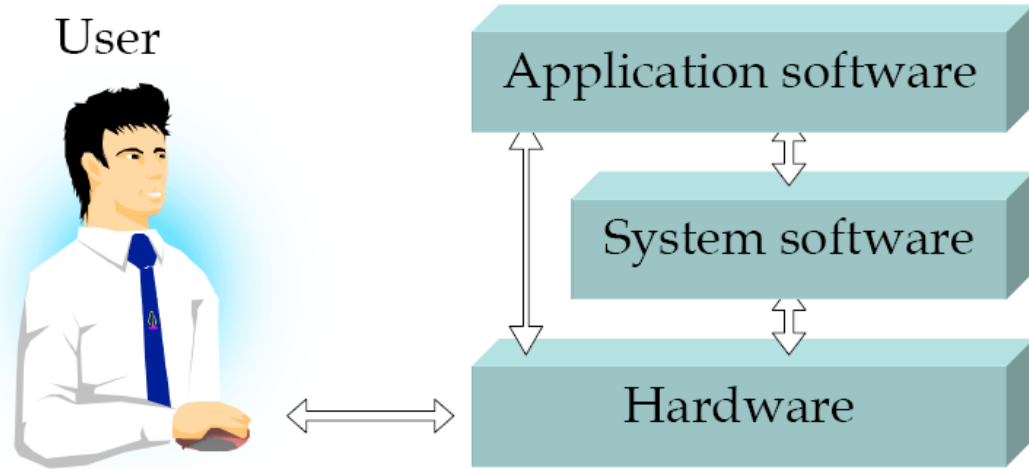
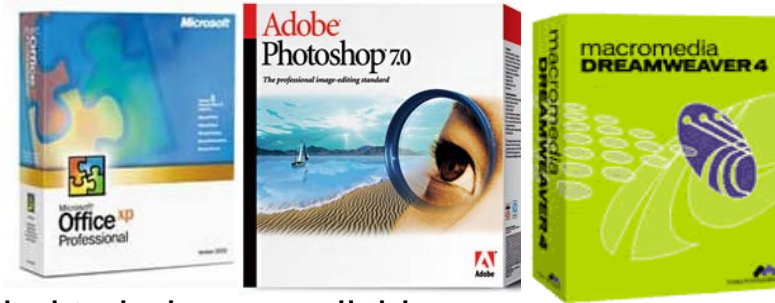


Software: a set of instructions that used for controlling computer hardware. Software is written in a computer programming language such as Pascal, COBOL, C++, Java, BASIC etc.



■ **Application software:** is a program that helps users in accomplishing specific tasks productively. Like (Word processors, spreadsheets, Photo Editing, Creating Web pages, Games, Instant messenger, Design, Accounting, Factory automation,.....).



■ **System software:** is a program that is not directly intended to help accomplishing the user's task but supports other application software. Helps the computer perform essential operating tasks and enables the application software to run.

Like:

1. Operating systems (e.g. DOS, Windows, Unix, Mac, Linux, solaris),
2. System tools (e.g. Antivirus, archiving tools, disk defragmenter),
3. Software development tools (e.g. Compiler, debugger, integrated development environment suite, Programming Languages, Database systems).
4. Drivers: Specific software programs that operates a specific piece of hardware.

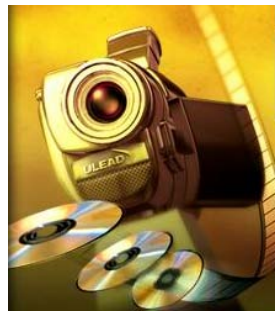
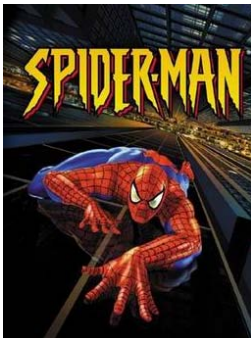
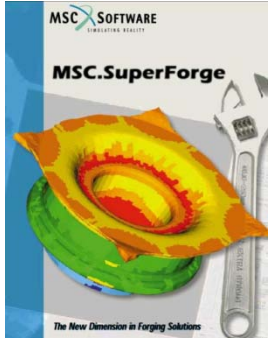


Useful Software Categories

Operating Systems	Unix and BSD	Unix system V, solaris, IRIX, BSD, HP-UX
	Linux	Linux
	MS Windows	Windows 95, Windows 98, Windows NT, Windows 2000, Windows XP, Windows Vista, Windows CE
	DOS	QDOS, PC-DOS, MS-DOS, Free DOS
	Mac OS	Mac OS Classic, Mac OS X
	Experimental	Amoeba, Oberon/Bluebottle, Plan 9 from Bell Labs
Library	Multimedia	Direct X, open GL, Open AL
	Programming Library	C Standard Library, Standard Templet Library
Data	Protocol	TCP/IP, Kermit, FTP, HTTP, SMTP
	File Format	HTML, XML, JPEG, MPEG, DXF, MP3, DWG
User Interface	Graphical User Interface	Microsoft Windows, GNOME, KDE, QNX Photon, CDE, GEM
	Text-based user interface	Command-line interface, Text user interface

Application

Office suite	Word processing (Microsoft Word), Desktop publishing, Presentation program (Microsoft PowerPoint), Database management (Microsoft Access), Spreadsheet (Microsoft Excel), Accounting, Scheduling & time management (Visio), Statistics (SPSS, NCSS).
Internet Access	Browser (IE, FireFox), E-mail client (Outlook, GMail), Web server, Instant messaging (Yahoo, MSN, Skype)
Design & Manufacturing	Computer Aided Design (AutoCAD, SolidWorks), Computer aided Manufacturing (MasterCAM, ArtCAM, ESPRIT), Planet management (Microstation), Robotic Manufacturing, Supply chain management
Graphics	Raster graphics editor (PhotoExpress), Vector graphics editor (Corel Draw), 3D modeler, Animation editor (Flash, Shockwave), Video editing (Premiere, Ulead Media Studio), Image processing and Editor (Paint, Adobe Photoshop), 3D computer graphics (3D Studio MAX, POSER, Bryce, Carrara).
Audio	Digital audio editor, Audio playback, Mixing, Computer Music, Audio synthesis.
Software Engineering	Compiler, Assembler, Interpreter, Debugger, Text editor, Software configuration Management.
Educational	Flight simulator, Educational game, Interactive Training, Language learning, Home Design,
Games	Strategy, Arcade, Puzzle, Simulation, Interactive fiction
Misc	Artificial Intelligence, Antivirus (Norton, McAfee), File manager, Mathematical (Maple, Mathematica, Matlab, MathCAD), FEA (Ansys, Nastran)



Why we need Software?

We know that the computer is composed of various components of hardware, When the user wants to perform certain action, he/she gives instructions to computer Hardware through computer Software. Generally, program (software) are written in high level languages easily understood by humans and translated into machine language, The machine language is easily readable by computer microprocessors.

Program:

A sequence of instructions to be performed by a computer.

Scripts are text files that tell programs what to do (like in Matlab).

Computer programming: The process of planning a sequence of steps for a computer to follow.

Programming languages:

A set of rules, symbols, and special words used to construct a computer program. There are rules for syntax (grammar) and semantics (meaning). They are generally either translated into machine code by a **compiler** or an **assembler** before being run, or translated directly at run time by an **interpreter**. Sometimes programs are executed by a hybrid method of the two techniques. There are thousands of different programming languages, some intended to be general purpose, others useful only for highly specialized applications.

Commonly used languages	
Assembly languages	ARM, MIPS, x86
Scripting languages	Bourne script, JavaScript, Python, Ruby, PHP, Perl
High-level programming languages	Ada, BASIC, C, C++, COBOL, Fortran, Java, Lisp, Pascal, Object Pascal, Matlab

Machine language	<ul style="list-style-type: none">● Binary-coded instructions.● Closely coupled with design of computer hardware.
Assembly language	<ul style="list-style-type: none">● Low-level programming language in which a mnemonic is used to represent each of the machine language instructions.● We need an assembler <i>which translate an assembly language program into machine code.</i>
High-level language	<ul style="list-style-type: none">● Closer to English and other natural languages.● We need a compiler <i>which translate a high-level language program into machine code.</i>● Source program: Program written in a high-level language.● Object program: Machine language version of a source program.● Difference between compilation and execution of a program.● Some programming languages are translated by an interpreter (some versions of BASIC). Interpreter translates and executes each instruction in the source program. Java uses both a compiler and interpreter.

Some examples of Programming Languages....

Fortran code:

```
if (N .eq. M) then  
N = M + 1  
endif
```

C code:

```
if (N == M) {  
N = M + 1;  
}
```

Matlab:

```
if (N == M)  
    N = M + 1;  
end
```

An assembly language:

```
LDA N           ;get n  
SUB M           ;subtract m  
JNZ NEXT       ;test N=M?  
ADD C1         ;yes-add one  
STA N          ;store result
```

Machine code - just bits.....

```
000010100  
000100100  
000001110
```

Why Study Programming ?

- ☑ Computers are fast and accurate in computation.
- ☑ Virtually all engineers use computers in some way.
- ☑ Engineers are responsible for the input and output of the programs they use.
- ☑ It is likely that you will have to write some programs some time.
- ☑ Programming skills are needed in other courses.
- ☑ Being able to program is a valuable job skill.
- ☑ Programming/problem solving skills from this course can be applied to other areas.
- ☑ It is fun !

Types of Software Distributions

Commercial Software	<ul style="list-style-type: none">▶ Created by a software house (Microsoft, Borland, Adobe, Mac OS), typically by large teams of programmers.▶ The user will pay the licensing fee to the maker.▶ The user is legally prohibited from making copies of the licensed software▶ Some commercial software is bundled with hardware.▶ Evaluation versions may be free, low cost, or with limited functionality.
Freeware	<ul style="list-style-type: none">● Software that can be copied and distributed at no cost.● Author still retains the copyright.● Free Software Downloadable websites like www.download.com● Need to be very careful about security when downloading.
Shareware	<ul style="list-style-type: none">■ Software that can be used in trial period for free, then the author expects a small payment.■ Author still retains the copyright.

❁ Types of Agreement in Software Licensing

There are four types of agreement which specifies the number of people that may use the software and the number of computers on which software may be installed:

1. Single-User License
2. Multi-User License
3. Concurrent-User License (e.g Database Software)
4. Site License (e.g. University Users)

Programming Process

1. Problem-solving phase:

- Analysis and specification (understand and define problem, and what is expected of solution)
- General solution (algorithm: a logical sequence of steps that solves the problem)
- Verification (Follow steps to make sure solution solves the problem)

2. Implementation phase:

- Concrete solution (Program in a Programming language)
- Testing (make sure the program produces the desired results)

3. Maintenance phase:

- Use Program
 - Maintain Program (meet changing requirements)
-

WHAT COMPUTER CAN DO

Basic operations that computers can perform are very limited. These operations are:

1. Read data.

2. Write data.

3. Make comparison

(= Equal to, > Greater than, < Less than, ≤ Less than or equal to, ≥ Greater than or equal to, <> Not Equal to)

Relational Operators:

OR Joins two conditions and gives true if either of the condition is true or both of them are true. In all other cases it gives false.

AND Joins two conditions and gives false if either of the condition is false or both of them are false. In all other cases it gives true.

NOT If the condition is true, it gives false. If it is false, it gives true.

4. Create variables and assign values to them.

5. Do processing: Computers can do calculations

(+ Addition, - Subtraction, ^ Raised to the power of, / Division, * Multiplication, () Brackets)

6. Loop formation: Computer can process a single or more steps repeatedly.

Presentation by students

Each student prepares a presentation on one of the following topics.
No. of Slides: Less than 10 (using Microsoft PowerPoint)



1	PCMCIA bus	11	3D Video Chipset	21	optical character recognition (OCR)	31	Wi-Fi	41	Vector Graphics
2	Infrared Interface	12	3D audio Processing	22	Raster Graphics	32	World Wide Web (WWW)	42	Java
3	Bluetooth Radio Interface	13	ASCII code	23	Registry Files	33	FTP	43	Perl
4	Xeon processors	14	computer-based training (CBT)	24	Image Rendering	34	ETHERNET	44	Nano engineering
5	AMD Athlon	15	Dynamic Link Library (DLL)	25	Network Router	35	HTML	45	Information technology (IT)
6	Dual-Core Processors	16	Joint Photographic Experts Group (JPEG)	26	TCP/IP	36	Puzzle Games	46	W3C
7	CMOS	17	LAN	27	Unicode	37	OpenGL,OpenAL	47	DNA computing
8	BIOS	18	LCD	28	UPC	38	Linux	48	Chemical Computer
9	MultiMediaCard (MMC)	19	Light pen	29	URL	39	Mac OS X	49	Optical Computer
10	DVD Multi	20	MPEG	30	virus	40	Animation	50	Quantum Computer