

KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ SPOŁECZNY

„Image Processing and Computer Graphics”

Prezentacja multimedialna współfinansowana przez Unię Europejską w ramach Europejskiego Funduszu Społecznego w projekcie pt. „Innowacyjna dydaktyka bez ograniczeń - zintegrowany rozwój Politechniki Łódzkiej - zarządzanie Uczelnią, nowoczesna oferta edukacyjna i wzmacniania zdolności do zatrudniania osób niepełnosprawnych”

Politechnika Łódzka, ul. Żeromskiego 116, 90-924 Łódź, tel. (042) 631 28 83
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Image Processing & Computer Graphics **2**

Contribution

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Image Processing & Computer Graphics **3**



Software

Image editing and processing	3D raster image processing
– Paint	– MRlcro
– Adobe PhotoShop	– MRlcron
– Corel Photopaint, Paint Shop	
– GIMP	Data computation
– ImageJ	– Matlab + Image Processing Toolbox
	– SciLab + Siptoolbox
	– MaZda + b11
Video processing	Programing
– Windows Movie Maker	– OpenCV
– Pinnacle Studio	– VxL
– Ulead VideoStudio	– ITK + VTK
– Corel Video Studio	– DirectShow
– VirtualDub(Mod)	
– Graph Edit	

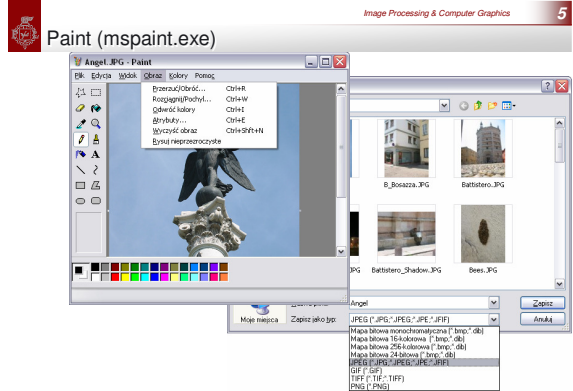
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Software

Image editing and processing

Paint (mspaint.exe)



Comparison of raster graphics editors

From Wikipedia, the free encyclopedia

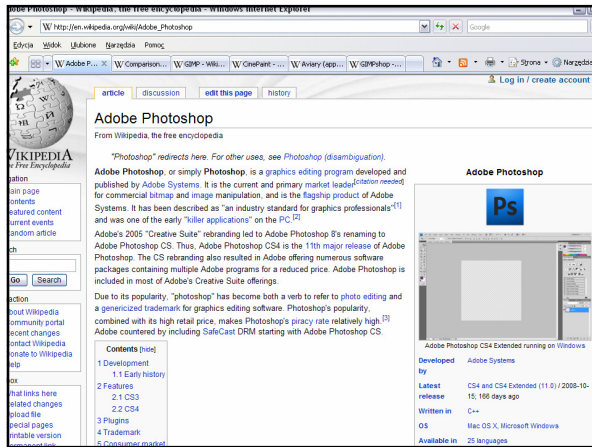
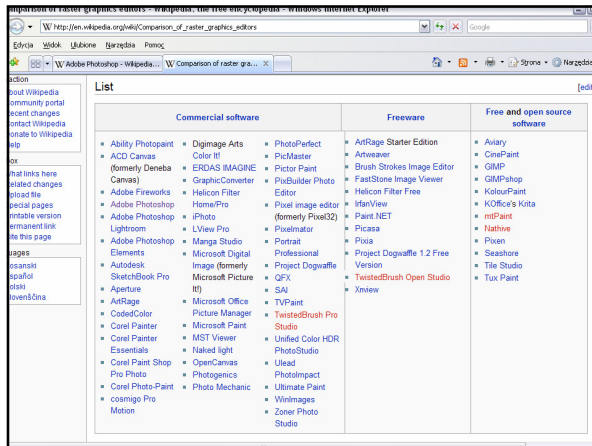
This is a comparison of raster graphics editors sorted by availability.

[Contents](#) [hide]

- List
- General information
- Operating system support
- Features
- Color spaces
- File support
- Notes and references
- See also
- External links

List

Commercial software	Freeware	Free and open source software
<ul style="list-style-type: none"> Ability Paintpaint ACD/Canvas (formerly Danaba Canvas) Adobe Fireworks Adobe Photoshop 	<ul style="list-style-type: none"> Digimage Arts Color II ERDAS IMAGINE GraphicConverter Helicon Filter Editor HomePie iPhoto PhotoPerfect PicMaster Pictor Paint PixBuilder Photo Editor Pixel image editor (formerly Pixel32) 	<ul style="list-style-type: none"> ArtRage Starter Edition Artweaver Brush Strokes Image Editor FastStone Image Viewer Helicon Filter Free ManView Paint.NET Aviary CinePaint GIMP GIMPshop KollonPaint KOffice's Krita miPaint



Overview

Paint Shop Pro Photo X2 has everything you need to create stunning photos. The integrated Learning Center and a selection of one-click photo-fixing tools make it easy to correct common photo flaws such as red-eye, color and sharpness. Unique makeover tools let you whiten teeth, remove blemishes and paint on a tan, so you can make everyone look their best before printing or posting photos online.

As your skills and confidence grow, you can harness the power of professional-quality features such as HDR Photo Merge, Histogram, Curves and Levels Adjustment tools to make precision edits. You can even get creative with artistic effects and filters to turn your favorite photos into fun projects to share with family and friends.

- Import pictures from your camera automatically
- Instantly fix common problems such as red-eye, color and sharpness
- Add special effects to photos, text and projects with a few simple clicks
- Use advanced editing tools to fine-tune images on your own
- Print, email and share photos

Try it for FREE
[DOWNLOAD TRIAL](#)

Paint Shop Pro Photo X2
Includes:
• Paint Shop pro photo editor

Paint Shop Pro Photo X2 Ultimate
Includes everything in Paint Shop Pro Photo X2, plus:
• **Enhanced!** Support for more than 250 camera raw

WIKIPEDIA
The Free Encyclopedia

GIMP
From Wikipedia, the free encyclopedia

For other uses, see [Gimp](#).

The **GIMP (GNU Image Manipulation Program**, previously **General Image Manipulation Program**) is a free software, raster graphics editor used to process digital graphics and photographs. Typical uses include creating graphics and logos, resizing and cropping photos, altering colors, combining multiple images, removing unwanted image components, and converting between different image formats.^[c] Along with these uses, GIMP is widely used as a tool for photo enhancement. GIMP can also be used to create basic animated images in GIF format. It is often used as a replacement for Adobe Photoshop, the most widely used bitmap editor in the printing and graphics industries; however, it is not designed to be a Photoshop clone.^[d] The project's mascot is named Wilber.

The project was started in 1995 by Spencer Kimball and Peter Mattis and is now maintained by a group of volunteers under the auspices of the GNOME Project.^[e] The current version of GIMP works with numerous operating systems, including most Unix variants, Microsoft Windows and Mac OS X. Released under the terms of the GNU General Public License, the GIMP is free software.

Contents (hide)

- 1 Features
 - 1.1 Color support
 - 1.2 Selection and masking tools
 - 1.3 Paths
 - 1.4 Effects, scripts, and filters
- 2 Development
- 3 History
 - 3.1 GIMP 0.54
 - 3.2 GIMP 0.54
 - 3.3 GIMP 0.54

References (hide)

External links

Developed by: The GIMP Development Team
Initial release: 1995
Stable release: 2.8.6 (2009-3-17): 13 days
Preview release: 2.7.0 (2009-02-10): 43 days
Written in: C
Platform: Unix, Mac OS X, Microsoft Windows

GNU Image Manipulation Program

News
Screenshots
Features
Downloads
Documentation
Get involved
Plug-in Registry
GIMP Development
Make a Donation

GIMP is the GNU Image Manipulation Program. It is a freely distributed piece of software for such tasks as photo retouching, image composition and image authoring. It works on many operating systems, in many languages ([details](#)).

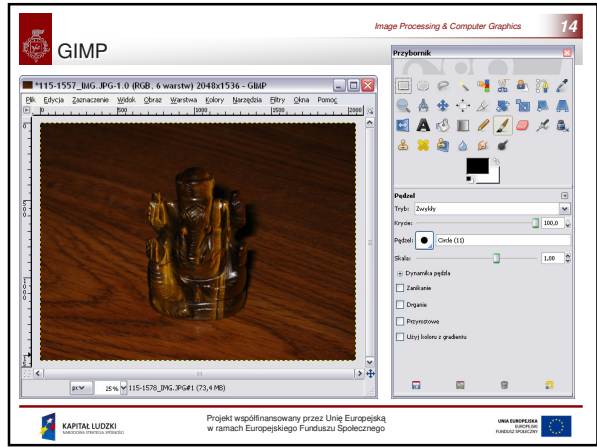
This is the official GIMP web site. It contains information about downloading, installing, using, and enhancing it. This site also serves as a distribution point for the latest releases. We try to provide as much information about the GIMP community and related projects as possible. Hopefully you will find what you need here. Grab a properly chilled beverage and enjoy.

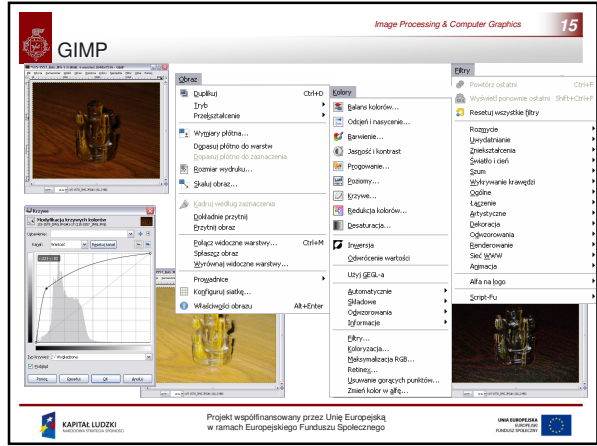
GOOGLE SUMMER OF CODE - STUDENT APPLICATION PERIOD HAS STARTED 03-24

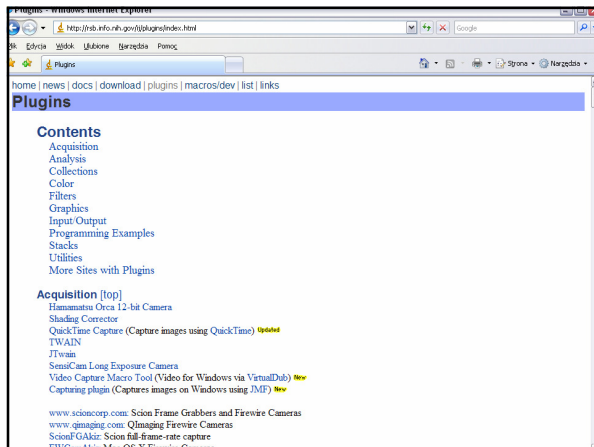
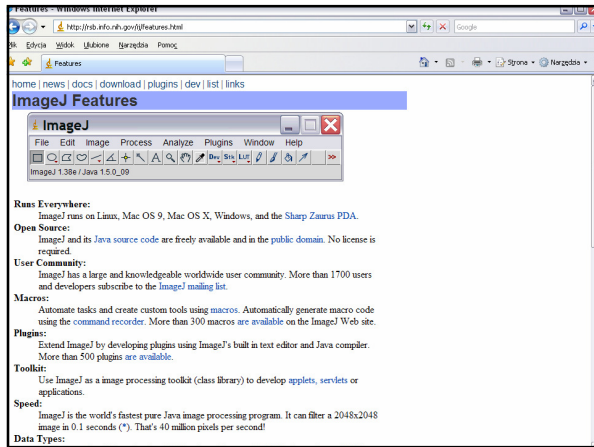
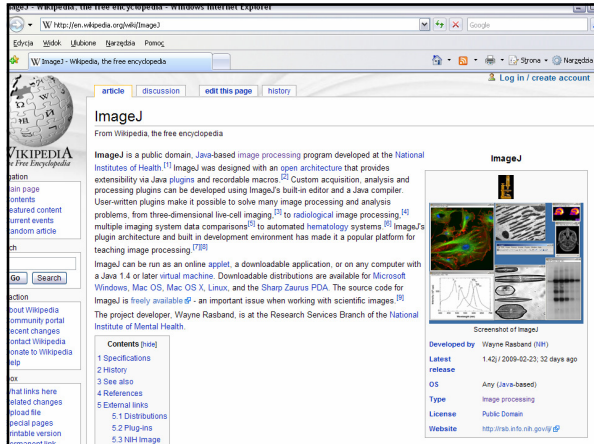
Google has started to accept applications from students for Summer of Code.

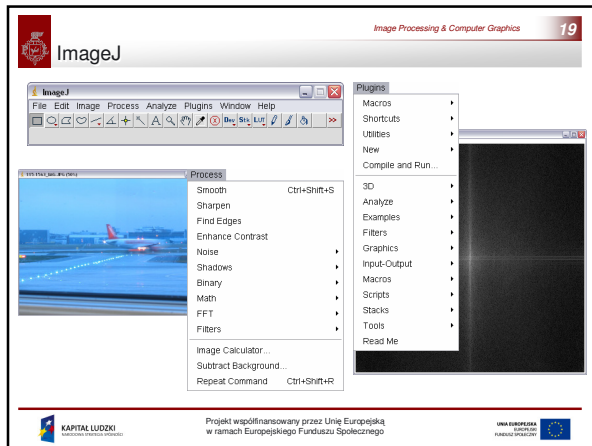
If you are interested in our [applications](#), then check if you meet [Google's requirements](#), have a look at their [advice](#) and check what we want to read in [your application](#).

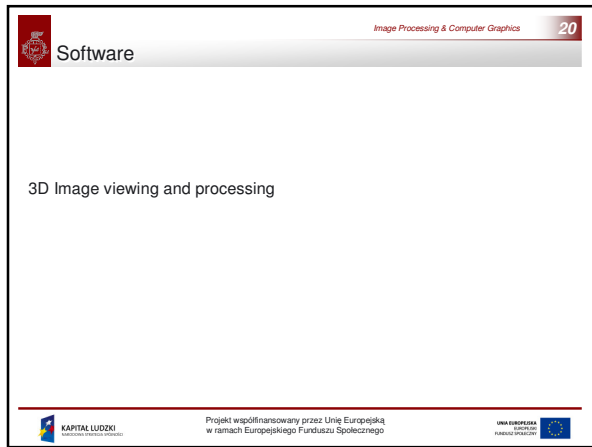


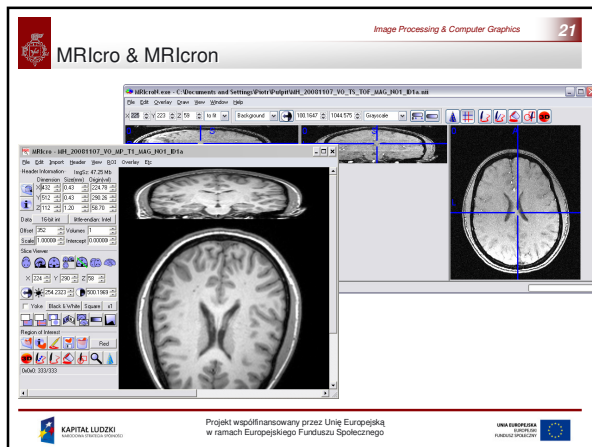


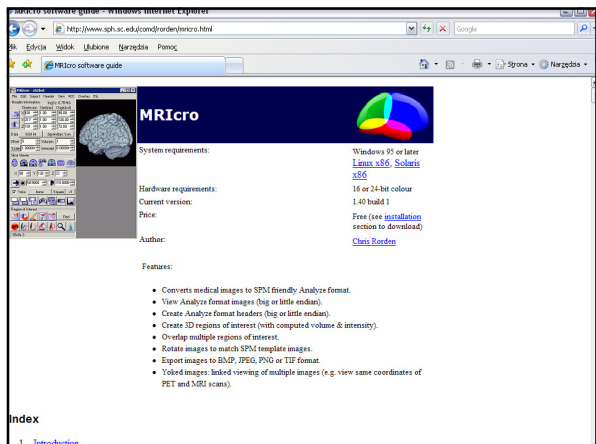


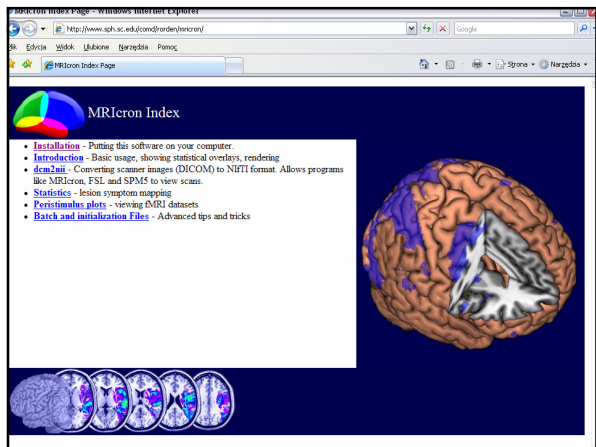












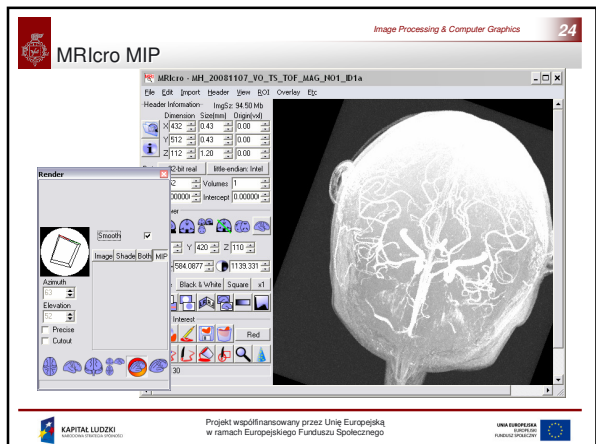


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MRIcro – image filtration and plugins

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Software

Video editing

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Comparison of video editing software - Wikipedia, the free encyclopedia

This is a comparison of non-linear video editing software applications. See also a more complete list of video editing software.

Contents (hide)

- General information
- System requirements
- High definition import
- Features set
- Output options
- Target market
- See also
- External links

General information

This table gives basic general information about the different editors:

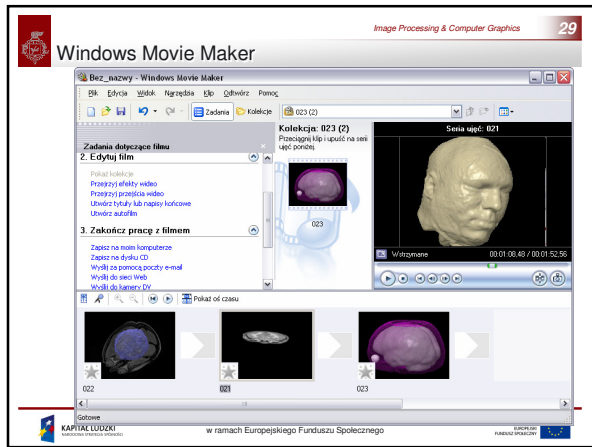
Program	Developer	Year of first release	Year of latest release	Latest version	List price (USD)	License
Adobe Premiere/Premiere Pro	Adobe Systems	1991	2008	CS4	\$799	Proprietary
Adobe Premiere Elements	Adobe Systems	2004	2008	7.0	\$100	Proprietary
Avid Free DV	Avid	?	?	1.8	Free (no Longer Available)	Proprietary
Avid Express DV	Avid	2000	?	4.8	No longer Available	Proprietary
Avid Express Pro Studio HD	Avid	2003	?	6.8	\$499	Proprietary

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

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Program (PL)	Developer (PL)	Year of first release (PL)	Year of latest release (PL)	Latest version (PL)	Latest version (EN)	License (PL)
Avid ProMedia Premiere Pro	Avid Systems	1991	2008	CS4	9.0	Proprietary
Avid ProMedia Premiere Elements	Avid Systems	2004	2008	2.5	9.0	Proprietary
Avid Free DV	Avid	?	?	1.0	Free DV-Large Audiences	Proprietary
Avid Kinetic 3D	Avid	2000	?	4.0	High-End software	Proprietary
Avid Access Pro Studio HD	Avid	2003	?	5.0	SD	Proprietary
Avid iStudio	Avid	2003	?	7.0	SD	Proprietary
Avid Media Composer	Avid	1999	2008	2.1.1	SD/HD	Proprietary
Amplifier	Amplifier Visual	2003	2008	2.0.0	Free	GPL
Conform	Conform	2008	2008	4.5	Free	GPL
DaVinci Resolve	Blackmagic	2007	2008	1.2	9.0	Proprietary
Edius	Genie Video Sony	2002	2008	5.5	SD	Proprietary
Final Cut Pro	Apple	2002	2007	4.0.1	SD	Proprietary
Final Cut Pro Studio	Apple	1999	2007	4.0	SD/HD	Proprietary
Avid Free DV	Avid Technology	2001	2008	?	9.0/8.5/7.0/6.0	Proprietary
Edius (HD)	Genie Video	2008	2008	?	9.0/8.5/8.0/7.0	Proprietary
Edius (SD)	Genie Video	2004	?	18 April 2007	Free	Proprietary
Edius (HD)	Genie Video	2004	2008	8.0	Free	GPL
Edius (SD)	Genie Video	2002	2008	8.0.2	Free	GPL
Edius (HD)	Genie Video	2008	2008	1.5	Free	GPL
Edius (SD)	Genie Video	2002	2008	3.9.9	Free	GPL
Edius (HD)	Genie Video	2008	2007	3.5	SD/HD-Large Audiences	Proprietary
Edius (SD)	Genie Video	2008	?	11.0	SD/HD	Proprietary
Edius (HD)	Genie Video	2008	2008	4.4.1.1	SD/HD	Proprietary
Edius (SD)	Genie Video	2008	2007	11	SD/HD	Proprietary
Edius (HD)	Genie Video	2007	2008	12.1	SD/HD	Proprietary
Edius (SD)	Genie Video	2007	2008	12.1	SD/HD	Proprietary
Edius (HD)	Genie Video	2007	2008	10.0.1	SD/HD	Proprietary
Edius (SD)	Genie Video	?	?	8.0	SD/HD	Proprietary
Edius (HD)	Genie Video	?	?	8.1	SD/HD	Proprietary
Edius (SD)	Genie Video	2008	2007	10	SD/HD	Proprietary
Edius (HD)	Genie Video	2007	2008	2.1.1	Free	Proprietary
Edius (SD)	Genie Video	2008	2008	1.0.0	Free	GPL
Edius (HD)	Genie Video	2002	2008	11.0.2.0.0.0	Free	GPL
Edius (SD)	Genie Video	2008	?	11.0001.0008	SD/HD-Large Audiences	Proprietary
Edius (HD)	Genie Video	2008	?	11.0001.0008	SD/HD-Large Audiences	Proprietary

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Wikipedia - Pinnacle Studio

W Pinnacle Studio - Wikipedia, the free encyclopedia

Pinnacle Studio

From Wikipedia, the free encyclopedia

Pinnacle Studio is a non-linear video editing software application manufactured by Pinnacle Systems, a division of Avix Technology. It is the consumer level counterpart to Pinnacle's former professional level software, Liquid Edition (now Avix Liquid). It also inherits from VOB Computersystem's Instant CD/DVD Studio which allows users to author video content, create VCD/DVDs with menus and burn them without the need for any additional software.

Pinnacle Studio may be purchased separately, but is also included in bundled packages with various video capture hardware devices. These include analog and digital capture, either as PCI cards or connection via USB. In September 2007, Pinnacle released new versions of their Motionbox devices, including HDV and AVCHD support, shipped with their new Studio products.

In addition, a cut-down SE version entitled Pinnacle Studio QuickStart was included with the Dazzle (another USB capture device) and Pinnacle PCTV products, though since the release of Studio 12, the QuickStart version has been discontinued. Dazzle Video Creator Platinum now ships with the regular basic version of Studio, and the PCTV products ship with VideoSpin (see below).

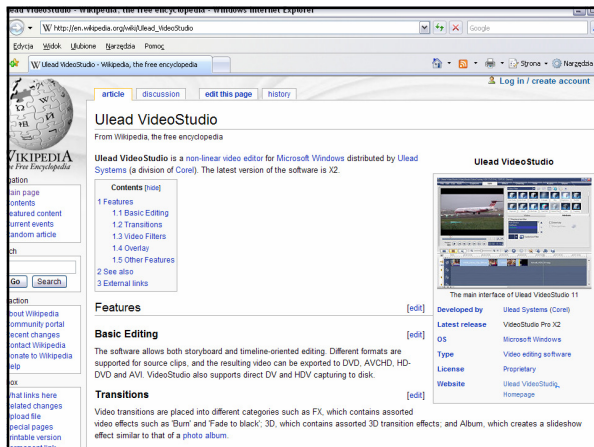
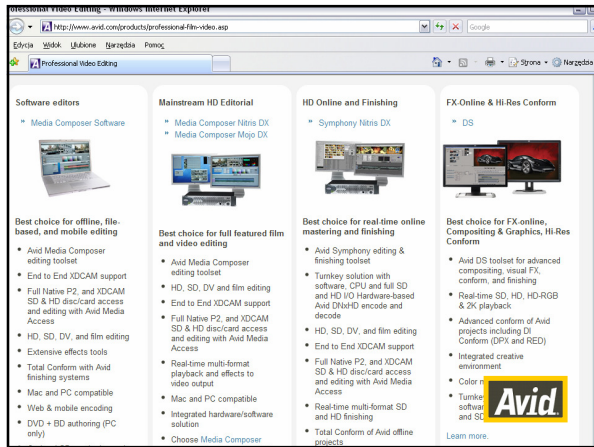
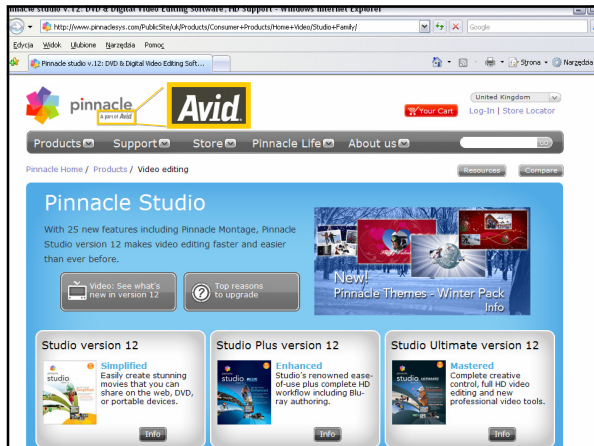
Contents

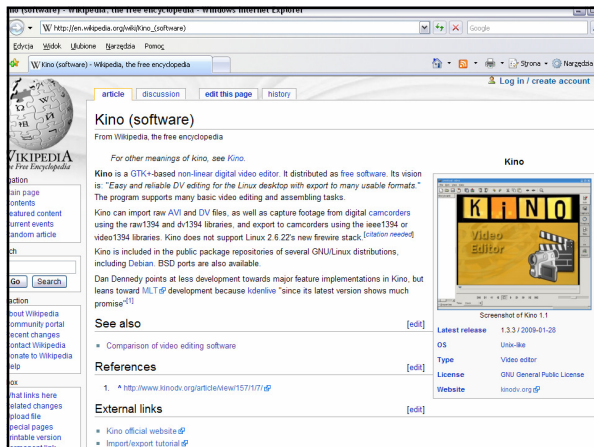
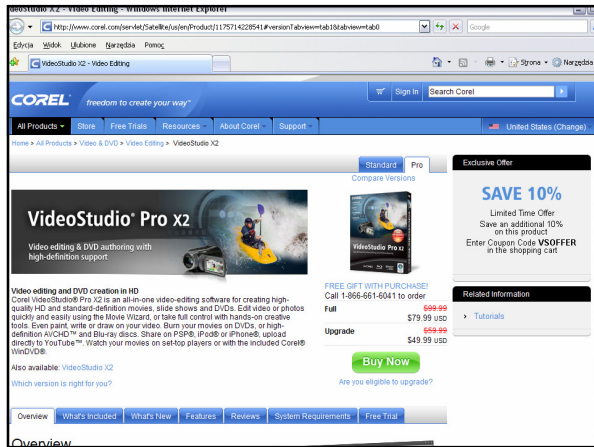
- 1 Versions
- 2 VideoSpin
- 3 References
- 4 External links

Versions

Developed by Pinnacle Systems
 Latest release 12.1 / October 15, 2008
 Preview release None / None
 OS Windows XP, Windows Vista
 Type Video editing software
 License Proprietary
 Website pinnacle.com







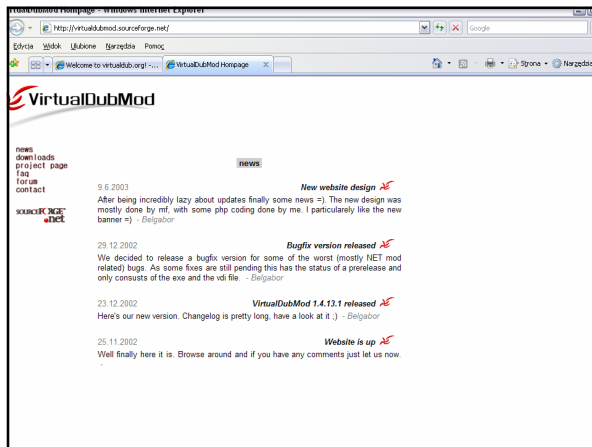
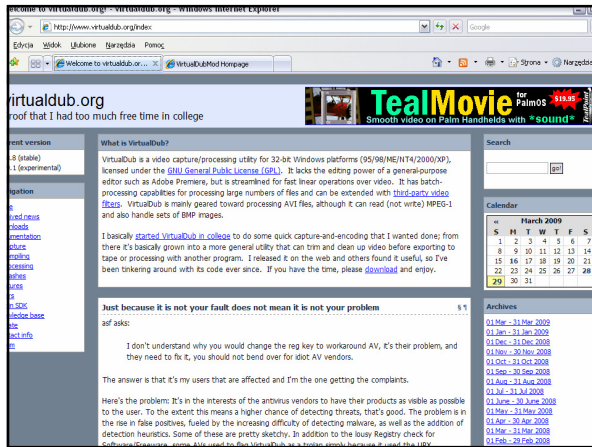


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Software

Video processing

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VirtualDub

VirtualDubbed 1.5.10.2 - [115-1552_MVI.AVI]

VirtualDubbed 1.5.10.2 - capture mode [C:\CAPTURE.AVI] [FILE EXISTS]

Frames captured	26
Total time	0:03
Total size	576,95
Total file size	29,048
Disk space free	416,5768
GPU usage	4%
-Video-	
Size	29,048
Average rate	14,6860 fps
Data rate	17451,83/s
Compression	1:0,1
Avg.frame size	12189,2
Frames dropped	0
-Audio-	
Size	16400 bytes
Relative rate	(n/a)
Data rate	119,8/s
Compression	1:0,1
VT adjust	+0 ms

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Image Processing & Computer Graphics 42

VirtualDub filters

Add Filter

- 2:1 reduction (high quality) (internal)
- 2:1 reduction (internal)
- blur more (internal)
- blur (internal)
- box blur (internal)
- brightness/contrast (internal)
- chroma smoother (internal)
- denoise (internal)
- emboss (internal)
- find bob (internal)
- find swap (internal)
- lfi (internal)
- flip horizontally (internal)
- flip vertically (internal)
- general convolution (internal)
- grayscale (internal)
- HSV adjust (internal)

Filter information

2 - capture audio [C:\CAPTURE.AVI] [FILE EXISTS]

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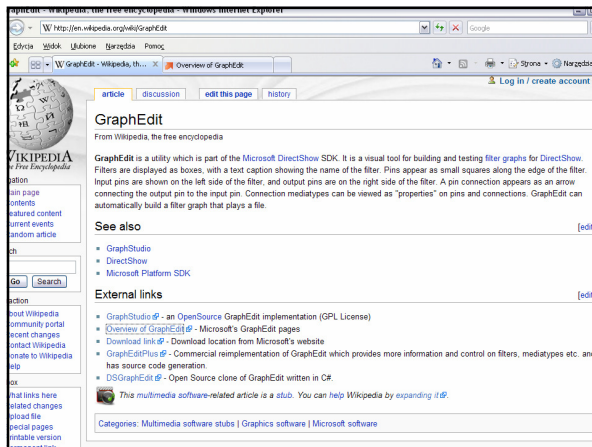
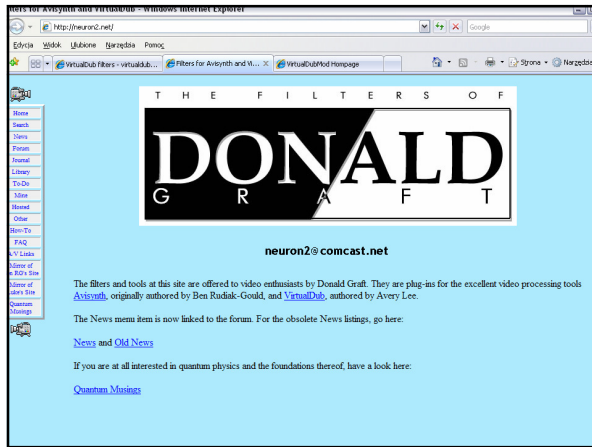
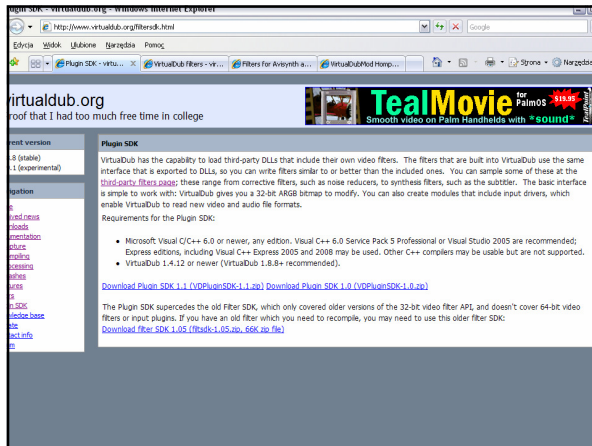




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Software

Numerical analysis


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WIKIPEDIA
The Free Encyclopedia

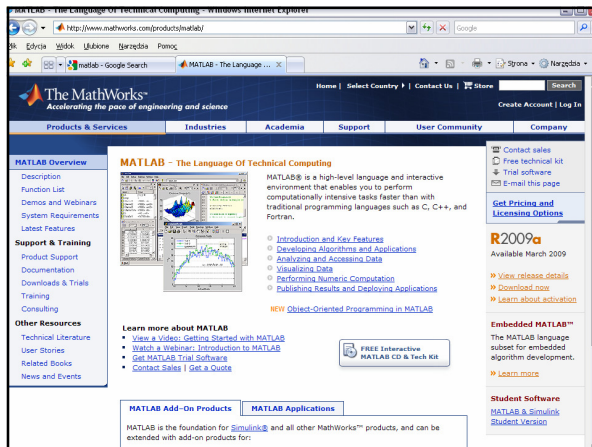
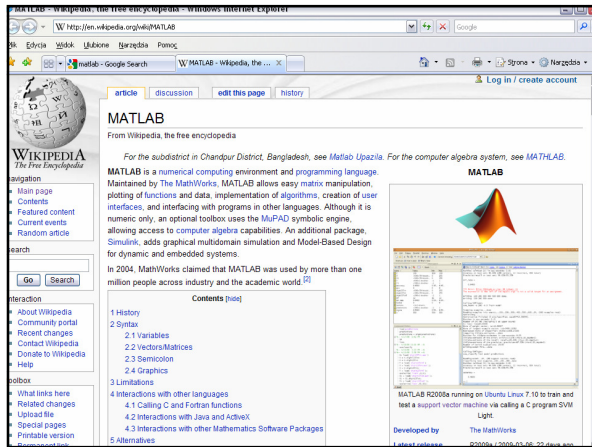
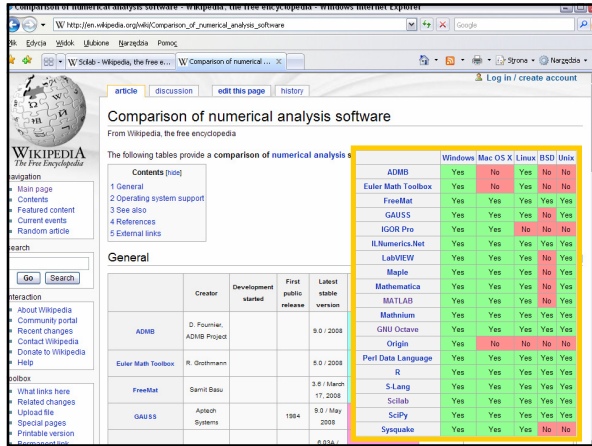
List of numerical analysis software

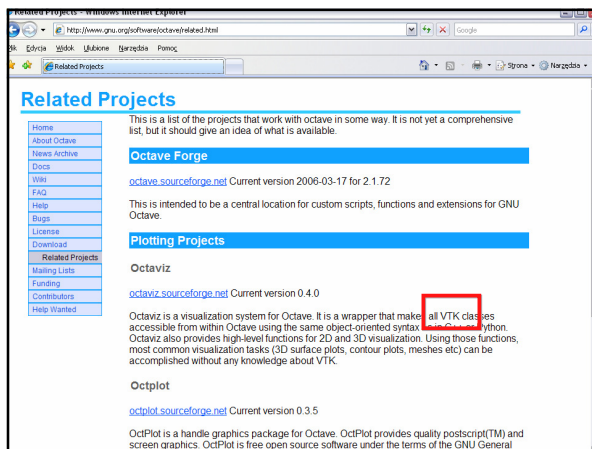
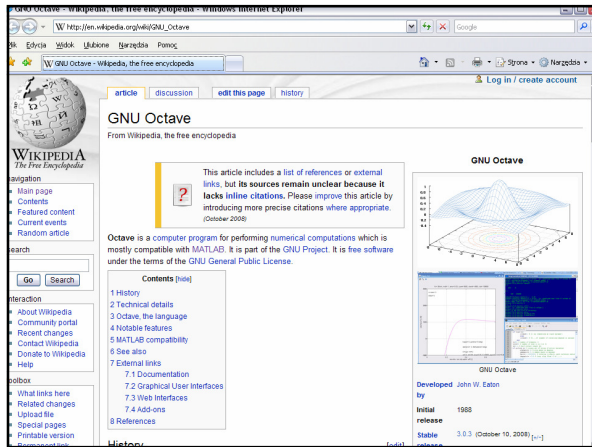
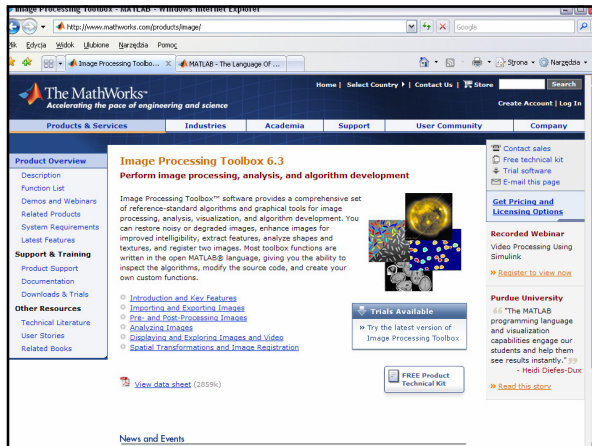
From Wikipedia, the free encyclopedia

Listed here are a number of computer programs used for performing numerical calculations:

- **ADMB** is a software suite for non-linear statistical modeling based on C++ which uses automatic differentiation.
- **acslX** is a software application for modeling and evaluating the performance of continuous systems described by time-dependent, nonlinear differential equations.
- **AIMMS** is a general mathematical modeling language that offers various solver programs for linear, nonlinear and other mathematical programs. It uses specially designed sparse data structures to assure fast execution and calculation on multi-dimensional data.
- **AMPL** is a mathematical modeling language for describing and solving high complexity problems for large scale optimization.
- **API** (programming language) is a language designed for array manipulation that is used for a wide variety of scientific, engineering, and actuarial analysis.
- **Apophenia #** is a C library, based on the GSL (below), that provides functions and structures on the level of data sets and statistical models.
- **Armadillo** is a C++ linear algebra library (matrix and vector maths), aiming towards a good balance between speed and ease of use.
- **ASCEND** is a free/open-source general mathematical modelling language and solver program for nonlinear systems of equations and systems of differential-algebraic equations.
- **Bluewin** is a time-frequency browser for numerical signals analysis and scientific visualization.
- **CC4** is version 4 of the Calculus Calculator. CC4 includes matrices and infinite precision arithmetic. It was developed in the Department of Mathematics at San Francisco State University.
- **CoIT #** provides a set of Open Source Libraries for High Performance Scientific and Technical Computing in Java.
- **COMSOL Script** for numerical computations and interactive partial differential equation solving with the finite element method, uses MATLAB-compatible syntax. Optionally connects to COMSOL Multiphysics.
- **DADSP** is a commercial program focused on DSP that combines the numerical capability of MATLAB with a spreadsheet like interface.

- **GRACO**, a numerical linear algebra toolkit for the Java programming language
- **iScience**, an open-source (multiple licenses) Java API for performing numerical calculations and data storage among other things.
- **JLab**, a research platform for building an open source Matlab-like environment in pure Java. Currently supports interpreted S-Scripts (Matlab-like), compiled GroovySci (extension to Groovy) scripts, direct interfacing to Java code and scripting access to many popular Java scientific libraries (e.g. WEKA, JSu, NUMAL) and application Wizards, project page: [1][2]
- **libNumerics #** is a Numerical Library for .NET written in C#. It provides routines for: Linear Algebra, Differential Equations and Optimization.
- **LabVIEW** offers both textual and graphical programming approaches to numerical analysis. Its text-based programming language MathScript utilizes .m file script syntax providing some compatibility with MATLAB, COMSOL Script, FreeMat, GNU Octave, O-Matrix, Riab, SciLab, and Sysquake.
- **LAPACK++**, a C++ wrapper library for LAPACK and BLAS
- **Lush** is an object-oriented programming language based on LISP for large-scale numerical and graphic applications.
- **Macsyma**, a general-purpose computer algebra system, which has a free GPL-licensed version called Maxima.
- **Maple**, a general-purpose commercial mathematics software package.
- **Mathcad** offers a WYSIWYG interface and the ability to generate publication-quality mathematical equations.
- **Mathmagix**, an open source (GNU GPL license) general-purpose mathematics software package.
- **Mathematica** offers numerical evaluation, optimization and visualization of a very wide range of numerical functions. It also includes a programming language and computer algebra capabilities.
- **MATLAB** is a widely used program for performing numerical calculations. It comes with its own programming language, in which numerical algorithms can be implemented. Several programs use a similar syntax: COMSOL Script, FreeMat, GNU Octave, LabVIEW (in MathScript blocks), O-Matrix, Riab, SciLab, and Sysquake.
- **MathWorks "GPI"** is a program for numerical computing, data analysis, and graphics. Its syntax is similar to Matlab. It is written in Java and provides very simple mechanisms for using and extending existing Java classes, and implementing Java interfaces. It can therefore also be used for rapid prototyping of Java applications as well as Java Swing/AWT GUIs.
- **MCSim** a Monte Carlo simulation tool.
- **MDYmaxX** is a general purpose molecular simulation package.
- **NA WorkSheet** is a collective aggregation of algorithms coded in Java that implements various Numerical Analysis solutions/techniques in one easy to use opensource tool.
- **NAG Numerical Libraries** are implementations (for a wide variety of platforms) of a software library of numerical analysis routines, which can be called from user applications.
- **NCAR Command Language** is an interpreted language designed specifically for scientific data analysis and visualization.





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Programming

Environments

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Wikipedia article: **Integrated development environment**

An **integrated development environment (IDE)** also known as **integrated design environment** or **integrated debugging environment** is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of a:

- Source code editor
- Compiler and/or interpreter
- Build automation tools
- Debugger

Sometimes a **version control system** and various tools are integrated to simplify the construction of a GUI. Many modern IDEs also have a **class browser**, an **object inspector**, and a **class hierarchy diagram**, for use with **object-oriented software development**.^[1]

Contents (hide)

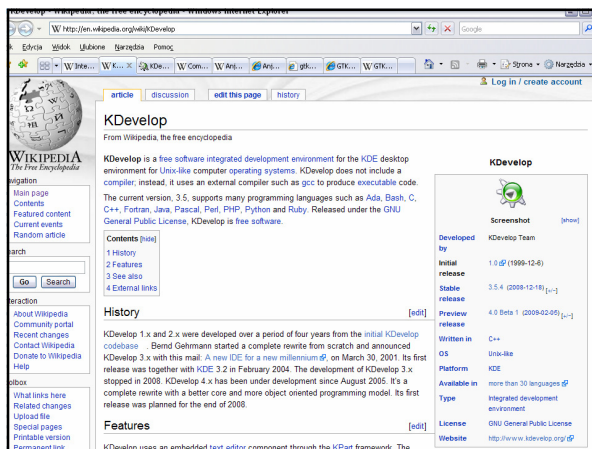
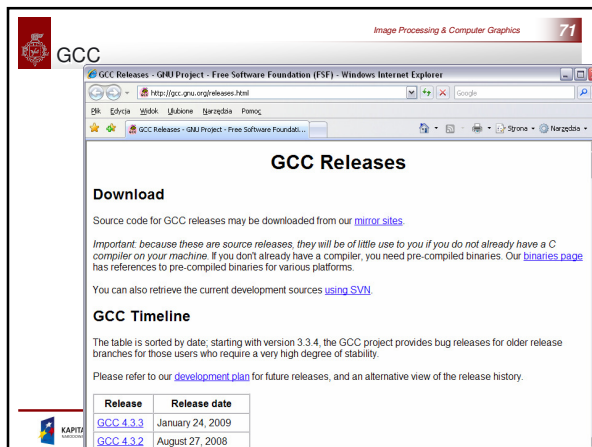
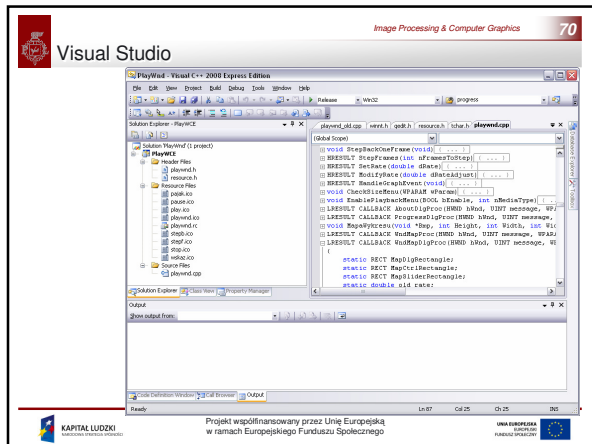
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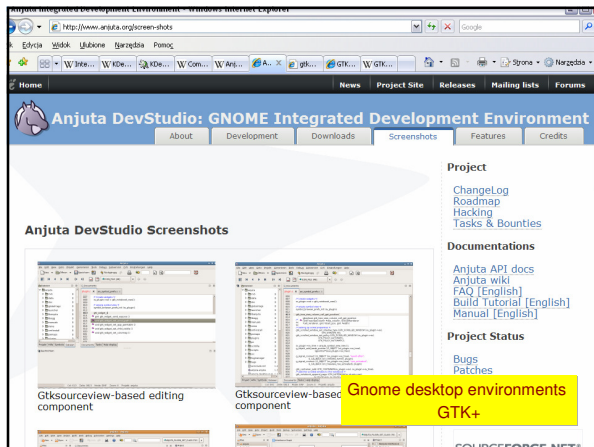
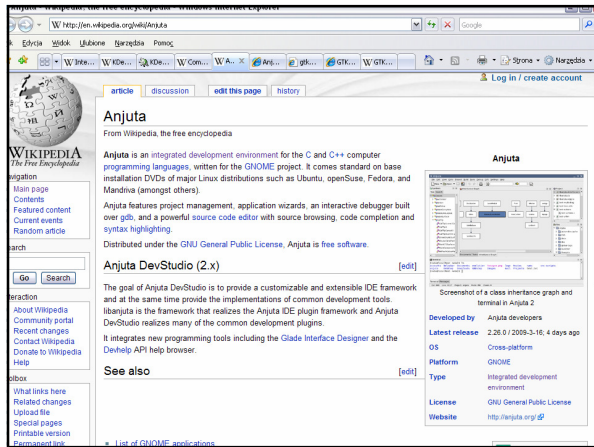
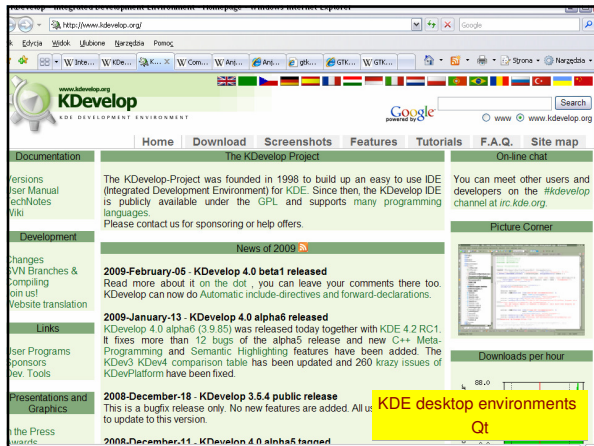
Overview [edit]

Wikipedia article: **Comparison of integrated development environments**

Main articles: **C (programming language)** and **C++**

IDE	License	Windows	Linux	Other platforms	Debugger	GUI Builder	Toolchain	Profiler	Code Coverage	Autocomplete	Static code analysis	GUI Based Design
Anjuta	GPL	No	Yes		Yes	Yes	Unknown	Yes	Unknown	Yes	Unknown	No
C++ Builder	Proprietary	Yes	Yes		Yes	Yes	Yes	No	No	Yes	No	Yes
Code::Blocks	GPL	Yes	Yes	Mac OS X	Yes	Yes	Yes	Unknown	Unknown	Yes	Unknown	Yes ^[1]
Codelite	GPL	Yes	Yes	Mac OS X	Yes	No	Yes	Unknown	Unknown	Yes	Unknown	Unknown
Dev-C++	GPL	Yes	Yes ^[2]		Yes	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Yes
Eclipse CDT	EPL	Yes	Yes	JVM	Yes	Yes ^[3]	No	Unknown	Unknown	Yes	Unknown	No
Geany	GPL	Yes	Yes		No	No	No	Unknown	Unknown	Yes	Unknown	Unknown
GBAT Programming Studio	GPL	Yes	Yes	Solaris	Yes	Unknown	Yes	Yes	Unknown	Unknown	Yes	Unknown
KDevelop	GPL	Yes ^[4]	Yes		Yes	Yes	Yes	Yes	Unknown	Yes	Unknown	Yes
MonoDevelop	GPL	Yes	Yes	Mac OS X	No ^[5]	Yes	No	Unknown	Unknown	Unknown	Unknown	Yes
NetBeans C/C++ pack	CCDL	Yes	Yes		Yes	No	Yes ^[6]	Unknown	Unknown	Yes	Unknown	No





OpenCV Wiki | CvReference

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Cv Reference Manual

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OpenCV samples

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OpenCV programming example

```

#include "opencv2/opencv.hpp"
#include "highgui.h"
using namespace cv;

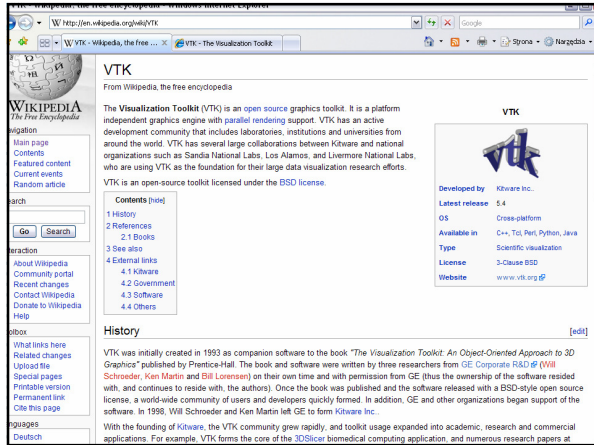
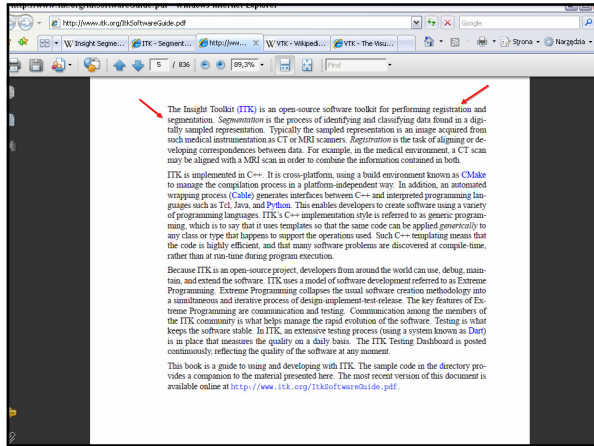
int main(int argc, char** argv)
{
    // Create a window
    cvNamedWindow("Edge", CV_WINDOW_AUTOSIZE);
    // Load the image
    IplImage* img = cvLoadImage("img.jpg", CV_LOAD_IMAGE_GRAYSCALE);
    // Convert to grayscale
    cvtColor(img, img, CV_BGR2GRAY);
    // Create a window
    cvNamedWindow("Edge", CV_WINDOW_AUTOSIZE);
    // Show the image
    imshow("Edge", img);
    // Wait for a key stroke; the same function arranges events processing
    cvWaitKey(0);
    // Release image data
    cvReleaseImage(&img);
    // Destroy a window
    cvDestroyWindow("Edge");
    return 0;
}

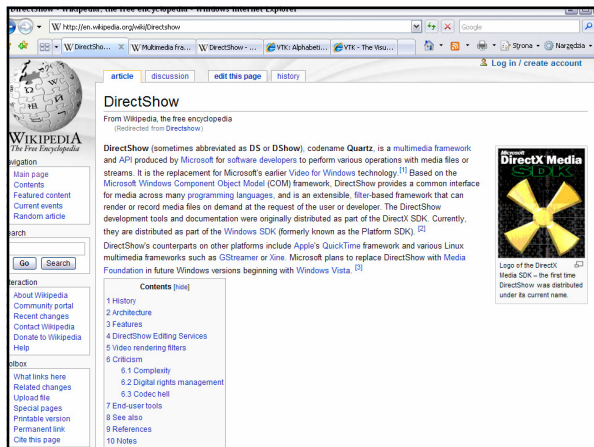
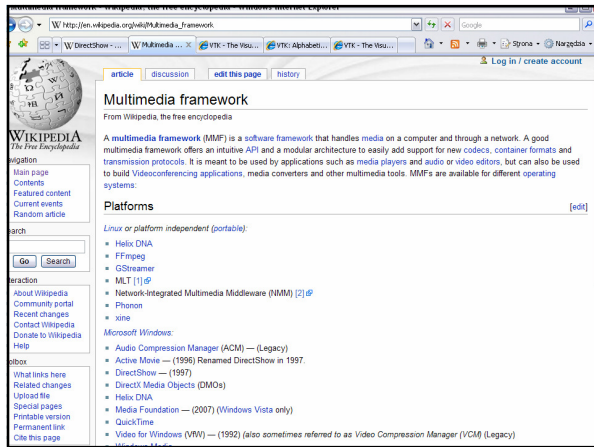
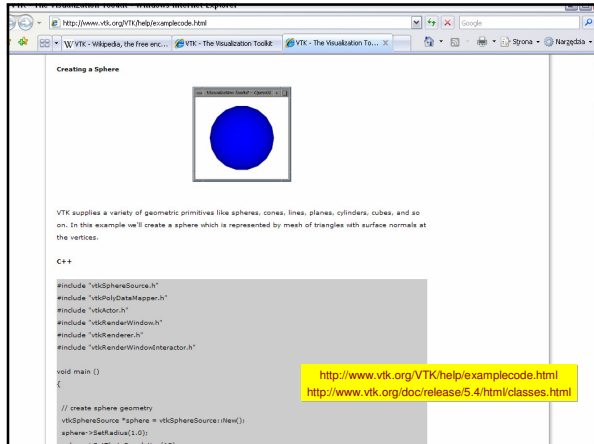
```

OpenCV sample code edge.c

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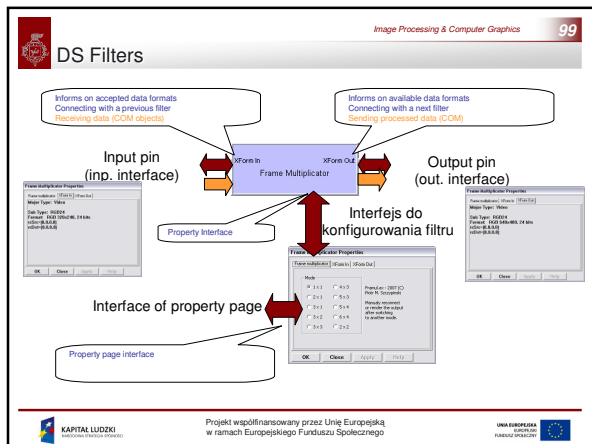
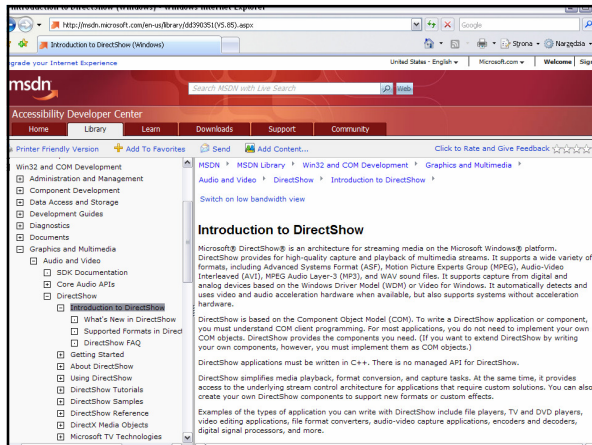
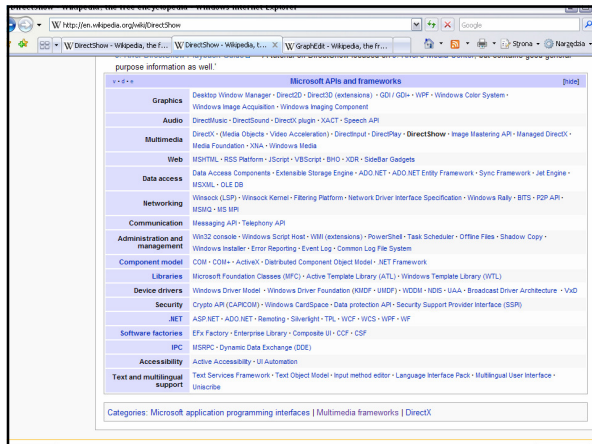






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Summary, discussion and quiz


Summary, discussion and quiz


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