

Software and Licences

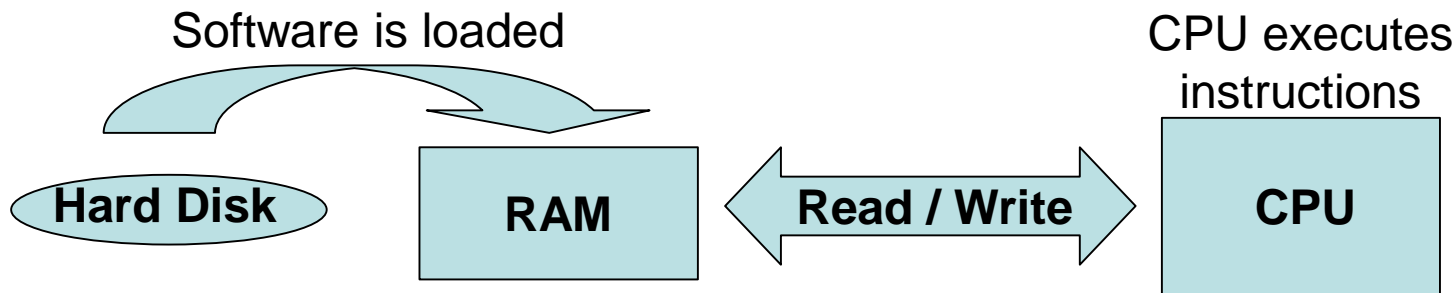
Lecture 3 - COMPSCI111/111G SS 2016

Today's lecture

- ▶ Describe what software is
- ▶ Understand the legal protections for software
- ▶ Understand different software licences
- ▶ Identify different kinds of software

What is software?

- ▶ Aka 'programs' or 'apps'. Instructions and other data used by the computer
- ▶ User can perform tasks and interact with the hardware through software
- ▶ Loaded from secondary memory into primary memory, where it is executed by the CPU

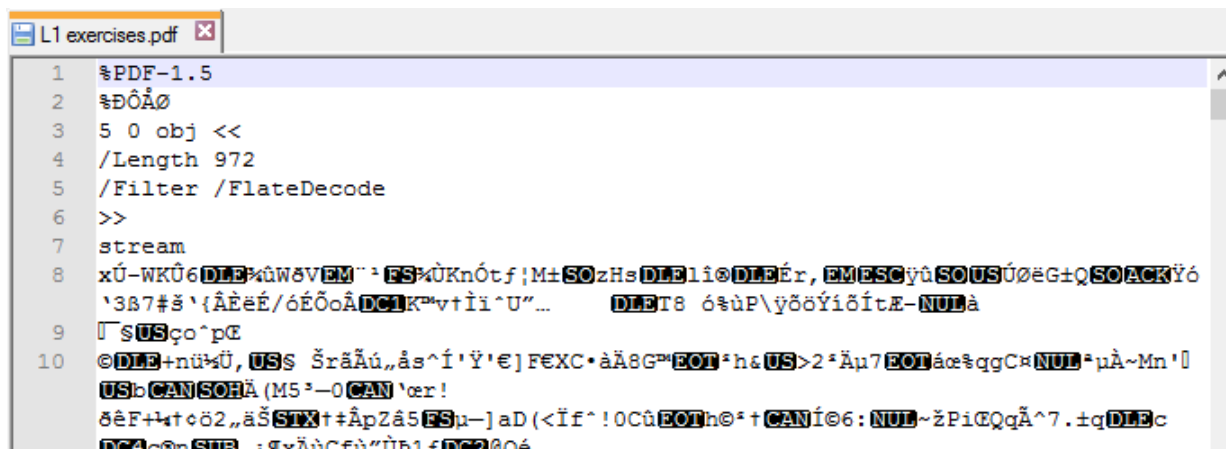


Kinds of software

- ▶ System software:
 - ▶ Operating system (eg. Windows, Mac OS X)
 - ▶ Device drivers
 - ▶ Diagnostic and maintenance tools (eg. Disk Cleanup)
- ▶ Application software:
 - ▶ Used by users to perform tasks on the computer

File formats

- ▶ All data on a computer is stored in binary
- ▶ However, a program encodes files in its own way; this is the file format
- ▶ A program will be unable to open a file if it does not understand the file format

A screenshot of a text editor window titled 'L1 exercises.pdf'. The window displays the raw binary content of a PDF file, starting with the header '%PDF-1.5'. The content is a mix of ASCII text and non-printable binary characters. Line numbers 1 through 10 are visible on the left. The text includes PDF object definitions and stream data. Some characters are highlighted in blue, possibly indicating a search or selection. The stream data on line 8 is partially decoded, showing some legible text like 'xÚ-WKÛ6' and 'DLE'.

The beginning of a file using the PDF format

File extension

- ▶ Used by the Operating System to determine a file's format
- ▶ Eg. the .docx file format opens by default with Microsoft Word

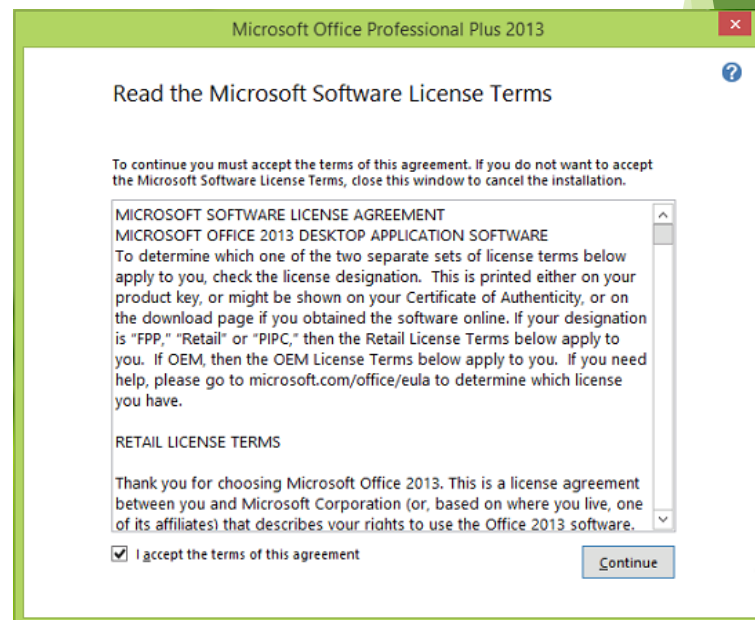
Graphics	.jpg , .png , .gif	Video	.mpg , .avi , .divx
Sound	.mp3 , .wma , .ogg	Programs	.exe , .com , .bat
Text	.txt , .doc	Program Code	.c , .java , .cs , .py

Standards

- ▶ File formats sometimes follow a standard; an agreed way encoding data (eg. webpages used the HTML5 standard)
- ▶ Standards can be:
 - ▶ Open
 - ▶ Published openly
 - ▶ Free to use
 - ▶ Eg. HTML, PDF
 - ▶ Proprietary
 - ▶ Owned by a company
 - ▶ Others can use the standard if they pay for a licence
 - ▶ Eg. MP3

Copyright

- ▶ Software is protected by a range of IP rights
- ▶ Copyright:
 - ▶ Protects the expression of an idea
 - ▶ Copyright Act 1994, s14(1)(a): literary works (includes software) is protected by copyright
 - ▶ s21: author owns the copyright
 - ▶ s111: copyrighted material can be used by others if they have a licence



Patents

- ▶ Patents:
 - ▶ Protect an idea from being copied by others
 - ▶ Patents Act 2013, s11(1): a computer program is not an invention and therefore can't be patented
 - ▶ Exception for software in embedded systems

Kinds of software

Proprietary software

- Owned by an individual or company
- Types:
 - Commercial
 - Shareware
 - Freeware
 - Semi-free (for non-profits)

Open source software

- Freely available
- Anyone can use or edit the software's source code

Proprietary software - commercial

- ▶ Software that a user must purchase to use
- ▶ Examples: Microsoft Office, Adobe Acrobat, SPSS



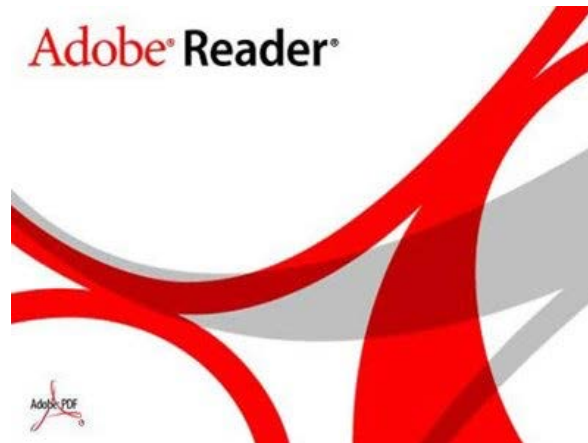
Proprietary software - shareware

- ▶ User has a trial period in which to evaluate the software, and purchase it if they want
- ▶ Nagware: software keeps reminding the user to purchase the full version
- ▶ Crippleware: software that works with limited functionality until the user purchases it
- ▶ Freemium: software with a free tier and paid tier



Proprietary software - freeware

- ▶ Software is free to use but source code is not publically available
- ▶ Freeware can be a loss leader or adware
- ▶ Some freeware is known as abandonware; software no longer maintained but still available

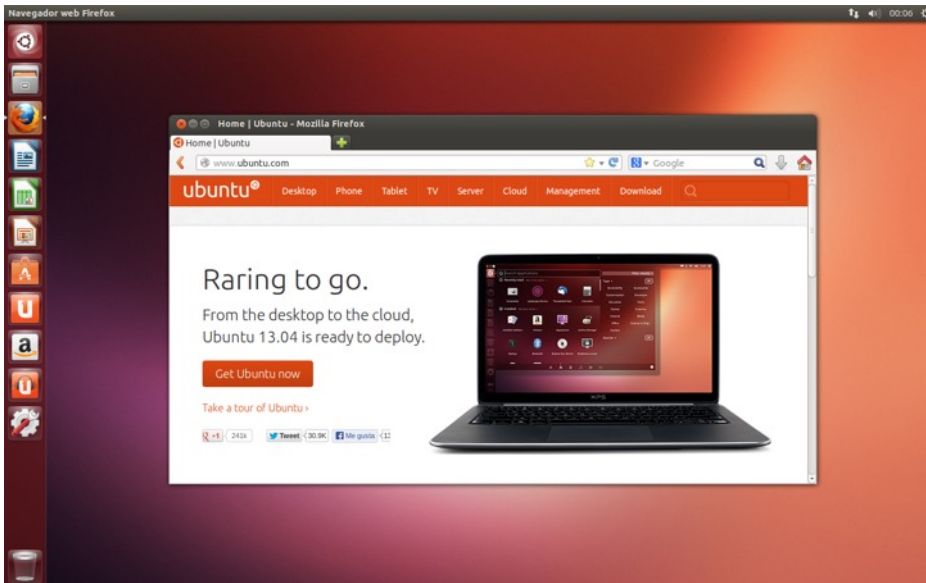


Open source software

- ▶ Software that is free to use and whose source code is public
 - ▶ Anyone can use or modify the source code
 - ▶ Anyone can create a **derivative work** from the source code
- ▶ Open source movement started in the late 1980's and crystallized with the **Open Source Definition**
- ▶ Open source software licences (eg. Apache, GNU) are not as restrictive as commercial software licences

Open source software

- Examples of open source software

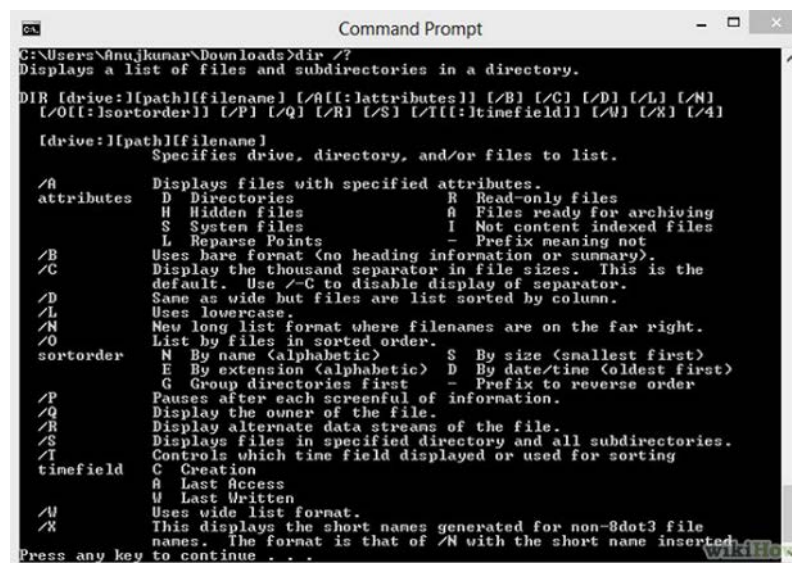


User interfaces

- ▶ Two kinds of user interface
 - ▶ Command line interface (CLI)
 - ▶ Graphical user interface (GUI)
- ▶ Key difference is that a CLI is text-based while a GUI graphically-based

Command line interface

- ▶ User enters text commands to perform tasks
- ▶ Can complete tasks very quickly by combining commands
- ▶ Can be difficult to use the text commands if you don't know or understand them



```
Command Prompt
C:\Users\Anu.jkumar\Downloads>dir /?
Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename] [/A[:attributes]] [/B] [/C] [/D] [/L] [/N]
[/O[:sortorder]] [/P] [/Q] [/R] [/S] [/T[:timefield]] [/W] [/X] [/4]

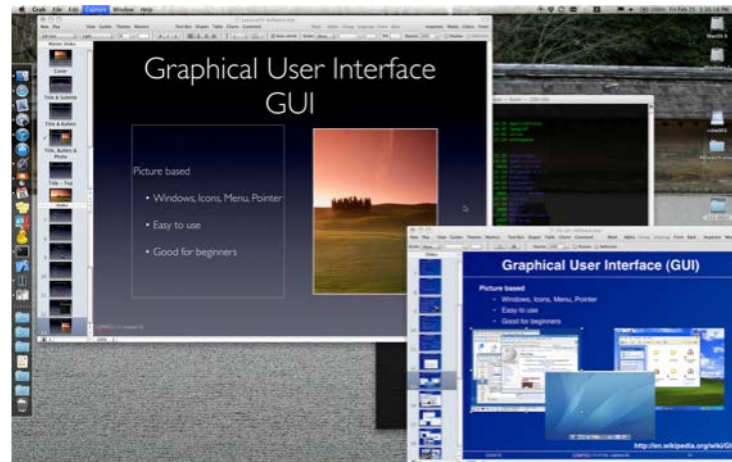
[drive:][path][filename]
    Specifies drive, directory, and/or files to list.

/A
    Displays files with specified attributes.
attributes    D Directories                R Read-only files
               H Hidden files            A Files ready for archiving
               S System files            I Not content indexed files
               L Reparse Points          - Prefix meaning not
/B
    Uses bare format (no heading information or summary).
/C
    Display the thousand separator in file sizes. This is the
    default. Use /-C to disable display of separator.
/D
    Same as /W but files are list sorted by column.
/L
    Uses lowercase.
/N
    New long list format where filenames are on the far right.
/O
    List by files in sorted order.
sortorder      N By name (alphabetic)      S By size (smallest first)
               E By extension (alphabetic) D By date/time (oldest first)
               G Group directories first  - Prefix to reverse order
/P
    Pauses after each screenful of information.
/Q
    Display the owner of the file.
/R
    Display alternate data streams of the file.
/S
    Displays files in specified directory and all subdirectories.
/T
    Controls which time field displayed or used for sorting
timefield      C Creation
               A Last Access
               W Last Written
/W
    Uses wide list format.
/X
    This displays the short names generated for non-8dot3 file
    names. The format is that of /N with the short name inserted.

Press any key to continue . . .
```

Graphical user interface

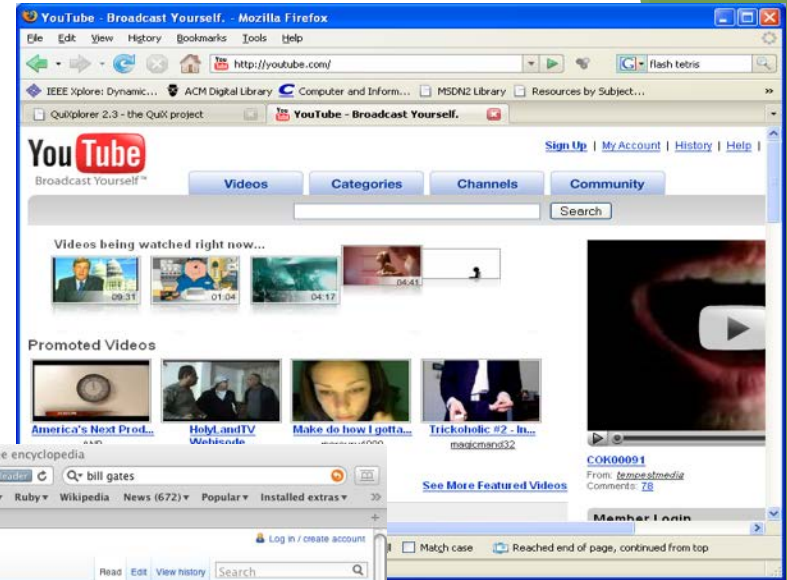
- ▶ User performs tasks using the software's graphical elements (eg. windows, pointers, icons, menus)
- ▶ Generally easy to use, especially for new users
- ▶ Can be inefficient for experienced users, but keyboard shortcuts help to make GUIs more efficient



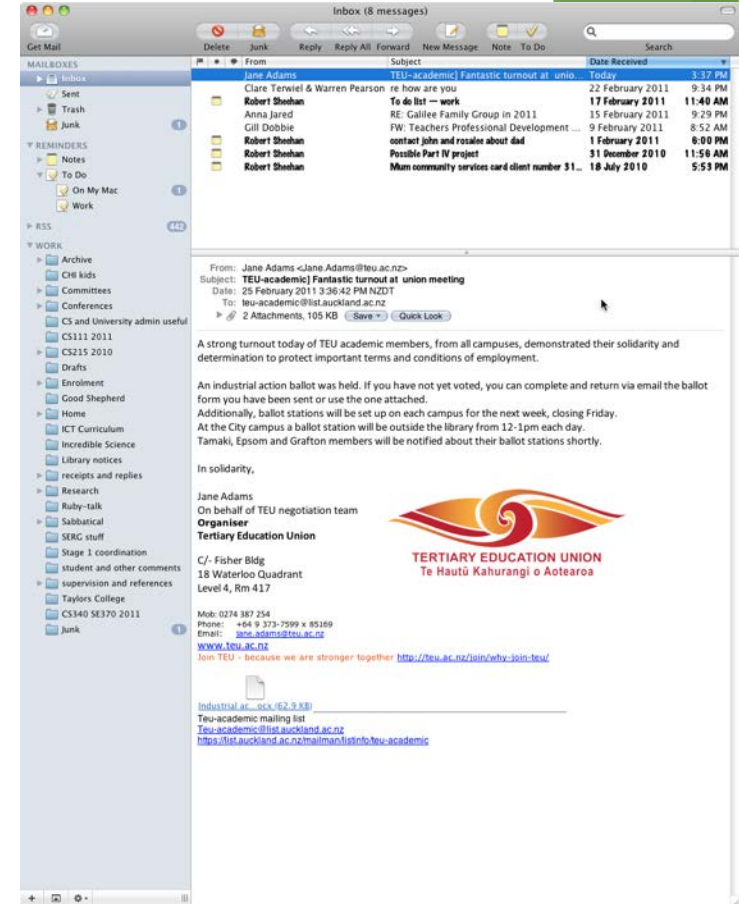
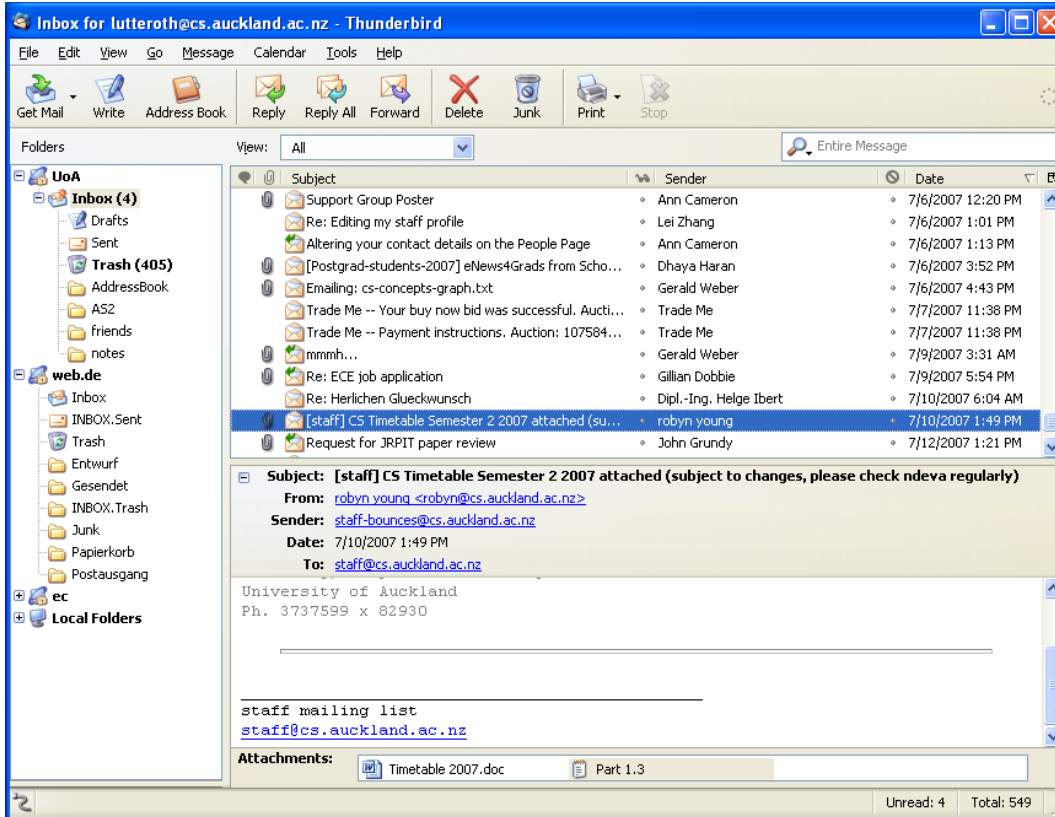
Application software

- ▶ Two kinds of software: system and application
- ▶ Very wide range of application software

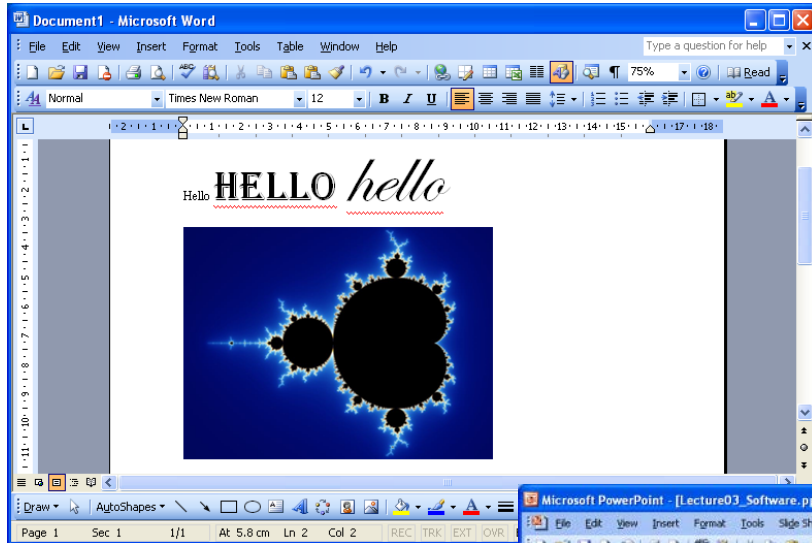
Web browsers



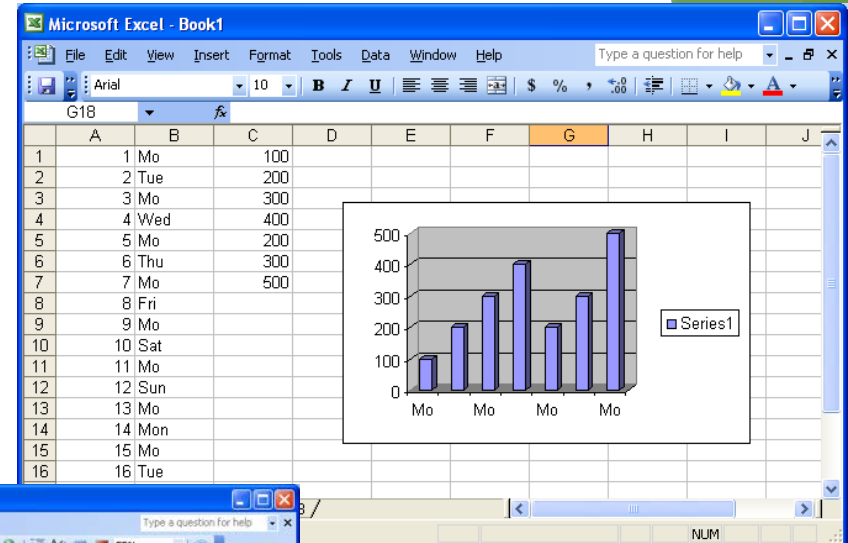
Email clients



Office software

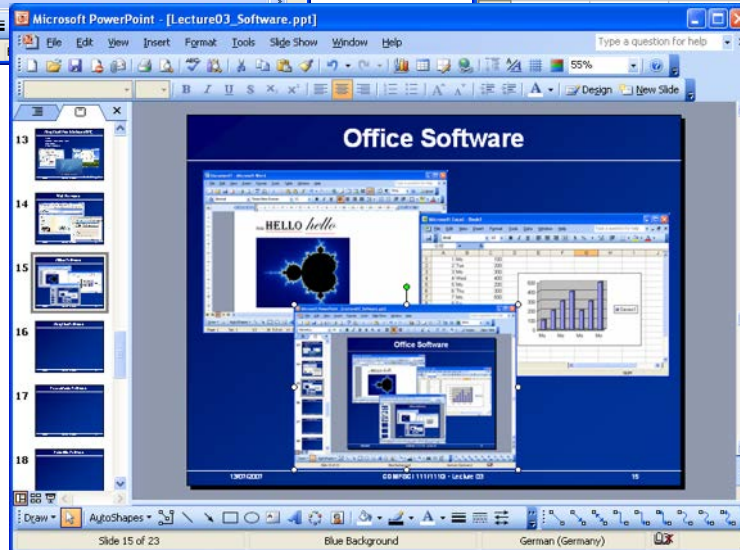


Word

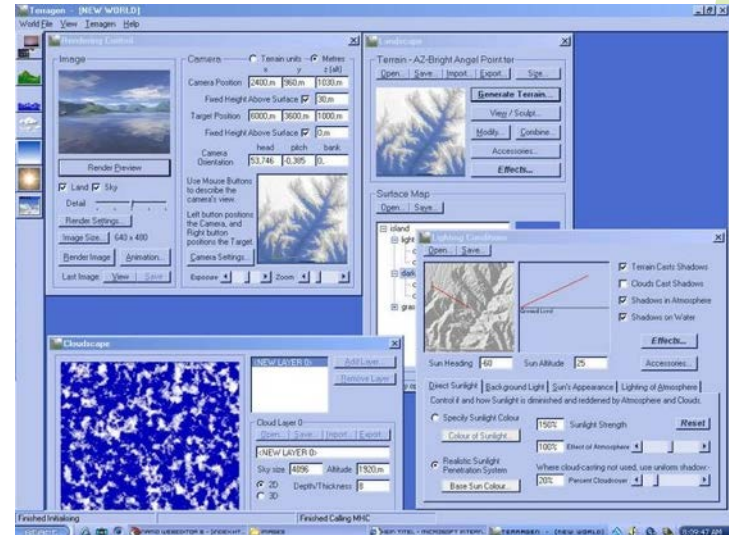
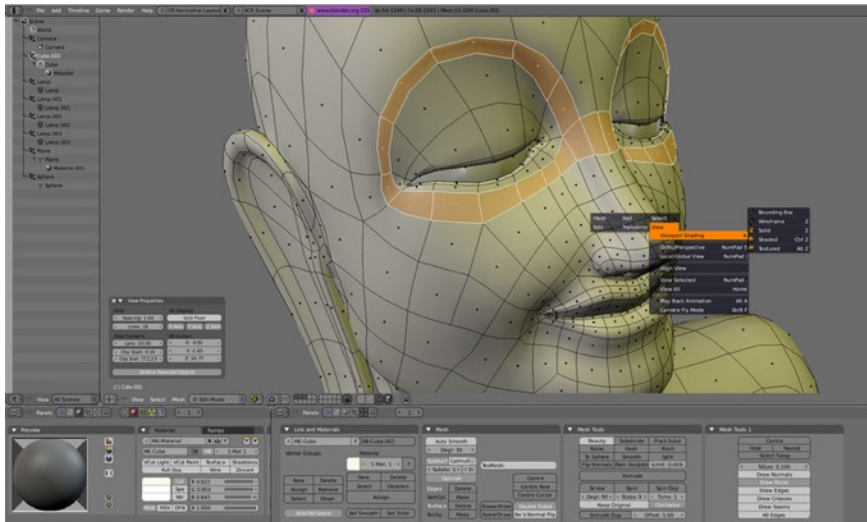
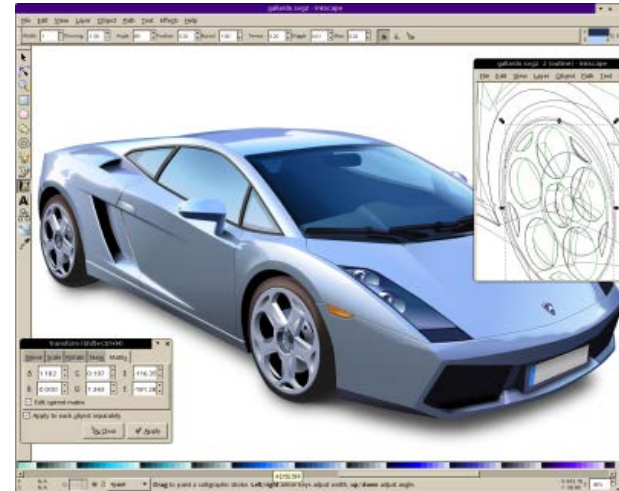
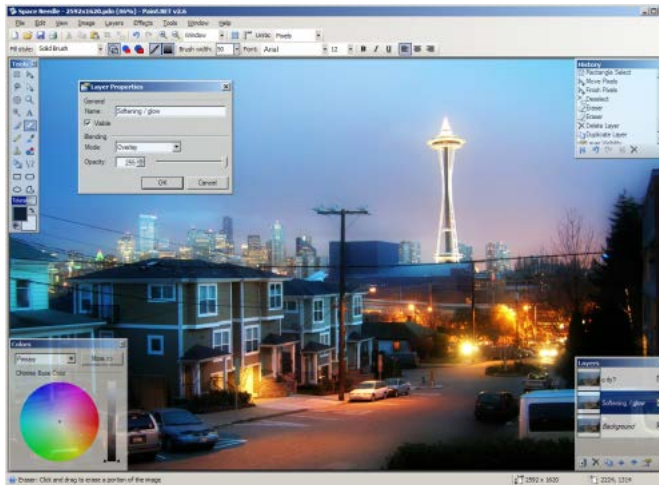


Excel

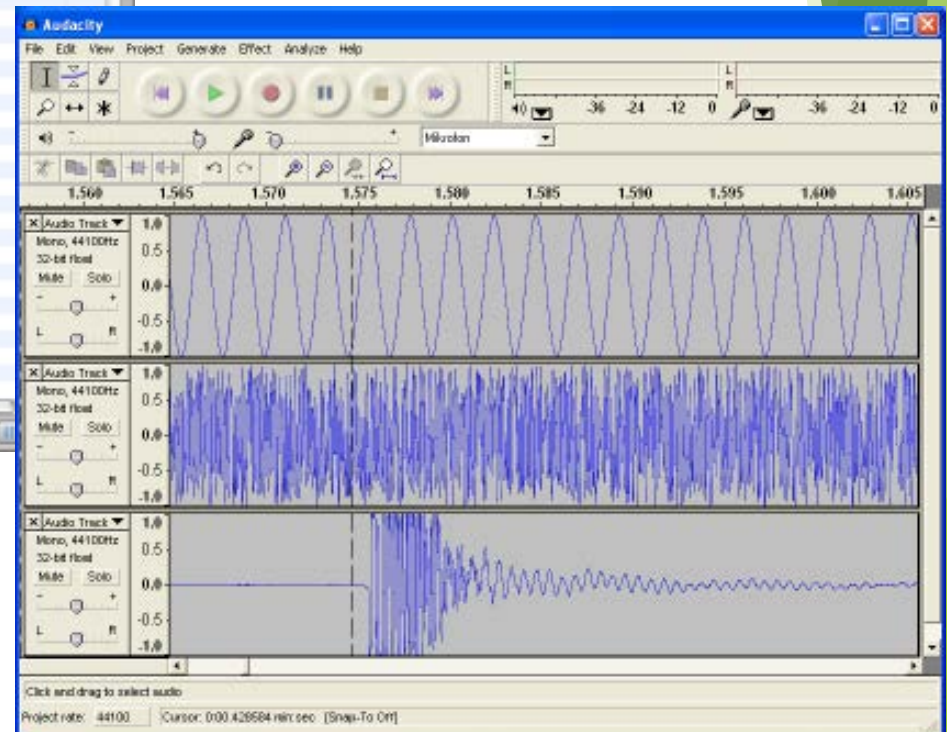
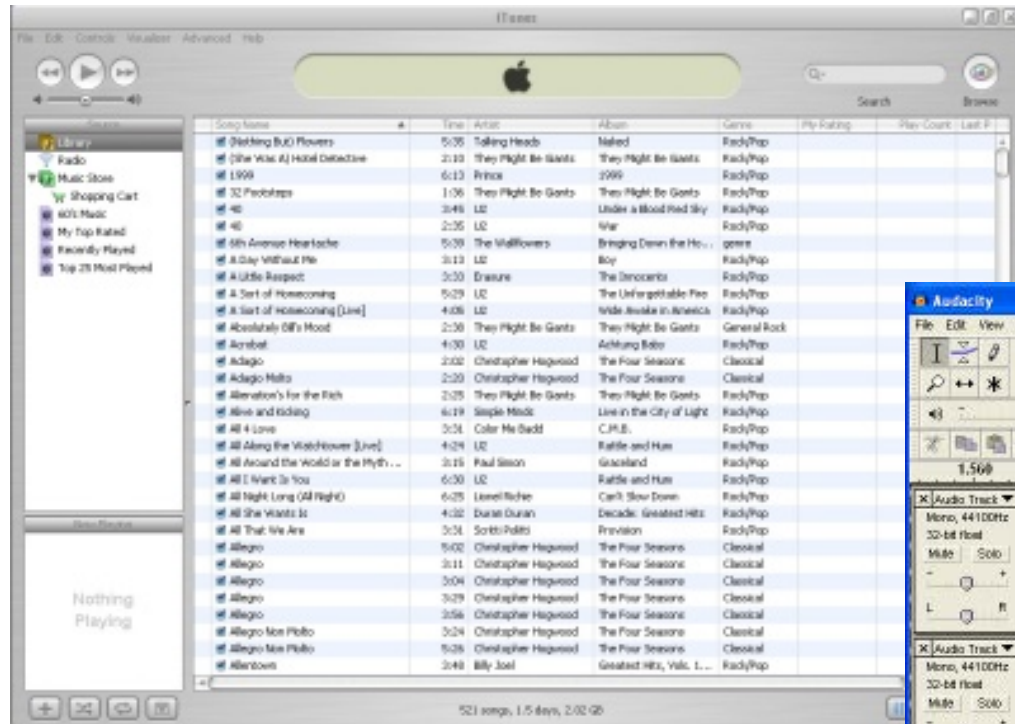
PowerPoint



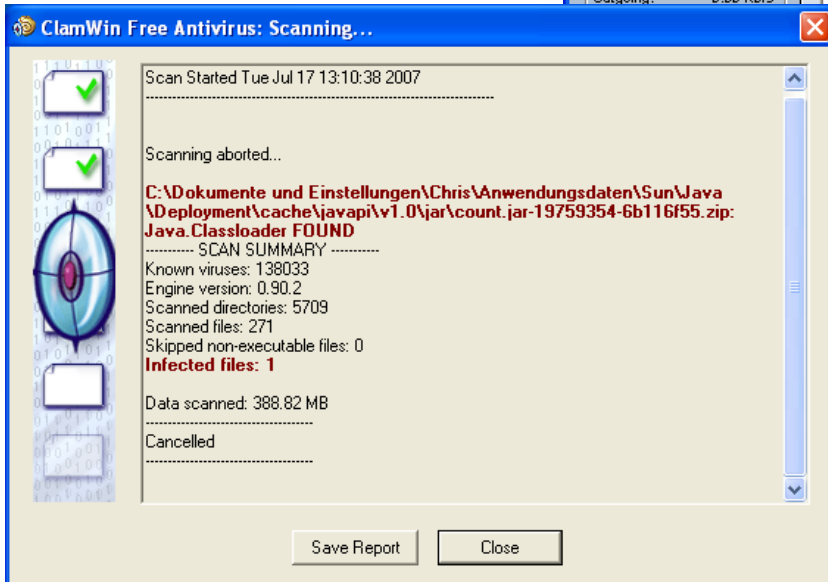
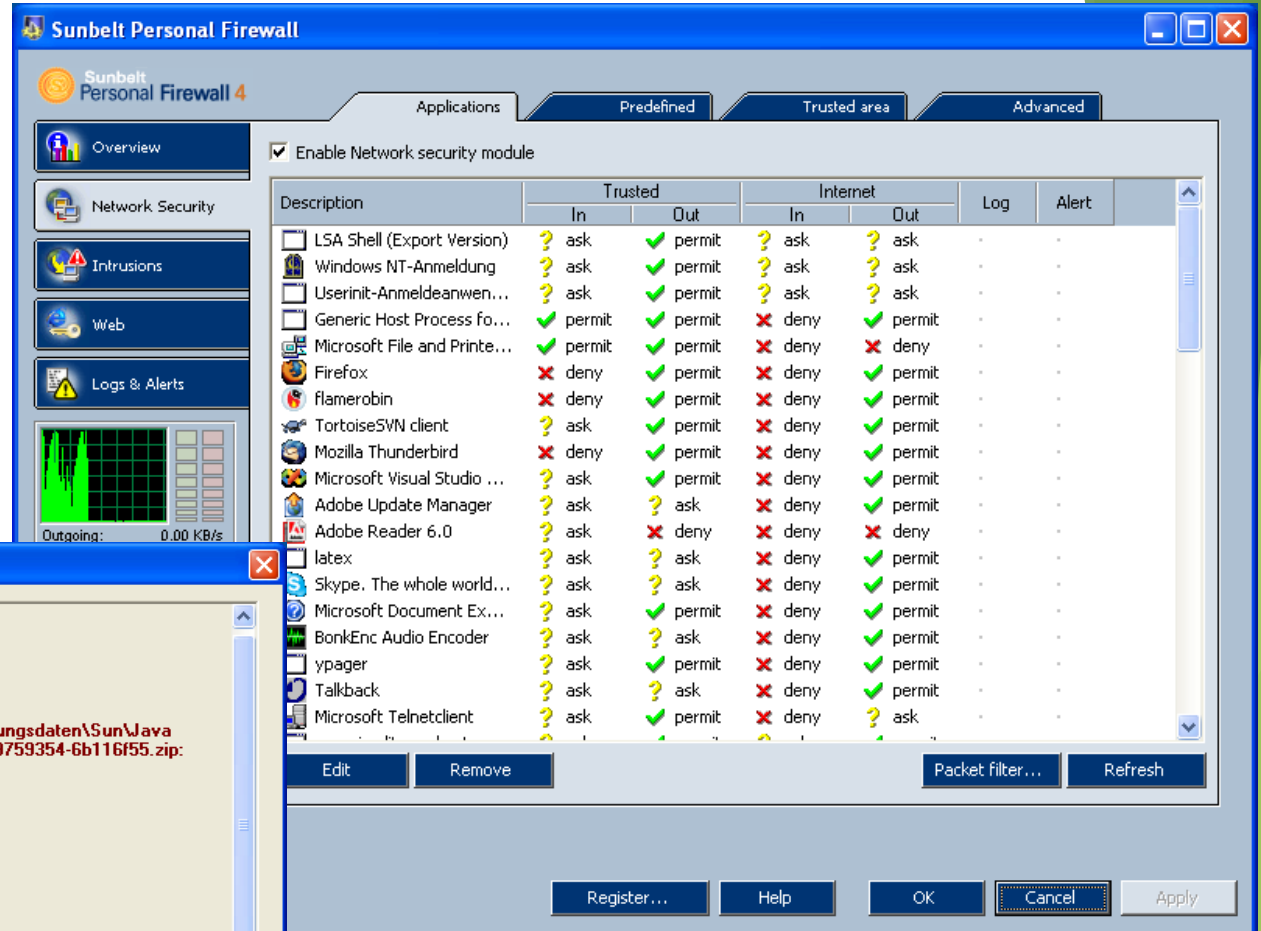
Graphics software



Music software



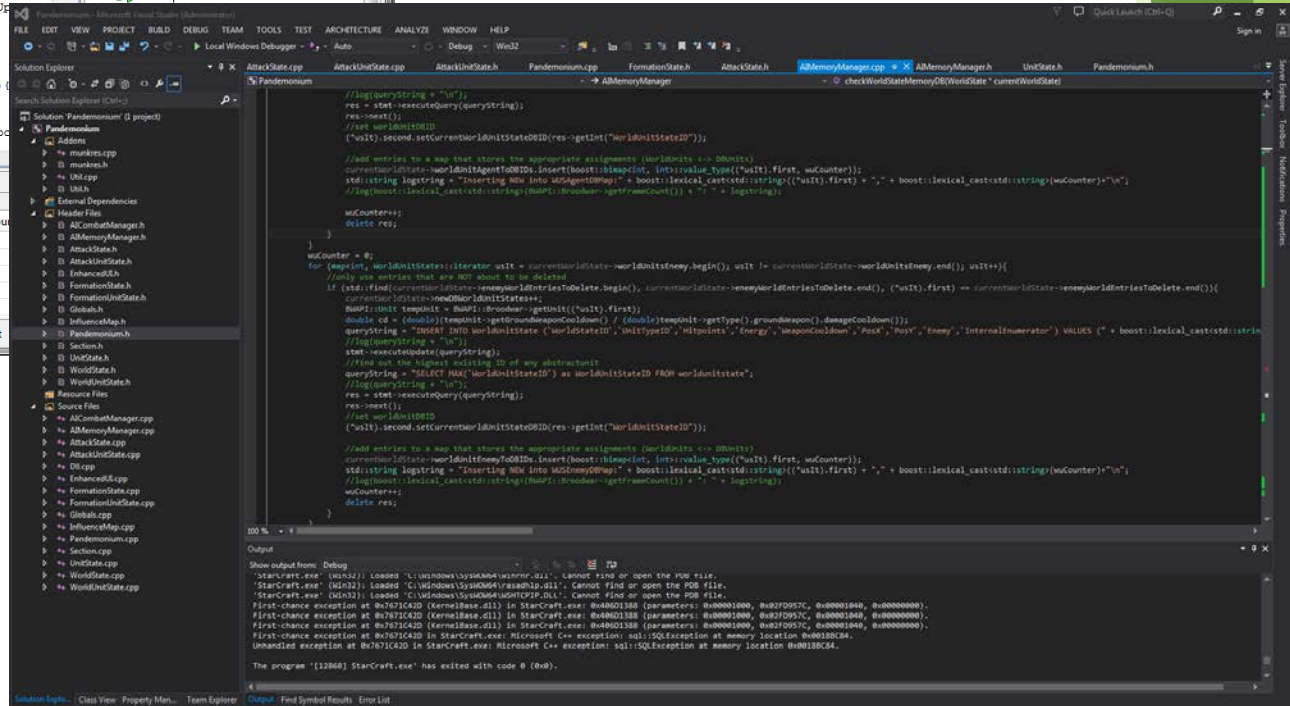
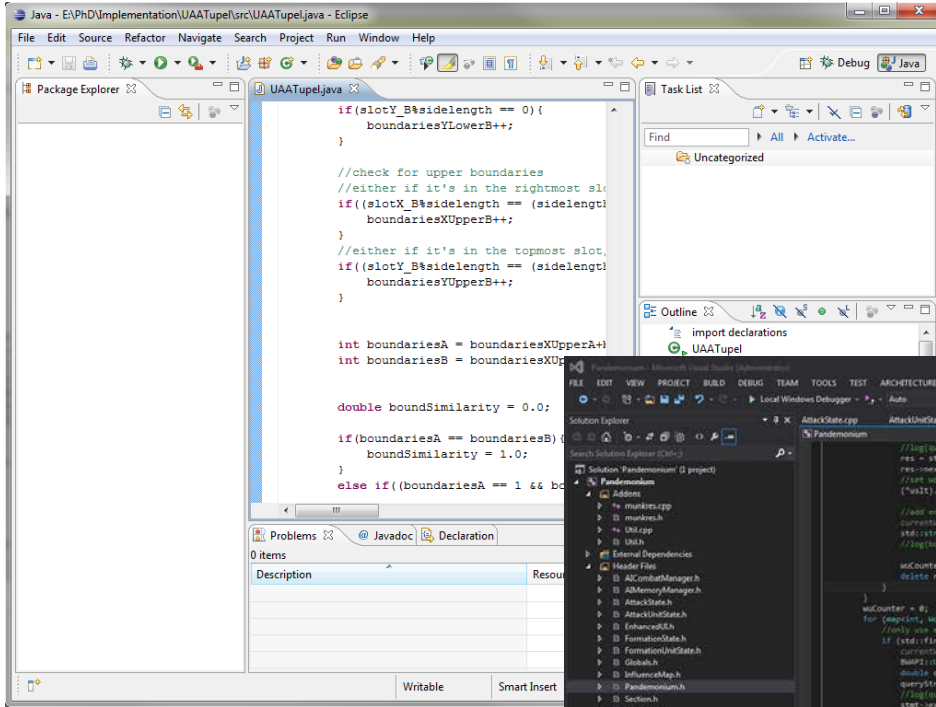
Security software



Software development

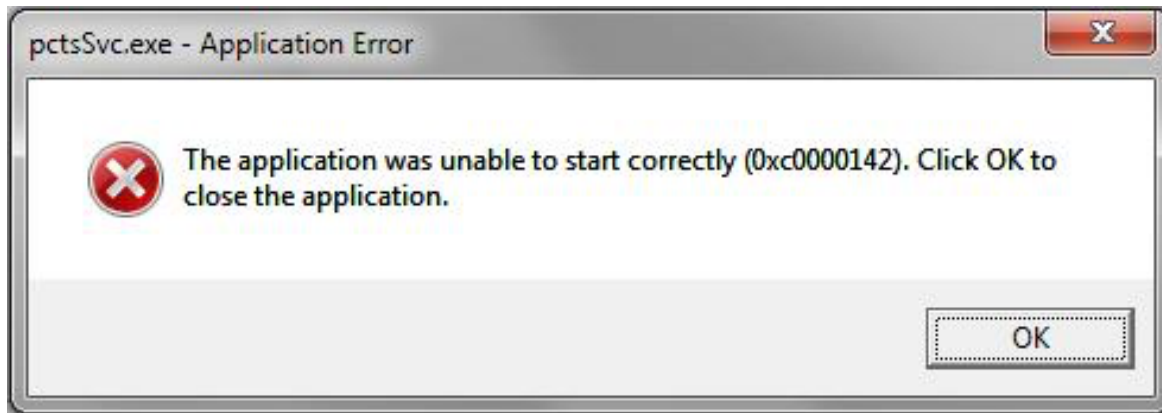
Visual Studio

Eclipse



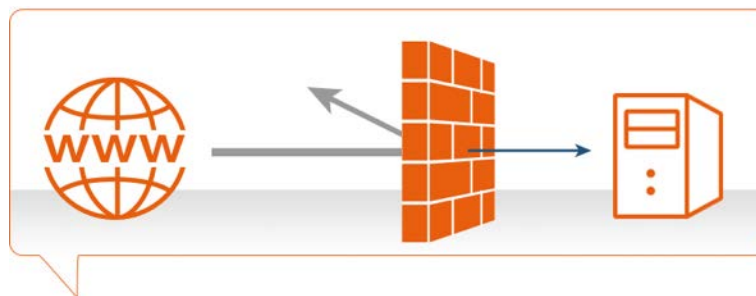
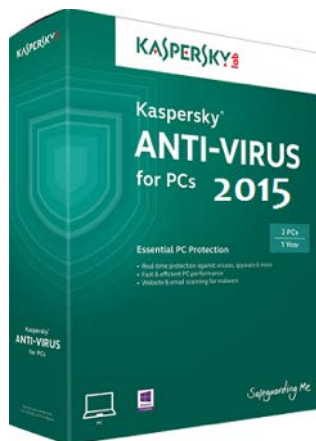
Software failure

- ▶ Sometimes errors occur in software, they generally can't be fixed but you can:
 - ▶ Google your problem to see if there's a solution
 - ▶ Report the problem to the developer



Malware and viruses

- ▶ Malicious software (malware) can damage a user's computer, data or apps
- ▶ Viruses attach themselves to other programs, where they can cause damage and spread to other computers
- ▶ Protect your computer and data with anti-virus software and a firewall



Summary

- ▶ Software allows users to perform tasks with their computer
- ▶ Software is protected by copyright. Users receive a licence to use software
- ▶ Proprietary software vs open source software
- ▶ CLI vs GUI
- ▶ Different kinds of software can be used to perform different tasks