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VirtualDJ is something you can try very easily. But if you play in club, its also amazing... I was super impressed, its very cool David Guetta Multi-platinum DJ & Producer VirtualDJ is a killer piece of software... There are innovations that simply dont exist on competing software. DJ Mag Reference DJ magazine If you are a scratcher, a technical scratcher.. you gonna love this! Advanced & accurate. VirtualDJ... right on! Qbert Legendary DJ Champion VirtualDJ 2025 uses advanced technology and the power of modern computers to revolutionize what DJs can do. With this new version you can mix in real-time the various components of your tracks (vocals, instruments, kicks, hihats, etc). This opens the door to new ways of mixing that were simply not possible before, and will forever change the way DJs mix. With real-time stem separation on any track, perfect live mashups and seamless transitions are now the new normal: ModernEQs can achieve a much more accurate separation than traditional frequency-based equalizers, and help achieve perfect transitions like never before. The new Stem pads will let you create live mash-ups and remixes in real-time easily. Let your creativity fly free. This new technology gives the DJ access to instant acapella and instrumental on any song, live during the mix! Real-time stems separation lets you easily remove or isolate parts of the song. Mix and remix songs live on the fly. Put vocals from one song over the beats from another song and explore new ways of mixing your tracks previously not possible. Stem separation right on the EQs allows the DJ to transition seamlessly in whole new ways, allowing the DJ to fine-tune different elements of the songs live in the mix. VirtualDJ is by far the most used DJ software on the planet, with over 100,000,000 downloads. Theres a reason why everybody starts with VirtualDJ. Packing the most advanced smart DJ technology, and intuitive features, VirtualDJ is easy to learn and master for any starter DJ. And its free for non-professional use. For professional DJs, by using VirtualDJ instead of the limited software that comes with your controller, you will have the most advanced technology at your fingertips and perform even better mixes. With more than hundred million downloads, VirtualDJ is by far the most used DJ software on the planet. Ask around, most DJs are familiar with VirtualDJ and likely have used VirtualDJ at some point. No matter if you are a beginner or an accomplished DJ, VirtualDJ will always provide you with the latest cutting-edge features, which will help you mix better, and give you an advantage. The professional press is unanimous: VirtualDJ keeps pioneering the DJ world by introducing features years before the competition, with new technologies that will shape the DJing world of tomorrow. Don't let others have better tools and mix better than you! Use the most advanced software yourself straight away, and perform the best mixes you can! ... putting the other choices to shame with a wealth of features... ... outmatches the competition in innovation, no other DJ software comes close ... at the cutting edge of digital DJing today. An impressive feature set... ... a killer piece of software - with features that dont exist on competing software VirtualDJ lets you start mixing as a DJ right away, with just your computer. To practice & learn, or prepare sets & playlists. VirtualDJ works for for every type of DJ, with or without hardware. Superior song library management with fast search, smart folders, playlists, and more. And with AI-suggestions, requests, and online catalogs. VirtualDJ supports a multitude of audio-, video- and karaoke formats. Entertain your guests with stunning visuals, video mixing or host karaoke events. Built-in professional audio- and video- effects to enhance your sound and mix. And unlimited sampler with easy control of sound and/or video loops. Independent studies show that VirtualDJ has the lowest crash-ratio in the industry! Using highly optimized, reliable, and well-tested code, VirtualDJ runs smoother and faster than any competitor's software, and can be trusted for your gigs. Choose a platform for your DJ work that will not let you down! VirtualDJ supports more DJ controllers and hardware than any other software. With plug & play support for over 300+ controllers, the choice of gear is all yours. From easy to use entry-level controllers to advanced club mixers, simply connect your controller and you are ready to mix. Detection and setup is automatic, and the powerful built-in mapper lets you customize everything easily to set your controller to work exactly as you want it to. Keep your options open and your gear fully under your control with VirtualDJ! INTUITIVE INTERFACE VIDEO & KARAOKE MULTITUDE OF EFFECTS 4 DECKS (OR MORE) UNLIMITED SAMPLER POWERFUL EDITORS VirtualDJ lets you stream tracks from our partner catalogs directly within the software. Play anything from the millions of songs available, discover new tracks from tailored charts, and create your own playlists with ease. From mainstream to underground, everything is available right at your fingertips. All in high-quality formats. You will always have access to the best versions and remixes intended specifically for DJ's, to karaoke and music videos, or to broader generalist catalogs like Deezer and SoundCloud. You will never run out of music to play, or be unable to fulfill a client's request. VirtualDJ stacks more features than any other software, and new ground-breaking technology comes in VirtualDJ first. With VirtualDJ you are always ahead of the curve with the latest technology and innovative features. VirtualDJ lets you do more!. Unleash your creative potential... Audio/video mixing softwareThis article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed.Find sources:"VirtualDJ"news newspapers books scholar JSTOR (July 2020) (Learn how and when to remove this message)VirtualDJDeveloper(s)Atomix ProductionsStable releaseVirtualDJ 2025 / BUILD 8528 (2025)[1]Operating systemmac OS, WindowsTypeMusic softwareLicenseProprietaryWebsitewww.virtualdj.comVirtualDJ (VDJ) is audio and video mixing software for DJs for Microsoft Windows and macOS, developed by Atomix Productions.[2]The first version of VirtualDJ appeared on 1 July 2003. VirtualDJ is the successor to AtomixMP3, the first version of which dates from September 2000. The development of AtomixMP3 stopped in December 2003 as soon as its successor VirtualDJ was marketed. VirtualDJ existed in three different versions until 2009: Home Edition (sold in stores), PRO (only available online), and Limited Version (free with certain MIDI controllers). In late 2009, a new version called VirtualDJ Basic went on sale as a budget-friendly alternative to VirtualDJ Pro, without MIDI control. Since May 2014, (the release of version 8) 5 licence options are available: Pro Infinity (the full version, one time purchase, free updates), Pro Subscription (same access as Pro Infinity but a monthly subscription charge), Business (same access as Pro Infinity with addition support services), Home Plus (Hardware control limited to a single device type), Home User (No hardware control other than a 10 minute trial when you start the software) .In 2010, VirtualDJ won the prize for best mixing software at the 25th edition of the Annual International Dance Music Awards in Miami.The software has a default layout made of two turntables (vinyl or CD) associated with a central mixer. It includes a bar for viewing the status of the two audio tracks as well as the management of the playlist and of current readings with a search function in the database. The current track of the different decks appears in a graphical window at the top of the screen which visualizes the curve (waveform) of the live sound. The user can also perform loops of variable duration. As a professional DJ software, VirtualDJ allows users to plug in their DJ controllers. It also works with custom DJ systems built by users and it recognizes any different hardware turntable or mixer.[3]VDJ has a scripting language, vdjscript, that allows mapping actions to hardware controls or the computer keyboard. Using this scripting language, a large number of plugins are available for download within VirtualDJ, adding additional skins, pads, effects and transitions.[4] In addition, VST3 plugins can be used to provide additional audio effects, either per deck, or on the global audio output.[5]VirtualDJ supports DJing with streaming music from Tidal, Deezer, Beatport, Beatsource, and SoundCloud.[6]^ "VirtualDJ Changelog". Retrieved 2025-03-25.^ cculbert (20 March 2020). "Starting from Scratch: How VirtualDJ* 8 mixes Music and Technology". software.intel.com. Retrieved 2020-05-03.[dead link]^ DECLAN MCGLYNN (18 June 2020). "Isolate vocals, drums, melodies in real-time with the new version of VirtualDJ". Retrieved 2024-04-09.^ "VirtualDJ - Download Addons". Retrieved 2024-01-29.^ "VirtualDJ - VDJPedia - how to use VST effects". Retrieved 2024-01-29.^ "VirtualDJ - Content Streaming Catalogs". VirtualDJ Website. Retrieved 2025-05-13.Official websiteRetrieved from " comprehensive guide covers everything beginner DJs need to know, from choosing equipment to learning mixing techniques. It focuses on the basics of mixing, choosing your music genre, and using software for DJing. The guide includes step-by-step tutorials, guided mix sessions, and free music tracks.To become a DJ for beginners, pick your ideal DJ setup, set up DJ decks and equipment, learn the basics of mixing, choose your music genre, and use a DJ controller. Master beat matching, mixing techniques, and advanced skills like hot cues and EQing.The idea is simple: pick a song, load it to a player, and press play. Once that song is playing, choose another one and load it to the other player. Learn step-by-step how to use the Virtual DJ software, which has over 100,000 downloads and offers the most advanced DJ technology.This beginner tutorial covers the setup, how to record your first mix, and an interface overview. With over 100,000 downloads, VirtualDJ packs the most advanced DJ technology, making it perfect for both beginners and advanced pro DJs. The tutorial series teaches beginning DJs to use Virtual DJ, available for both Windows and Macs.In summary, this guide provides a comprehensive guide for beginners to learn how to DJ perfectly with Virtual DJ. It covers the basics of mixing, music genre, and software, making it an essential tool for both beginners and advanced DJs. Your First Day With Virtual DJ 8 Tutorial for new DJsThis Virtual DJ 8 video tutorial demonstrates software setup, loading and playing tracks, and connecting to a hardware controller.(Image Source: Pixabay.com) Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. DJing is no longer about vinyl and decks anymore. DJ software have become an important part of the music industry. Where digital vinyl, software and controllers are the new thing. With these upgrades, we have so many options to choose from in different pricing according to our needs. We can get our hands on the cheaper, most effective and most convenient setup than ever before! A huge part of this new Digital DJing spectrum is software. This software can be used on laptops and computers. The controllers can be connected to laptop or interfaces for digital vinyl systems (DVS). Virtual DJ is the one name that comes up when we talk about DJ software. Virtual DJ is a mixing software for audios and videos. It is a widely used software and is feasible for the beginners. The software was released in 2003 by Atomix Productions. Atomix virtual DJ has seen more than 100,000,000 downloads since. It is used by many professional DJs worldwide. The software is compatible with Windows XP, Vista, Windows 7 and 8, Mac OS Leopard, Mac OS Snow Leopard, and Mac OS X Lion. Initially, there was a free trial version available for users, offered for 20 days, after which the user had to purchase the license to continue usage of the Pro Version. But now, the trial version for 20 days is not available anymore. Instead, the Virtual DJ HOME version is available for free. It cannot be commercially used but it allows the use of the Virtual DJ Pro features for about 10 minutes at a time. Virtual DJ has been a software that brought the experience of DJing to our laptops and computers. It is hugely popular with controller DJs and laptop DJs. Its super smooth interface and its fine functionality make it extremely competent for all the DJ and mixing operations. Virtual DJ has an easy-to-use and streamlined user interface which is familiar to most people. Even those who are not familiar with its UI find it easy to pick up on it and get used to it. You can also choose and download your own skins from the virtual DJ site and add them to your system. It also has two-deck and four-deck setup, and you also have the option to add up to 99 decks on the side. For those DJ who want to load up many tunes for longer sets or use in radio, this feature is very useful. The Virtual DJ software is nearly universally compatible along with all its controllers and devices. With the backing of a dedicated community of loyal users, the company is very liberal of what they let their users do. This means that users can get setup files and mappings for almost every piece of hardware that here is. The software currently works on more than 300 devices with the Virtual DJ free version suitable for home use. Virtual DJ is very cheap to expand with the help of some extra bobs and bits like a module of video DJing, editing modules for sampling and cutting tracks, many custom layouts, community-made FX. The virtual DJ controller is highly effective for use on computer as well as laptop. You can download virtual DJ and use its home version for free. This is given on the basis that you do not use it in a professional way, it is for your personal use. It will not allow you to connect to the controller for more than 10 minutes, but you can get the full version of the software for laptop only mixers. The paid version of the software aka the advanced version enables its users to use one controller fully but again it comes with a confusing clause that you can use at home and not professionally. This costs between $49 and $149 depending upon which controller you want to get the license of. But its cheaper as compared to other sites which come with fully-suited DJ software. You can use virtual DJs Professional paid version which lets you to make money from it. It enables you to use custom mappings so that you can connect it to any controller without any problem. This version comes with add on and a whole suite. Open your browser and go to the Virtual DJ website. On the top line, you will see the download link which will pop down other options. Click on it and from the drop-down menu, select Download Virtual DJ, and then the interface will allow you to choose the version which is compatible with the OS that your computer has. For controller use, youll have to choose from the menu and go to select a mapping file for your controller. Mappings for custom controller or controllers in general are typically not supported in the software can be found online. You can run and test the functions of your equipment before you begin mixing. The two versions available are for Mac and PC users. Click on the link accordingly. Once you have clicked on it, the site will take you to the download portal. Click the download button again and wait for the download to start automatically. Once the download is complete, click on the downloaded prompt at the bottom of your browser to install the software. Then, click continue on the installer window and accept the software license agreement. Loading tunes to the library is a pretty easy task once you are finished with the Virtual DJ download. You have 3 options where either you can browse your folders directly from within the software folder navigator, add tunes to the software folder or import from iTunes. You can choose to analyze the tunes you fine in folders or the imported ones as it always best to have a look before. Virtual DJ and create an account by putting your login details and personal information on the Login window. Verify the account by the confirmation code, which will be sent to you on your account. With your account confirmed, the Virtual DJ software is now officially launched. Once, the software is launched, you have to choose the interface. The software requires you to select the interface for your mix (audio or video). A window that has the entire DJ setup, will open. On the top right corner of the window, there is a button for configuration. Click it to choose the skin. When you click the configuration button once, it pops up a window, choose the, click on the Skin tab and choose the Mix lab version 3.1 and then click OK. You can select any other skin as well. The reason to choose this is that it has crossfade EQ, which plays a significant role to create a good remix. Now, you need to set up your sound card. Click the setting icon in the top left corner of the Virtual DJ interface. A window opens, which allows you to choose external or internal sound cards. Click internal soundcard and then click apply. To get music on the virtual DJ setup, you can use the list which contains the folders (in your computer) recognized by the Virtual DJ software. Click one of the folders, choose the audio track and drag it to one of the virtual vinyl turntables above. The music or the audio file is now loaded, and you can see a track overview. It allows you to navigate through the track on a point, by just clicking on that point. To mix two different tracks, both the tracks must have similar beats per minute (BPM). If they do not have the same BPM, you can do it manually as well. Just press the sync button, and the software will do that for you. A good mix can be created by mixing one tracks intro and the others outro. To do that, you can select an outro point of one track and for the other track press cue button, which makes the track start from the intro. Similarly, there are several functions and effects available in the software for you to mix your music. Like, in the mixer portion, two volume faders control the music for each decks track, respectively. Then there are crossfaders used to turn the volume from one deck to another. The software also lets you mix more than one track with the options like, adjusting the speed (BPM) and applying different effects. Firstly, you will have to check some basic requirements: Gain: You can find the software gain control next in the middle console. Gains are supposed to be set so the meter levels inside your software lie between yellow and green when the channel faders are set to 200. If you find it to be too quiet, always turn up the speaker or the master volume and not the gain. It is said that having gains set to 12 oclock is fine. EQ: EQ can be found below the gain, and it controls the frequency balance of your songs. EQ should be set at the center. Faders: There are mainly two faders, the channel faders and the crossfader. Channel faders have the control to channel volume whereas the crossfaders control the blend of the two decks together. Both the songs can be audible at the same if time if the crossfader put in the middle and both the channel faders turned up. When you want to engage your mix and fade from one track to another track, you should use cross faders. Others prefer to let it be and leave centrally rather than moving the channel slowly to fade in a song. You can notice the waveforms loading in the top sections of each deck as well as the top bar. The deck waveform displays are developed to enable its users to navigate and check the entire songs. You can assess where the breakdowns and buildups are present as well as you can look for interludes. The display of top waveform is designed to help you match the betas of the tracks. Before you try to match up your tunes. You will have to adjust your BPMs for each track. The goal is to get them to match up exactly. Virtual DJ 2021 enables you to auto-sync the BPMs quite easily. Once you have matched the BPMs, the next thing you need to do is cue your song while the other one is already playing. Cueing means to take the first beat of one section of the track and readying it for dropping. First beats after buildups and breakdowns are usually good places to pick. Once you have cued your next track and are ready to mix it into the first one, its time to wait. You have got to wait until the moment to mix in your songs comes. Once its up, you can count in your mind with the cue, 1,2,3 and DROP! This requires a lot of practice as you dont want to accidentally drop your next track a beat late or a beat early. of course, the software does have an auto-syn feature that can help you bring in the track in time but that is not foolproof and will not even work if the beat grids are not set up correctly. Hence, it is always better if you practice this beforehand so you dont screw up in the final set, and you can make adjustments if any well in time. Once you have dropped the beat, you need to check the waveforms at the top of the mix window to make sure that the peaks of your songs are aligned. Peaks are basically the kicks and snare drums as well as other hits and percussions. Kicks and snares are most significant for lining up two beats and easiest to pick out. If the BPMs are matched exactly then you can get the mix right pretty quickly. Although auto-sync is not something that should rely on always but if you are only going to use your laptop and no other hardware, you might need to use it as you will not be able to effectively nudge around the decks to get the tracks in time. If you are experiencing any issues with auto-sync, then you will have to check the way virtual DJ has analyzed your tracks and tunes as it can get the incorrect BPM or put the beat grids in wrong place at times. Virtual DJ software has always remained at the top for laptop DJs due to its uncomplicated and precise layout and easily accessible libraries. The software is perfect for practising and making sets for live and stage performances using hardware. We hope this Virtual DJ guide gives you a brief overview of the software. Stay tuned to grab more snippets from the world of EDM. Series of Macintosh operating systems"Mac OS" redirects here. For the now classic OS, formerly named that way, see Classic Mac OS.For a list of all Apple operating systems, see List of Apple operating systems.Mac operating systems were developed by Apple Inc. in a succession of two major series.In 1984, Apple debuted the operating system that is now known as the classic Mac OS with its release of the original Macintosh System Software. The system, rebranded Mac OS in 1997, was pre-installed on every Macintosh until 2002 and offered on Macintosh clones shortly in the 1990s. It was noted for its ease of use, and also criticized for its lack of modern technologies compared to its competitors.[1][2]The current Mac operating system is macOS, originally named Mac OS X until 2012 and then OS X until 2016.[3] It was developed between 1997 and 2001 after Apple's purchase of NeXT. It brought an entirely new architecture based on NeXTSTEP, a Unix system, that eliminated many of the technical challenges that the classic Mac OS faced, such as problems with memory management. The current macOS is pre-installed with every Mac and receives a major update annually.[4] It is the basis of Apple's current system software for its other devices iOS, iPadOS, watchOS, and tvOS.[5]Prior to the introduction of Mac OS X, Apple experimented with several other concepts, releasing different products designed to bring the Macintosh interface or applications to Unix-like systems or vice versa, A/UX, MAE, and MkLinux. Apple's effort to expand upon and develop a replacement for its classic Mac OS in the 1990s led to a few cancelled projects, code named Star Trek, Taligent, and Copland.Although the classic Mac OS and macOS (Mac OS X) have different architectures, they share a common set of GUI principles, including a menu bar across the top of the screen; the Finder shell, featuring a desktop metaphor that represents files and applications using icons and relates concepts like directories and file deletion to real-world objects like folders and a trash can; and overlapping windows for multitasking.Before the arrival of the Macintosh in 1984, Apple's history of operating systems began with its Apple II computers in 1977, which run Apple DOS, ProDOS, and GS/OS; the Apple III in 1980 runs Apple SOS; and the Lisa in 1983 which runs Lisa OS and later MacWorks XL, a Macintosh emulator. Apple developed the Newton OS for its Newton personal digital assistant from 1993 to 1997.Apple launched several new operating systems based on the core of macOS, including iOS in 2007 for its iPhone, iPad, and iPod Touch mobile devices and in 2017 for its HomePod smart speakers; watchOS in 2015 for the Apple Watch; and tvOS in 2015 for the Apple TV set-top box.Main article: Classic Mac OSThe classic Mac OS is the original Macintosh operating system introduced in 1984 alongside the first Macintosh and remained in primary use on Macs until Mac OS X in 2001.[6][7]Apple released the original Macintosh on January 24, 1984; its early system software is partially based on Lisa OS, and inspired by the Alto computer, which former Apple CEO Steve Jobs previewed at Xerox PARC.[6] It was originally named "System Software", or simply "System"; Apple rebranded it as "Mac OS" in 1996 due in part to its Macintosh clone program that ended one year later.[8]Classic Mac OS is characterized by its monolithic design. Initial versions of the System Software run one application at a time. System 5 introduced cooperative multitasking. System 7 supports 32-bit memory addressing and virtual memory, allowing larger programs. Later updates to the System 7 enable the transition to the PowerPC architecture. The system was considered user-friendly, but its architectural limitations were critiqued, such as limited memory management, lack of protected memory and access controls, and susceptibility to conflicts among extensions.[2]This text-only logo for classic Mac OS started with Mac OS 7.6, released in 1997.Nine major versions of the classic Mac OS were released. The name "Classic" that now signifies the system as a whole is a reference to a compatibility layer that helped ease the transition to Mac OS X.[9]Macintosh System Software "System 1", released in 1984System Software 2, 3, and 4 released between 1985 and 1987System Software 5 released in 1987System Software 6 released in 1988System 7 / Mac OS 7.6 released in 1991Mac OS 8 released in 1997Mac OS 9 final major version, released in 1999Main article: macOSmacOS Big Sur was released in 2020 to introduce the current design iteration of macOS.The system was launched as Mac OS X, renamed OS X from 20122016,[10] and then renamed macOS as the current Mac operating system that officially succeeded the classic Mac OS in 2001.The system was originally marketed as simply "version 10" of Mac OS, but it has a history that is largely independent of the classic Mac OS. It is a Unix-based operating system[11][12] built on NeXTSTEP and other NeXT technology from the late 1980s until early 1997, when Apple purchased the company and its CEO Steve Jobs returned to Apple.[13] Precursors to Mac OS X include OPENSTEP, Apple's Rhapsody project, and the Mac OS X Public Beta.macOS is based on Apple's open source Darwin operating system, which is based on the XNU kernel and BSD.[14]macOS is the basis for some of Apple's other operating systems, including iPhone OS/iOS, iPadOS, watchOS, tvOS, and visionOS.The "X" logo for Mac OS X versions 10.0 "Cheetah" and 10.1 "Puma", released in 2001The first version of the system was released on March 24, 2001, supporting the Aqua user interface. Since then, several more versions adding newer features and technologies have been released. Since 2011, new releases have been offered annually.[4]Mac OS X 10.0 codenamed "Cheetah", released Saturday, March 24, 2001Mac OS X 10.1 codenamed "Puma", released Tuesday, September 25, 2001Mac OS X Jaguar version 10.2, released Friday, August 23, 2002Mac OS X Panther version 10.3, released Friday, October 24, 2003Mac OS X Tiger version 10.4, released Friday, April 29, 2005Mac OS X Leopard version 10.5, released Friday, October 26, 2007Mac OS X Snow Leopard version 10.6, publicly unveiled on Monday, June 8, 2009Mac OS X Lion version 10.7, released Wednesday, July 20, 2011OS X Mountain Lion version 10.8, released Wednesday, July 25, 2012OS X Mavericks version 10.9, released Tuesday, October 22, 2013OS X Yosemite version 10.10, released Thursday, October 16, 2014OS X El Capitan version 10.11, released Wednesday, September 30, 2015macOS Sierra version 10.12, released Tuesday, September 20, 2016macOS High Sierra version 10.13, released Monday, September 25, 2017macOS Mojave version 10.14, released Monday, September 24, 2018macOS Catalina version 10.15, released Monday, October 7, 2019macOS Big Sur version 11, released Thursday, November 12, 2020macOS Monterey version 12, released Monday, October 25, 2021macOS Ventura version 13, released Monday, October 24, 2022macOS Sonoma - version 14, released Tuesday, September 26, 2023macOS Sequoia - version 15, released Monday, September 16, 2024macOS 10.16's version number was updated to 11.0 in the third beta. The third beta version of macOS Big Sur is 11.0 Beta 3 instead of 10.16 Beta 3.An early server computing version of the system was released in 1999 as a technology preview. It was followed by several more official server-based releases. Server functionality has instead been offered as an add-on for the desktop system since 2011.[15]Mac OS X Server 1.0 code named "Hera", released in 1999Mac OS X Server later called "OS X Server" and "macOS Server", released between 2001 and 2022.Main article: A/ROSEThe Apple Real-time Operating System Environment (A/ROSE) is a small embedded operating system which runs on the Macintosh Coprocessor Platform, an expansion card for the Macintosh. It is a single "overdesigned" hardware platform on which third-party vendors build practically any product, reducing the otherwise heavy workload of developing a NuBus-based expansion card. The first version of the system was ready for use in February 1988.[16]Main article: A/UXIn 1988, Apple released its first UNIX-based OS, A/UX, which is a UNIX operating system with the Mac OS look and feel. It was not very competitive for its time, due in part to the crowded UNIX market and Macintosh hardware lacking high-end design features present on workstation-class computers. Most of its sales was to the U.S. government, where MacOS lacks POSIX compliance.[17]Main article: Macintosh Application EnvironmentThe Macintosh Application Environment (MAE) is a software package introduced by Apple in 1994 that allows certain Unix-based computer workstations to run Macintosh applications. MAE uses the X Window System to emulate a Macintosh Finder-style graphical user interface. The last version, MAE 3.0, is compatible with System 7.5.3. MAE was published for Sun Microsystems SPARCstation and Hewlett-Packard systems. It was discontinued on May 14, 1998.[18]Main article: MkLinuxAnnounced at the 1996 Worldwide Developers Conference (WWDC), MkLinux is an open source operating system that was started by the OSF Research Institute and Apple in February 1996 to port Linux to the PowerPC platform, and thus Macintosh computers. In mid 1998, the community-led MkLinux Developers Association took over development of the operating system. MkLinux is short for "Microkernel Linux", which refers to its adaptation of the monolithic Linux kernel to run as a server hosted atop the Mach microkernel version 3.0.[19]Main article: Star Trek projectThe Star Trek project (as in "to boldly go where no Mac has gone before") was a secret prototype beginning in 1992, to port the classic Mac OS to Intel-compatible x86 personal computers. In partnership with Apple and with support from Intel, the project was instigated by Novell, which was looking to integrate its DR-DOS with the Mac OS GUI as a mutual response to the monopoly of Microsoft's Windows 3.0 and MS-DOS. A team consisting of four from Apple and four from Novell was got the Macintosh Finder and some basic applications such as QuickTime, running smoothly. The project was canceled one year later in early 1993, but was partially reused when porting the Mac OS to PowerPC.[20][21]Main article: TaligentTaligent (a portmanteau of "talent" and "intelligent") is an object-oriented operating system and the company producing it. Started as the Pink project within Apple to provide a replacement for the classic Mac OS, it was later spun off into a joint venture with IBM as part of the AIM alliance, with the purpose of building a competing platform to Microsoft Cairo and NeXTSTEP. The development process never worked, and has been cited as an example of a project death march. Apple pulled out of the project in 1995 before the code had been delivered.[22]Main article: Copland (operating system)Copland was a project at Apple to create an updated version of the classic Mac OS. It was to have introduced protected memory, preemptive multitasking, and new underlying operating system features, yet still be compatible with existing Mac software. They originally planned the follow-up release Gershwin to add multithreading and other advanced features. New features were added more rapidly than they could be completed, and the completion date slipped into the future with no sign of a release. In 1996, Apple canceled the project outright and sought a suitable third-party replacement. Copland development ended in August 1996, and in December 1996, Apple announced that it was buying NeXT for its NeXTSTEP operating system.[23]Timeline of Mac operating systems vteComparison of operating systemsHistory of the graphical user interfaceMacList of Mac software^ Gruber, John (January 21, 2009). "Three things OS X could learn from the Classic Mac OS". Macworld. Archived from the original on September 24, 2016. Retrieved September 13, 2016.^ a b Hertzfeld, Andy. "The Original Macintosh: Mea Culpa". folklore.org. Archived from the original on June 19, 2010. Retrieved May 10, 2010.^ Siracusa, John (March 24, 2006). "Five years of Mac OS X". Ars Technica. Cond Nast Digital. Archived from the original on June 25, 2009. Retrieved April 15, 2009. Even Steve Jobs still says "ecks" instead of "ten" sometimes.^ a b Gruber, John. "Mountain Lion". Daring Fireball. Archived from the original on August 11, 2015. Retrieved August 15, 2015.^ Honan, Matthew (January 9, 2007). "Apple unveils iPhone". Macworld. Archived from the original on April 15, 2008. Retrieved January 16, 2010.^ a b Linzmayer, Owen W. (2004). Apple Confidential 2.0. No Starch Press. Archived from the original on November 13, 2016. Retrieved October 1, 2016.^ "The Macintosh Product Introduction Plan". Stanford University Libraries & Academic Information Resources. Stanford University. Archived from the original on July 21, 2010.^ Gruman, Galen (November 1997). "Why Apple Pulled the Plug". Macworld. Vol.14, no.11. pp.3136.^ "A Brief History of the Classic Mac OS". Low End Mac. Archived from the original on October 5, 2016. Retrieved October 1, 2016.^ "What is an operating system (OS)?". Apple Inc. July 15, 2004. Archived from the original on July 22, 2010. Retrieved September 6, 2014.^ "Mac OS X and Unix" (PDF). Apple Inc. Archived from the original (PDF) on May 30, 2009. Retrieved February 5, 2016.^ "macOS version 10.12 Sierra on Intel-based Mac computers". The Open Group. Archived from the original on October 2, 2016. Retrieved September 29, 2016.^ "Apple Computer, Inc. Agrees to Acquire NeXT Software Inc". Apple Computer. December 20, 1996. Archived from the original on January 16, 1999.^ "Mac OS X: What is BSD?". Apple Inc. Archived from the original on February 19, 2013. Retrieved October 25, 2012.^ "Apple Releases Developer Preview of Mac OS X Lion" (Press release). Apple Inc. February 24, 2011. Archived from the original on October 13, 2019. Retrieved October 13, 2019.^ "Inside the Macintosh Coprocessor Platform and A/ROSE". Archived from the original on October 15, 2016. Retrieved October 1, 2016.^ Crabb, Don (August 10, 1992). "Apple finally gets Unix right with A/UX 3.0". InfoWorld. pp.6869. Archived from the original on August 1, 2016. Retrieved October 1, 2016.^ "MAE screenshots". Archived from the original on January 24, 2014. Retrieved March 4, 2015.^ Barbou des Places, Franois; Stephen, Nick; Reynolds, Franklin D. (January 12, 1996). "Linux on the OSF Mach3 microkernel". Grenoble and Cambridge: OSF Research Institute. Archived from the original on February 11, 2012. Retrieved April 4, 2013.^ Hormby, Tom (2005). "Star Trek: Apple's First Mac OS on Intel Project". Low End Mac. Archived from the original on November 2, 2015. Retrieved November 10, 2015.^ Linzmayer, Owen W. (1999). Apple Confidential. San Francisco, CA: No Starch Press. ISBN9781886411289. OCLC245921029. Archived from the original on September 20, 2019. Retrieved May 29, 2017.^ "Apple surrenders the Pink (to Microsoft) Archived August 10, 2017, at the Wayback Machine", The Register, October 3, 2008.^ Widman, Jake (October 9, 2008). "Lessons Learned: IT's Biggest Project Failures". PCWorld. Archived from the original on November 5, 2012. Retrieved October 23, 2012. Media related to Macintosh operating systems at Wikimedia CommonsRetrieved from " 2Computer architecture bit widthComputer architecture bit widthsBit148121618242630313236454860641282565 12bit slicingApplication8163264Binary floating-point precision16 ()2432 (1)4064 (2)80128 (4)256 (8)Decimal floating-point precision3264128vteIn computer architecture, 32-bit computing refers to computer systems with a processor, memory, and other major system components that operate on data in a maximum of 32-bit units.[1][2] Compared to smaller bit widths, 32-bit computers can perform large calculations more efficiently and process more data per clock cycle. Typical 32-bit personal computers also have a 32-bit address bus, permitting up to 4GiB of RAM to be accessed, far more than previous generations of system architecture allowed.[3]32-bit designs have been used since the earliest days of electronic computing, in experimental systems and then in large mainframe and minicomputer systems. The first hybrid 16/32-bit microprocessor, the Motorola 68000, was introduced in the late 1970s and used in systems such as the original Apple Macintosh. Fully 32-bit microprocessors such as the HP FOCUS, Motorola 68020 and Intel 80386 were launched in the early to mid 1980s and became dominant by the early 1990s. This generation of personal computers coincided with and enabled the first mass-adoption of the World Wide Web. While 32-bit architectures are still widely-used in specific applications, the PC and server market has moved on to 64 bits with x86-64 and other 64-bit architectures since the mid-2000s with installed memory often exceeding the 32-bit address limit of 4GiB on entry level computers. The latest generation of smartphones have also switched to 64 bits.A 32-bit register can store 232 different values. The range of integer values that can be stored in 32 bits depends on the integer representation used. With the two most common representations, the range is 0 through 4,294,967,295 (232 1) for representation as an (unsigned) binary number, and 2,147,483,648 (231) through 2,147,483,647 (231 1) for representation as two's complement.One important consequence is that a processor with 32-bit memory addresses can directly access at most 4GiB of byte-addressable memory (though in practice the limit may be lower).Motorola 68020 prototype from 1984. It features a 32-bit ALU and 32-bit address and data buses.The world's first stored-program electronic computer, the Manchester Baby, used a 32-bit architecture in 1948, although it was only a proof of concept and had little practical capacity. It held only 32 32-bit words of RAM on a Williams tube, and had no addition operation, only subtraction.Memory, as well as other digital circuits and wiring, was expensive during the first decades of 32-bit architectures (the 1960s to the 1980s).[4] Older 32-bit processor families (or simpler, cheaper variants thereof) could therefore have many compromises and limitations in order to cut costs. This could be a 16-bit ALU, for instance, or external (or internal) buses narrower than 32 bits, limiting memory size or demanding more cycles for instruction fetch, execution or write back.Despite this, such processors could be labeled 32-bit, since they still had 32-bit registers and instructions able to manipulate 32-bit quantities. For example, the IBM System/360 Model 30 had an 8-bit ALU, 8-bit internal data paths, and an 8-bit path to memory,[5] and the original Motorola 68000 had a 16-bit data ALU and a 16-bit external data bus, but had 32-bit registers and a 32-bit oriented instruction set. The 68000 design was sometimes referred to as 16/32-bit.[6]However, the opposite is often true for newer 32-bit designs. For example, the Pentium Pro processor is a 32-bit machine, with 32-bit registers and instructions that manipulate 32-bit quantities, but the external address bus is 36 bits wide, giving a larger address space than 4GB, and the external data bus is 64 bits wide, primarily in order to permit a more efficient prefetch of instructions and data.[7]Prominent 32-bit instruction set architectures used in general-purpose computing include the IBM System/360, IBM System/370 (which had 24-bit addressing), System/370-XA, ESA/370, and ESA/390 (which had 31-bit addressing), the DEC VAX, the NS320xx, the Motorola 68000 family (the first two models of which had 24-bit addressing), the Intel IA-32 32-bit version of the x86 architecture, and the 32-bit versions of the ARM,[8] SPARC, MIPS, PowerPC and PA-RISC architectures. 32-bit instruction set architectures used for embedded computing include the 68000 family and ColdFire, x86, ARM, MIPS, PowerPC, and Infineon TriCore architectures.On the x86 architecture, a 32-bit application normally means software that typically (not necessarily) uses the 32-bit linear address space (or flat memory model) possible with the 80386 and later chips. In this context, the term came about because DOS, Microsoft Windows and OS/2[9] were originally written for the 8088/8086 or 80286, 16-bit microprocessors with a segmented address space where programs had to switch between segments to reach more than 64 kilobytes of code or data. As this is quite time-consuming in comparison to other machine operations, the performance may suffer. Furthermore, programming with segments tend to become complicated; special far and near keywords or memory models had to be used (with care), not only in assembly language but also in high level languages such as Pascal, compiled BASIC, Fortran, C, etc.The 80386 and its successors fully support the 16-bit segments of the 80286 but also segments for 32-bit address offsets (using the new 32-bit width of the main registers). If the base address of all 32-bit segments is set to 0, and segment registers are not used explicitly, the segmentation can be forgotten and the processor appears as having a simple linear 32-bit address space. Operating systems like Windows or OS/2 provide the possibility to run 16-bit (segmented) programs as well as 32-bit programs. The former possibility exists for backward compatibility and the latter is usually meant to be used for new software development.[10]In digital images/pictures, 32-bit usually refers to RGBA color space; that is, 24-bit truecolor images with an additional 8-bit alpha channel. Other image formats also specify 32 bits per pixel, such as RGBE.In digital images, 32-bit sometimes refers to high-dynamic-range imaging (HDR) formats that use 32 bits per channel, a total of 96 bits per pixel. 32-bit-per-channel images are used to represent values brighter than what sRGB color space allows (brighter than white); these values can then be used to more accurately retain bright highlights when either lowering the exposure of the image or when it is seen through a dark filter or dull reflection.For example, a reflection in an oil slick is only a fraction of that seen in a mirror surface. HDR imagery allows for the reflection of highlights that can still be seen as bright white areas, instead of dull grey shapes.A 32-bit file format is a binary file format for which each elementary information is defined on 32 bits (or 4 bytes). An example of such a format is the Enhanced Metafile Format.History of video games (32-bit era)Word (computer architecture)Physical Address Extension (PAE)^ Prosise, Jeff (1995-11-07). "16 or 32 Bits: Should It Matter to You?". PC Magazine. pp.321322. Retrieved 2022-11-30.^ Buchanan, William (1997). Software Development for Engineers: C/C++, Pascal, Assembly, Visual Basic, HTML, Java Script, Java DOS, Windows NT, UNIX. Burlington: Elsevier Science. p.230. ISBN978-0-08-054137-2. OCLC854975383.^ Venkateswarlu, N.B. (2012). Essential Computer and IT

billion or more colors.[20] 230 is 1,073,741,824. Usually this is 10bits each of red, green, and blue (10bpc). If an alpha channel of the same size is added then each pixel takes 40bits.Some earlier systems placed three 10-bit channels in a 32-bit word, with 2bits unused (or used as a 4-level alpha channel); the Cineon file format, for example, used this. Some SGI systems had 10- (or more) bit digital-to-analog converters for the video signal and could be set up to interpret data stored this way for display. BMP files define this as one of its formats, and it is called "HiColor" by Microsoft.Video cards with 10bits per component started coming to market in the late 1990s. An early example was the Radius ThunderPower card for the Macintosh, which included extensions for QuickDraw and Adobe Photoshop plugins to support editing 30-bit images.[21] Some vendors call their 24-bit color depth with FRC panels 30-bit panels; however, true deep color displays have 10-bit or more color depth without FRC.The HDMI1.3 specification defines a bit depth of 30bits (as well as 36 and 48bit depths).[22]In that regard, the Nvidia Quadro graphics cards manufactured after 2006 support 30-bit deep color[23] and Pascal or later GeForce and Titan cards when paired with the Studio Driver[24] as do some models of the Radeon HD5900 series such as the HD5970.[25][26] The ATI FireGL V7350 graphics card supports 40- and 64-bit pixels (30 and 48 bit color depth with an alpha channel).[27]The DisplayPort specification also supports color depths greater than 24bpp in version1.3 through "VESA Display Stream Compression, which uses a visually lossless low-latency algorithm based on predictive DPCM and YCoCg-R color space and allows increased resolutions and color depths and reduced power consumption."[28]At WinHEC 2008, Microsoft announced that color depths of 30bits and 48bits would be supported in Windows 7, along with the wide color gamut scRGB.[29][30]High Efficiency Video Coding (HEVC or H.265) defines the Main10 profile, which allows for 8 or 10bits per sample with 4:2:0 chroma subsampling.[2][4][5][31][32] The Main10 profile was added at the October2012 HEVC meeting based on proposal JCTVC-K0109 which proposed that a 10-bit profile be added to HEVC for consumer applications.[5] The proposal stated that this was to allow for improved video quality and to support the Rec. 2020 color space that will be used by UHDTV.[5] The second version of HEVC has five profiles that allow for a bit depth of 8bits to 16bits per sample.[33]As of 2020, some smartphones have started using 30-bit color depth, such as the OnePlus8 Pro, Oppo Find X2 & FindX2 Pro, Sony Xperia 1 II, Xiaomi Mi 10 Ultra, Motorola Edge+, ROG Phone 3 and Sharp Aquos Zero2.[citation needed]Using 12 bits per color channel produces 36 bits, 68,719,476,736 colors. If an alpha channel of the same size is added then there are 48 bits per pixel.Using 16 bits per color channel produces 48 bits, 281,474,976,710,656 colors. If an alpha channel of the same size is added then there are 64 bits per pixel.Image editing software such as Adobe Photoshop started using 16 bits per channel fairly early in order to reduce the quantization on intermediate results (i.e. if an operation is divided by 4 and then multiplied by 4, it would lose the bottom 2 bits of 8-bit data, but if 16 bits were used it would lose none of the 8-bit data).Some systems started using those bits for numbers outside the 01 range rather than for increasing the resolution. Numbers greater than 1 were for colors brighter than the display could show, as in high-dynamic-range imaging (HDRI). Negative numbers can increase the gamut to cover all possible colors, and for storing the results of filtering operations with negative filter coefficients. The Pixar Image Computer used 12 bits to store numbers in the range [-1.5, 2.5), with 2 bits for the integer portion and 10 for the fraction. The Cineon imaging system used 10-bit professional video displays with the video hardware adjusted so that a value of 95 was black and 685 was white.[34] The amplified signal tended to reduce the lifetime of the CRT.More bits also encouraged the storage of light as linear values, where the number directly corresponds to the amount of light emitted. Linear levels makes calculation of computer graphics much easier. However, linear color results in disproportionately more samples near white and fewer near black, so the quality of 16-bit linear is about equal to 12-bit sRGB.Floating point numbers can represent linear light levels spacing the samples semi-logarithmically. Floating point representations also allow for drastically larger dynamic ranges as well as negative values. Most systems first supported 32-bit per channel single-precision, which far exceeded the accuracy required for most applications. In 1999, Industrial Light & Magic released the open standard image file format OpenEXR which supported 16-bit-per-channel half-precision floating-point numbers. At values near 1.0, half precision floating point values have only the precision of an 11-bit integer value, leading some graphics professionals to reject half-precision in situations where the extended dynamic range is not needed.Virtually all television displays and computer displays form images by varying the strength of just three primary colors: red, green, and blue. For example, bright yellow is formed by roughly equal red and green contributions, with no blue contribution.For storing and manipulating images, alternative ways of expanding the traditional triangle exist: One can convert image coding to use fictitious primaries, that are not physically possible but that have the effect of extending the triangle to enclose a much larger color gamut. An equivalent, simpler change is to allow negative numbers in color channels, so that the represented colors can extend out of the color triangle formed by the primaries. However these only extend the colors that can be represented in the image encoding; neither trick extends the gamut of colors that can actually be rendered on a display device.A typical CRT monitor[a] gamut: Inside the colored triangle represents colors that the monitor can display. The horseshoe-shaped surrounding grey area represents colors humans can see, but that the monitor cannot show.Supplementary colors can widen the color gamut of a display, since it is no longer limited to the interior of a triangle formed by three primaries at its corners, e.g. the CIE 1931 color space. Recent technologies such as Texas Instruments's BrilliantColor augment the typical red, green, and blue channels with up to three other primaries: cyan, magenta, and yellow.[35] Cyan would be indicated by negative values in the red channel, magenta by negative values in the green channel, and yellow by negative values in the blue channel, validating the use of otherwise fictitious negative numbers in the color channels. Mitsubishi and Samsung (among others) use BrilliantColor in some of their TV sets to extend the range of displayable colors.[citation needed]The Sharp Aquos line of televisions has introduced Quattron technology, which augments the usual RGB pixel components with a yellow subpixel. However, formats and media that allow or make use of the extended color gamut are at present extremely rare.[citation needed]Because humans are overwhelmingly trichromats or dichromats[b] one might suppose that adding a fourth "primary" color could provide no practical benefit. However humans can see a broader range of colors than a mixture of three colored lights can display. The deficit of colors is particularly noticeable in saturated shades of bluish green (shown as the left upper grey part of the horseshoe in the diagram) of RGB displays: Most humans can see more vivid blue-greens than any color video screen can display.Audio bit depth corresponding concept for digital audioBit planeImage resolutionList of color palettesList of colors (alphabetical)Mach bandingRGB color model^ The cathode-ray tube monitor (CRT) is obsolete technology, but its more limited color-rendering clearly illustrates the problem that LCD monitors also have, despite their somewhat broader color gamut.^ Some women have tested as functional tetrachromats but they are exceedingly rare.[citation needed] Less rare are "color blind" dichromats, who theoretically would only need two primary colors.^ a b Sullivan, G. J.; Ohm, J.-R.; Han, W.-J.; Wiegand, T. (May 25, 2012). "Overview of the High Efficiency Video Coding (HEVC) Standard" (PDF). IEEE Transactions on Circuits and Systems for Video Technology. Retrieved May 18, 2013.^ a b c Sullivan, G. J.; Schwarz, Heiko; Tan, Thiow Keng; Thomas Wiegand (August 22, 2012). "Comparison of the Coding Efficiency of Video Coding Standards Including High Efficiency Video Coding (HEVC)" (PDF). IEEE Trans. on Circuits and Systems for Video Technology. Retrieved May 18, 2013.^ "After Effects / Color basics". Adobe Systems. Retrieved July 14, 2013.^ a b "High Efficiency Video Coding (HEVC) text specification draft 10 (for FDIS & Consent)". JCT-VC. January 17, 2013. Retrieved May 18, 2013.^ a b c d Alberto Dueas; Adam Malamy (October 18, 2012). "On a 10-bit consumer-oriented profile in High Efficiency Video Coding (HEVC)". JCT-VC. Retrieved May 18, 2013.^ Thenkabail, P. (2018). Remote Sensing Handbook - Three Volume Set. Remote Sensing Handbook. CRC Press. p.20. ISBN978-1-4822-8267-2. Retrieved August 27, 2020.^ US5574478A, Bril, Vlad & Pett, Boyd G., "VGA color system for personal computers", issued November 12, 1996^ "Reading and writing 18-bit RGB VGA Palette (pal) files with C#". The Cyotek Blog. December 26, 2017. Retrieved March 27, 2023.^ "VGA/SVGA Video Programming--Color Registers". www.osdever.net. Retrieved March 27, 2023.^ "VGA Palette Conversion \ VOGONS". www.vogons.org. Retrieved March 27, 2023.^ "How we see color". Pantone (pantone.co.uk). Archived from the original on December 29, 2011.^ Edward M. Schwalb (2003). iTV handbook: technologies and standards. Prentice Hall PTR. p.138. ISBN978-0-13-100312-5.^ David A. Karp (1998). Windows 98 annoyances. O'Reilly Media. p.156. ISBN978-1-56592-417-8.^ Kowaliski, Cyril; Gasior, Geoff; Wasson, Scott (July 2, 2012). "TR's Summer 2012 system guide". The Tech Report. p.14. Retrieved January 19, 2013.^ Cianci, Lisa (February 23, 2023). "How digital screens display colour". {{cite journal}}: Cite journal requires |journal= (help)^ D. B. Judd and G. Wyszecki (1975). Color in Business, Science and Industry. Wiley Series in Pure and Applied Optics (thirded.). New York: Wiley-Interscience. p.388. ISBN0-471-45212-2.^ Clint DeBoer (April 16, 2008). "HDMI Enhanced Black Levels, xvYCC and RGB". Audioholics. Retrieved June 2, 2013.^ "Digital Color Coding" (PDF). Telairity. Archived from the original (PDF) on January 7, 2014. Retrieved June 2, 2013.^ Charles A. Poynton (2003). Digital Video and HDTV. Morgan Kaufmann. p.36. ISBN1-55860-792-7.^ Jack, Keith (2007). Video demystified: a handbook for the digital engineer (5thed.). Newnes. p.168. ISBN978-0-7506-8395-1.^ "Radius Ships ThunderPower30/1920 Graphics Card Capable of Super Resolution 19201080 and Billions of Colors". Business Wire. August 5, 1996.^ "HDMI Specification 1.3a Section 6.7.2". HDMI Licensing, LLC. November 10, 2006. Archived from the original on July 10, 2009. Retrieved April 9, 2009.^ "Chapter32. Configuring Depth30 Displays (driver release notes)". NVIDIA.^ "NVIDIA Studio Driver431.70 (Release Highlights)". NVIDIA.^ "ATI Radeon HD5970 Graphics Feature Summary". AMD. Retrieved March 31, 2010.^ "AMD's 10-bit Video Output Technology" (PDF). AMD. Archived from the original (PDF) on February 16, 2010. Retrieved March 31, 2010.^ Smith, Tony (March 20, 2006). "ATI unwraps first 1GB graphics card". Archived from the original on October 8, 2006. Retrieved October 3, 2006.^ "Looking for a HDMI2.0 displayport to displayport for my monitor". Tom's Hardware. [Solved] - Displays. Archived from the original on March 21, 2018. Retrieved March 20, 2018.^ "WinHEC 2008 GRA-583: Display Technologies". Microsoft. November 6, 2008. Archived from the original on December 27, 2008. Retrieved December 4, 2008.^ "Windows7 High Color Support". Softpedia. November 26, 2008. Retrieved December 5, 2008.^ Furgusson, Carl (June 11, 2013). "HEVC: The background behind the game-changing standard- Ericsson". Focus on ... Ericsson. Archived from the original on June 20, 2013. Retrieved June 21, 2013.^ Forrest, Simon (June 20, 2013). "The emergence of HEVC and 10-bit colour formats". Imagination Technologies. Archived from the original on September 15, 2013. Retrieved June 21, 2013.^ Boyce, Jill; Chen, Jianle; Chen, Ying; Flynn, David; Hannuksela, Miska M.; Naccari, Matteo; etal. (July 11, 2014). "Draft high efficiency video coding (HEVC) version2, combined format range extensions (RExt), scalability (SHVC), and multi-view (MV-HEVC) extensions". JCT-VC. Retrieved July 11, 2014.^ "8-bit vs. 10-bit Color Space" (PDF). January 2010. Archived from the original (PDF) on March 12, 2014. Retrieved May 15, 2014.^ Hutchison, David (April 5, 2006). "Wider color gamuts on DLP display systems through BrilliantColor technology". Digital TV DesignLine. Archived from the original on September 28, 2007. Retrieved August 16, 2007.Retrieved from " 4Computer color depthColor depth1-bit monochrome8-bit grayscale8-bit color15- or 16-bit color (high color)24-bit color (true color)30-, 36-, or 48-bit color (deep color)RelatedIndexed colorPaletteRGB color modelWeb-safe colorvte8-bit color graphics are a method of storing image information in a computer's memory or in an image file, so that each pixel is represented by 8 bits (1 byte). The maximum number of colors that can be displayed at any one time is 256 per pixel or 28.[1]8-bit color, with three bits of red, three bits of green, and two bits of blue.In order to turn a true color 24-bit image into an 8-bit image, the image must go through a process called color quantization. Color quantization is the process of creating a color map for a less color dense image from a more dense image.[2] The simplest form of quantization is to simply assign 3 bits to red, 3 bits to green and 2 bits to blue, as the human eye is less sensitive to blue light. This creates a so called 3-3-2 8-bit color image, arranged like on the following table:Bit 7 6 5 4 3 2 1 0Data R R R G G G B BThis process is sub optimal. There could be different groupings of colors that make evenly spreading the colors out inefficient and likely to misrepresent the actual image. An alternative approach is to use a palette, with each of the 256 possible indexes pointing towards a larger color space (ex: 256 colors chosen from 4096).Because the color map doesn't need to have every color in it and just needs to accurately represent the more color dense image, an arbitrary color can be assigned to each of the 256 available color indexes on the map. Popular approaches for creating these maps (also known as palettes) include the popularity algorithm which chooses the 256 most common colors and creates a map from them. The more accurate median cut algorithm resorts and divides colors to find the median of different color groups resulting in a more accurate final color map.[3]Because of the low amount of memory and resultant higher speeds of 8-bit color images, 8-bit color was a common ground among computer graphics development until more memory and higher CPU speeds became readily available to consumers. 8-bit color was used in many different applications including:[4][failed verification]The MSX2 series of personal computerThe Uzebox gaming consoleThe Atari FalconThe NTSC version of the Atari GTIAThe Tiki 100 personal computer (limited to 16 simultaneous color display)The Research Machines 380Z computer equipped with a High Resolution Graphics board.Wearable OS smartwatches with ambient displaysMany scanners use an 8-bit grey scale as their standardThe VGA standard for graphical interface used a redefinable 256 color (8-bit) color palette, although these were selected from an 18-bit (6-bit per RGB channel, 262,144 colors) gamut.[5][6][7][8] Developed in 1987 by IBM, the VGA interface supported a maximum resolution of 640x480 pixels. Due to this legacy, some image types such as GIF and TIFF use an 8-bit color palette system to store data.Even though it is now outdated for most consumer applications, 8-bit color encoding can still be useful in imaging systems with limited data bandwidth or memory capacity. For example, both Mars Exploration Rovers used an 8-bit grayscale format for navigation imaging.[9]Due to the nature of the 8-bit system, most images have different color maps. Since an 8-bit color display can not display two images with different color maps at the same time, it is usually impossible to display two different 8-bit images on the same such display at the same time. In practice, in order to avoid this problem, most images do not use the full range of 256 colors. Another problem comes when doing image processing: whenever two images with different color maps are added to each other, the resulting image has to have a new color map created, meaning another quantization operation has to occur, making the resulting image an imperfect version of the expected result.[1]Currently, most graphics hardware runs in 24-bit truecolor or 32-bit truecolor (24-bit truecolor and an 8-bit alpha channel). However, some remote desktop software (Virtual Network Computing, Remote Desktop Protocol) can switch to 8-bit color to conserve bandwidth. With the comparative low cost and high speeds of modern computers, some image editing is even done in a raw format with anywhere from 12 to 14 bits from each of the camera's image sensor pixels in order to avoid image quality reduction while editing. [10]PlanarPacked pixel15/16-bit color (High color)24-bit color (True color)Raw imagesColor depthList of palettesIndexed color^ a b Fisher, Robert; Perkins, Simon; Ashley, Walker; Wolfart, Erik. "8-bit Color Images". Hypermedia Image Processing Reference. University of Edinburgh. Retrieved 14 November 2019.^ Fisher, Robert; Perkins, Simon; Walker, Ashley; Wolfart, Erik. "Color Quantization". Hypermedia Image Processing Reference. University of Edinburgh. Retrieved 14 November 2019.^ Spring, Kenneth R.; Russ, John C. "Color Reduction and Image Dithering". Molecular Expressions Optical Microscopy Primer Digital Image Processing. Michael W. Davidson and The Florida State University. Archived from the original on 2 December 2020. Retrieved 14 November 2019.^ "When Atari Ruled the World". PCMAG. Retrieved 2021-09-17.^ US5574478A, Bril, Vlad & Pett, Boyd G., "VGA color system for personal computers", issued 1996-11-12^ "Reading and writing 18-bit RGB VGA Palette (pal) files with C#". The Cyotek Blog. 2017-12-26. Retrieved 2023-03-27.^ "VGA/SVGA Video Programming--Color Registers". www.osdever.net. Retrieved 2023-03-27.^ "VGA Palette Conversion \ VOGONS". www.vogons.org. Retrieved 2023-03-27.^ A. Kiely; M. Klimesh. The ICER Progressive Wavelet Image Compressor (PDF) (Report).^ Patterson, Steve. "The Benefits Of Working With 16-Bit Images In Photoshop". Photoshop Essentials. Photoshop Essentials. Retrieved 14 November 2019.Retrieved from " 5The following pages link to 8-bit color External tools(link counttransclusion countsorted list) See help page for transcluding these entriesShowing 50 items.View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)GIF (links | edit)The Addams Family (links | edit)Acorn Archimedes (links | edit)ANSI escape code (links | edit)High color (links | edit)Binary image (links | edit)Macintosh II (links | edit)Color management (links | edit)FFmpeg (links | edit)Amiga Unix (links | edit)Police Quest (links | edit)Deluxe Paint (links | edit)Web colors (links | edit)Color depth (links | edit)Fourth generation of video game consoles (links | edit)Grayscale (links | edit)Pixel art (links | edit)The Settlers (1993 video game) (links | edit)The Dagger of Amon Ra (links | edit)Multimedia PC (links | edit)FM Towns (links | edit)SimTower (links | edit)FM Towns Marty (links | edit)CP System II (links | edit)Wallpaper (computing) (links | edit)Tseng Labs (links | edit)Freddy Pharkas: Frontier Pharmacist (links | edit)The Legend of Mir 3 (links | edit)Microsoft Office 2003 (links | edit)Microsoft Office XP (links | edit)Microsoft Space Simulator (links | edit)Cirrus Logic (links | edit)New World Computing (links | edit)Palm IIIc (links | edit)Rex Nebular and the Cosmic Gender Bender (links | edit)Pitfall: The Mayan Adventure (links | edit)BioForge (links | edit)Microsoft Office 2000 (links | edit)Eight-bit color (redirect page) (links | edit)The Settlers III (links | edit)256 colors (redirect page) (links | edit)IBM 8514 (links | edit)Stunt Island (links | edit)Posterization (links | edit)Xterm (links | edit)Autodesk Animator (links | edit)Michael Stemmle (links | edit)History of telecommunication (links | edit)Sun-1 (links | edit)Extended Graphics Array (links | edit)History of videotelephony (links | edit)Palette (computing) (links | edit)Indexed color (links | edit)Sharp MZ (links | edit)Siemens M65 (links | edit)Myth III: The Wolf Age (links | edit)Vadem Clio (links | edit)Curse of Enchantia (links | edit)Unreal Engine 1 (links | edit)The Dark Queen of Krynn (links | edit)View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Retrieved from " WhatLinksHere/8-bit_color"Mixing beats is an exciting part of DJing that lets you transform tracks into a seamless musical journey. Virtual DJ is a popular software choice for beginners because of its user-friendly interface and powerful features. This guide helps DJ beginners mix beats in Virtual DJ with simple language.When planning an event, DJ Will Gill should be your top selection. He is the go-to DJ for high-energy corporate events. Over 1,500 five-star reviews support his remarkable reputation.DJ Will Gill mix style is Open Format, meaning youll hear a variety of favorites across every genre. Visit hisInstagramto find thrilling content that featuresAT&T Business, CDW,Team USA, Virgin Galactic, and more!1. Setting Up the SoftwareFirst, youll need to download and install Virtual DJ on your computer. You can find the software on the official Virtual DJ website. Once downloaded, follow the installation instructions to get it set up. Make sure your audio settings are configured correctly, and your headphones and speakers are connected properly.2. Understanding the InterfaceWhen you open Virtual DJ, youll see a digital workspace that includes decks, a mixer, and a browser. Heres a quick breakdown:Decks: The decks are the spots where you load and play your music tracks. They are like virtual turntables. Here, youll find buttons to control your music, such as play, pause, and cue. The play button starts the music, the pause stops it, and the cue sets a track starting point for easy return.Mixer: In this part of DJ software, you can control the sound of your music to make it just right. First, you can adjust the volume, which means making the music louder or quieter as needed. This is important because it helps you match the levels of different songs so everything sounds nice and even.Browser: Navigating through your music library is an essential skill. It involves using the tools provided within the software to browse and find the tracks you want to play. Typically, you can scroll through your collection, search for specific songs, or explore playlists that you have created.Loading Tracks and Basic ControlsTo start mixing, you need to load tracks into Virtual DJ:Select a Track: The browser is a handy tool that helps you find the music tracks you want to mix. It works like a search bar where you can type in the name of a song or artist to quickly locate the track you need.Load the Track: Using the drag-and-drop feature is a simple way to get your music ready for mixing. First, you look for a song you want to play using the browser tool. Once you find the track you like, click on it with your mouse and hold the button down.Once your track is loaded, familiarize yourself with these basic controls:Play/Pause: Starts and stops the track.Cue: Sets a starting point in the track.Pitch Slider: Adjusts the speed of the track to help with beatmatching.BeatmatchingBeatmatching is the technique of aligning the tempo and beats of two tracks so they play in sync. Heres how to do it:Match the BPM: Use the pitch slider to adjust the BPM (beats per minute) of the second track to match the first track.Align the Beats: Listen through your headphones and use the jog wheel (or mouse) to nudge the track so the beats line up perfectly.Practice Syncing: Once the beats are aligned, practice syncing the tracks using the crossfader to blend them smoothly.Using Effects and TransitionsVirtual DJ offers a variety of effects to enhance your mix:Effects Panel: Open this to explore effects like echo, reverb, and filters. These can add depth and interest to your mix.Using Effects: Apply effects sparingly to avoid overloading the mix. Use them to highlight transitions or emphasize parts of a track.Creating Smooth TransitionsA good transition keeps the energy flowing between tracks. Heres how to make seamless transitions:Fade In/Out: Use the crossfader to gradually transition from one track to another. Start by slowly moving the crossfader towards the incoming track while fading out the outgoing track.EQ Mixing: Adjust the EQ knobs to balance the sound. Lower the bass on one track while raising it on another to avoid clashing frequencies.Beat Grid Alignment: Ensure your beat grid is aligned properly. This helps in maintaining a consistent rhythm during transitions.Practical Tips for Beginners1. Start SimpleWhen starting out as a DJ, its important not to try everything at once. Focus on mastering the basics first. Begin with learning how to match the beats of two tracks so they play together smoothly, which is called beatmatching. Practice making simple transitions from one song to another.2. Know Your MusicGet to know your music tracks well. Understanding the structure of each song and its key parts is really important for DJs. This knowledge helps you decide when and how to move from one track to another smoothly. Songs usually have parts like the intro, verses, chorus, and outro, and knowing where these parts are can guide you in making seamless transitions.3. Record Your MixesRecording your mixes is an excellent method to track how youre doing as a DJ. By listening to your recorded sets, you can pinpoint what parts of your mix could use a little more work and which parts sound great. It helps you see what needs fixing and what works, improving your skills.4. Use HeadphonesHeadphones play a crucial role for DJs when mixing music. They let you listen to the next track privately without disturbing the audiences music. This is vital for preparing the next song in your mix. By wearing headphones, you can hear both the track playing live and the one youre about to mix in.Common Mistakes to AvoidOverusing Effects: Its easy to get carried away with effects. Use them to enhance, not overshadow, your tracks.Ignoring the Audience: Always consider the vibe and energy of your audience. Adjust your mix accordingly to keep them engaged.Not Practicing Enough: Regular practice is crucial. The more you practice, the better your transitions and timing will become.Effective Practice StrategiesSet Goals: Pick one goal for each practice, like learning something new or smoothing out a transition.Experiment: Try mixing different genres to expand your skills. Each genre has unique characteristics that can challenge and improve your technique.Review and Reflect: After each session, take time to reflect on what went well and what can be improved. Keep a practice journal to track your progress.Mixing Beats in a Virtual DJMixing beats in a Virtual DJ can be both fun and rewarding. Learn the software basics, practice matching beats, use effects smartly, and make smooth transitions to create exciting mixes. Remember, the key to becoming a successful DJ is practice and experimentation. So, get creative, enjoy the process, and let your passion for music guide you.

How to mix music in virtual dj. How to make a mixtape on virtual dj. How to mix songs in virtual dj.