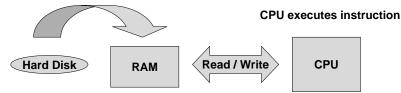
What is software?

Instructions and other data for the computer

- Also known as "programs"
- Loaded from Secondary Storage into Primary Memory
- Runs (executes) from RAM

Software is loaded



http://en.wikipedia.org/wiki/Software

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2

Windows Vista

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Mastering Cyberspace: An introduction to practical computing



Software

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File Formats

All data is stored as (binary) numbers

- Data is organised in files (chunks of related data)
- Method of encoding depends on the software, called file format

File Formats

- · Defines the way that the numbers are interpreted
- E.g. for a graphics file: "first the width, then the height, then all the pixel color values line by line"

File Extensions

- A dot followed by letters at the end of a file name
- · Windows OS uses the file extension to determine the file format
- Also used to decide which application to use to open the file

Graphics	.jpg , .png , .gif	Video	.mpg , .avi , .divx
Sound	.mp3 , .wma , .ogg	Programs	.exe , .com , .bat
Text	.txt , .doc	Program Code	.c , .java , .cs , .py

Standards

Open Standard

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- Published publicly
- Free to use
- Maintained by a "non-profit" organisation
- E.g. XML, HTML, UML
- "Open" does not necessarily mean "good"

Proprietary Standard

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- Intellectual property of an entity (individual / company)
- Use of the standard is usually through license
- E.g. Adobe Flash, RealPlayer, some digital rights management (DRM) technologies
- Risk for users: vendor lock-in

"The nice thing about standards is that there are so many to choose from."

3

Copyright and Patents

Software subject to normal legal copyright

- Copyright = "right to copy"
- Creator retains the rights to their creations (not the ideas behind them)
- · Usually lasts for the life of the author plus 50 or 70 years
- · Best applicable to: music, visual art, literature, programs

Software Patents

- Retain control over ideas / inventions
- Usually enables to exclusively commercialise an idea for 20 years (can be important to amortise research cost)
- US recognises software patents, Europe does not
- Hotly debated issue

Proprietary Software

Software that has restrictions on using and copying

- All rights are retained by the owner.
- Owner enforces these restrictions

Can be:

- Commercial
- Freeware
- Shareware
- Semi-free (for non-profit)

Would you have invested?



Microsoft Corporation, 1978

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Freeware

Software is distributed free of charge

· No agreement about distribution, access to source code

Types of Freeware

- · Loss Leader (given away with loss as sales promotion)
- Adware
- Donationware
- Postcardware

Abandonware

• Not legally recognised

E.g. MS Internet Explorer, Apple iTunes, Adobe Reader

Shareware

Idea: try before you buy

Trial period offered

· Purchase the license and upgrade to commercial version

Nagware

· Reminder messages to license software

Crippleware

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- · Software lacks the advanced features until licensed
- · E.g. Word processor that cannot Save or Print

E.g. WinZip, TextPad

Open Source / Free Software

Free Software

- · Freedom to use and study the work
- Freedom to copy and share the work with others
- Freedom to change the work
- Freedom to distribute changed and therefore derivative works

Copyright prevents these acts

"I would love to change the world, but they won't give me the source code"

- Explicit permission is required
- Free software license gives permission

Richard Stallman

- Free Software Foundation (FSF)
- GNU General Public License (GPL)
- Copyleft



http://en.wikipedia.org/wiki/Copyleft

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10

Kinds of Software

Application Software

- Helps the user complete a task
- E.g. word processor, spreadsheet, database, web browser, games

System Software

- Needed to run the computer system
- Operating System (OS): manages all the hardware resources for application programs (CPU, RAM, HD, ...)
- · Device drivers: programs that help an OS to control a piece of hardware
- Diagnostic and maintenance tools: tools for analysis, trouble shooting and optimisation (e.g. checkdisk, defrag)

Operating System

Low-level software that allows you to use the system

- Default interface when no application is running
- Manages the system: CPU, memory, HD, …
- Does all the direct interaction with the hardware (using drivers)

Examples:

- Microsoft Windows: most used, but many complaints
- Macintosh OS: more expensive, less software & hardware, more focus on usability
- more technical
- "Unix is user-friendly. It's just very selective about who its friends are."

"Windows - so intuitive you only need a 678-page manual."

- Unix, Linux:

Mac and PC: http://www.apple.com/getamac/ads/

http://en.wikipedia.org/wiki/Operating_system

11

Spyware, Malware, Viruses

Spyware

- Collects data from your PC and sends it to someone else ٠
- May otherwise look like (or even be) a useful program
- The data may be sensitive (e.g. passwords, personal documents) or just statistical

Malware

- . Generic term for malicious software
- Usually malicious program is disguised as useful program
- Causes harm, such as deleting or modifying data ٠

Viruses

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- Small programs that attach themselves to other programs
- May cause harm

Golden rule: never run programs (or open files) that you cannot trust !!!

Command Line Interface

Text-based

- Powerful way to combine different commands
- Hard to use: textual commands look weird if you don't know them
- · Good for experts that use it often

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-rw	andrew-Istaff 78 Nov 17 14:06 echo	
	andrew-1 staff 8192 Mar 1 11:38 mac	
	andrew-1 staff 183566 Jan 11 16:08 netman.ps	
	andrew-1 staff 1820608 Jan 11 16:00 phdthesis.ps	
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http://en.wikipedia.org/wiki/Command_line_interface

13

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Graphical User Interface (GUI)

Picture based

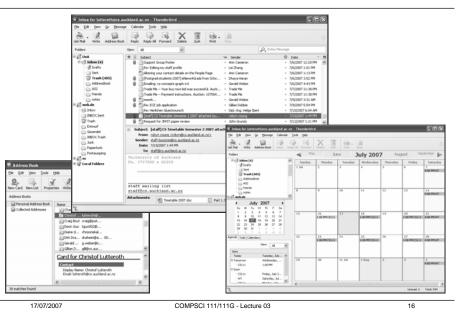
- Windows, Icons, Mouse, Pointer
- Easy to use
- Good for beginners



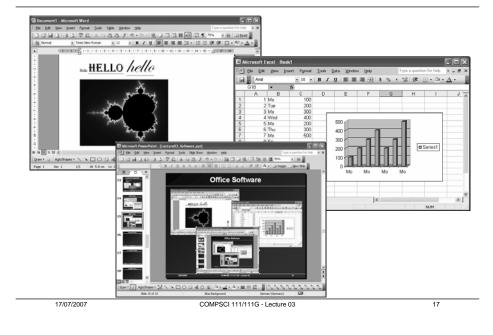
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Email Clients



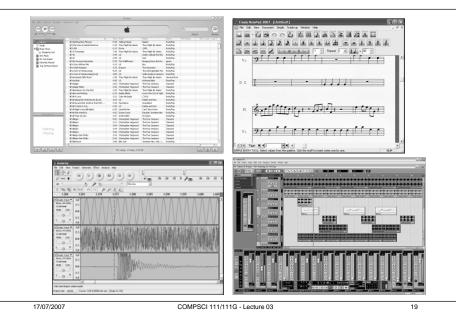
Office Software



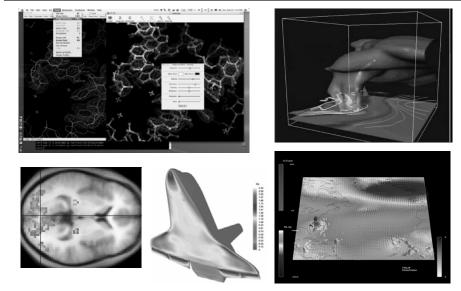
Graphics Software



Sound/Music Software



Scientific Software

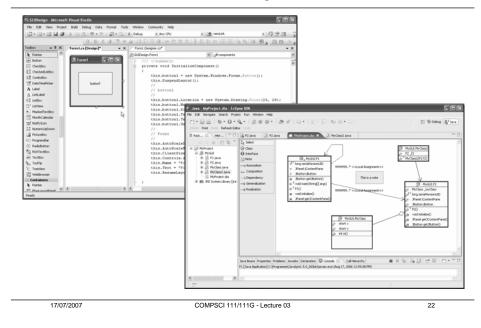


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Security Software

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Software Development Tools



What if software fails?

Usually software is not perfect !!!

- Too complex to be completely free of errors
- Many programmers have good technical know-how but lack a sense of usability
- User interfaces are often not logical

If a problem occurs...

- It may not be your fault
- You are most likely not the only one with that problem
- Ask others for help !!!
- · Search the Internet and you will often find solutions

Is it easy to fix a defect in a program?

- Unfortunately, usually not
- The internals of proprietary software are usually not accessible
- Open-source programs can be large and hard to understand
- But often problems can be circumvented by using the program in a different way

Summary

- Software (programs) consists of instructions that control the computer and data
- Programs are loaded from secondary storage into primary memory, then executed by the CPU
- Data is organized in files, which have different file formats
- Software (and other data) is protected by copyright laws
- Software can be proprietary or open-source or a mixture of both
 - Different kinds of software:
 - System software
 - Applications
 - Spyware, Malware, Viruses

If all else fails, read the manual.

I am going to the OTL now. Everybody invited to come along !

"Men are from Mars.

Women are from Venus.

Computers are from hell."