

BMM 111

Bilgisayar Programlama-I

Tanıtım

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Ön Söz

“Öğretici, öğrencisini bir su kaynağına kadar, sadece götürür.

O kaynaktan bir yudum almak,

veya kaynağın içine dalıp kana kana içmek,

veya kovalar dolusu almak,

ya da öylece kenardan kaynağa bakıp izlemek

öğrencinin kendi tercihidir.”

Çin Atasözü

BMM111 Ders İçeriği

- ◉ Programlamaya giriş.
- ◉ Algoritma kavramı, akış diyagramları
- ◉ C programlama diline giriş, temel G/Ç.
- ◉ Değişkenler, operatörler
- ◉ Kontrol deyimleri
- ◉ Döngüler
- ◉ Fonksiyonlar
- ◉ Diziler, çok boyutlu diziler
- ◉ Göstericiler
- ◉ Yapılar
- ◉ Dosyalama

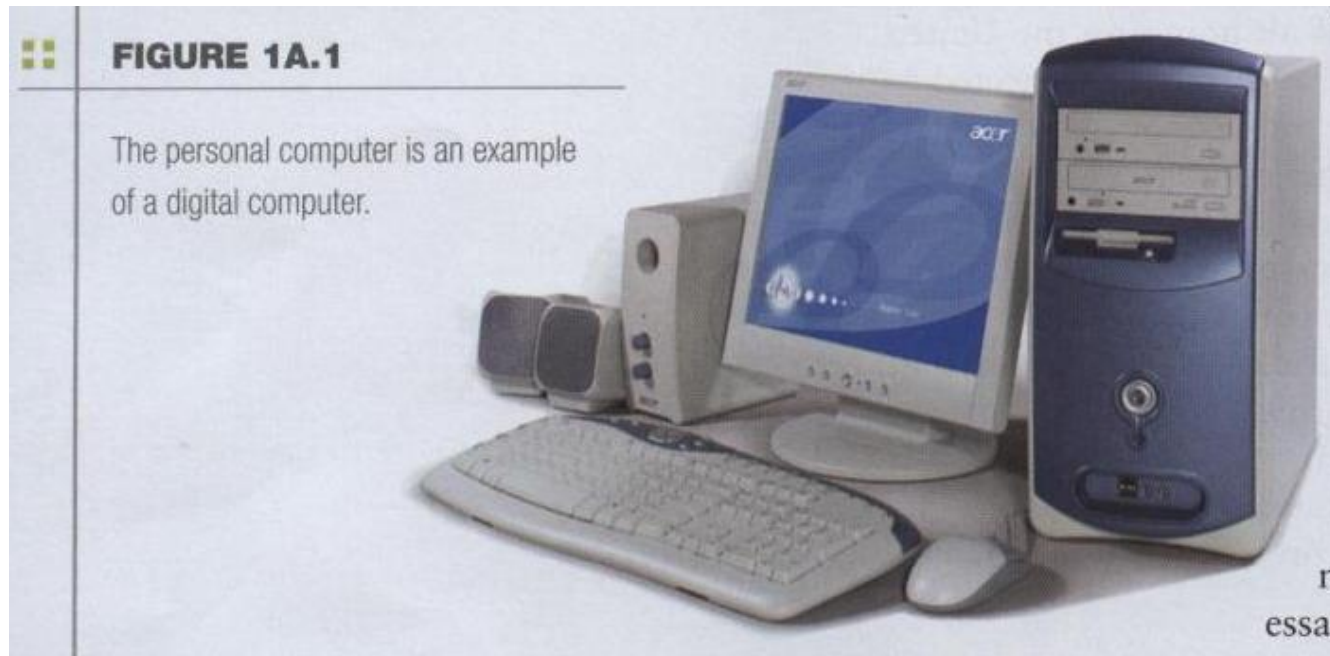
KAYNAKÇA

- Prof.Dr. İbrahim DEVELİ, Bilgisayar Programlama Ders Notları, Erciyes Üniv. Elektrik-Elektronik Müh. Böl.
- H.Turgut UYAR, Programlamaya Giriş Ders Notları,İTÜ, 2004.
- Fedon KADİFELİ,Standart C Programlama Dili, (Tercüme),2000.
- Doç. Dr. Soner ÇELİKKOL, Programlamaya Giriş ve Algoritmalar, Murathan Yayınevi, TRABZON; 2009
- N. Ercil Çağıltay ve ark., C DERSİ PROGRAMLAMAYA GİRİŞ, Ada Matbaacılık, ANKARA; 2009.
- Çeşitli kişilerin internette paylaşımına açtığı notlardan faydalanılmıştır.

BİLGİSAYARIN GENEL TANITIMI

The Computer

- ◉ Electronic device
- ◉ Converts data* into information#
- ◉ Modern computers are digital
 - Two digits combine to make data (0, 1)



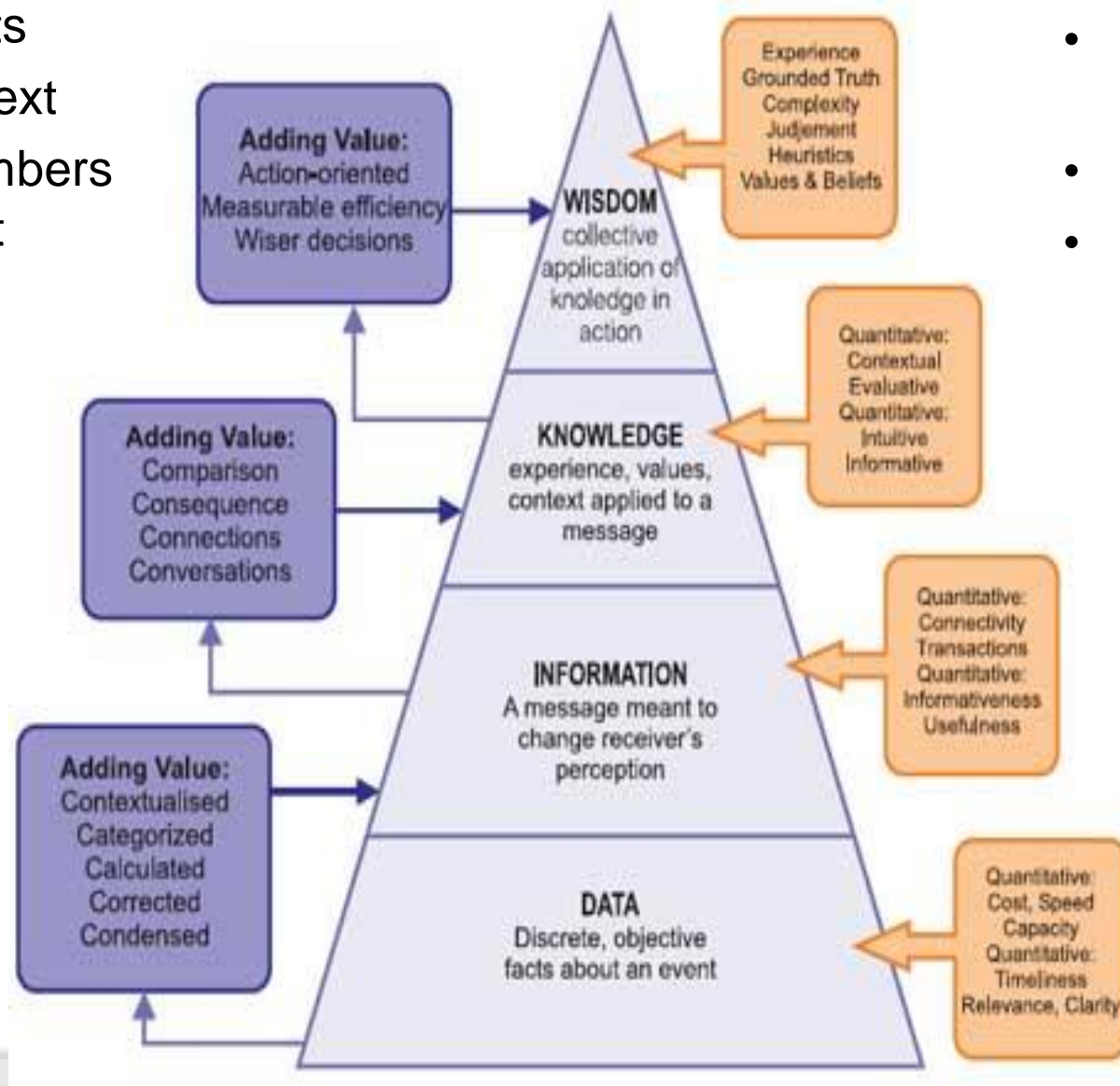
Data vs. Information

Data

- raw facts
- no context
- just numbers and text

Information

- data with context
- processed data
- value-added to data
 - summarized
 - organized
 - analyzed



The Computer

- Older computers were analog
 - A range of values made data

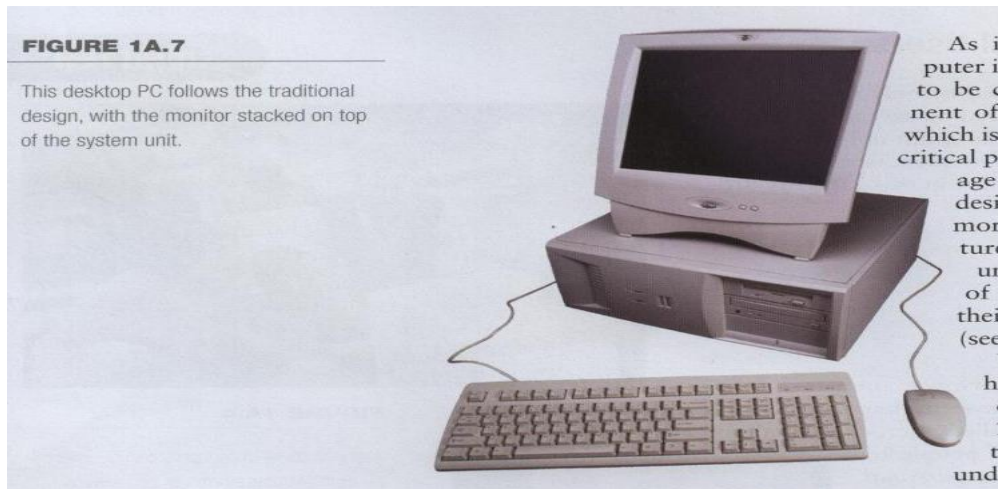
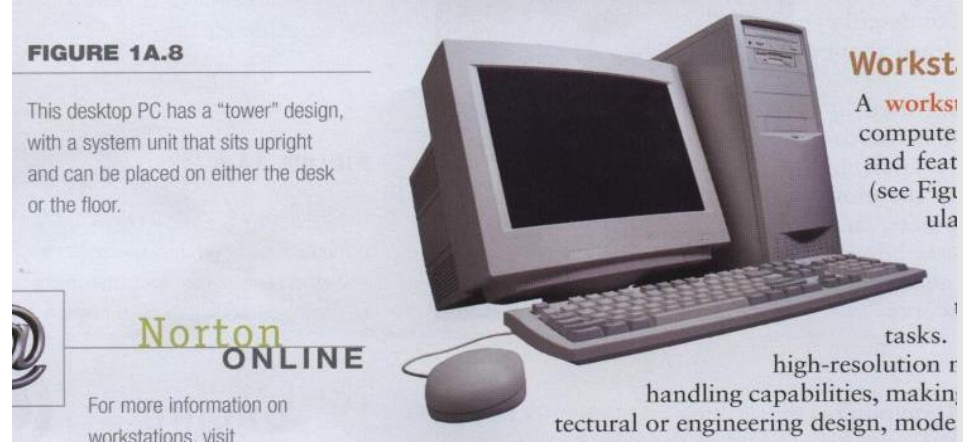
PACE 231R analog computer



EAI ELECTRONIC ASSOCIATES, INC. Long Beach, New Jersey

Computers for Individual Use: PC

- Desktop computers
 - Different design types

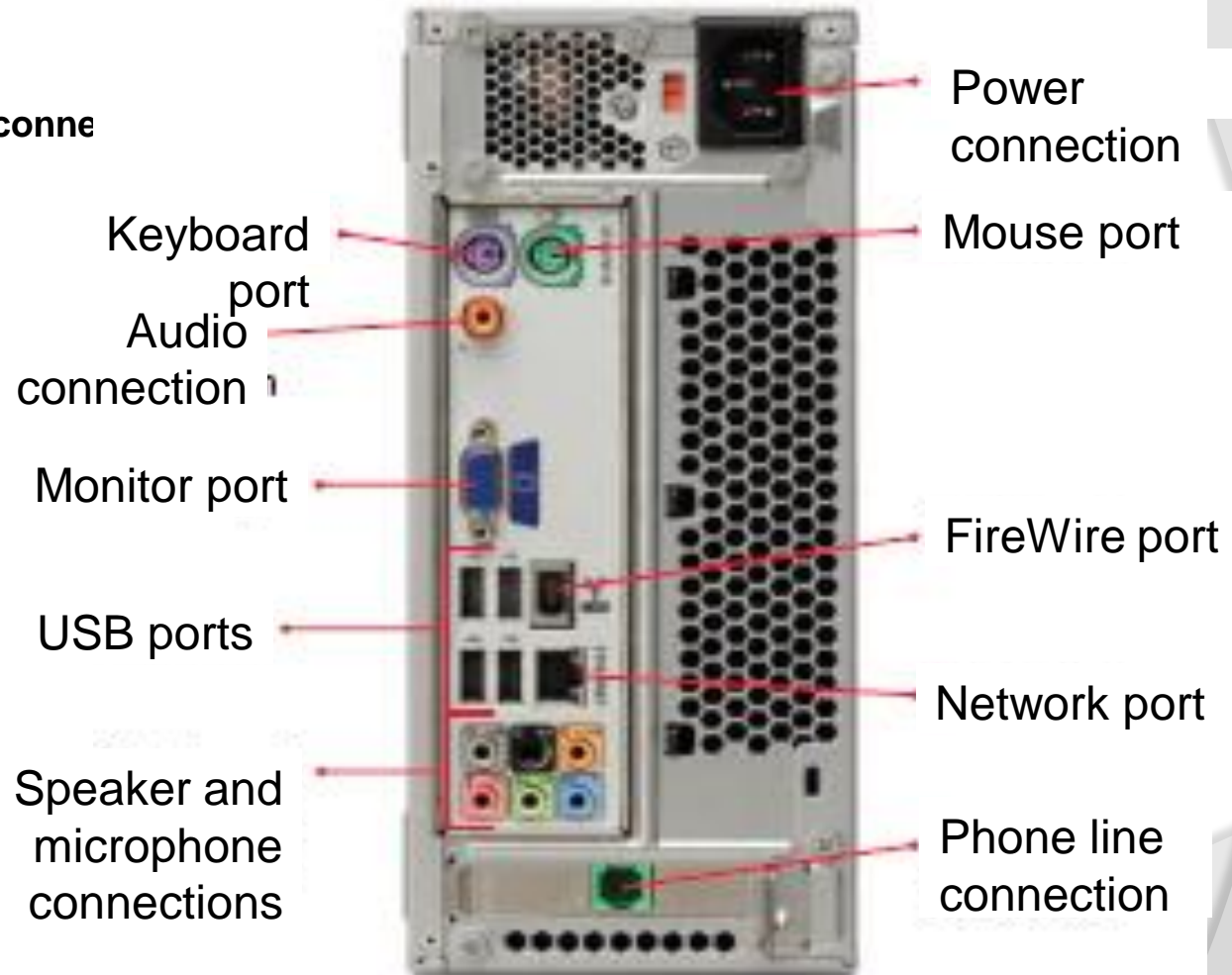


A Desktop PC with Peripherals



Exploring I/O Ports of Desktop PC

Computer ports and connections



Computers for Organizations

◎ Network servers

- Provides access to network resources
- Multiple servers are called server farms
- Often simply a powerful desktop: Google



FIGURE 1A.16

Large corporate networks can use hundreds of servers.

Computers for Organizations

◎ Mainframes

- Large and powerful systems



Computers for Organizations

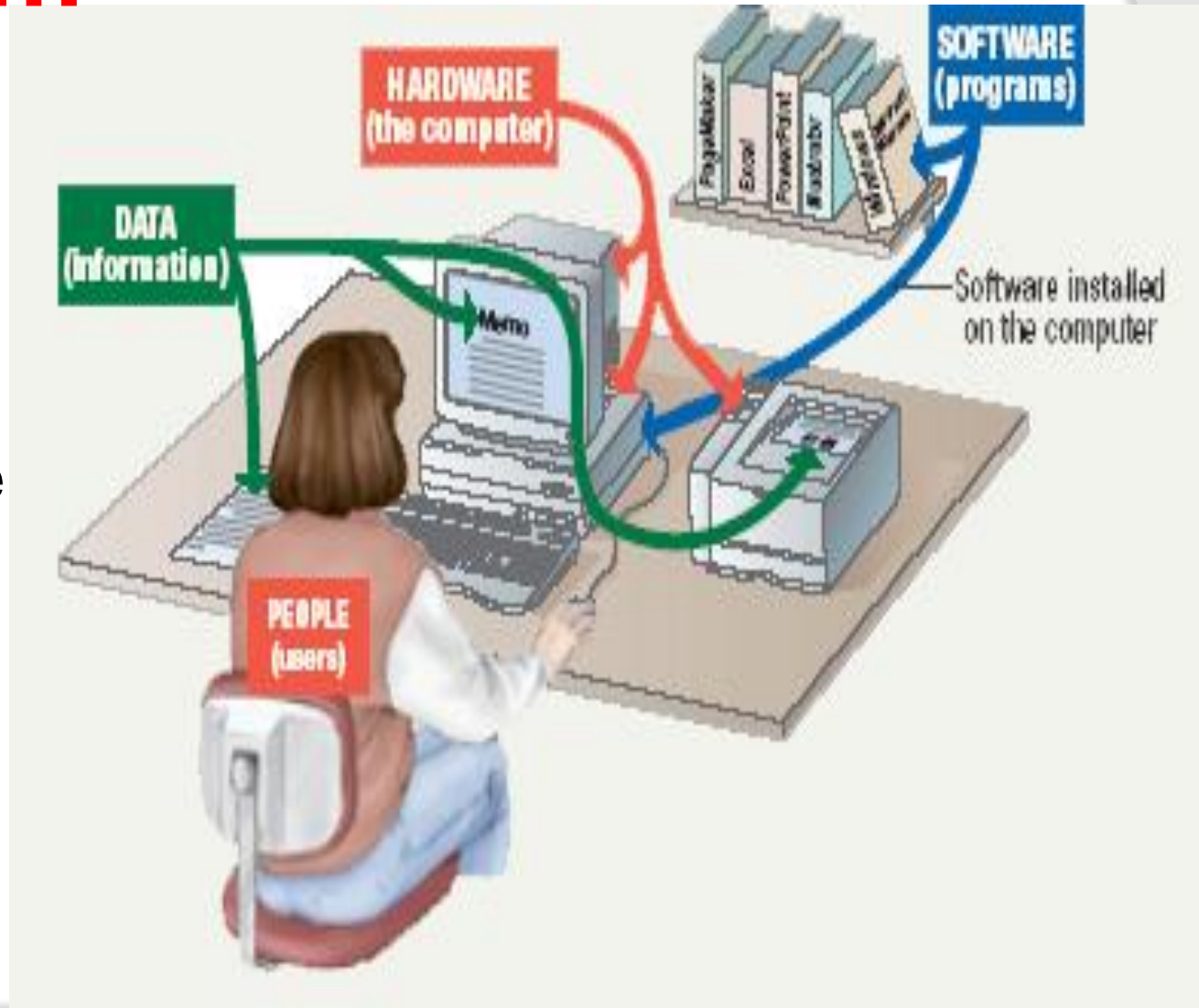
◎ Supercomputers

- The most powerful computers made
- Handle large and complex calculations
- Process trillion
- Found in research



Parts of the Computer System

- Computer systems have four parts
 - Hardware
 - Software
 - Data
 - User



Parts of the Computer System

⦿ Hardware

- Mechanical devices in the computer
- Anything that can be touched

⦿ Software

- Tell the computer what to do
- Also called a program
- Thousands of programs exist

Parts of the Computer System

⦿ Data

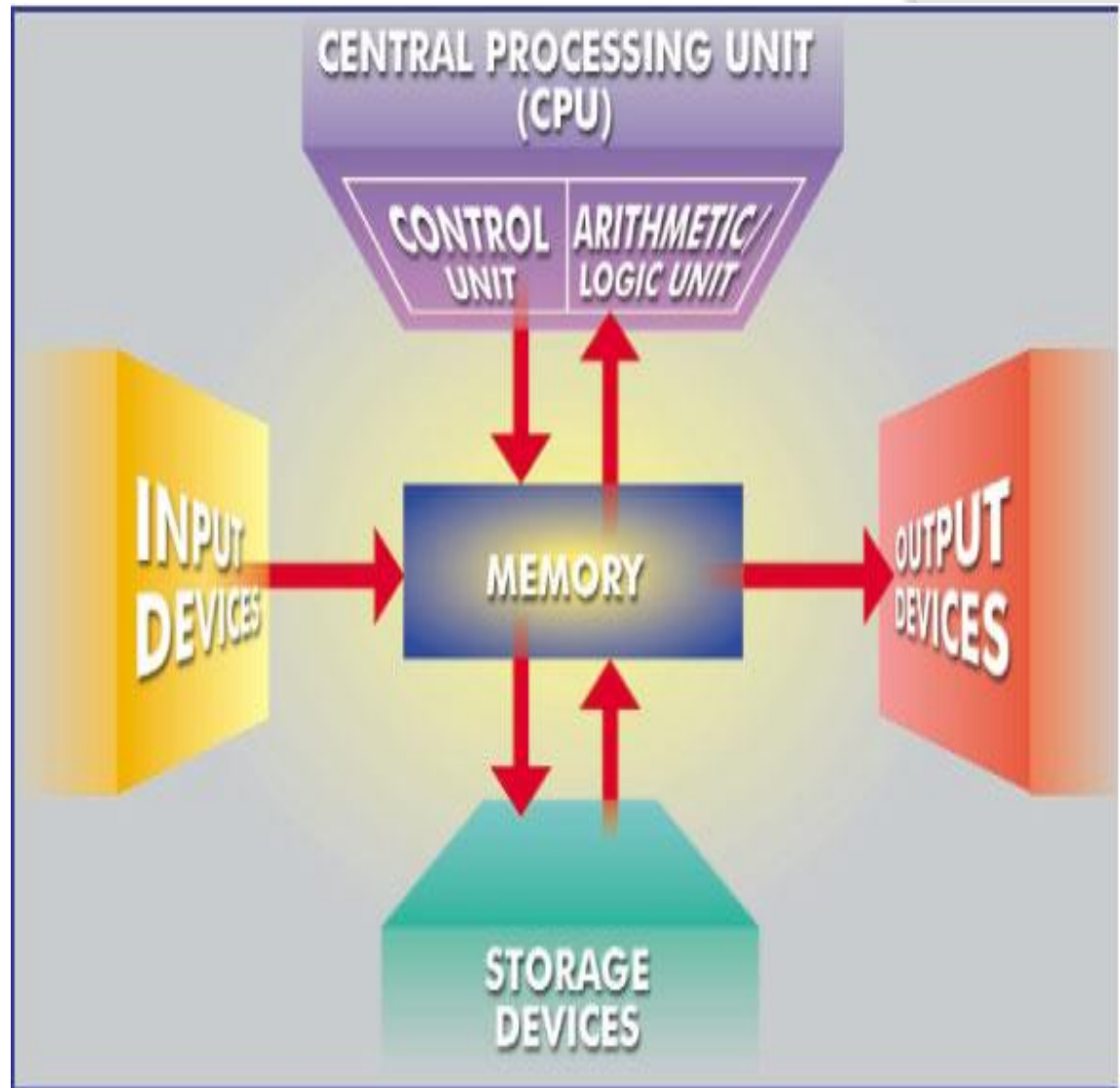
- Pieces of information
- Computers organize and present data

⦿ Users

- People operating the computer
- Most important part
- Tell the computer what to do

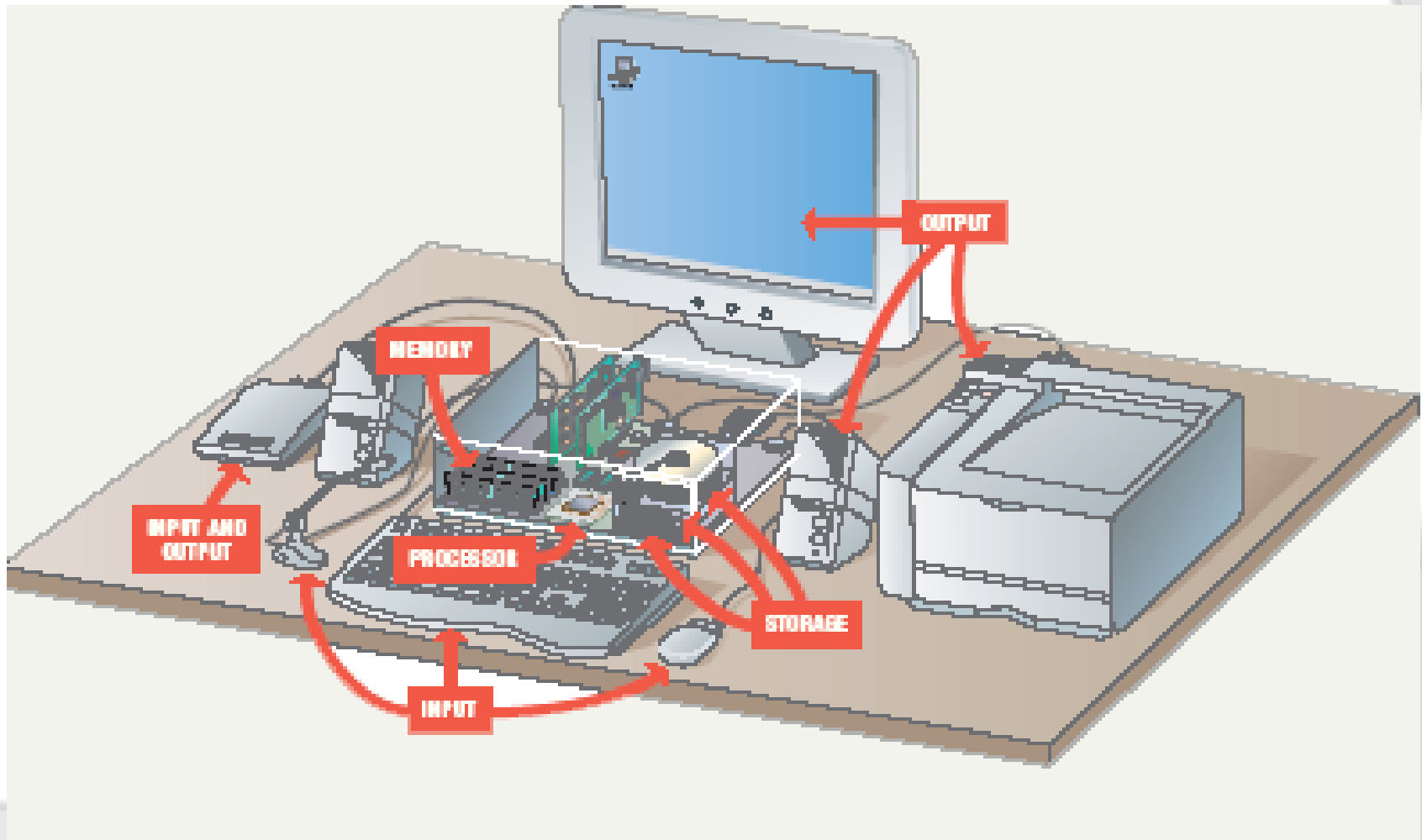
The Main Components Of A Computer

- Input devices.
- Central Processing Unit (containing the control unit and the arithmetic/logic unit).
- Memory.
- Output devices.
- Storage devices.



Essential Computer Hardware

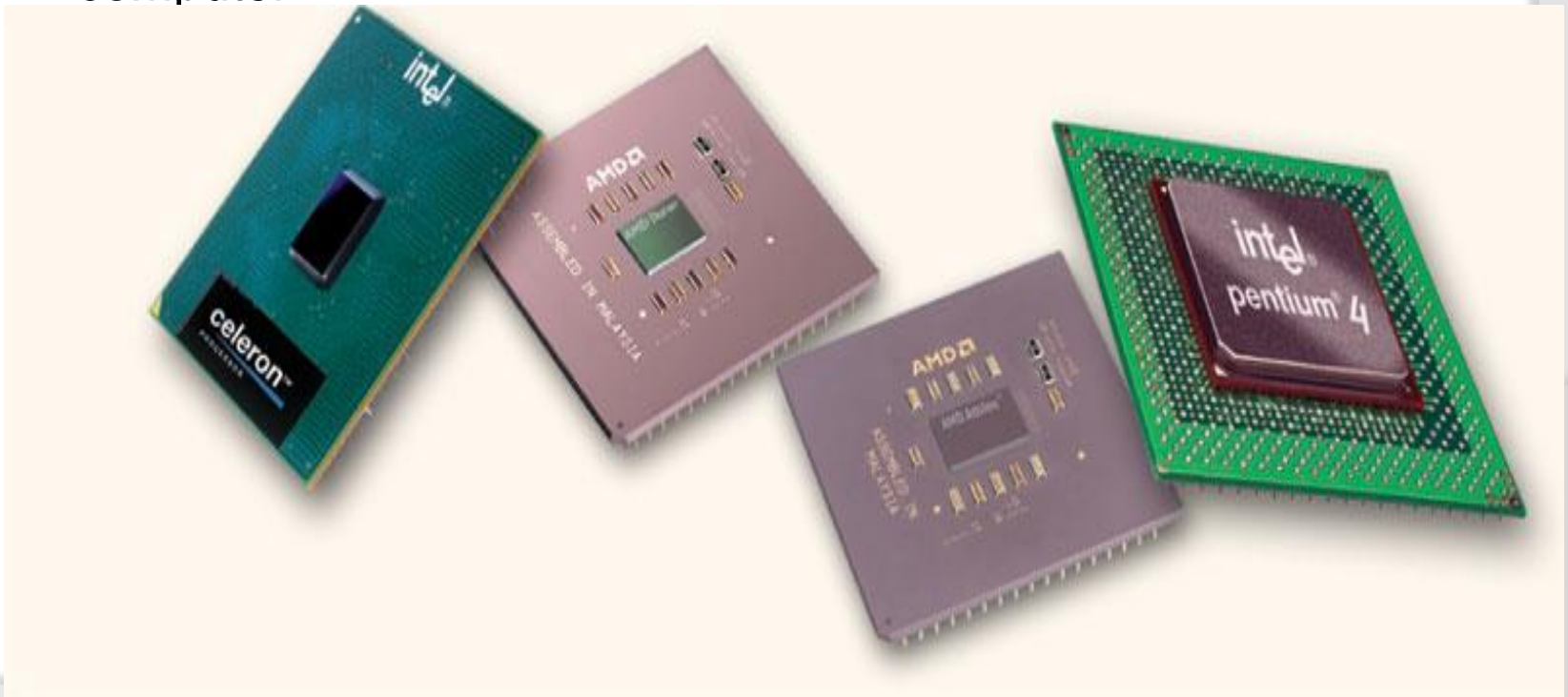
- Computers use the same basic hardware
- Hardware categorized into four types



Essential Computer Hardware

◎ The Central Processing Unit (CPU) :

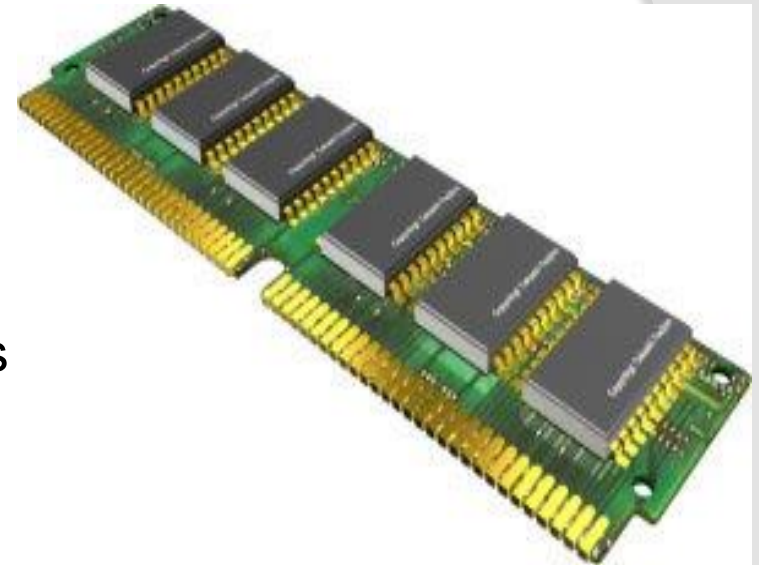
- contains electronic circuits that cause processing to occur. The CPU interprets instructions to the computer, performs the logical and arithmetic processing operations, and causes the input and output operations to occur. It is considered the “brain” of the computer.



Essential Computer Hardware

◉ Memory devices

- Stores data or programs
- Random Access Memory (RAM)
 - Volatile
 - Stores current data and programs
 - More RAM results in a faster system
- Read Only Memory (ROM)
 - Permanent storage of programs
 - Holds the computer boot directions



Essential Computer Hardware

- ⦿ Input and output devices
 - Allows the user to interact
 - Input devices accept data
 - Keyboard, mouse
 - Output devices deliver data
 - Monitor, printer, speaker
 - Some devices are input and output
 - Touch screens

Essential Computer Hardware

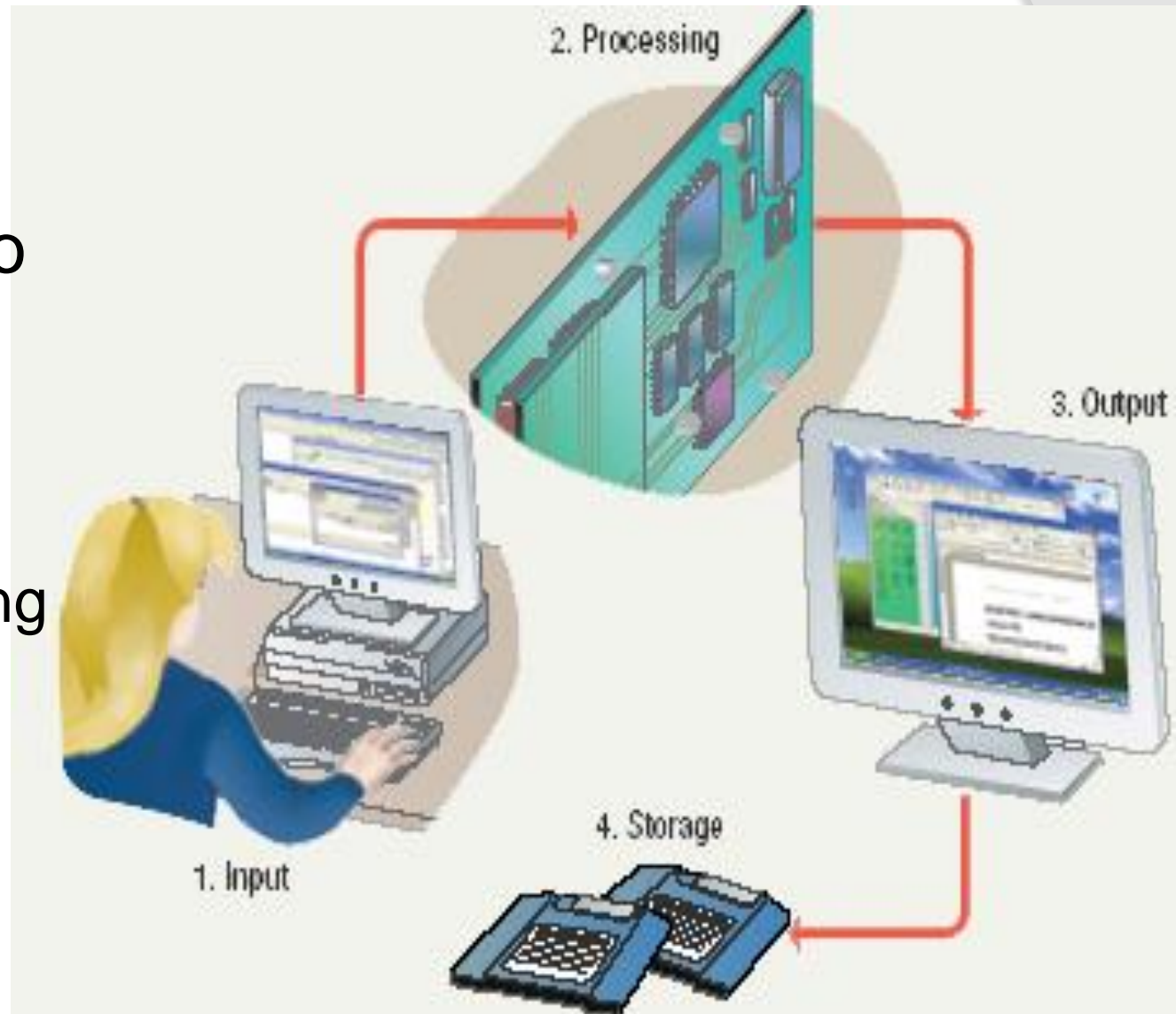
- Storage devices
 - Hold data and programs permanently
 - Different from RAM
 - Magnetic storage
 - Floppy and hard drive
 - Uses a magnet to access data
 - Optical storage
 - CD and DVD drives
 - Uses a laser to access data



Information Processing Cycle

- Steps followed to process data:

- Input
- Processing
- Output
- Storage



Software Runs the Machine

- ⦿ Tells the computer what to do
- ⦿ Reason people purchase computers
- ⦿ Two types
 - System software
 - Application software

Software Runs the Machine

- ◎ System software
 - Most important software
 - Operating system
 - Pardus, Windows, Linux, Unix
 - Network operating system (OS)
 - Windows Server
 - Utility
 - AntiVirus

Operating System Software

- Operating system software tells the computer how to perform the functions of loading, storing and executing an application and how to transfer data.
- Today, many computers use an operating system that has a graphical user interface (GUI) that provides visual clues such as icon symbols to help the user. Microsoft **Windows 10/ Windows 7/8** is a widely used graphical operating system.
- **Linux** is an open source operating system that is also widely used.

Software Runs the Machine

⦿ Application software

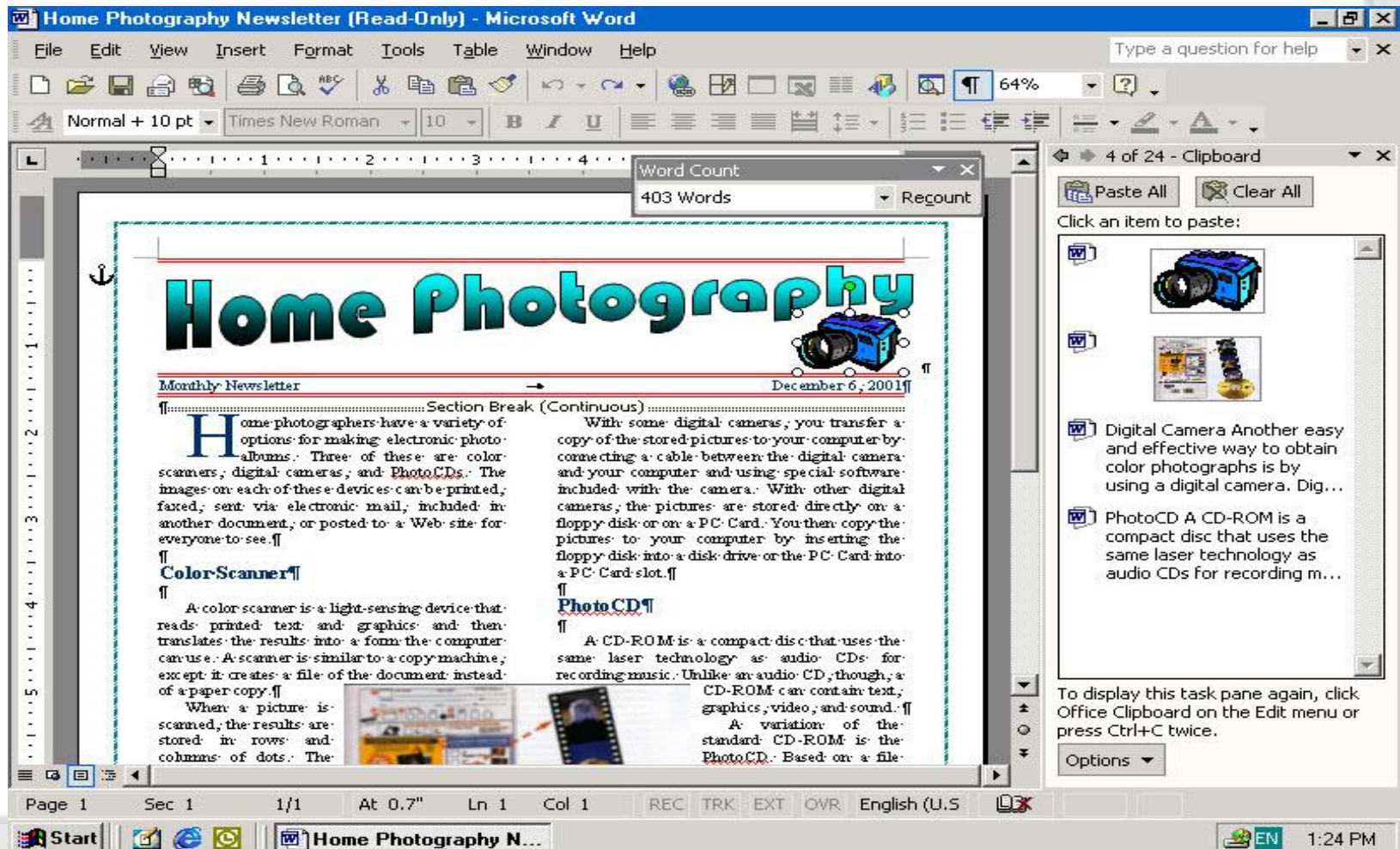
- Accomplishes a specific task
- Most common type of software
 - MS Word
- Covers most common uses of computers

Application Software

- ⦿ Application Software consists of programs that tell a computer how to produce information. Some of the more commonly used packages are:
 - ⦿
 - **Word processing**
 - **Electronic spreadsheet**
 - **Database**
 - **Presentation graphics**

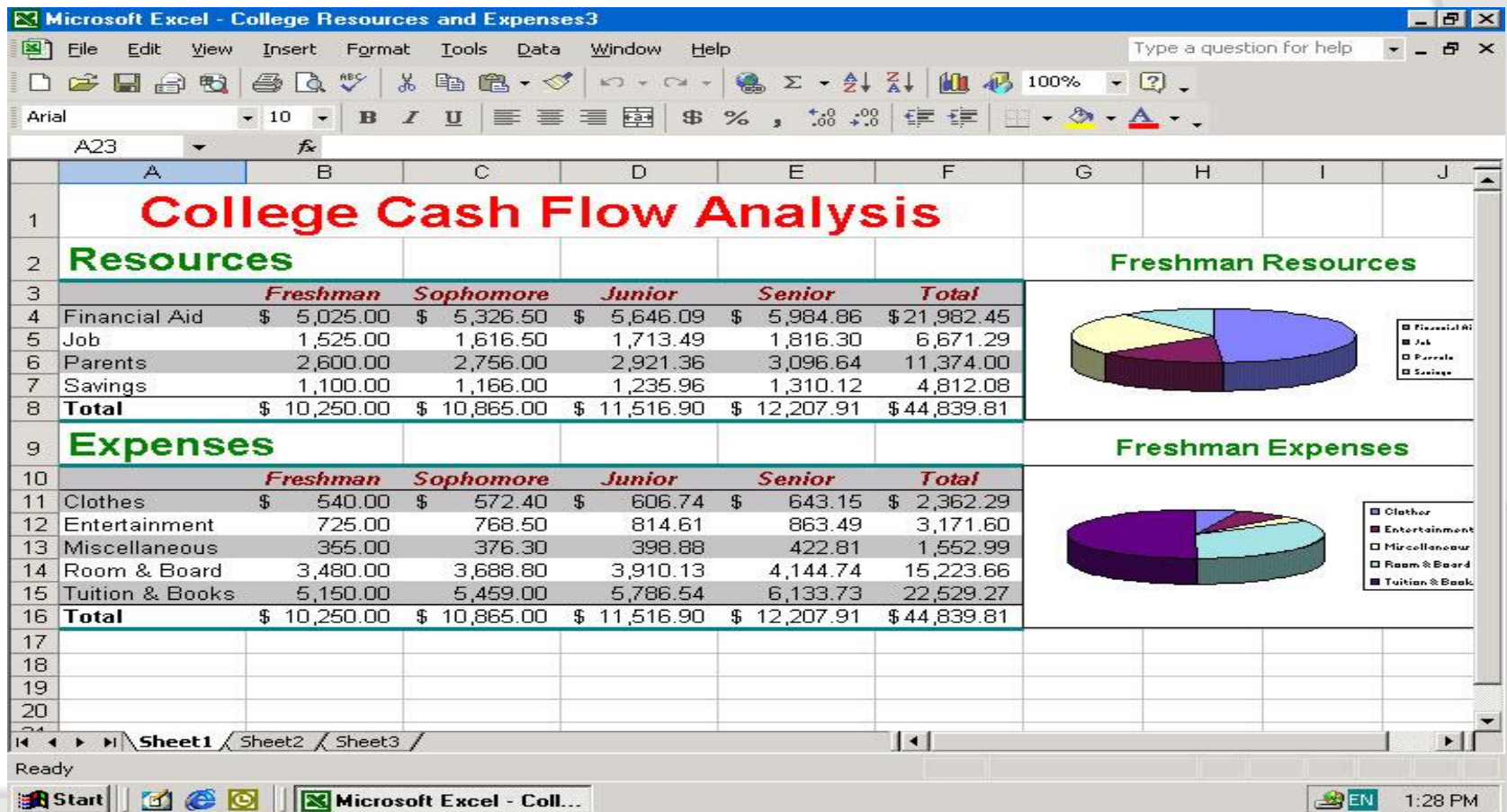
Word Processing

- Word Processing software is used to create and print documents. A key advantage of word processing software is that users easily can make changes in documents.



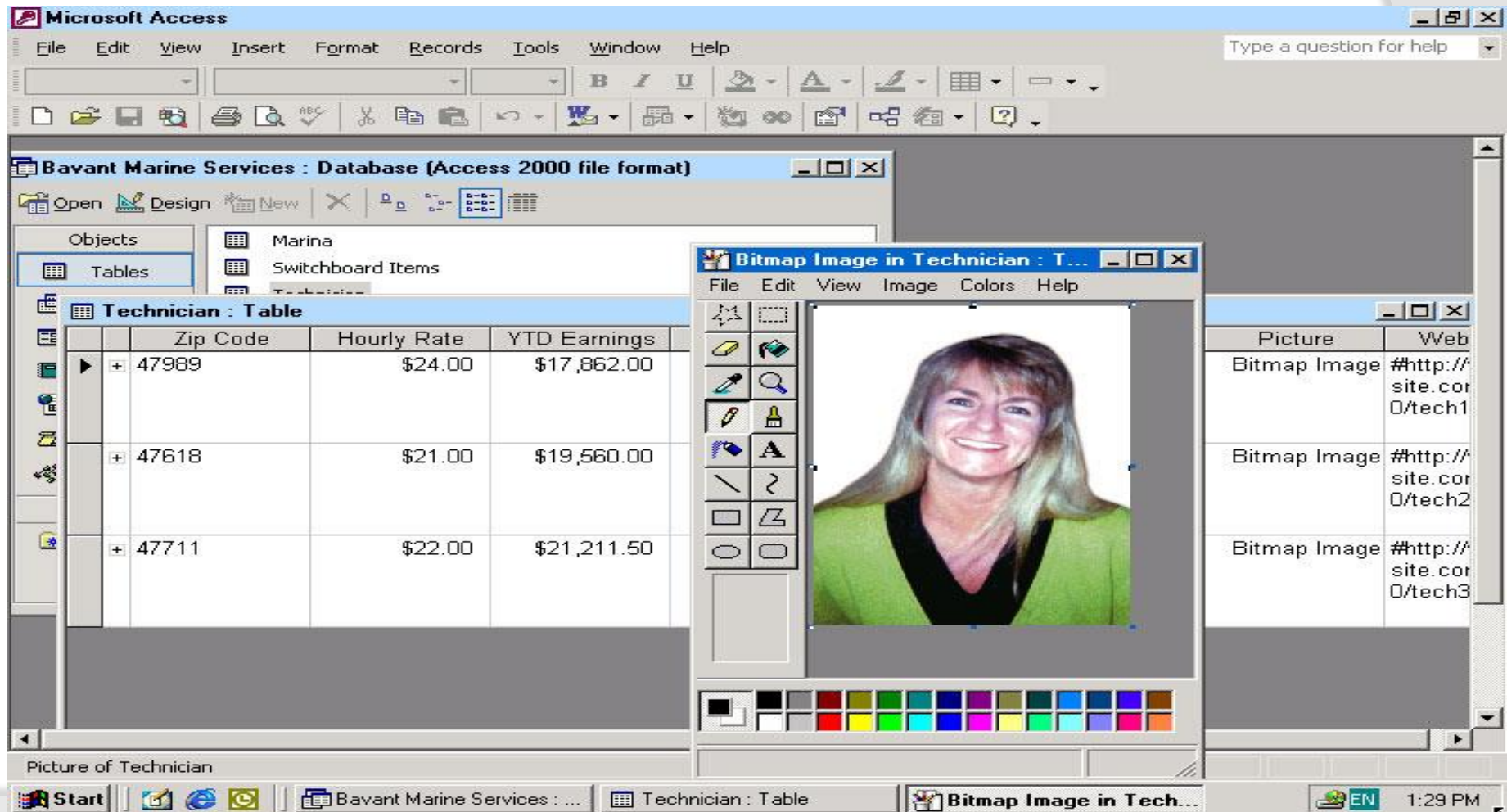
Electronic Spreadsheets

- Electronic spreadsheet software allows the user to add, subtract, and perform user-defined calculations on rows and columns of numbers. These numbers can be changed and the spreadsheet quickly recalculates the new results.



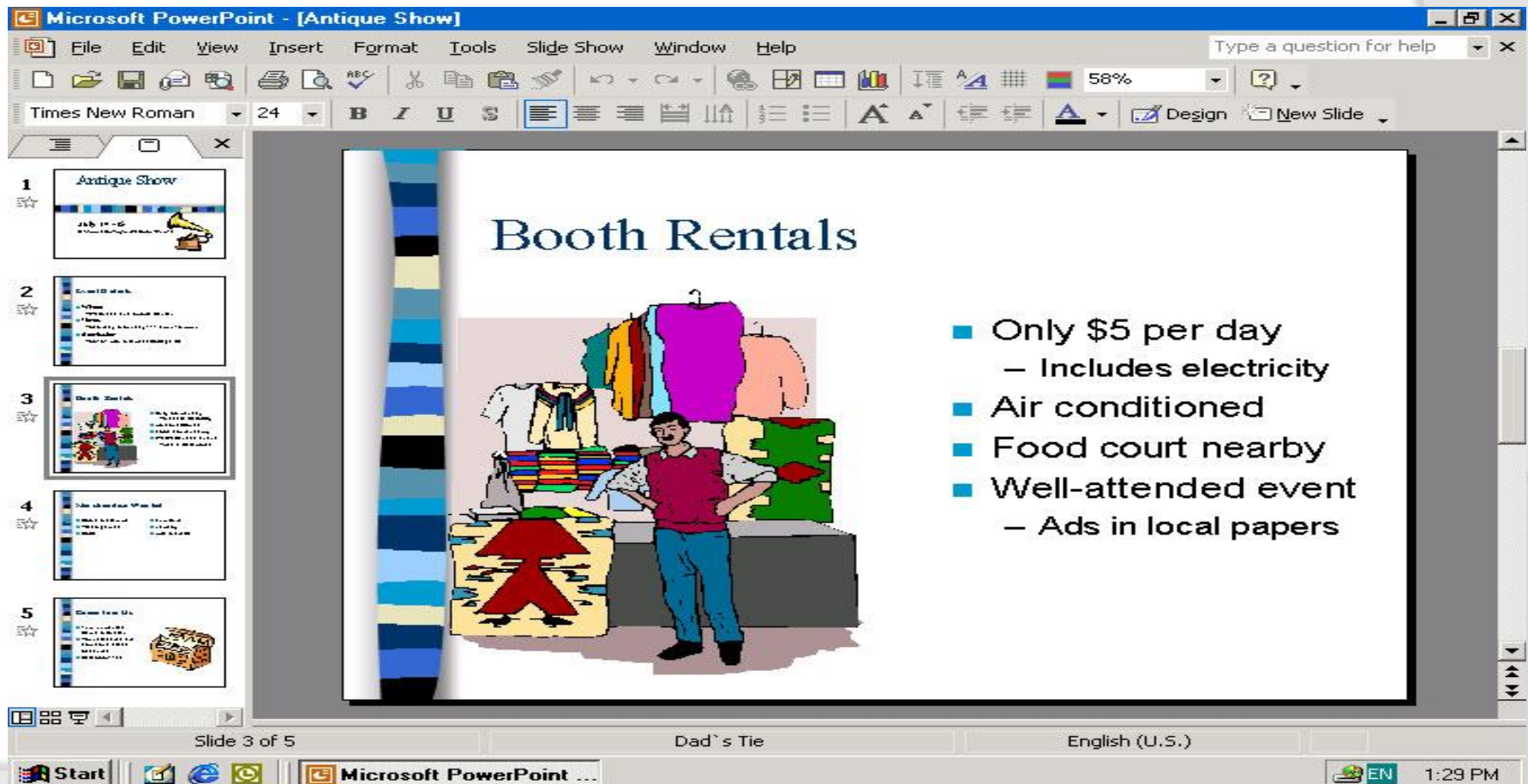
Database Software

- Allows the user to enter, retrieve, and update data in an organized and efficient manner, with flexible inquiry and reporting capabilities.



Presentation Graphics

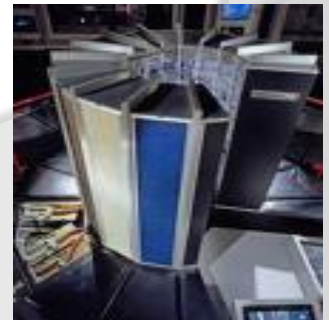
- Presentation graphic software allows the user to create documents called slides to be used in making the presentations. Using special projection devices, the slides display as they appear on the computer screen.



PROGRAMLAM A KAVRAMLARI

Computation

- ⦿ A **computation** is a sequence of well-defined operations that lead from an initial starting point to a desired final outcome.
 - note this definition does not include the word “computer”
 - a computation is a **process** that can be carried out by a person or a machine
 - the same computation might be carried out using any one of a number of different technologies



Algorithms

- ⦿ The sequence of steps carried out during a computation are defined by an **algorithm**
 - an algorithm can be thought of as a “prescription”
 - “follow these steps and you will solve your problem”
- ⦿ An algorithm includes a complete description of
 - the set of **inputs**, or starting conditions
 - a full specification of the problem to be solved
 - the set of **outputs**
 - descriptions of valid solutions to the problem
 - a sequence of **operations** that will eventually produce the output
 - steps must be simple and precise

History of Algorithms

- ◉ The earliest known algorithms were defined by Greek mathematicians
 - e.g. Euclid's method for the greatest common divisor of two integers, ca. 300 BC
- ◉ The modern word “algorithm” comes from the name of the Muḥammad ibn Mūsā al-Ḳwārizmī (Harezmi 780--850)
 - when his work was published in Latin his name was spelled **Algoritmi** he was the author of several influential works on mathematics and natural science his book on the systematic solution of linear equations contained several algorithms the title of this book is also the source of our word “algebra”.



Attributes of Algorithms

- ⦿ It's difficult to specify exactly what defines an algorithm
 - just what do we mean by “a sequence of simple and precise steps”
- ⦿ Most people who write about algorithms agree that steps must be
 - **precise**: they must be written in terms understandable by anyone
 - but what does “precise” mean? how precise does a step have to be?
 - **effective**: a step must help the algorithm progress to the final goal
 - but how effective? is there a formal definition of “effective”?
 - **practical**: a sequence of precise and effective steps may not be useful in practice

The Language of a Computer

- ⦿ Uses digital signals
 - all 0's and 1's (binary)
 - bits (**B**inary **digiT**s)
- ⦿ Data and commands stored in binary
 - 8 bits in a byte
 - ASCII character stored in a byte
 - Integers stored in 2 or 4 bytes

Evolution of Programming Languages

- Early computers programmed in machine languages
 - All binary numbers
- Assembly language used mnemonic codes
 - Codes translated into machine language by a program called the "assembler"

Assembly Language	Machine Language
LOAD	100100
STOR	100010
MULT	100110
ADD	100101
SUB	100011

Evolution of Programming Languages

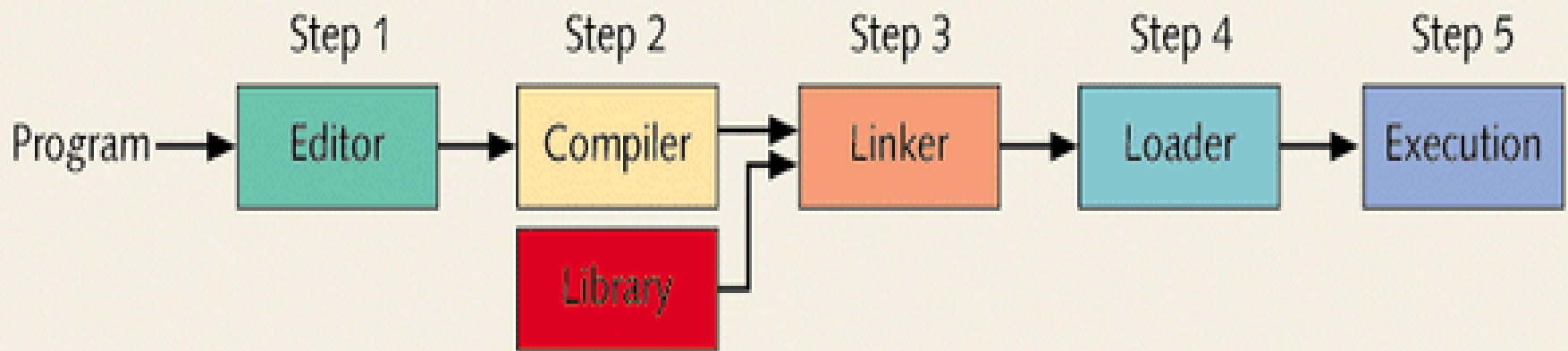
- High level languages read like combination of English and algebra

```
write_string (outfile,cust_name,'1',23);
first_line = 1;
ord.read_order(infile);
while (!ord.done())
{
    if ( !first_line) write_string (outfile," ", '1',23);
    ord.print_order (outfile,part_list);
    first_line = 0;
    ord.read_order(infile);
}
```

- Translated into machine language by a program called a compiler

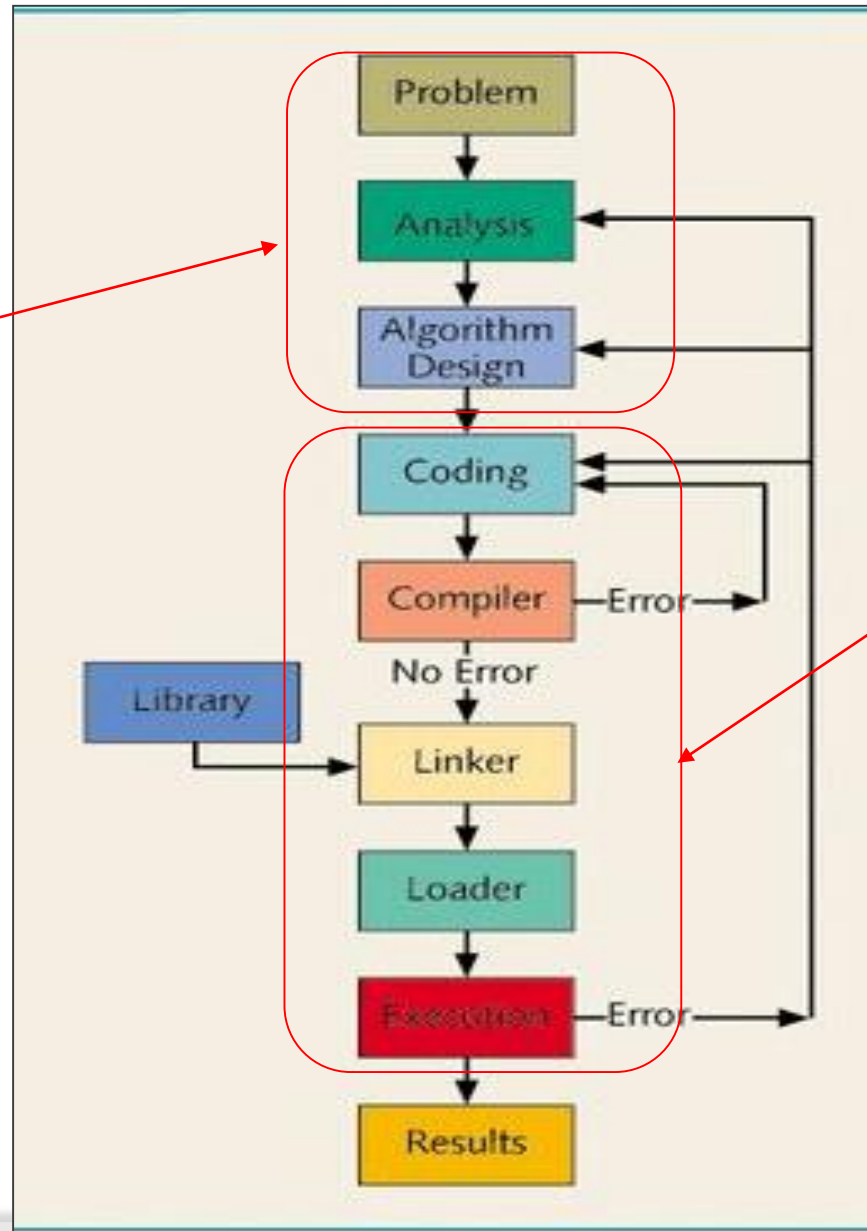
Processing a High-Level Language Program

1. Source program created with an editor
2. Source code translated into machine language by compiler
 - results in a .obj file (object code)
3. Linker combines common library routines with object code
 - Results in a .exe file (executable code)
4. Loader brings executable code into memory and it is run



Analysis-Coding-Execution

Analysis and algorithm design done apart from any specific programming language



Processing of the high-level language programming language

Structured Programming

- ⦿ Thoroughly understand the problem
- ⦿ Determine
 - the output desired
 - the required input
 - processing that will occur
- ⦿ Divide the problem into sub-problems
- ⦿ Other names for this process
 - structured design
 - top-down design
 - stepwise refinement
 - modular programming