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1: 4 Best Free and Open Source Tools for RAW Image Processing in Linux | It's FOSS

To the question - there is a lot of talk about non-destructive edits that can be done during post-processing, but I'm a bit puzzled by the term non-destructive. Edits to RAW file are said to be lossless/non-destructive, because original data is kept.

Photo by Giuseppe Milo Attention: Do you know what your 1 Photography Killer is and what it means? Take this 30 second quiz to find out the 1 thing holding you back from reaching the next level in your photographic efforts. Your choice of post-processing workflow really depends on what you want to achieve. If you post-process your photographs often, it helps to have a standard workflow with a set of defined steps irrespective of the photo-editing software you utilize, to save time and get consistent results. Here is a list of ten post-processing terms that every serious photographer should have a good understanding of. Not only will it make you more confident in your post-processing, it will also help you have a better control over the process and get creative at the same time. The terms or the tools mentioned in this post are relevant to most of the popular photo-editing programs out there. An S-curve adjustment boosts contrast and saturation. Photo by Bud Ellison 2. Saturation and Vibrance Enhancing color saturation is a common step in almost every post-processing workflow. While saturation affects the intensity of all colors in your image, the vibrance slider only affects the more muted colors and does not alter the skin tones and already saturated colors, giving you a better control over how you want the colors to appear in the final image. A comparison of vibrance and saturation adjustment made to an image. Sharpening As the name suggests, sharpening improves the details in the image by boosting sharpness. Almost all photographs, from portraits to landscapes, can benefit from sharpening. Image sharpening helps bring out the finer details in a shot, like the details in this cityscape. This bestselling guide gives you a step-by-step post-processing workflow to help you create great-looking photos efficiently and consistently, using popular programs like Lightroom, Elements and Photoshop. Click here now to check it out. White Balance The color of the light impacts the way your photographs look. The White Balance setting can help you adjust for the varying light conditions and take care of color casts, if any. It can be adjusted in-camera while capturing the shot, or you can change it in post-processing if you photograph in raw. The White Balance setting can help you color correct an image or create a mood of your choice. Photo by Bruno Girin 5. Highlights, Shadows and Midtones and the Histogram The brightest regions in an image are referred to as highlights, the darkest ones as shadows and everything in between as midtones. A good understanding of the histogram allows you to get the most out of curves 1 above , and achieve the desired exposure and contrast. An image with its histogram. The histogram is skewed to the left as there are a lot of dark areas shadows in the image. Photo by jpeter2 6. Noise Noise is the visible, grainy look in your image that can arise out of various factors. Shooting at a high ISO, long exposures and careless editing can all contribute towards image noise, among other reasons. No matter how much you avoid it, noise can still creep into an image. There are different ways you can reduce noise in post-processing to improve the quality of the photograph. Sometimes image noise works towards adding a mood to the photograph like in this one. At other times, you can remove noise in post-processing. Blending Blending, as the name suggests, is a technique to combine two or more versions of the same shot in a post-processing software to create a final image that aims to achieve, among other results, a better exposure exposure blend , wider depth of field focal length blend , or perspective panorama or vertorama. Focus stacking allows you to create a wider depth of field than what is possible in a single shot by blending multiple shots with different focus planes, which is especially useful in macro photography. Masking Masking is a powerful tool in Photoshop when working with layers. It allows you to selectively make changes to a layer without affecting the other layers, and helps you perform non-destructive editing. Learning how to utilize masks in your photo-editing can help you employ more advanced techniques with ease. Masking allows you to selectively edit portions of an image in a non-destructive way, like enhancing the foreground and the sky here using two separate adjustment layers.

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Photo by Robert J Heath 9. Dodging and Burning Dodging refers to lightening the tones, and burning refers to darkening the tones. Dodging and burning allows you to selectively brighten and darken areas of the image to enhance the tonal range. Photo by Thomas A high dynamic range HDR would refer to a wider range of lights in the scene, that is, regions of bright parts highlights as well as regions of dark areas shadows. Cameras have a limited dynamic range that they can capture in a photo, but in post-processing you can combine multiple exposures exposure blending from 7 before to create an image that shows details in both highlights and shadow regions of the image. An HDR image with details in highlights as well as shadows. Photo by Photographer No. Kent DuFault has written a comprehensive guide on the subject. It covers all three Adobe products: Photoshop, Lightroom, and Elements. Plus it includes a free printable step-by-step editing checklist with that you can pin-up, or leave next to your computer. If you missed out on your copy last time. Click below now, to read about it on the next page

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2: GoPro 4K Video Stabilization: How to Fix Shaky GoPro Clips

With so many editing / post-processing software packages on the market today, photographers might find it rather difficult to go through them all and compare key features in order to pick something that would ultimately work for their needs.

Basic techniques[edit] A non-linear editing approach may be used when all assets are available as files on video servers or hard disks , rather than recordings on reels or tapes. When ingesting audio or video feeds, metadata are attached to the clip. Those metadata can be attached automatically timecode , localization, take number, name of the clip or manually players names, characters, in sports: It is then possible to access any frame by entering directly the timecode or the descriptive metadata. An editor can, for example at the end of the day in the Olympic Games , easily retrieve all the clips related to the players who received a gold medal. The non-linear editing method is similar in concept to the cut and paste techniques used in IT. However, with the use of non-linear editing systems, the destructive act of cutting of film negatives is eliminated. The data are then imported into servers employing any necessary transcoding , digitizing or transfer. Once imported, the source material can be edited on a computer using application software , any of a wide range of video editing software. Many generations and variations of the original source files can exist without storing many different copies, allowing for very flexible editing. It also makes it easy to change cuts and undo previous decisions simply by editing the edit decision list without having to have the actual film data duplicated. Generation loss is also controlled, due to not having to repeatedly re-encode the data when different effects are applied. Compared to the linear method of tape-to-tape editing, non-linear editing offers the flexibility of film editing, with random access and easy project organization. In non-linear editing, the original source files are not lost or modified during editing. This is one of the biggest advantages of non-linear editing compared to linear editing. With the edit decision lists, the editor can work on low-resolution copies of the video. This makes it possible to edit both standard-definition broadcast quality and high definition broadcast quality very quickly on desktop computers that may not have the power to process huge full-quality high-resolution data in real-time. The costs of editing systems have dropped such that non-linear editing tools are now within the reach of home users. Accessing the material[edit] The non-linear editing retrieves video media for editing. Because these media exist on the video server or other mass storage that stores the video feeds in a given codec , the editing system can use several methods to access the material: Direct access The video server records feeds with a codec readable by the editing system, has network connection to the editor and allows direct editing. The editor previews material directly on the server which it sees as remote storage and edits directly on the server without transcoding or transfer. Shared storage The video server transfers feeds to and from shared storage that is accessible by all editors. Media in the appropriate codec on the server need only transferred. If recorded with a different codec, media must be transcoded during transfer. In some cases depending on material , files on shared storage can be edited even before the transfer is finished. Importing The editor downloads the material and edits it locally. This method can be used with the previous methods. This positioning has changed, and many more editing platforms now exist. Home use[edit] Early consumer applications using a multimedia computer for non-linear editing of video may have a video capture card to capture analog video or a FireWire connection to capture digital video from a DV camera, with its video editing software. Various editing tasks could then be performed on the imported video before export to another medium , or MPEG encoded for transfer to a DVD. Modern web-based editing systems can take video directly from a camera phone over a GPRS or 3G mobile connection, and editing can take place through a web browser interface, so, strictly speaking, a computer for video editing does not require any installed hardware or software beyond a web browser and an internet connection. The discussion page may contain suggestions. May When videotapes were first developed in the s, the only way to edit was to physically cut the tape with a razor blade and splice segments together. While the footage excised in this process was not technically "destroyed", continuity was

lost and the footage was generally discarded. In , with the introduction of the Ampex Editec, video tape could be edited electronically with a process known as linear video editing by selectively copying or dubbing the original footage to another tape called a "master". The original recordings are not destroyed or altered in this process. These were commonly used to store about half an hour of data digitally on mainframe computers of the time. The had a console with 2 monitors built in. The right monitor, which played the preview video, was used by the editor to make cuts and edit decisions using a light pen. The editor selected from options superimposed as text over the preview video. The left monitor was used to display the edited video. A Digital PDP computer served as a controller for the whole system. Because the video edited on the was in black and white and in low-resolution "skip-field" mode, the was suitable only for offline editing. The LA-based post house Laser Edit which later merged with Pacific Video as Laser-Pacific also had an in-house system using recordable random-access laserdiscs. Adrian Ettlinger , Herb Dow A. Montage used 17 identical copies of a set of film rushes on modified consumer Betamax VCRs. A custom circuit board was added to each deck that enabled frame-accurate switching and playback using vertical interval timecode. Intelligent positioning and sequencing of the source decks provided a simulation of random-access playback of a lengthy edited sequence without any recording. Editdroid used analogue videodisks. The theory was that with so many copies of the rushes, there could always be one machine cued up to replay the next shot in real time. Changing the play list could be done easily, and the results seen immediately. The Montage system generated significant interest and systems were installed in several post-production houses, primarily in Manhattan and LA. The original system won an Academy Award for Technical Achievement in Although Montage had some success with feature films, it was "Ediflex", using a similar principle but with multiple VHS machines, which captured most of the television market in the US Dallas, Dynasty, Falcon Crest etc. In they introduced a PAL version and Yorkshire TV became the first British television company to use nonlinear methods in a routine way. A Guide to Digital Film and Video Editing Triad, â€”which popularized this terminology over other language common at the time, including "real time" editing, "random-access" or "RA" editing, "virtual" editing, "electronic film" editing, and so on. An example of computing power progressing to make non-linear editing possible was demonstrated in the first all-digital non-linear editing system, the "Harry" effects compositing system manufactured by Quantel in Although it was more of a video effects system, it had some non-linear editing capabilities. Most importantly, it could record and apply effects to 80 seconds due to hard disk space limitations of broadcast-quality uncompressed digital video encoded in 8-bit CCIR format on its built-in hard disk array. Non-linear editing with computers as it is known today was first introduced by Editing Machines Corp. It was based on the Apple Macintosh computer platform Macintosh II systems were used with special hardware and software developed and installed by Avid. It was sufficient, however, to provide a versatile system for offline editing , to revolutionize video and film editing. Avid quickly became the dominant NLE platform. The NewTek Video Toaster Flyer for the Amiga included non-linear editing capabilities in addition to processing live video signals. The Flyer used hard drives to store video clips and audio, and supported complex scripted playback. Its hardware included three embedded SCSI controllers. Two of these SCSI buses were used to store video data, and the third to store audio. This was primarily because the purchase cost of the system was very high, especially in comparison to the offline tape-based systems that were then in general use. Nonetheless, as all editing was being done at an offline video quality, it was possible to edit broadcast documentaries on as little as 3 gigabytes of hard drive storage. Up until , the Apple Macintosh computers could access only 50 gigabytes of storage at once. By February , this team had integrated a long-form system that let the Avid Media Composer Apple Macintosh access over seven terabytes of digital video data. With instant access to the shot footage of an entire movie , long form non-linear editing Motion Picture Editing was now possible. The system made its debut at the NAB conference in , in the booths of the three primary sub-system manufacturers, Avid, Silicon Graphics and Sony. More importantly, the traditional tape workflow had involved editing from tape, often in a rented facility. When the editor left the edit suite, they could take their confidential video tapes with them. The tape paradigm of keeping your confidential content with you was

not possible with these fixed disks. Editing machines were often rented from facilities houses on a per-hour basis, and some productions chose to delete their material after each edit session, and then recapture it the next day to guarantee security of their content. These issues were addressed by a small UK company, Eidos Interactive. Because it implemented its own compression software designed specifically for non-linear editing, the Eidos system had no requirement for JPEG hardware and was cheap to produce. The software could decode multiple video and audio streams at once for real-time effects at no extra cost. But most significantly, for the first time, it supported unlimited cheap removable storage. The Eidos Edit 1, Edit 2, and later Optima systems let the editor use any Eidos system, rather than being tied down to a particular one, and still keep his data secure. The Optima software editing system was closely tied to Acorn hardware, so when Acorn stopped manufacturing the Risc PC in the late s, Eidos discontinued the Optima system. In August , Media entered the market, providing would-be editors with a low-cost, high-quality platform. Around the same period, two other competitors provided non-linear systems that required special hardwareâ€”typically cards added to the computer system. Fast Video Machine was a PC-based system that first came out as an offline system, and later became more online editing capable. Immix Video Cube was also a contender for media production companies. The Immix Video Cube had a control surface with faders to allow mixing and shuttle controls without the purchase of third-party controllers. The Media system kept increasing its maximum video resolution via software upgrades rather than hardware. This was because the Media cards had enough processing power support resolutions as high as Avid systems at the upper end of the Avid product line. Cards at the time had embedded dedicated CPUs for example a Motorola processor , which were as powerful as the processors inside the Macintosh systems that hosted the application. These other companies caused tremendous downward market pressure on Avid. Avid was forced to continually offer lower-priced systems to compete with the Media and other systems. Inspired by the success of Media , members of the Premiere development team left Adobe to start a project called "Keygrip" for Macromedia. Difficulty raising support and money for development led the team to take their non-linear editor to the NAB conference. After various companies made offers, Keygrip was purchased by Apple as Steve Jobs wanted a product to compete with Adobe Premiere in the desktop video market. At around the same time, Avidâ€”now with Windows versions of its editing softwareâ€”was considering abandoning the Macintosh platform. DV[edit] Another leap came in the late s with the launch of DV-based video formats for consumer and professional use.

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3: Photoshop vs Lightroom: The Differences That Really Matter

Curves or the tone curve is a powerful tool for adjusting tones - to add contrast, brighten, darken, or adjust colors in an image. It is a visual representation, similar to the histogram, that allows you a whole lot of control and versatility whether you want to brighten a dark scene, enhance contrast and color, check for clipped pixels, or make color corrections to the image.

I got a few comments that basically said; "Why do you care about 4k? I want to shoot 4k footage to enhance my p videos. To save money on processors and memory buffers, cheaper cameras typically output HD footage at a relatively low bit-rate megabits per second. This causes your footage to look soft, pixelated, and muddy. Shrinking down 4k footage to be p is a night and day difference in detail and quality. Down-sampling can also help cut down on noise and grain making the footage appear to be cleaner as well. If I have to start walking, the footage becomes unusable. Shooting in 4k will give you enough pixels to play with so that effects like video stabilization will have no discernible effect on your finished video. When we were filming our landscape photography tutorial we used a Dji Phantom 2 with a Gorpo 4 Silver at 2. Back in post I was able to crop the footage to be the best composition without losing any quality in the final p export. Perfect Pans and Zooms Have you ever tried to film a perfectly smooth pan with a video camera? Have you ever tried to film a perfectly smooth zoom with a manual lens? If you shoot 4k, small pans and zooms have never been easier. Simply zoom out, grab a few seconds of your scene and then add a pan or a zoom once you get back to the computer. Adding these movements to your video in post will actually look better than anything you can do in the field and because 4k gives you so many extra pixels to work with, your finished product will look flawless. A 5 minute video might have around cuts in it and to mask each of them, you will need to jump from camera to camera to avoid the dreaded " jump cut. For many of our videos we end up setting 2 cameras in almost an identical position, one shooting wide and the other shooting tight. One 4k camera could easily replace this 2 camera setup. Not only is most 4k footage good enough to replace standard still images on the web, but many shooters are starting to realize that 4k still frames are actually good enough to print. To put this into perspective, a video contains 2 million pixels where a single frame of 4k video contains 8. Check out our video where we compare a Hasselblad file to a still frame pulled from a very outdated Red Epic. Back in when we filmed this we were all really impressed with the Epic but today the Red Dragon puts the Epic to shame. Conclusion 4k is far from being a common household format. Even though it is easy to go out and buy a 4k TV, you will have a very hard time finding footage to play on it. Luckily p footage has so much room to improve.

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4: 10 Post-Processing Terms Every Photographer Should Know

Non-destructive editing is a form of audio, video, or image editing in which the original content is not modified in the course of editing; instead the edits are specified and modified by specialized software.

Stephen Harker Guides November 14, Adobe Photoshop PS has been around for almost three decades now and is considered one of the premier post-processing programs available in digital photography. Recently, many photographers have been singing the praises of Lightroom LR , another Adobe post-processing program. There are differences between the two Adobe programs, obviously. But, which differences really matter? A lot has already been said by many photographers about PS vs LR. Straight out of the camera SOOC images can often use at least a tweak. When taking photos, a person will tend to differentiate in their minds what images are snapshots as opposed to fine photography. Regardless of how careful a photographer is in setting up exposure and composition, there is often at least one little thing that could be changed. In other words, there is nothing inherently superior in presenting SOOC images as opposed to an image with improvements or corrections. In addition, many images displayed as fine art or sold to clients have had some custom work done to them before delivering files or printing. Images shot in RAW will require some sort of processing to be shared, seen, sold, or printed. Many articles are available to see what those advantages are. Adobe is a leader in post-processing programs. Their programs really are good. Full of features designed to allow photographers and other artists to manipulate their images to bring out the full potential of their artwork. The Main Differences File management is one of the major differences between the two programs. While both programs can be used to edit images, Lightroom is a workflow solution, too. It offers easy solutions to manage your process, from loading your camera image files onto your computer, to cataloging RAW and finished files, to exporting options and even printing. Batch processing is another thing that Lightroom does differently than Photoshop. Lightroom also has an advanced batch editing feature called Sync that offers an alternative method of batch processing. Advanced functions are where Photoshop excels. With LR having such awesome file management and batch processing tools, some may wonder why they would need Photoshop at all. Well, those advanced editing tools are the main reason PS exists in the first place. Sometimes, a photographer simply needs what Photoshop does. Where Lightroom Excels File management Photoshop and Lightroom are both able to handle many different image formats, including the RAW files of most digital cameras. Just wait a while, Adobe quickly updates file support, especially for the CC versions. Some older versions of the programs will not be able to be upgraded for the newest cameras. Lightroom differs significantly from PS in that LR edits are accomplished through non-destructive editing. What that means is that the original file is never actually changed in LR. When adjusting your image, the edits are stored in a catalog. That catalog is a set of program commands that get applied to the image file when you export it as whatever file type output you are using. This catalog holds the editing instruction for all of your LR images. Thus, the hard drive space needed for storage is relatively small. You can go back to your original image file again and again and it will be just as it was when you loaded it to your computer. You can also continue adjusting from where you left off. Of course, you also have the option of saving it as a specific file type. With Photoshop, you are changing the image file. Finally, you save your finished work in a file format that can be used. So, in PS, you will have at least three large image files in order to have a non-destructive image editing workflow. For every single image. So, you could quickly use up a whole lot of disk storage space. Since LR has some of the most used edits available, it becomes a very good option for photographers with large volumes of images. This is batch editing or batch processing. There are actions that can be purchased, or sometimes downloaded for free, that have presets to use to speed up this process. Lightroom handles batch editing easier and better, in my opinion. Since the adjustments are saved in the LR catalog, you save a lot of disk space, and a whole bunch of processing time, when batch editing in LR as opposed to the same edits in PS. Besides the regular batch editing options, there is a LR feature called Sync Settings that lets you batch edit in a slightly different way.

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The way this works is you select an image file to edit that is representative of the entire group of files you want edited. Complete the adjustments for that image, then select which of those edits you want applied across the board of several different images. It can be several hundred, if you want, or perhaps you have your images separated into smaller groups by some sort of criteria. For a portrait studio, a real estate photographer, or a wedding photographer, the time savings for this method can be huge. Importing files We will include organizing and exporting files in this section as well. One of the major functions of Lightroom is that it is an end to end workflow management tool. Before LR, a common method was to create a new file to load into from the memory card. This speeds up your workflow from the first step. Use Lightroom folders and keywords to organize your image files with a system you personalize for your own preferences. This will take a little time to set up when you first install and start using LR, but afterward, you can make this function work almost automatically. You never lose control of your image cataloging, because the settings are all made by you in the first place. After using LR for a while, you have dozens, hundreds, even thousands of images all searchable by keywords. Want to include a stock image you have of the Rockies or a remote beach in with your submission for a travel agency or hotel chain? Use the LR keyword search to find the perfect image. No more guessing what what folders to look through. Or the mother of the bride wants that group shot of her and her sisters three years after the wedding, keywords such as the client name and family or group will bring up the pictures for her to choose from. End to end includes exporting and printing. Lightroom is one program you never have to close to take care of almost everything you might need to do for that photoshoot. Load, organize, edit, and send or print. Lightroom can handle all of it. At least most of it. However, there are still very good reasons to use PS. Easy tools Admittedly, the first version of Photoshop was a little intimidating for photographers to figure out and use. It had so many controls, some kept a little cardboard basic instruction folder by the computer to help keep track of what tool did what and how to access it. Other programs came out, competing with Adobe, and usually one of the biggest selling points of those programs was that the tools were more intuitive to use. Adobe has continued to improve the PS interface through the years, and when they launched LR, many of the best of those improvements were included. Plus, LR has a generally more intuitive operating feel than even current versions of PS. When in Lightroom, you can pretty much tell that exactly what you want to happen is happening. Like having instant feedback from a darkroom process. Deep edits Though Lightroom has many of the same editing controls as Photoshop, the PS versions are generally deeper. In Lightroom, the develop module has a basic image sharpening panel, and also a simple output sharpening function. Photoshop has six different global sharpening tools, each tool having a wide range of options available. Add to that an array of localized sharpening tools. Now, multiply that by every editing action available in PS. You might find new tools, or new aspects of tools, every month that you keep using PS. Maybe that light pole in the yard of the old estate ruins the classic look of the property. Take it out, clone in some grass or trees. Cut his head out of that image, replace it on him in the image with everyone else smiling. This is also the tool that lets you add roses to the barren garden, or bright puffy clouds to the clear sky, or an image in the TV or monitor screen for that advertisement. Yes, this is the tool that allows you to put wings on a horse or a face in a brick wall. If you can imagine it, you can probably do it in PS. HDR High Dynamic Range is a photographic method used to defeat the issue of a scene having a wider range of dark to light than can be reproduced in a photographic image. In the days of film, photographers used the Zone System, adjusted contrast in developing or printing, and dodged or burned in parts of the scene. In digital image processing, you work with the deep levels of information in the RAW files to accomplish similar things. Or, you can blend images taken at different exposure levels together. In PS, this is done with the Merge Images tool. It can be done in a very natural looking way. A good number of the best selling nature scenes or architectural images have probably been HDR processed to show more of what it looked to the naked eye of the casual viewer. Few people, besides other photographers, are even aware of how highly processed those images are. Of course, if you like the other worldly artsy effect some that photographers do, then go for it. Panos Merge also gives the option of creating a panorama. This will be a static image, not the drag-and-see-things type of file made with

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PTGui.

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5: Camera Raw vs Photoshop - Which Should I Use?

How complete they are is hard to tell, but they also claim to be the world's only non-destructive retouching app, and world's only non-destructive stackable and re-editable filter. Essentially what they're saying is they are a new option for all-in-one raw processing and photo editing.

In a previous tutorial, we looked at the benefits that the raw file format has over JPEG when capturing images with our camera. What we end up with is an already developed image, with permanent changes already made to its pixels, and with a lot of what would have been useful image detail missing and gone forever. Not only do we gain complete creative freedom over the process, but the abundance of image information means we can often rescue and restore detail in the highlights and shadows that, as a JPEG, would most likely have been lost. We also learned that in order to process raw files, we need to use a program like Adobe Camera Raw. Get all of our tutorials as print-ready PDFs! What Is Camera Raw? To work with these files, we need to use special software that knows what to do with the raw data. Adobe came up with two great solutions. One is a completely separate, standalone application known as Adobe Lightroom. The other is a free plug-in for Photoshop itself - Adobe Camera Raw - that ships and installs with Photoshop. Lightroom is a standalone application it needs to be purchased separately that includes additional features to help with your overall workflow, like the ability to catalog your photos. Camera Raw is strictly an image editing application. However, both Lightroom and Camera Raw use the exact same image processing engine, which means both are equally capable of giving you fantastic results. Like Adobe Lightroom, Camera Raw gives you everything you need for processing raw images. Camera Raw Or Photoshop? So which should you use for editing your images, Camera Raw or Photoshop? The simple answer is - both! Think of Camera Raw as an image developer, while Photoshop is an image editor. In general, you can think of our work in Camera Raw as global edits. That is, edits that affect the entire image as a whole. Once we have the overall image looking the way we want, we can then move on to Photoshop for more specific local edits which is where Photoshop excels. So what makes Camera Raw so special? Streamlined For Image Editing Photoshop has become so big and powerful over the years that what started out initially as a program for editing photos is now used not only in the world of photography but also in practically every creative field imaginable, including graphic and multimedia design, video editing, 3D rendering, even medical research! They make learning the program more difficult and time consuming than it needs to be, and with no clear indication of where to begin once an image is open on the screen, you can easily be left wondering, "Now what? Where the heck do I start? For photographers, Camera Raw is just easier to use. Panels like this one make processing images in Camera Raw simple and intuitive. What this means is that as we work on a photo, Photoshop makes changes to its pixels. This is called destructive editing because it alters the original image information. The opposite of pixel-based editing is parametric editing, and Camera Raw is a parametric image editor. Parametric editing is non-destructive because it uses nothing more than a series of instructions called metadata to tell the software application how to display the image on the screen. The important thing to understand is that with Camera Raw, the original photo and the instructions on how to process the photo are two completely separate things. No changes are ever made to the original image data. How would it look if I cropped the image as an 8x10? What about a 4x6 or a 5x7? Can I get away with a little more sharpening? What if I add a vignette effect? Of course, there are ways to work in Photoshop that are non-destructive, like duplicating an image, using layers, adjustments layers, Smart Objects, and more. No matter what we do in Camera Raw, the original image remains unharmed. Additionally, you can copy and paste Camera Raw settings from one image to another directly from within Adobe Bridge. You can apply the settings from the previous image to your new image, and you can even save your settings from one image as a preset which can then be applied to other images without having to redo any of the work! After processing one photo in Camera Raw, you can instantly synchronize the settings across multiple images. Camera Raw is just plain faster than Photoshop. Every

change we make with a tool or panel happens instantly for us on the screen. Add in the ability to sync, or copy and paste, settings from one image to another or many others! Both have their strengths and knowing when to use each one is the key to an efficient workflow. Camera Raw should be your starting point, your digital darkroom. And there have it! Check out our Photo Retouching section for more Photoshop image editing tutorials!

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6: 6 Reasons To Shoot 4k Video Even If You Can't View It Yet | Fstoppers

OpenCine is a free RAW processing suite in active development. If you'd like to contribute then, together with the below information, it's important to become familiar with three things: 1.

Guide to Identifying Color Movie Film Stocks This page is intended to be used by the collector of 16mm films to aid in the identification of the various kinds of film stock that one is likely to encounter. Please let me know if I have included any errors in this page. I am always trying to improve this page, and appreciate any suggestions. If you have comments please Contact Me. Called "IB Technicolor" for Imbibition. The most fade resistant color process. A dye transfer process. The soundtrack is printed by itself onto black and white stock. The colors are mechanically printed from gelatin relief matrices onto this blank film. Three matrices are made from separation negatives for yellow, cyan and magenta. The film usually has no marking on the edges. The edges are usually clear. The soundtrack looks grey, and the film looks from the edge like black and white stock. Some prints have a grey stripe along the opposite edge from the sound track depending on its position in the printer. I have been told that the clear edge prints are double rank prints, made 2 at a time and then slit in 2, and the the black edge prints are single rank, but clear edge prints can be single rank also, in particular pre prints. Single rank prints supposedly have better color registration than the black edge single rank prints, but this is debatable. Technicolor prints made in the U. British made Technicolor prints are usually black around the perforations like Kodachrome, and are marked "Technicolor Safety". Some of the British Technicolor prints have clear edges, with black lettering. British Technicolor also often has a lacquer coating to protect the emulsion. A reversal direct positive process. Never used for 35mm release prints, only 16mm and 8mm. There was a special version known as Technicolor Monopack which was used for a few camera originals in the s. Most commonly used for amateur films for direct projection. Identified by being completely black around the perforations, with white or similar light color markings. Print stock comes in 2 types, ordinary Kodachrome, marked "Kodachrome Safety", which has a brownish sulfite soundtrack, and "Eastman Rev Color Safety Film", which has a grey silver soundtrack, similar to Technicolor. Kodachrome is high in contrast, and the contrast increases in printing, causing the shadows to be quite dark. For longevity of color, this is the next best thing to Technicolor. There are reports of the first production of Kodachrome having fading problems, but this was fixed around In the samples of silent film above, on was shot on Kodachrome with a date code of shortly after introduction. The color has faded quite significantly. Another sample above shows Kodachrome with a date code of It shows no sign of fading. This indicates that the fading problem was fixed pretty early in the production of Kodachrome. Similar in appearance to Kodachrome, except for the markings. Not seen in a grey track version. Cinecolor is a 2 color process. The blue emulsion is on one side of the film, and the red emulsion is on the other side. The sound track is usually blue, and the film is marked "Kodak Safety". Cinecolor is fade resistant, but the colors are not very accurate. Most commonly seen used for cartoons. There is also a 3 color process called Super Cinecolor, but it is relatively rare. There was probably never Super Cinecolor in 16mm, only 35mm. Cinecolor is notorious for "yellow laddering," a deterioration that happens given the fact that many Cinecolor prints had a yellow layer added to them to give better color rendition that seeps on frames that were wound next to them. As these frames are not exactly lined up, it gives a weird yellow image that ghosts its way up and down the film. Not all Cinecolor prints do this, but many do. Cinecolor is also notable for having Eastman edge codes that are usually bright red or blue. There was, however, 16mm Trucolor. Trucolor was a Dupont process with a blue track and it does fade. I have not seen this on 16mm, but have on 35mm. Thanks to Eric Grayson. Occasionally seen in a grey silver sound track version. The lower scan has a silver track, and is marked "Eastman Safety" It does not say Ektachrome anywhere. Most commonly used for camera originals for duplication or direct projection. Favorite of TV news crews in the magnetic sound version. Unusual on release prints. It looks like Agfa-Gevaert with at grey track! A leader printed on A-G is attached to a camera original on Ektachrome. A release print is made on

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Ektachrome print stock with the light extending to the sprocket edges, which copies the edge codes from the original. This is a positive-negative process. Clear around the perforations with a very light pink or orange cast. Markings along the edge in red, sometimes very small. Eastmancolor is the stock most prone to fading. Some later versions sometimes erroneously called "4b" seem to hold up better, similar to SP. Many films have turned so that nothing but red is left. Rate of fading depends on the quality of processing as well as storage conditions. The cyan layer will fade first. The 4b Mystery Some prints are reported to be on Eastman "4b" stock, which is claimed by some to be a relatively low fade stock. Sometimes these look vaguely like the characters "4b". It is believed that these codes indicate the slitter machine when the film stock is cut down from a wide roll to 16mm width. There are several different codes that appear on various Eastman stocks over many years. Tom Robinson at the Oregon Historic Photo Archive has put together a chart of the various slit codes he has seen. Here is the link to his chart, which also includes Eastman date codes: Around the time that this code was appearing on the film, Eastman was making small quantities of a stock with improvements to the cyan stability, but these were not specially marked. I have seen some badly faded prints marked with the code identified as "4b", so this is not really a sign of a low fade print. Most of these are also only a little more than 20 years old, so if they were stored properly, fading should be just starting. As far as I know, these were not marked in any special way, and were available in parallel with the standard Eastmancolor, possibly at a higher price. Thanks, Peter, for the information on these. Stands for "Special Process". I thought it was "Slow Phade". Holds up better than standard Eastmancolor. Tends to turn brownish in the shadows. Some of it has held up quite well, others are noticeably brown. In the particular sample in the scan, the greenish-gray background around the perforations indicates that it was printed to show edge numbering from the negative. In the lower picture there is marking in white. This is from the negative, not the positive print. This can be confusing. The soundtrack is a dual bilateral variable area. It is not stereo, both tracks are identical. Kodak probably did not make any claims that this film had better fading characteristics compared to their standard Eastman Color print film Stands for "Lowfade Positive Print". Nice, rich colors without excessive contrast. Note that the year of manufacture is no longer a code. Kodacolor Kodacolor movie film is really strange stuff. It was made from about to the early s. It is an additive process where the film has a black and white emulsion. The film has lenticular ridges on the base side. It is exposed through the base with a special filter on the lens having red green and blue stripes. The ridges on the base cause the red, green and blue content of the image to be exposed in vertical stripes under the filters.

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7: Video Editing - Simple Steps to help you Edit your Video Footage.

This is the first step in your efforts for working non-destructively. At one point in time people were actually using eraser tools and permanently removing pixels from a photograph.

It is therefore possible to shoot some footage, plug your camera into your HD TV and show your friends your masterpiece straight away! Step away from the HDMI cable! Consider your workflow as a stills photographer. With moving images, editing is arguably even more important. If you are new to the world of film, I suggest using a free application to begin with - both the Apple and Windows offerings are extremely capable and simple, and both allow you to import, edit and export high definition movies. Despite what you may read, iMovie is capable of editing H. MOV files that come straight out of your D without the need to convert. You should copy all of the files from the relevant directory on the memory card including the. THM files, which are used by some editing programs as clip thumbnails to a hard drive, before importing them into your editing software. This avoids the need for your camera to be plugged into your computer throughout the import process, and is very fast. AVCHD files are more like DVD movie files - using reference files, which cannot be previewed directly by double clicking - these will need to be imported directly from the camera into your editing software. Give your project a name. Choose the relevant aspect ratio The directory will look something like this: Choose an Event to import the footage into. You can use events to organise footage into scenes or shots if making a longer movie. You can select to Optimise Video. This converts your video into Apple Intermediate Codec. I only suggest doing this if your machine struggles when previewing your footage. Copy or Move files. Again, as long as space is not an issue, copy the files so that your originals are safe. The Editing Window video editing iMovie splits your workspace into three main windows, which are contextual, and change depending on what you have selected. When editing, you will usually see a main timeline window, a preview window and the event browser: Clips are automatically imported as standalone shots. If you click on a clip in the browser, you can press Space Bar to view the clip in the preview window, or rightclick on the clip to view it full screen. There are lots of other options from this main screen, but for now you just want to get used to having a pool of raw clips in your event browser, a timeline window where you will build your movie, and a preview window where you can watch your clips and edited movie. Basic Edit video editing The first stage of your edit should be to build a rough sequence of shots. Simply click on a clip in the event browser, and drag it to the empty timeline. Click on the next clip you want to appear, and drag it onto the timeline after the first clip. If you want to insert a clip in between two clips, just drag a new clip and drop it in the gap between the two. You can also reorder the clips in the timeline, by dragging them and moving their positions. Just by dragging and dropping, you can quickly build a basic sequence of shots. Like any good application, iMovie has more than one way to skin your cat. You can make basic edits right in the timeline, or you can use more precise tools to do the same job. Editing on the Timeline video editing You can edit clips in the timeline by clicking on a clip to select it, bringing up a yellow box around the selection. You can change the length of the selection by dragging the ends of the yellow box. Then, either right clicking or using the edit menu, you can Trim to Selection or Split Clip. Trimming leaves just the area selected by the yellow box, and splitting will chop the clip into smaller clips using your selected end points. Unless you used a tripod and remote, you will want to trim the beginning and end of every clip to remove the inevitable movement however small created by starting and stoppin movie capture. Once you get into the rhythm, you will find this process very quick, and it will make a huge improvement to the look of your edit. Editing using the Clip Trimmer and Precision Editor Clicking the small Cog dropdown menu on a selected clip reveals the precision editing tools. The Clip Trimmer allows you to trim a clip, and choose which part is selected in a more precise way. It also reveals the non-destructive nature of the timeline - you will see the selected section which appears on your timeline, and also the unused section, which is still there. The Precision Editor allows you to accurately edit the point at which a cut or transition is made between two clips on your timeline. Dragging the blue dot moves

the position at which the edit occurs. Using just these few editing tools, you should now be able to put together a refined edit of your shot sequence. You can then edit the length of the transition, and change the style by double clicking on its icon in the timeline, which brings up an Inspector window. You can choose to have the same length of transition applied each time, or change it according to your needs. Now it is time to refine the look of the footage, making sure all the shots are balanced, and adding any effects that might be needed. Select a representative clip and click the Cog dropdown or just double click the clip to open the Clip Inspector. On the Clip tab, you can add an effect to your clip if required, change its speed and add stabilisation. Effects should be used sparingly - they are not adjustable, simply on or off, and are best avoided if possible. The Video tab has extremely powerful grading tools, offered up in an albeit non-precise way - sliders only. Play around with these controls subtly, and you should be able to achieve anything from contrasty black and white through a yellowing Super 8 film stock, to a desaturated art cinema look - the possibilities are huge. You can always revert to the original footage at any time, so you may as well give it a go. To avoid the time consuming tedium of having to adjust every similar clip, you can copy and paste styles and effects. Simply select the graded clip and copy it. You can choose to paste all of the settings or just one aspect. After you have completed one clip to your liking, basic grading on the whole project takes just minutes. Minor adjustments can then be made to individual clips as required. Audio video editing iMovie 11, which is being released at time of writing, will introduce enhanced audio controls, which should allow for noise reduction and better general volume controls, but even in the current version you can add multiple layers of audio simply by dragging them from the Music and Sound Effects window, as well as controlling the volume of individual clips. Balance your audio, before adding music and sound effects. If all you can hear is wind from the built in microphone - all is not lost. Just mute the audio and add a musical score - it can sometimes transform what you have shot into something surprising. If you intend to do a film with a musical soundtrack, you may want to add the audio track early on, so you can edit to the music. Stills video editing You can add stills from your iPhoto library by dragging them from the dedicated tab. The Ken Burns Effect, which animates stills by having a start and end point, is added automatically by default, but you can edit the settings by selecting the clip and clicking the Crop icon, or turn it off completely by selecting Fit. Titles video editing When you have your final edit, you can add some credits or titles using the very simple tools built in to iMovie. You can choose the font, size, colour, style and duration, as well as the basic look - just drag your choice from the Titles window, and click the text in the Edit window to edit it. Move your text around on the timeline by dragging it, and change the length of time it appears and time it takes to fade by double clicking it on the timeline to open an Inspector window. Under the Share menu, you will be given basic presets which work brilliantly for the given environments - YouTube, iPhone, HD, etc - and you may never require more, so simply choose how big you want it or where you want to show it and click go! But what if your little blockbuster gets chosen to be shown at a festival that requires a ProRes file? No need to panic. If you export Using Quicktime, you will find dozens of professional industry standard codecs, and myriad options for exporting your project in broadcast quality and above at almost any size. Applications such as iMovie and Windows Movie Maker allow you the opportunity to produce professional results, with minimum outlay and a very shallow learning curve. Try making a three minute movie and practice your editing skills. You maybe be surprised with the results that are possible using free software and a little patience.

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8: post processing - What are non-destructive edits and do they exist? - Photography Stack Exchange

About the Customer. Our customer is one of the largest engineering and fabrication companies in the UK. They employ around staff across 14 divisions, operating in many different industries including aerospace and defense, oil and gas, nuclear, mining, and automotive.

Share Rotoscoping is the process of manually altering film or video footage one frame at a time. The frames can be painted on arbitrarily to create custom animated effects like lightning or lightsabres, or traced to create realistic traditional style animation or to produce hold-out mattes for compositing elements in a scene and, more recently, to produce depth maps for stereo conversion. As a VFX artist, you are primarily creating motion graphics or visual effects. A thorough knowledge of rotoscoping and roto tools is vital to solving a vast amount of problem solving in VFX: It is perhaps one of the widely used tools in visual effects. With a thorough knowledge of rotoscoping, digital artists can create better live-action or CG composites as well as amazing visual effects. Various rotoscoping techniques are covered below, including matte creation, effects painting, paint touch-up, digital cloning, stereoscopic conversion and motion tracking, as well as a brief history of the craft and summary of the tools. Bug Goes to Town. Perhaps most importantly, Fleischer invented the rotoscope, a device that changed the look of animation forever. Born in Vienna, Austria in , Max Fleischer immigrated with his family to America at the age of four. His artistic skills were quickly recognized, and instead of attending public high school he opted for the Art Students League in New York. While attending school he landed his first job at the Brooklyn Daily News, where he worked as an assistant in the cartoon department. Within a few years, he was a full-time staff artist with his own comic strip. He then moved on to Popular Science Monthly, which sparked a life-long fascination with machinery and inventions. While working at this magazine, Fleischer began working on his plans to create the rotoscope. Early animated films were crude, jerky and difficult to look at. They were not very popular and were only tolerated because they were a curiosity. Max Fleischer aimed to change this by inventing a device that would allow them to project live action film onto the glass of an animation stand. The animators could then place paper on the animation stand and trace the live action footage one frame at a time. In a New York Times interview, Fleischer said, "An artist, for example, will simply sit down and, with a certain character in mind, draw the figures that are to make it animated. If he wants an arm to move, he will draw the figure several times with the arm in the positions necessary to give it motion on the screen. With only the aid of his imagination, an artist cannot, as a rule, get the perspective and related motions of reality. The first cartoons created by the Fleischers using the rotoscope were the Koko the Clown series, and they then went on to utilize it in Betty Boop and Popeye. Though they used rotoscoping to create the main characters, they continued to rely on traditional rubber hose style animation in their cartoons. The Fleischers pioneered other traditional animation priniciples in their studio which changed the face of modern animation, right up to today. The difference was that the Fleischers would have assistants draw the in-betweens while the lead animators moved on to create more keyframes. Disney During the s, the Fleischers found themselves in an ongoing competition with another animator -- Walt Disney. The Fleischers and Disney constantly raced one another to each new milestone in animation -- first sound cartoon, first color cartoon, and first feature. Walt Disney also turned to rotoscoping, for Snow White. The company, Bosworth, Defresnes and Felton, had never patented it, so Fleischer actually was entitled to sue, but he evidently lost interest in pursuing the Disney case after hearing about the earlier machine. The movements of Snow White herself were acted out by a high school student named Marjorie Belcher, later known as dancer Marge Champion. Nevertheless, some of the Disney animators looked down on the idea of rotoscoping. One of them, Don Graham, derided the technique as a "crutch" for artists who lacked the skill to do their work on their own. Another, Grim Natwick, said that even when the artists used the device, they used it only as the basis for their work, adding heavy elaboration and even changing the proportions of the original filmed figures. But rival animator Walter Lantz criticized the look of the

rotoscoped work in Snow White. Yet rotoscoping did help the artists on Snow White maintain a consistency that might otherwise have been impossible. On earlier animated shorts, each character was done by a single animator; as a result, the characters had a unity of style. Because Snow White was so extensive, however, more than one artist had to work on each character. Working from live-action footage offered them the best way to create a cohesive look. Analog rotoscoping for visual effects While the technique is useful for animation, rotoscoping eventually became an important tool for visual effects in general. From the s through the s, U. Rotoscoping in visual effects was used primarily to make holdout mattes. The outline traced onto the cel then would be filled in with black paint, so that it would block the appropriate section of the frame. This black matte then could "hold out" the part of the explosion image where the two people would appear, so that when the two images were printed together, the people would appear to be in front of the explosion. Rotoscoping also could be used to stabilize a shaky film image. To do stabilization, each film frame was rotoscoped onto an alignment chart. A comparison of the charts allowed changes in position to be tracked from frame to frame. Bertino said people underestimate the difficulty of rotoscoping during the photochemical era: There were so many moving parts to the rotoscope camera, and so many places for things to get out of hand. They finally stopped making them because the artisans would go blind. He remembers working in rooms that were completely dark except for the light coming out of the projector. The rotoscope artists were at the mercy of the painters who would later fill in their outlines, and who could with a few stray brushstrokes outside the outline make the image suddenly jittery. The shift to computer-based rotoscoping began in the early s with a software called Colorburst, an image editing tool like Photoshop, that later evolved into Matador. This is often because in traditional rotoscoping, each frame had to be drawn individually. The computer, on the other hand, can use the previous frame as a basis, which means most of the drawing may already be done. Rotoscoping software works using splines, which are a series of points connected by a line or curve. These splines are adjusted from frame to frame, so that they continue to conform to whatever shape the artist is tracing. Because rotoscoping software includes the tools to paint an image, rotoscope artists now find themselves doing a lot of paint work as well. Some skills remain necessary, including a sense of what is important. More important is consistency. You need to have that sense for judicious editing. Instead of creating elaborate particle effects in 3D simulation software like Maya, many effects can be done faster by a skilled artist using a paintbrush or airbrush in a paint application. Effects like lightning or light-sabres can be painted one frame at a time. More advanced roto tools offer auto-paint capabilities which allow you to record brush strokes and then play them back over a selected range of frames. Some roto applications also allow you to add jitter to the brushes, as well as add the ability to paint the stroke out over time. There are two types of paint engines used in modern graphics applications; Bitmap also known as raster and Vector. Raster paint engines are destructive in the sense that they replace the pixels being painted onto with the color from the paint stroke. Photoshop, and the original Flame paint are raster based applications. This is a very fast way of working since the frame is immediately updated and the results can be played back in real time without rendering. Vector based paint engines, like Illustrator, Nuke, After Effects Vector Paint, or others, use points and splines to define a brush stroke, and do not destroy the underlying pixels. This non-destructive process allows you to edit paint strokes at any time, though you pay the price in speed since the strokes need to be rendered before they can be previewed in realtime. The other disadvantage is that hundreds of channels will be created with the spline information even if you do not plan on using them. In a sense, 2D layered painting is a sub-set of what Mari needs to do in 3D with multiple layers on extremely large textures using powerful GPU accelerated paint engines. Mari allows artists to do painting detailed, multi-layered textures directly onto 3D models in a fluid and natural way. Mari was originally conceived at Weta Digital, because no existing commercial product could handle the complex, highly detailed look development work required by films such as District 9 and Avatar. One could look to products like Mari and others to be the next generation of effects 2D paint. This includes removing wires and rigs, removing logos, dust busting, scratch removal, etc. In these circumstances, the roto tool must be able to provide temporal and spatial cloning. Spatial cloning is a type of

cloning which takes pixels from one position of the frame, and paints the source onto another position on the frame. Temporal cloning allows you to paint pixels from one frame in a sequence to another frame. A good roto tool should provide both of these options together so users can offset position and frame number together. Typically, wire removal tools clone pixels from a specified value on either side of the line, then smear the outside pixels together to cover up the wire or scratch. More advance wire removal tools will add advanced cloning techniques to the wire removal process. Matte creation keying, rotosplining, painting AE roto tools Creating hold-out mattes, sometimes referred to as masks or alpha channels, is a major part of the compositing process. A matte is a grayscale clip which is used to stencil portions of the background footage. Anything in the black area will be obscured, and anything in the white area will show through in some systems like Avid this is backwards. Any gray area in the matte will be semi-transparent. Roto artists are expected to cut precise mattes with consistent edges which will not chatter. If the matte is sloppy, the shot will look fake. The best compositor will produce unacceptable work if provided with poor mattes. Mattes can be created with three different techniques; Extraction, Rotosplining and Painting. For most situations a combination of these three techniques will have to be used. Extraction is the process of procedurally generating a black and white matte. This can be done by shooting an element against a blue or green screen, then using a color keyer to knock out the specified color. Sometimes bluescreens are not practical, and in these cases other types of extractions need to be performed. Luminance keying can extract a matte based on the luminance values of the source. Either dark or light areas can be extracted into a matte. An image can be de-saturated then leveled to create a high contrast matte. Sometimes it is better to start with one of the color channels to create an extraction.

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9: The Art of Roto: | fxguide

I want to shoot 4k footage to enhance my p videos. Sharper P footage You may think that HD footage is a universal standard and anything shot in "HD" will look ultra sharp but that isn't true.

To install it use the commands below: RawTherapee RawTherapee is another cross-platform, free and open source RAW image processing application supporting different image editing operations and a large number of files handling. Features bit floating point processing engine. Advanced color handling from white balance to HSV Hue-Saturation-Value curves, color toning and color management including wide-gamut and soft-proofing support. Enhanced exposure and tonality tools: Several tools to enhance details: You can install it by clicking on the link below: Alternatively, you can install it using the command below: Prominent features include adjusting colors, cropping and sharpening, curve adjustments, panorama stitching and more. Features Importing and processing RAW files and photos digiKam core, image editor and image filters support 16 bits color depth pictures. Image Editor has a full-color management support using ICC color profiles. Black and White and tonality converter using curves adjustments. Noise reduction, Liquid Rescale, Unsharp mask, correcting lens spherical aberration. Hot Pixels Correction, Vignetting, Channel mixer, white balance etc. Pseudo HDR-tone mapping tool to recover highlights and shadows while keeping local contrast. Features Darktable currently serves 47 image operations modules some of which are: Crop and rotate, base curve presets, exposure controls, highlight reconstruction, white balance, demosaic, inverting options. Local modification of the exposure based on pixel lightness, level adjustments. Tone curve, changing lightness of the image, tone mapping. Saturation enhancement, overexposed correction, channel mixer, color correction, contrast adjustment, color transfer from one image to another, managing color profiles. Sharpen, equalizer, denoise, lens correction, spot removal, chromatic aberrations, hot pixels. Low light vision, split toning, framing, watermark support, soften, colorization options etc. These software are feature-rich and can accomplish all your needs. It depends on your technical skills and priorities while choosing the software from above list.

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Political science research paper example 12. Developing algebraic thinking in earlier grades : some insights from international comparative studie Community engineering Barbie of Swan Lake Restriction and saturation Music in early America Hon. Judith S. Kaye, 1994 Fumbling with a Flyrod Essential of physical chemistry by bs bahl Single variable calculus stewart 2nd edition Performing Shakespeare Examination of the Gramm-Leach-Bliley Act five years after its passage Ordinary Language Criticism 11. The Death of Sarah 228 Final fantasy and philosophy S G Fund of Business Math (Mathematics) The Great Australian Diet (The Atkins Alternative) Golden Girl&grdn Gemst Proceedings of the 33rd Southeastern Symposium on System Theory Non-zero offset vertical seismic profile data recorded using a downhole marine airgun source and vertical The investment insurance program managed by the Overseas Private Investment Corporation Career Opportunities in the Armed Forces (Career Opportunities) Phonics from A to Z (Grades K-3) La marcha del imperialismo hacia el fascismo y la guerra, Nueva Internacional no. 4 (Nueva Internacional History of boy scout of the philippines Chemoarchitectonic atlas of the developing mouse brain The Centenary Life Of OConnell AFC programmers guide Aux.uncc.edu sites aux.uncc.edu files media s aux-info-guide. Monty the Runaway Mouse V. 1. Coniferous forest, continental margin, deciduous forest, desert Economic problems in the philippines Seafood twice a week Cyc Gd Eastern-Road Gr Accessible 3 matt garrish Skulls, cats and witch bottles Small business legal guide Interactive Managerial Accounting Lab Student Package Beer johnston statics solution manual 9th Conclusion : building cultural knowledge in the contemporary Native novel.