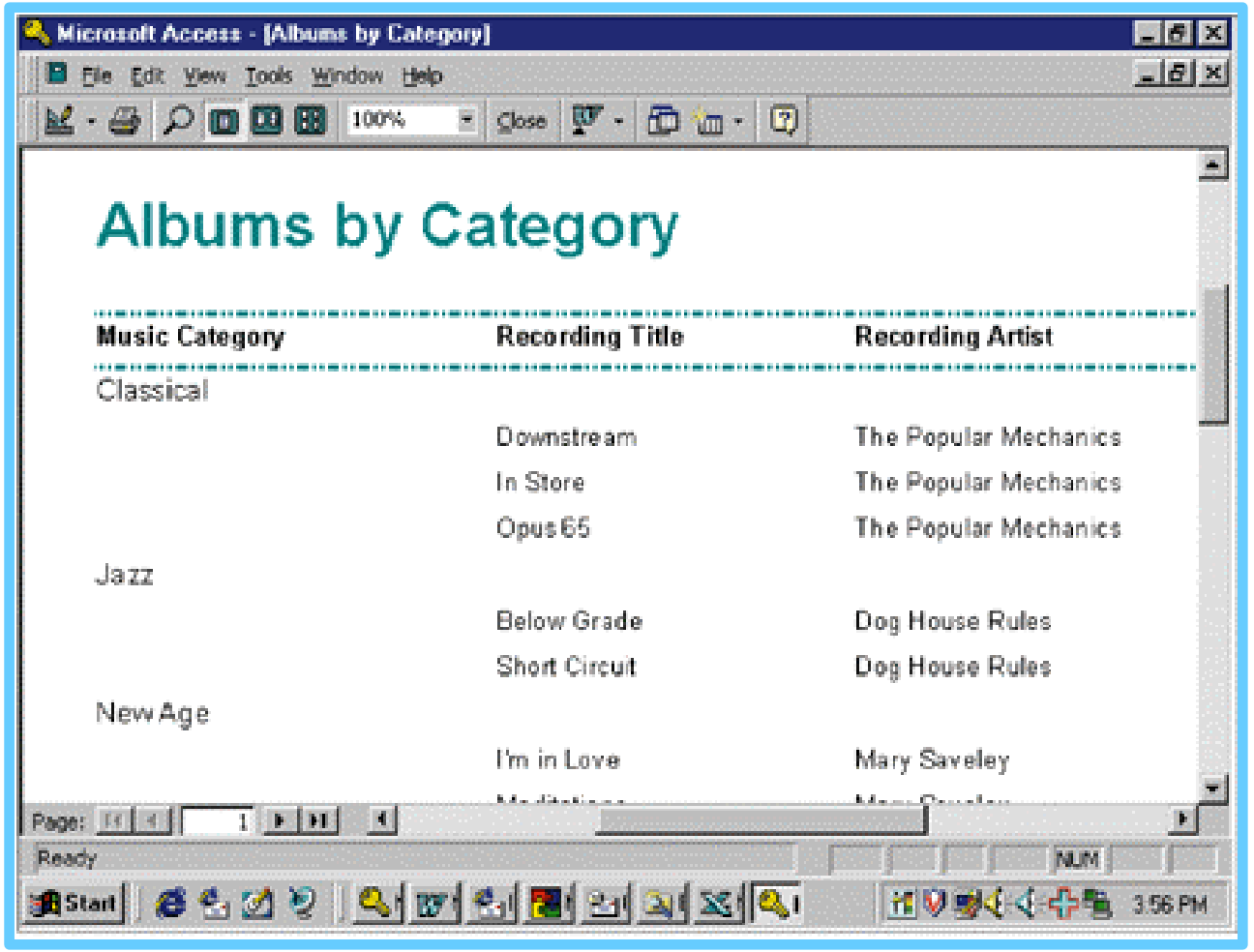
Spreadsheet

Spreadsheet
Provides a wide range of built-in functions for statistical, financial, logical, database, graphics, and data and time calculations.



Database

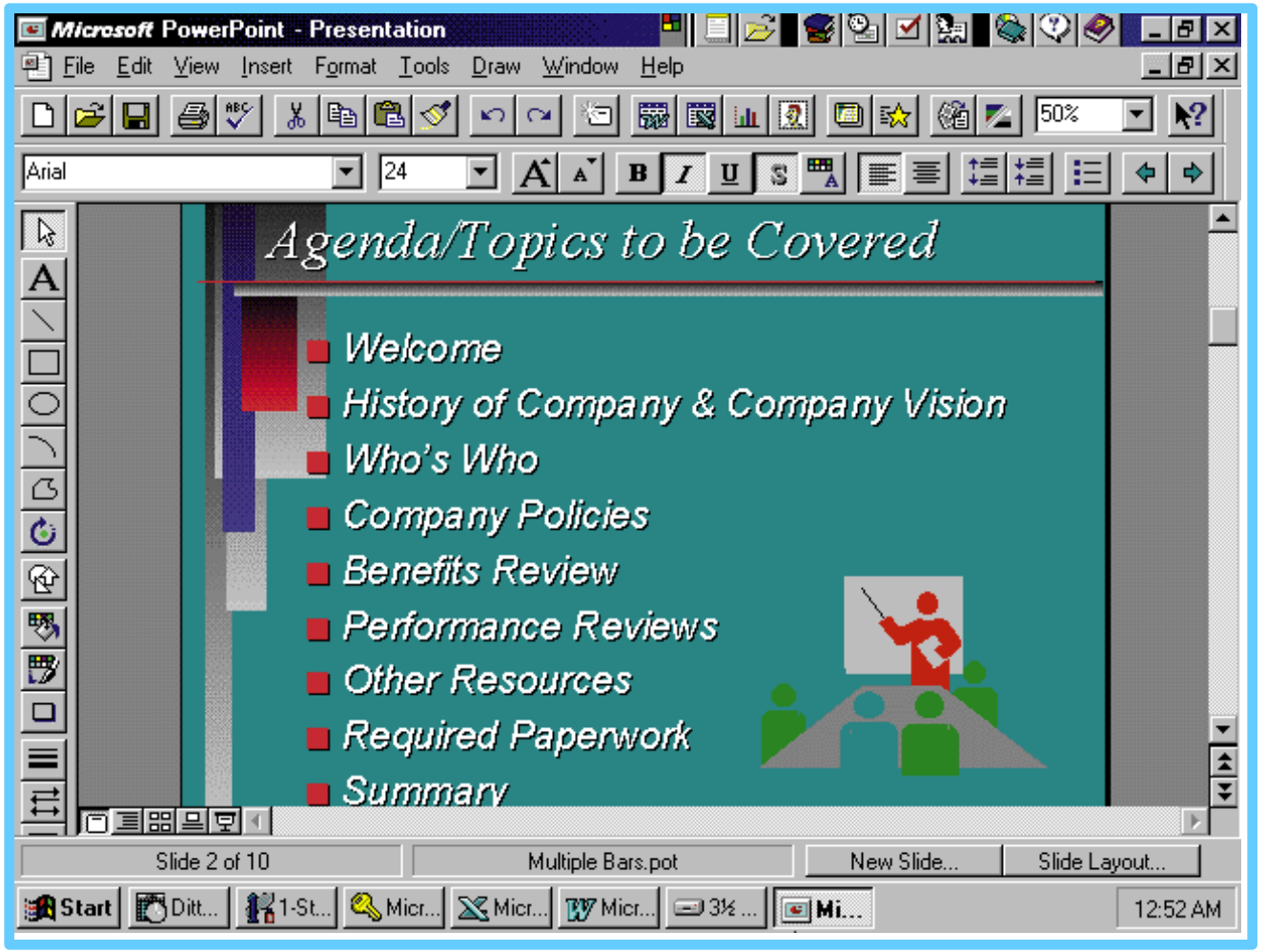
Database
Stores, manipulates, and retrieves data.



Graphics

Graphics Program
Helps make a presentation; develops brochures, illustrations, etc.

Usually called
Presentation Graphics



On-Line Services

On-Line Services
Provide access to various information resources.

Software Suite

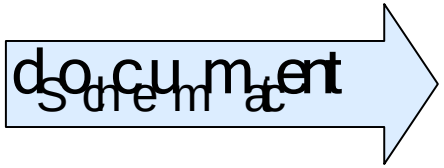
Collection of personal productivity software such as word processor, spreadsheet, and database.

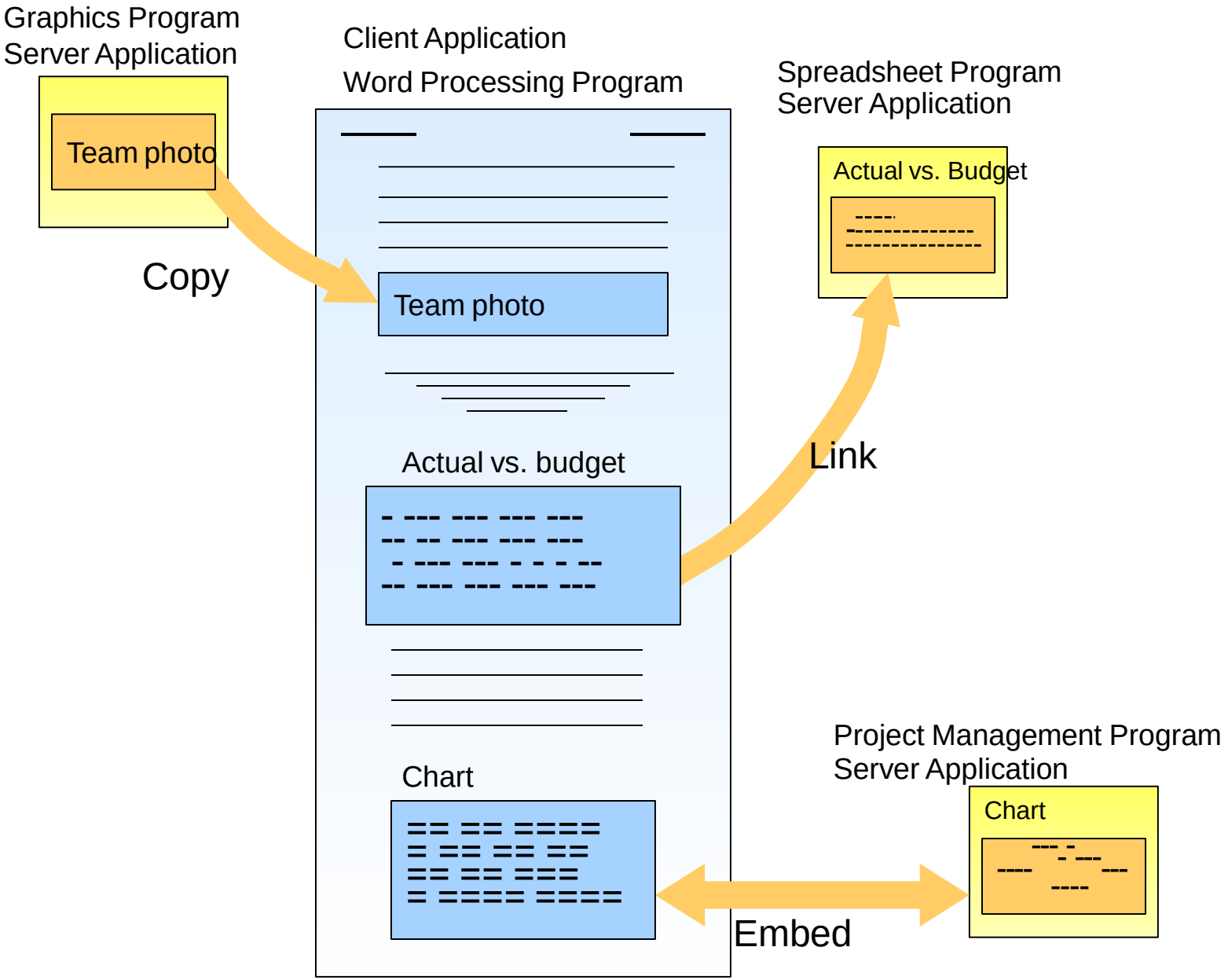
Software Concepts - OLE

- OLE = Object Linking and Embedding
  - A software feature that allows you to copy text from one document to another or embed graphics from one program into another program or document
- Server Application
  - The application that supplies objects you place into other applications
- Client application
  - The application that accepts objects from other applications

OLE Concepts

- Copy
  - Copy data from one application and place it in another
- Link
  - Changes made to the server object to automatically appear in all linked client objects
- Embed
  - An object to become part of the client document




Graphics Program
Server Application
Team photo
Copy
Client Application
Word Processing Program
Team photo
Actual vs. budget
Chart
Spreadsheet Program
Server Application
Actual vs. Budget
Link
Project Management Program
Server Application
Chart
Embed

OLE 'Discussion'

Abbreviation for Object Linking and Embedding, pronounced as separate letters or as oh-leh.

OLE is a compound document standard developed by Microsoft Corporation. It enables you to create objects with one application and then link or embed them in a second application. Embedded objects retain their original format and links to the application that created them.

Support for OLE is built into the Windows and Macintosh operating systems.

A competing compound document standard developed jointly by IBM, Apple Computer, and other computer firms is called OpenDoc.

Workgroup Application Software

- Groupware
  - Software that helps groups of people work together more efficiently and effectively
- Collaborative computing software
  - Software that helps teams of people work together toward a common goal

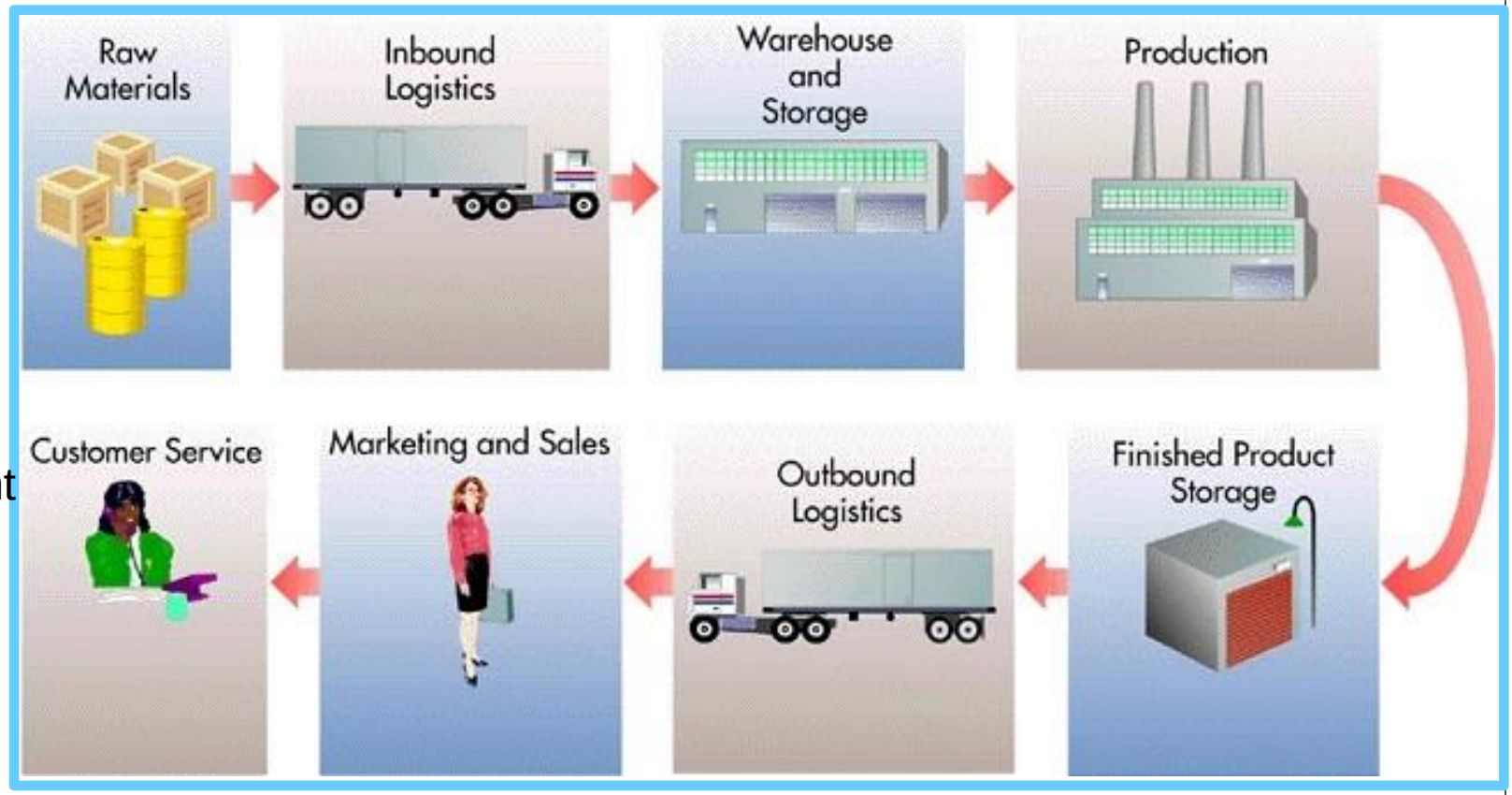
Enterprise Application Software

- Enterprise application software…
  - Software that benefits the entire organization
  - Examples

Accounts receivable	Sales ordering
Accounts payable	Order entry
Cash-flow analysis	Check processing
Manufacturing control	Receiving
General Ledger	Retail Operations

Example

Integrated Supply Chain Management Software



Enterprise Resource Planning)ERP(

- Enterprise Resource Planning (ERP…(
  - A set of integrated programs that manage a company's vital business operations for an entire multi-site, global organization
  - Vendor examples

SAP	Baan	
Oracle	SSA	
PeopleSoft		Marcam
Dun & Bradstreet		QAD
JD Edwards		Ross Systems

ERP 'Discussion'

Short for enterprise resource planning, a business management system that integrates all facets of the business, including planning, manufacturing, sales, and marketing. As the ERP methodology has become more popular, software applications have emerged to help business managers implement ERP.

Programming Languages

- Programming languages…
  - Coding schemes used to write both systems and application software

Categories of Programming Languages ((1

- Machine Language
  - 1st generation programming language
  - Considered a low-level language because it involves basic coding using the binary symbols 1 and 0
- Assembly Language
  - 2nd generation language
  - Replaced binary digits with mnemonics (e.g., “ADD”) programmers could more easily understand

Categories of Programming Languages ((2

- Third Generation Languages
  - Continued trend to more symbolic code (e.g. COBOL(
- Fourth Generation Languages (4GLs(
  - Languages that are less procedural and even more English-like than third-generation languages (e.g. FOCUS(

Categories of Programming Languages ((3

- Query languages
  - Used to ask the computer questions in English-like sentences
  - Also known as database languages
- Structured query language (SQL(
  - A standardized language often used to perform database queries and manipulations

Object Oriented Languages ((1

- Object-oriented languages (OOL(
  - Languages that allow interaction of programming objects, including data elements and the actions that will be performed on them
  - Note: OOP = object-oriented programming
- Encapsulation
  - The process of grouping items into an object
- Polymorphism
  - A process allowing the programmer to develop one routine or set of activities that will operate on multiple objects

Object Oriented Languages ((2

- Inheritance
  - Property used to describe objects in a group of objects taking on characteristics of other objects in the same group or class of objects
- Reusable code
  - The instruction code within an object that can be reused in different programs for a variety of applications
- Examples
  - Smalltalk, C++, Java

Visual Programming Languages

- Visual programming languages…
  - Languages that use a mouse, icons, or symbols on the screen and pull-down menus to develop programs
  - Examples
    - Visual Basic
    - Visual C++
    - PC COBOL

Fifth-Generation Languages

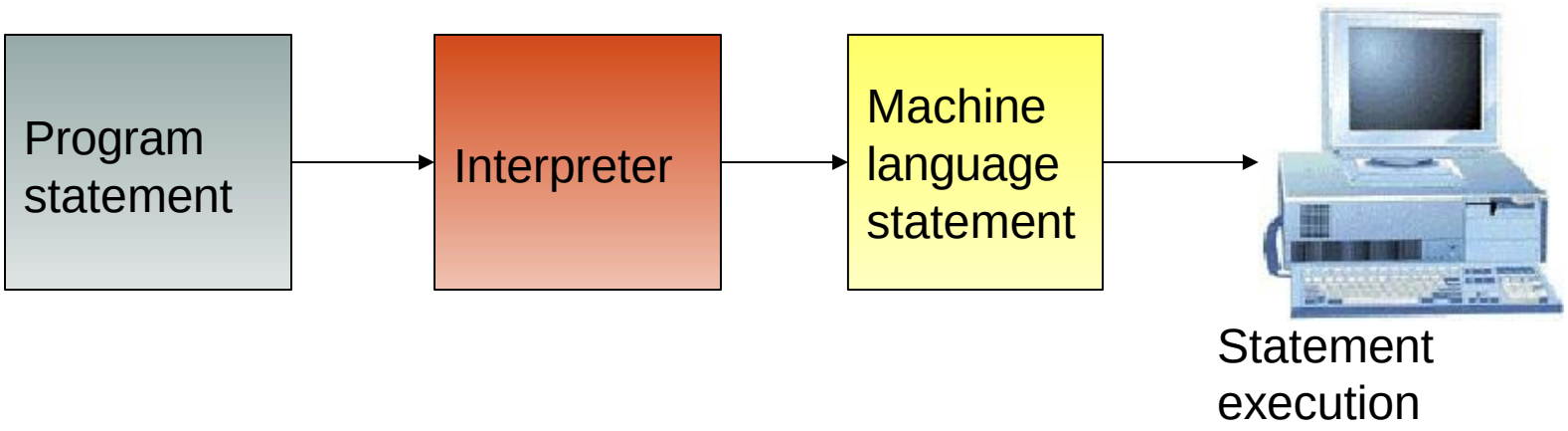
- 5th generation languages…
  - Combines rule-based code generation, component management, visual programming techniques, and reuse management
  - Knowledge-based management
    - An approach to the development of computer programs in which you do not tell a computer how to do a job, but what you want it to do

Programming Languages: Terminology ((1

- Language translator
  - Systems software that converts a programmer's source code into its equivalent in machine language
- Source code
  - High-level program code written by the programmer
- Object code
  - Another name for machine language code

Programming Languages: Terminology ((2

- Interpreter
  - A language translator that translates one program statement at a time into machine code

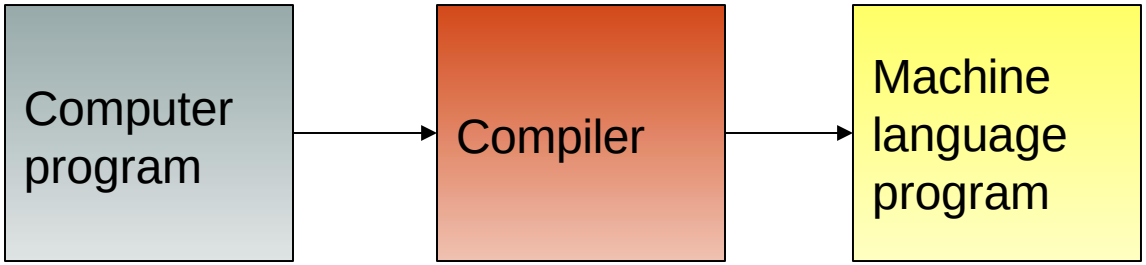


Programming Languages: Terminology ((3

- Compiler
  - A language translator that converts a complete program into machine language to produce a program that the computer can process in its entirety

Schematic

Step 1: Translate program



Step 2: Execute program

Thanks!