

Syllabus – Photo Journalism, Films and Animation

Photo Journalism:

Photojournalism is a particular form of journalism (the collecting, editing, and presenting of news material for publication or broadcast) that employs images in order to tell a news story. It is now usually understood to refer only to still images, but in some cases the term also refers to video used in broadcast journalism.

Photojournalism is distinguished from other close branches of photography (e.g., documentary photography, social documentary photography, street photography or celebrity photography) by complying with a rigid ethical framework which demands that the work be both honest and impartial whilst telling the story in strictly journalistic terms. Photojournalists create pictures that contribute to the news media, and help communities connect with one other. Photojournalists must be well informed and knowledgeable about events happening right outside their door. They deliver news in a creative format that is not only informative, but also entertaining.

Need and importance,

Timeliness

The images have meaning in the context of a recently published record of events.

Objectivity

The situation implied by the images is a fair and accurate representation of the events they depict in both content and tone.

Narrative

The images combine with other news elements to make facts relatable to audiences.

Like a writer, a photojournalist is a reporter, but he or she must often make decisions instantly and carry photographic equipment, often while exposed to significant obstacles (e.g., physical danger, weather, crowds, physical access).

subject of photo picture sources,

Photojournalists are able to enjoy a working environment that gets them out from behind a desk and into the world. While working conditions can be difficult, here's what you can expect:

- Long and unstructured hours.
- On-call 24-7. Photojournalists must be ready to go when news breaks.
- Tight deadlines and multiple projects.
- Unusual working conditions—inclement weather, lack of facilities, sometimes dangerous situations.
- Working independently.

picture selection enlarging, reducing, Insetting, clubbing, picture editing, photo developing.

How to Enlarge an Image Using Photoshop

Image editing programs like Adobe Photoshop are ideal when resizing images. Enlargements can be done in Photoshop, however it is recommended to keep enlargements minimal since quality can be easily lost. For example, enlargements would be made for situations such as one needing a document to print with a larger document size or need the image to have a higher resolution (while retaining document size).

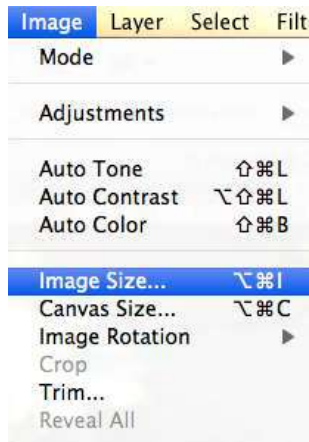
1. With Photoshop open, go to File > Open and select an image

You may right-click and save the tiger image below to use it as a practice image.

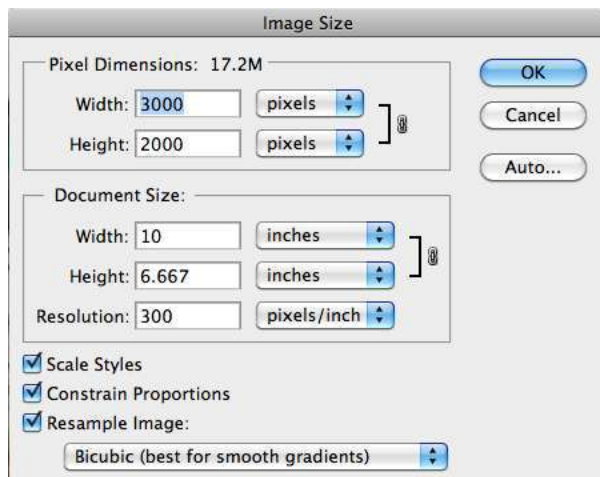
Note: When enlarging images, it is recommended to clean up dust and scratches or any noise before enlarging because these items may be magnified in your enlarged image.



2. Go to Image > Image Size

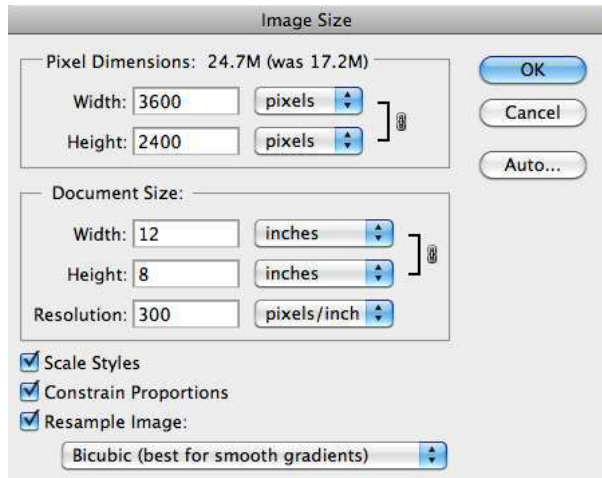


3. An Image Size dialog box will appear like the one pictured below.



4. Enter new pixel dimensions, document size, or resolution.

The original image was 10" x 6.667". Lets say we wanted to enlarge this image to a 12" x 8" so that it can easily be printed and framed. We want to keep the 300 resolution, so all we need to do is type in new pixel or document dimensions. In this example, we increased the document width from 10" to 12" and the height from 6.667" to 8".

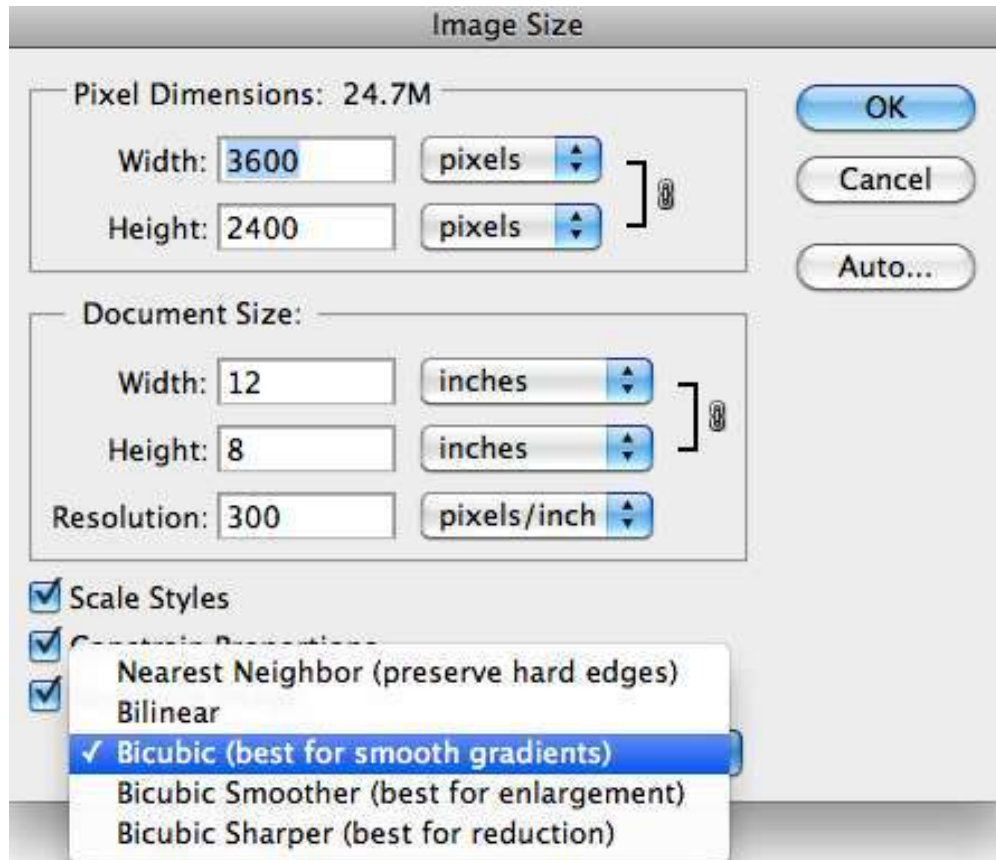


5. Select Resampling Method

Before hitting OK, we will want to select our resampling method. What does this mean? Basically, Photoshop will have to create new pixel information in order to enlarge the image. By selecting bicubic smaller, we are telling Photoshop to interpolate (or create new pixel information) that will produce the best results when enlarging images.

Bicubic (best for smooth gradients) - Very precise method that calculates the averages of surrounding pixels.

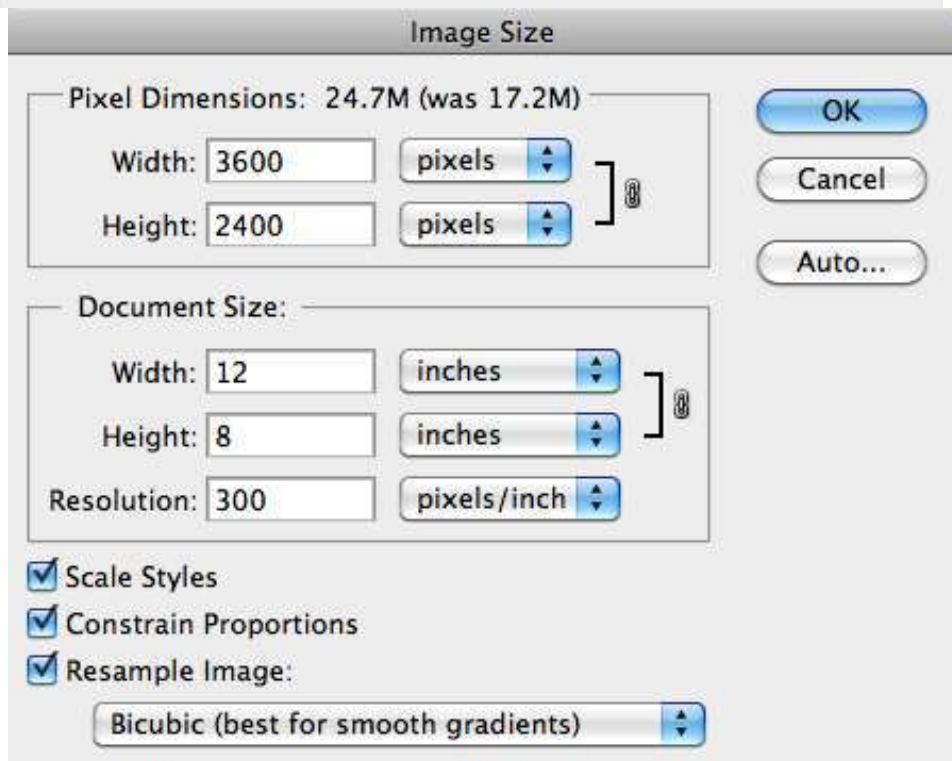
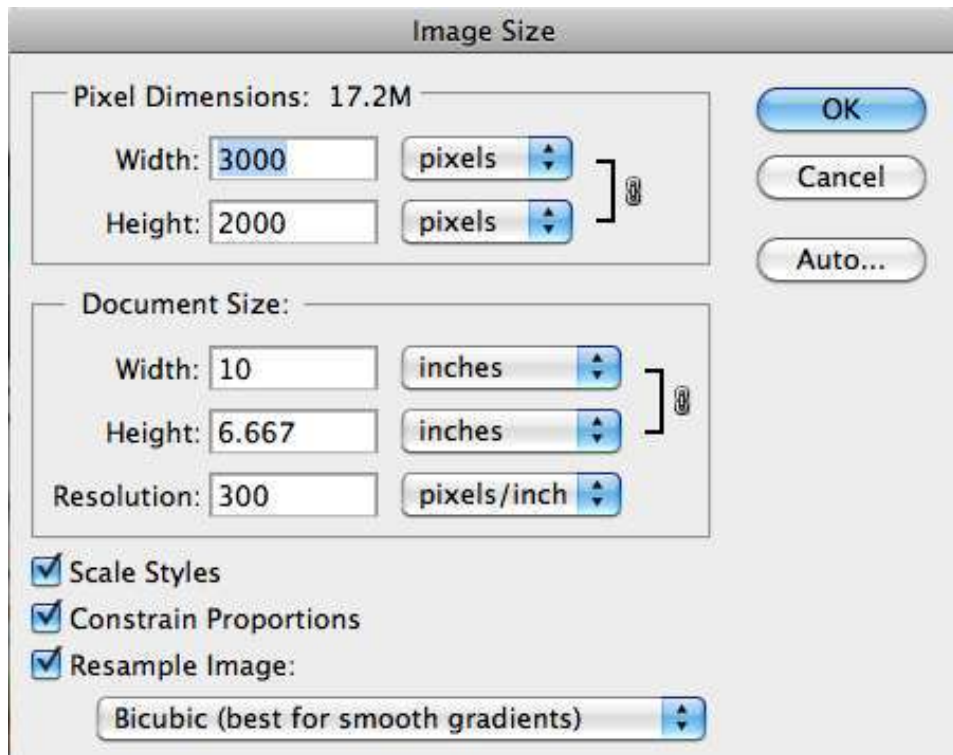
Bicubic Smoother (best for enlargements) - Based off of Bicubic sampling and works best when enlarging images that have high image noise. Images will look smoother or more soft with this method.



6. Click OK to accept the changes.

Congratulations! You have now successfully changed the size of your image!

In this example, we enlarged our image by increasing the document size from 10" x 6.667" to 12" x 8". Also note that the pixel dimensions changed from 3000 x 2000 to 3600 x 2400. Finally, notice that our image size started as 17.2M (megabyte) and increased to 24.7M with the enlargement.



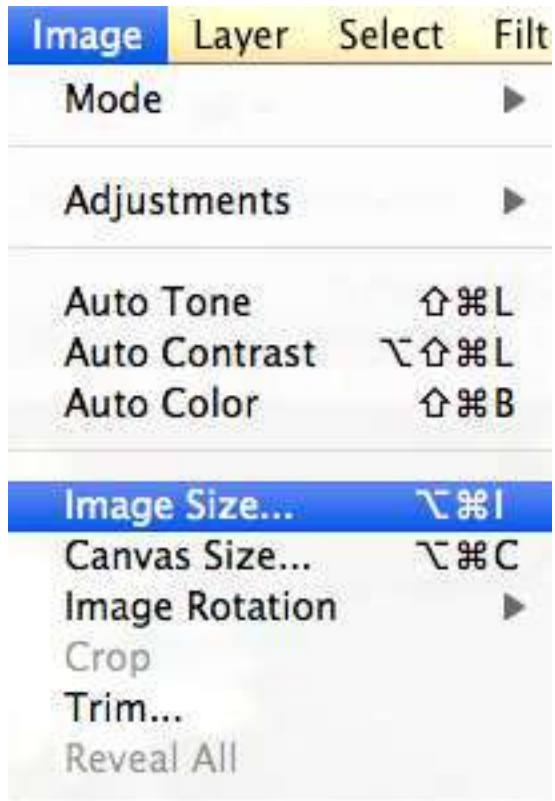
How to Reduce the Size of an Image Using Photoshop

The process of reducing the size of an image in Photoshop is only slightly different than when enlarging. One may need to reduce the size of an image because the resolution is too high for web, the file size is too large to e-mail, or only a small image is required for a printed piece.

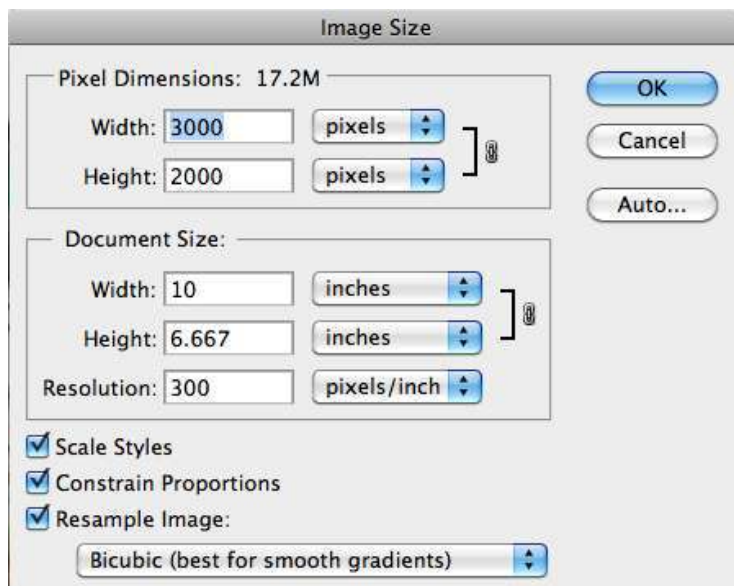
1. With Photoshop open, go to File > Open and select an image



2. Go to Image > Image Size

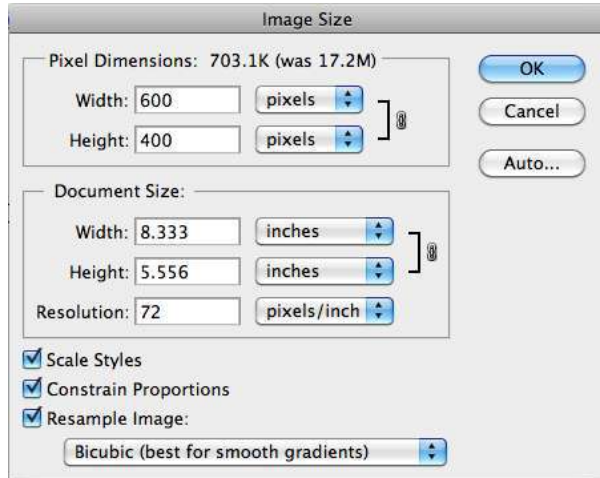


3. An Image Size dialog box will appear like the one pictured below.



4. Enter new pixel dimensions, document size, or resolution.

The original image is at 300ppi. Let's say that we want to put this image on our website, so we want it to be only 600 x 400 pixels and with a resolution of 72ppi. First, we can change the resolution by typing in 72 and then, we can change the pixel dimensions by entering 600 x 400 as the width and height.

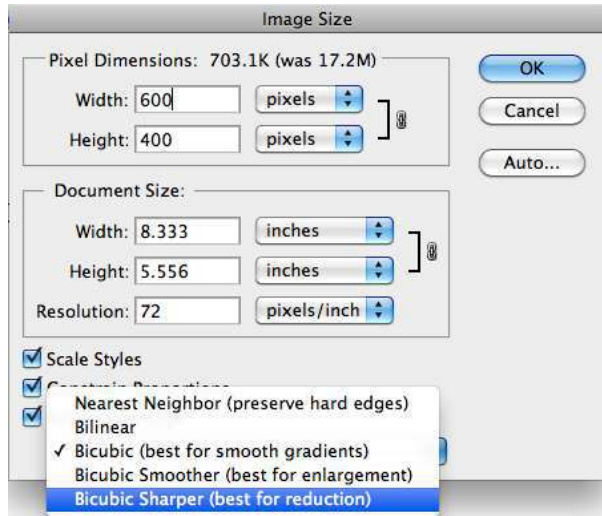


5. Select Resampling Method

Before hitting OK, we will want to select our resampling method. What does this mean? Basically, Photoshop will discard any unused pixels in order to reduce the image. By selecting a Resampling Method, we are telling Photoshop to alter pixel information in a way that will produce the best results when reducing image sizes.

Bicubic (best for smooth gradients) - Very precise method that calculates the averages of surrounding pixels.

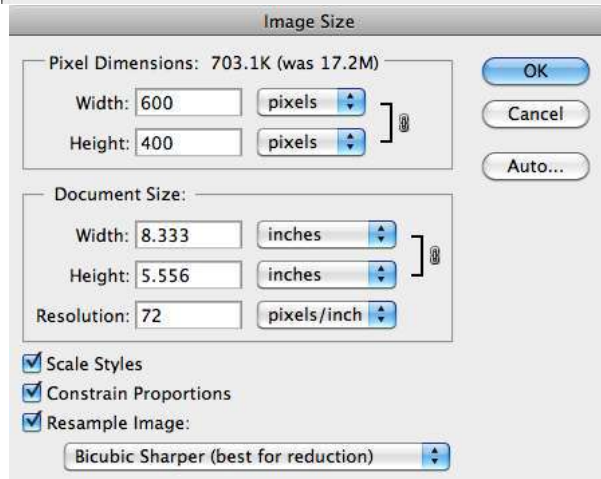
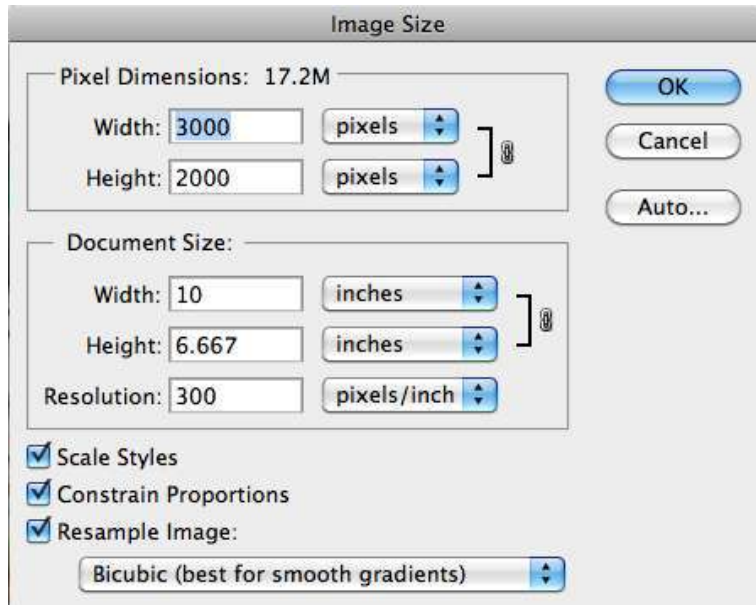
Bicubic Sharper (best for reduction) - Based off of Bicubic sampling and works best when reducing images while keeping detail sharper. If image appears too sharp, Bicubic is recommended.



6. Click OK to accept the changes.

Congratulations! You have now successfully changed the size of your image!

In this example, we reduced our image size by changing the resolution from 300 to 72ppi and changing the pixel dimensions from 3000 x 2000 to 600 x 400px. Notice that when we reduced the image size, our file size was also reduced from 17.2M (megabytes) to only 703.1K (kilobytes)!



screen/Web Resolution

Images for Web

Web images work differently than printed images. With printed images, we must pay close attention to resolution to ensure we get a high-quality print.

For web images, we must focus on the pixel dimensions. Look at the two images below - one is 300ppi and the other is 72ppi.



(Pixel Dimensions 300 x 200; Resolution 300ppi)



(Pixel Dimensions 300 x 200; Resolution 72ppi)

Both of these images display at the exact same size even though their resolution varies. This is because the pixel dimensions are what really matter when working with web images. Notice that the pixel dimensions of each image are the same and therefore both images will display at the same size even though they have differing resolutions.

Camera:

A **camera** is an optical instrument for recording or capturing images, which may be stored locally, transmitted to another location, or both. The images may be individual still photographs or sequences of images constituting videos or movies. The camera is a remote sensing device as it senses subjects without any contact. The word *camera* comes from *camera obscura*, which means "dark chamber" and is the Latin name of the original device for projecting an image of external reality onto a flat surface. The modern photographic camera evolved from the camera obscura. The functioning of the camera is very similar to the functioning of the human eye. The first permanent photograph was made in 1826 by Joseph Nicéphore Niépce.

Basic functioning,

Basic elements of a modern still camera

A camera works with the light of the visible spectrum or with other portions of the electromagnetic spectrum. A still camera is an optical device which creates a single image of an object or scene and records it on an electronic sensor or photographic film. All cameras use the same basic design: light enters an enclosed box through a converging lens/convex lens and an image is recorded on a light-sensitive medium (mainly a transition metal-halide). A shutter mechanism controls the length of time that light can enter the camera. Most photographic cameras have functions that allow a person to view the scene to be recorded, allow for a desired part of the scene to be in focus, and

to control the exposure so that it is not too bright or too dim. A display, often a liquid crystal display (LCD), permits the user to view the scene to be recorded and settings such as ISO speed, exposure, and shutter speed.

A movie camera or a video camera operates similarly to a still camera, except it records a series of static images in rapid succession, commonly at a rate of 24 frames per second. When the images are combined and displayed in order, the illusion of motion is achieved.

Lens,

A **camera lens** (also known as **photographic lens** or **photographic objective**) is an optical lens or assembly of lenses used in conjunction with a camera body and mechanism to make images of objects either on photographic film or on other media capable of storing an image chemically or electronically.

There is no major difference in principle between a lens used for a still camera, a video camera, a telescope, a microscope, or other apparatus, but the detailed design and construction are different. A lens might be permanently fixed to a camera, or it might be interchangeable with lenses of different focal lengths, apertures, and other properties.

While in principle a simple convex lens will suffice, in practice a compound lens made up of a number of optical lens elements is required to correct (as much as possible) the many optical aberrations that arise. Some aberrations will be present in any lens system. It is the job of the lens designer to balance these and produce a design that is suitable for photographic use and possibly mass production.

Types of lens

"Close-up" or macro

A macro lens used in macro or "close-up" photography (not to be confused with the compositional term *close up*) is any lens that produces an image on the focal plane (i.e., film or a digital sensor) that is one quarter of life size (1:4) to the same size (1:1) as the subject being imaged. Magnification from life size to larger is called "Micro" photography (2:1, 3:1 etc.). This configuration is generally used to image *close-up* very small subjects. A macro lens may be of any focal length, the actual focus length being determined by its practical use, considering magnification, the required ratio, access to the subject, and illumination considerations. It can be a special lens corrected optically for close up work or it

can be any lens modified (with adapters or spacers, which are also known as "extension tubes".) to bring the focal plane "forward" for very close photography. Depending on the camera to subject distance and aperture, the depth-of-field can be very narrow, limiting the linear depth of the area that will be in focus. Lenses are usually stopped down to give a greater depth-of-field.

Zoom

Some lenses, called **zoom lenses**, have a focal length that varies as internal elements are moved, typically by rotating the barrel or pressing a button which activates an electric motor. Commonly, the lens may zoom from moderate wide-angle, through normal, to moderate telephoto; or from normal to extreme telephoto. The zoom range is limited by manufacturing constraints; the ideal of a lens of large maximum aperture which will zoom from extreme wide angle to extreme telephoto is not attainable. Zoom lenses are widely used for small-format cameras of all types: still and cine cameras with fixed or interchangeable lenses. Bulk and price limit their use for larger film sizes. Motorized zoom lenses may also have the focus, iris, and other functions motorized.

Special-purpose

A tilt/shift lens, set to its maximum degree of tilt relative to the camera body.

- Apochromat (APO) lenses have added correction for chromatic aberration.
- Process lenses have extreme correction for aberrations of geometry (pincushion distortion, barrel distortion) and are generally intended for use at a specific distance.

Process and apochromat lenses are normally of small aperture, and are used for extremely accurate photographs of static objects. Generally their performance is optimized for subjects a few inches from the front of the lens, and suffers outside this narrow range.

- Enlarger lenses are made to be used with photographic enlargers (specialised projectors), rather than cameras.
- Lenses for aerial photography.
- Fisheye lenses: extreme wide-angle lenses with an angle of view of up to 180 degrees or more, with very noticeable (and intended) distortion.
- Stereoscopic lenses, to produce pairs of photographs which give a 3-dimensional effect when viewed with an appropriate viewer.

- Soft-focus lenses which give a soft, but not out-of-focus, image and have an imperfection-removing effect popular among portrait and fashion photographers.
- Infrared lenses
- Ultraviolet lenses
- Swivel lenses rotate while attached to a camera body to give unique perspectives and camera angles.
- Shift lenses and tilt/shift lenses (collectively perspective control lenses) allow special control of perspective on SLR cameras by mimicking view camera movements.

Filter,

In photography and videography, a **filter** is a camera accessory consisting of an optical filter that can be inserted into the optical path. The filter can be of a square or oblong shape and mounted in a holder accessory, or, more commonly, a glass or plastic disk in a metal or plastic ring frame, which can be screwed into the front of or clipped onto the camera lens.

Filters modify the images recorded. Sometimes they are used to make only subtle changes to images; other times the image would simply not be possible without them. In monochrome photography, coloured filters affect the relative brightness of different colours; red lipstick may be rendered as anything from almost white to almost black with different filters. Others change the colour balance of images, so that photographs under incandescent lighting show colours as they are perceived, rather than with a reddish tinge. There are filters that distort the image in a desired way, diffusing an otherwise sharp image, adding a starry effect, etc. Linear and circular polarising filters reduce oblique reflections from non-metallic surfaces.

Many filters absorb part of the light available, necessitating longer exposure. As the filter is in the optical path, any imperfections—non-flat or non-parallel surfaces, reflections (minimised by optical coating), scratches, dirt—affect the image.

There is no universal standard naming system for filters. The Wratten numbers adopted in the early twentieth century by Kodak, then a dominant force in film photography, are used by several manufacturers. Colour correction filters are often identified by a code of the form CC50Y—CC for colour correction, 50 for the strength of the filter, Y for yellow.

Optical filters are used in various areas of science, including in particular astronomy; they are essentially the same as photographic filters, but in practice often need far more accurately controlled optical properties and precisely defined transmission curves than filters exclusively for photographic use. Photographic filters sell in larger quantities at correspondingly lower prices than many laboratory filters. The article on optical filters has material relevant to photographic filters.

In **digital** photography the majority of filters used with film cameras have been rendered redundant by digital filters applied either in-camera or during post processing. Exceptions include the ultraviolet (UV) filter typically used to protect the front surface of the lens, the neutral density (ND) filter, the polarising filter and the infra red (IR) filter. The neutral density filter permits effects requiring wide apertures or long exposures to be applied to brightly lit scenes, while the graduated neutral density filter is useful in situations where the scene's dynamic range exceeds the capability of the sensor. Not using optical filters in front of the lens has the advantage of avoiding the reduction of image quality caused by the presence of an extra optical element in the light path and may be necessary to avoid vignetting when using wide-angle lenses.

Lighting Indoor & Outdoor,

Lighting or **illumination** is the deliberate use of light to achieve a practical or aesthetic effect. Lighting includes the use of both artificial light sources like lamps and light fixtures, as well as natural illumination by capturing daylight. Daylighting (using windows, skylights, or light shelves) is sometimes used as the main source of light during daytime in buildings. This can save energy in place of using artificial lighting, which represents a major component of energy consumption in buildings. Proper lighting can enhance task performance, improve the appearance of an area, or have positive psychological effects on occupants.

Indoor lighting is usually accomplished using light fixtures, and is a key part of interior design. Lighting can also be an intrinsic component of landscape projects.

Forms of lighting

Indoor lighting

Forms of lighting include alcove lighting, which like most other uplighting is indirect. This is often done with fluorescent lighting (first available at the 1939 World's Fair) or rope light, occasionally with neon lighting, and recently with LED strip lighting. It is a form of backlighting.

Soffit or close to wall lighting can be general or a decorative wall-wash, sometimes used to bring out texture (like stucco or plaster) on a wall, though this may also show its defects as well. The effect depends heavily on the exact type of lighting source used.

Recessed lighting (often called "pot lights" in Canada, "can lights" or "high hats" in the US) is popular, with fixtures mounted into the ceiling structure so as to appear flush with it. These downlights can use narrow beam spotlights, or wider-angle floodlights, both of which are bulbs having their own reflectors. There are also downlights with internal reflectors designed to accept common 'A' lamps (light bulbs) which are generally less costly than reflector lamps. Downlights can be incandescent, fluorescent, HID (high intensity discharge) or LED.

Track lighting, invented by Lightolier, was popular at one period of time because it was much easier to install than recessed lighting, and individual fixtures are decorative and can be easily aimed at a wall. It has regained some popularity recently in low-voltage tracks, which often look nothing like their predecessors because they do not have the safety issues that line-voltage systems have, and are therefore less bulky and more ornamental in themselves. A master transformer feeds all of the fixtures on the track or rod with 12 or 24 volts, instead of each light fixture having its own line-to-low voltage transformer. There are traditional spots and floods, as well as other small hanging fixtures. A modified version of this is cable lighting, where lights are hung from or clipped to bare metal cables under tension.

A sconce is a wall-mounted fixture, particularly one that shines up and sometimes down as well. A torchère is an uplight intended for ambient lighting. It is typically a floor lamp but may be wall-mounted like a sconce.

The portable or table lamp is probably the most common fixture, found in many homes and offices. The standard lamp and shade that sits on a table is general lighting, while the desk lamp is considered task lighting. Magnifier lamps are also task lighting.

The illuminated ceiling was once popular in the 1960s and 1970s but fell out of favor after the 1980s. This uses diffuser panels hung like a suspended ceiling below fluorescent lights, and is considered general lighting. Other forms include neon, which is not usually intended to illuminate anything else, but to actually be an artwork in itself. This would probably fall under accent lighting, though in a nightclub it could be considered general lighting.

In a movie theater, steps in the aisles are usually marked with a row of small lights for convenience and safety, when the film has started and the other lights are off. Traditionally made up of small low wattage, low voltage lamps in a track or translucent tube, these are rapidly being replaced with LED based versions.

Outdoor lighting

Street Lights are used to light roadways and walkways at night. Some manufacturers are designing LED and photovoltaic luminaires to provide an energy-efficient alternative to traditional street light fixtures.

Floodlights are used to illuminate outdoor playing fields or work zones during nighttime.

Floodlights can be used to illuminate work zones or outdoor playing fields during nighttime hours. The most common type of floodlights are metal halide and high pressure sodium lights.

Beacon lights are positioned at the intersection of two roads to aid in navigation.

Sometimes security lighting can be used along roadways in urban areas, or behind homes or commercial facilities. These are extremely bright lights used to deter crime. Security lights may include floodlights.

Entry lights can be used outside to illuminate and signal the entrance to a property. These lights are installed for safety, security, and for decoration.

Underwater accent lighting is also used for koi ponds, fountains, swimming pools and the like.

Different types of camera,

Plate camera

The earliest cameras produced in significant numbers used sensitised glass plates were *plate cameras*. Light entered a lens mounted on a lens board which was separated from the plate by an extendible bellows. There were simple

box cameras for glass plates but also single-lens reflex cameras with interchangeable lenses and even for color photography (Autochrome Lumière). Many of these cameras had controls to raise or lower the lens and to tilt it forwards or backwards to control perspective.

Focussing of these plate cameras was by the use of a ground glass screen at the point of focus. Because lens design only allowed rather small aperture lenses, the image on the ground glass screen was faint and most photographers had a dark cloth to cover their heads to allow focussing and composition to be carried out more easily. When focus and composition were satisfactory, the ground glass screen was removed and a sensitised plate put in its place protected by a dark slide. To make the exposure, the dark slide was carefully slid out and the shutter opened and then closed and the dark slide replaced.

Glass plates were later replaced by sheet film in a dark slide for sheet film; adaptor sleeves were made to allow sheet film to be used in plate holders. In addition to the ground glass, a simple optical viewfinder was often fitted. Cameras which take single exposures on sheet film and are functionally identical to plate cameras were used for static, high-image-quality work; much longer in 20th century, see Large-format camera, below.

Folding camera

The introduction of films enabled the existing designs for plate cameras to be made much smaller and for the base-plate to be hinged so that it could be folded up compressing the bellows. These designs were very compact and small models were dubbed *vest pocket* cameras. Folding rollfilm cameras were preceded by folding plate cameras, more compact than other designs.

Box camera

Box cameras were introduced as a budget level camera and had few if any controls. The original box Brownie models had a small reflex viewfinder mounted on the top of the camera and had no aperture or focusing controls and just a simple shutter. Later models such as the Brownie 127 had larger direct view optical viewfinders together with a curved film path to reduce the impact of deficiencies in the lens.

Rangefinder camera

As camera lens technology developed and wide aperture lenses became more common, rangefinder cameras were introduced to make focusing more precise. Early rangefinders had two separate viewfinder windows, one of which is linked to the focusing mechanisms and moved right or left as the focusing ring is turned. The two separate images are brought together on a ground glass viewing screen. When vertical lines in the object being photographed meet exactly in the combined image, the object is in focus. A normal composition viewfinder is also provided. Later the viewfinder and rangefinder were combined. Many rangefinder cameras had interchangeable lenses, each lens requiring its own range- and viewfinder linkages.

Rangefinder cameras were produced in half- and full-frame 35 mm and rollfilm (medium format).

Instant picture camera

After exposure every photograph is taken through pinch rollers inside of the instant camera. Thereby the developer paste contained in the paper 'sandwich' distributes on the image. After a minute, the cover sheet just needs to be removed and one gets a single original positive image with a fixed format. With some systems it was also possible to create an instant image negative, from which then could be made copies in the photo lab. The ultimate development was the SX-70 system of Polaroid, in which a row of ten shots - engine driven - could be made without having to remove any cover sheets from the picture. There were instant cameras for a variety of formats, as well as cartridges with instant film for normal system cameras.

Single-lens reflex

In the single-lens reflex camera, the photographer sees the scene through the camera lens. This avoids the problem of parallax which occurs when the viewfinder or viewing lens is separated from the taking lens. Single-lens reflex cameras have been made in several formats including sheet film 5x7" and 4x5", roll film 220/120 taking 8,10, 12 or 16 photographs on a 120 roll and twice that number of a 220 film. These correspond to 6x9, 6x7, 6x6 and 6x4.5 respectively (all dimensions in cm). Notable manufacturers of large format and roll film SLR cameras include Bronica, Graflex, Hasselblad, Mamiya, and Pentax. However

the most common format of SLR cameras has been 35 mm and subsequently the migration to digital SLR cameras, using almost identical sized bodies and sometimes using the same lens systems.

Almost all SLR cameras use a front surfaced mirror in the optical path to direct the light from the lens via a viewing screen and pentaprism to the eyepiece. At the time of exposure the mirror is flipped up out of the light path before the shutter opens. Some early cameras experimented with other methods of providing through-the-lens viewing, including the use of a semi-transparent pellicle as in the Canon *Pelli* and others with a small periscope such as in the Corfield Periflex series.

Twin-lens reflex

Twin-lens reflex cameras used a pair of nearly identical lenses, one to form the image and one as a viewfinder. The lenses were arranged with the viewing lens immediately above the taking lens. The viewing lens projects an image onto a viewing screen which can be seen from above. Some manufacturers such as Mamiya also provided a reflex head to attach to the viewing screen to allow the camera to be held to the eye when in use. The advantage of a TLR was that it could be easily focussed using the viewing screen and that under most circumstances the view seen in the viewing screen was identical to that recorded on film. At close distances however, parallax errors were encountered and some cameras also included an indicator to show what part of the composition would be excluded.

Some TLR had interchangeable lenses but as these had to be paired lenses they were relatively heavy and did not provide the range of focal lengths that the SLR could support. Most TLRs used 120 or 220 film; some used the smaller 127 film.

Large-format camera

The large-format camera, taking sheet film, is a direct successor of the early plate cameras and remained in use for high quality photography and for technical, architectural and industrial photography. There are three common types, the view camera with its monorail and field camera variants, and the press camera. They have an extensible bellows with the lens and shutter mounted on a lens plate at the front. Backs taking rollfilm, and later digital backs are available in addition to the standard dark slide back. These cameras have a wide range of movements allowing very close control of focus and perspective. Composition

and focusing is done on view cameras by viewing a ground-glass screen which is replaced by the film to make the exposure; they are suitable for static subjects only, and are slow to use.

Medium-format camera

Medium-format cameras have a film size between the large-format cameras and smaller 35mm cameras. Typically these systems use 120 or 220 rollfilm. The most common image sizes are 6×4.5 cm, 6×6 cm and 6×7 cm; the older 6×9 cm is rarely used. The designs of this kind of camera show greater variation than their larger brethren, ranging from monorail systems through the classic Hasselblad model with separate backs, to smaller rangefinder cameras. There are even compact amateur cameras available in this format.

Subminiature camera

Cameras taking film significantly smaller than 35 mm were made. Subminiature cameras were first produced in the nineteenth century. The expensive 8×11 mm Minox, the only type of camera produced by the company from 1937 to 1976, became very widely known and was often used for espionage (the Minox company later also produced larger cameras). Later inexpensive subminiatures were made for general use, some using rewind 16 mm cine film. Image quality with these small film sizes was limited.

Movie camera

A ciné camera or movie camera takes a rapid sequence of photographs on image sensor or strips of film. In contrast to a still camera, which captures a single snapshot at a time, the ciné camera takes a series of images, each called a "frame" through the use of an intermittent mechanism.

The frames are later played back in a ciné projector at a specific speed, called the "frame rate" (number of frames per second). While viewing, a person's eyes and brain merge the separate pictures to create the illusion of motion. The first ciné camera was built around 1888 and by 1890 several types were being manufactured. The standard film size for ciné cameras was quickly established as 35mm film and this remained in use until transition to digital cinematography. Other professional standard formats include 70 mm film and 16mm film whilst

amateurs film makers used 9.5 mm film, 8mm film or Standard 8 and Super 8 before the move into digital format.

The size and complexity of ciné cameras varies greatly depending on the uses required of the camera. Some professional equipment is very large and too heavy to be hand held whilst some amateur cameras were designed to be very small and light for single-handed operation.

Camcorders

A camcorder is an electronic device combining a video camera and a video recorder. Although marketing materials may use the colloquial term "camcorder", the name on the package and manual is often "video camera recorder". Most devices capable of recording video are camera phones and digital cameras primarily intended for still pictures; the term "camcorder" is used to describe a portable, self-contained device, with video capture and recording its primary function.

Professional video camera

A professional video camera (often called a television camera even though the use has spread beyond television) is a high-end device for creating electronic moving images (as opposed to a movie camera, that earlier recorded the images on film). Originally developed for use in television studios, they are now also used for music videos, direct-to-video movies, corporate and educational videos, marriage videos etc.

These cameras earlier used vacuum tubes and later electronic sensors.

Digital camera

A digital camera (or digicam) is a camera that encodes digital images and videos digitally and stores them for later reproduction.^[61] Most cameras sold today are digital, and digital cameras are incorporated into many devices ranging from mobile phones (called camera phones) to vehicles.

Digital and film cameras share an optical system, typically using a lens with a variable diaphragm to focus light onto an image pickup device. The diaphragm and shutter admit the correct amount of light to the imager, just as with film but the image pickup device is electronic rather than chemical. However, unlike film cameras, digital cameras can display images on a screen immediately after

being recorded, and store and delete images from memory. Most digital cameras can also record moving videos with sound. Some digital cameras can crop and stitch pictures and perform other elementary image editing.

Consumers adopted digital cameras in 1990s. Professional video cameras transitioned to digital around the 2000s-2010s. Finally movie cameras transitioned to digital in the 2010s.

Panoramic camera

Panoramic cameras are fixed-lens digital action cameras. They usually have a single fish-eye lens or multiple lenses, to cover the entire 180° up to 360° in their field of view.

VR Camera

VR cameras are panoramic cameras that also cover the top and bottom in their field of view. There have also been camera rigs employing multiple cameras to cover the whole 360° by 360° field of view. The most famous VR camera rig is known as 'Google Jump'.

computer in photography.

One of the first decisions is between a laptop and desktop computer. The portability of a laptop may suit your lifestyle, but desktop computers generally have a higher specification for the money. **A large screen** can be useful for the digital photographer, and a desktop machine gives you the flexibility to upgrade to bigger and brighter screens without having to change your computer.

Many digital artists claim that Macs are better than Windows PCs, but it's really just a matter of personal preference. Photoshop and other photo editing software run the same on both types of machine. Apple's devices do tend to be more robust when it comes to security, but a PC can be just as safe if you keep your antivirus software up to date.

Digital photographs tend to be large files, so it's important to choose a computer with sufficient random-access memory (**RAM**) to avoid the frustration of slow processing speed. Data from applications like Photoshop is accessed randomly,

so a computer with at least 4GB of RAM is necessary if you want to work quickly. Advanced tools like Photoshop's Liquify filters work better with 8GB or more.

The processor at the heart of your machine is another important factor when choosing a computer for digital photography. Intel processors are generally faster than AMD processors, but technology changes very quickly so don't assume one brand is always better than the other. A quad-core processor will ensure you can upload and process hundreds of images in seconds.

One of the factors some photographers overlook when choosing a new computer is the speed of the hard drive. A faster hard drive makes viewing and saving your images a smoother experience. More expensive machines come with so called 'Solid State' hard drives, and these are perfect for digital photography.

A computer capable of supporting more than one monitor isn't critical for photo editing, but it can make life easier if you need to process high volumes of images. A machine with lower power consumption is worth considering if you need to spend several hours a day working on your images, as this helps to keep electricity costs down.

A good general rule for choosing a computer is to invest in the best you can afford. Photographers usually have a list of new lenses and equipment they want to buy next, but spending a little more on your computer could bring real benefits to your creative art. Speeding up the process of uploading and sorting your images gives you more time to spend on the creative and enjoyable aspects of digital photography.

Colour photography.

Color (or colour) photography is photography that uses media capable of reproducing colors. By contrast, black-and-white (monochrome) photography records only a single channel of luminance (brightness) and uses media capable only of showing shades of gray.

In color photography, electronic sensors or light-sensitive chemicals record color information at the time of exposure. This is usually done by analyzing the spectrum of colors into three channels of information, one dominated by red, another by green and the third by blue, in imitation of the way the normal human eye senses color. The recorded information is then used to reproduce the original colors by mixing various proportions of red, green and blue light (RGB color, used by video displays, digital projectors and some historical photographic processes), or by using dyes or pigments to remove various proportions of the red, green and blue which are present in white light (CMY color, used for prints on paper and transparencies on film).

Monochrome images which have been "colorized" by tinting selected areas by hand or mechanically or with the aid of a computer are "colored photographs", not "color photographs". Their colors are not dependent on the actual colors of the objects photographed and may be very inaccurate or completely arbitrary.

The foundation of virtually all practical color processes, the three-color method was first suggested in an 1855 paper by Scottish physicist James Clerk Maxwell, with the first color photograph produced by Thomas Sutton for a Maxwell lecture in 1861. Color photography has been the dominant form of photography since the 1970s, with monochrome photography mostly relegated to niche markets such as art photography.

Web photography other new technology in photography.

People and animals are a popular photo subject on web pages. And if you have photos of people or animals you should make sure of the following:

- **Make sure the eyes are visible.** Eyes are what people look at when they look at photographs, so a photo where the eyes are hard to see or in shadow is going to be less effective than one with clear visible eyes.
- **Zoom in on faces.** Just like with the eyes, faces are more interesting than the entire body in most cases.
- **Get in tight on the subject.** Especially with animals, you want to get as much of the subject in your frame as possible.
- **People like action.** Action photos of animals or people bring your viewers into the scene.

If you're photographing products for your website, you want to make sure that they stand out. Many people rely on photos to make their purchasing decisions, so having a good product photo could make the sale.

- **Zoom in on the product.** If you can't zoom in, then crop the photo down to just the product you're highlighting.
- **Light your product well.** People won't want to buy it if they can't see it.
- **Provide multiple angles.** If you can, take photos of the product from multiple sides. This gives your customers more information.

So you've zoomed in on the face of your dog or taken a full-body shot of your son playing in the sand, but what's in the background? If the background has too much clutter or noise, the photo will be hard to look at. If you can't get a good background from where you're standing you should move or have your subjects move.

Be aware of more than just clutter. Does the background look messy? Are there other things in the frame taking the focus off your subject? And don't forget mirrors, unless you want to be in the photo yourself.

Always photograph products on a white background. This makes the product stand out, and makes shadows more effective. If you want to use a colored background, make sure that it's a solid color. When you can't get a solid color background on your product image, use photo editing software to blur the background slightly. This will make your product stand out more even with a less than ideal background.

Often what makes a professional photograph stand out from a novice's is the lighting. Be aware of where the sun is if you're shooting outdoors. You don't want to take photos with your subjects directly facing the sun. Yes, they'll be well lit, but they'll almost certainly be squinting and that doesn't look good either. Diffused light is the best for most animal and people shots, because the subjects aren't called out in harsh relief and shadows are muted.

Fill flashes are a really useful tool. With a fill flash, you can photograph subjects with the light source behind them and their faces won't be in shadow. And on

days when the sunlight is filtered by clouds, a fill flash can highlight things that the more muted sunlight would miss.

Product shots should have good strong lighting. If you want the effect of shadows in your image, using a strong light source on your subject will help develop them. It is always possible to add them in later with Photoshop, but that can look unnatural unless you're very careful. Besides, the less post-processing that you have to do the better—if only because it's less work.

Photos of people with recognizable faces should always have a model release. Editorial use of a person's photo is usually okay, but getting a model release protects you from legal liabilities.

In most countries, it is okay to take photos of architecture without permission if you are on publicly accessible land when you take the shot. But be sure you know your rights and the rights of the building owners before you publish the photograph.

Film:

An introduction & understanding of Film culture and technique.

Exactly? "Culture" has no exact definition. Here's a definition for it anyway.

"Culture" is (but not limited to) the manifestations of a mind interacting with its environment via sensory organs, hands, etc. These manifestations usually help the mind in some way or another. E.g., words, technology, behaviour, etc.

"Movie culture" narrows down to those involved with producing and/or consuming movies. This includes movie theatres, acting, certain conventions, directing, cameras, the movies themselves, etc.

But what is a movie? Does it have to be over an hour and a half? Does it require a large budget? No and no. A movie is an animated (live, drawn, and/or CGI), audio-visual (semi-exception: silent films) narrative distributed on TV, theatres, and/or online.

Half/full hour series aren't usually considered as movies. Even though there are short films that are less than half an hour. Even though movies can be serial as well. Even though there are such things as budget films that use as much or less money and resources, but make up for it with ingenuity. Even though they're all basically produced in the same manner.

Filmmaking (or, in an academic context, **film production**) is the process of making a film, generally in the sense of films intended for extensive theatrical exhibition. Filmmaking involves a number of discrete stages including an initial story, idea, or commission, through screenwriting, casting, shooting, sound recording and reproduction, editing and screening the finished product before an audience that may result in a film release and exhibition. Filmmaking takes place in many places around the world in a range of economic, social, and political contexts, and using a variety of technologies and cinematic techniques. Typically, it involves a large number of people, and can take from a few months to several years to complete.

Stages of production

Film production consists of five major stages:

- **Development:** The first stage in which the ideas for the film are created, rights to books/plays are bought etc., and the screenplay is written. Financing for the project has to be sought and obtained.
- **Pre-production:** Arrangements and preparations are made for the shoot, such as hiring cast and film crew, selecting locations and constructing sets.
- **Production:** The raw footage and other elements for the film are recorded during the film shoot.
- **Post-production:** The images, sound, and visual effects of the recorded film are edited and combined into a finished product.
- **Distribution:** The completed film is distributed, marketed, and screened in cinemas and/or released to home video.

Development

In this stage, the project producer selects a story, which may come from a book, play, another film, true story, video game, comic book, graphic novel, or an original idea, etc. After identifying a theme or underlying message, the producer works with writers to prepare a synopsis. Next they produce a step outline, which breaks the story down into one-paragraph scenes that concentrate on dramatic structure. Then, they prepare a treatment, a 25-to-30-page description of the story, its mood, and characters. This usually has little dialogue and stage direction, but often contains drawings that help visualize key points. Another way is to produce a scriptment once a synopsis is produced.

Next, a screenwriter writes a screenplay over a period of several months. The screenwriter may rewrite it several times to improve dramatization, clarity, structure, characters, dialogue, and overall style. However, producers often skip the previous steps and develop submitted screenplays which investors, studios,

and other interested parties assess through a process called script coverage. A film distributor may be contacted at an early stage to assess the likely market and potential financial success of the film. Hollywood distributors adopt a hard-headed no approach and consider factors such as the film genre, the target audience and assumed audience, the historical success of similar films, the actors who might appear in the film, and potential directors. All these factors imply a certain appeal of the film to a possible audience. Not all films make a profit from the theatrical release alone, so film companies take DVD sales and worldwide distribution rights into account.

The producer and screenwriter prepare a film pitch, or treatment, and present it to potential financiers. They will also pitch the film to actors and directors (especially so-called bankable stars) in order to "attach" them to the project (that is, obtain a binding promise to work on the film if financing is ever secured). Many projects fail to move beyond this stage and enter so-called development hell. If a pitch succeeds, a film receives a "green light", meaning someone offers financial backing: typically a major film studio, film council, or independent investor. The parties involved negotiate a deal and sign contracts.

Once all parties have met and the deal has been set, the film may proceed into the pre-production period. By this stage, the film should have a clearly defined marketing strategy and target audience.

Development of animated films differs slightly in that it is the director who develops and pitches a story to an executive producer on the basis of rough storyboards, and it is rare for a full-length screenplay to already exist at that point in time. If the film is green-lighted for further development and pre-production, then a screenwriter is later brought in to prepare the screenplay.

Analogous to most any business venture, financing of a film project deals with the study of filmmaking as the management and procurement of investments. It includes the dynamics of assets that are required to fund the filmmaking and liabilities incurred during the filmmaking over the time period from early development through the management of profits and losses after distribution under conditions of different degrees of uncertainty and risk. The practical aspects of filmmaking finance can also be defined as the science of the money management of all phases involved in filmmaking. Film finance aims to price assets based on their risk level and their expected rate of return based upon anticipated profits and protection against losses.

Pre-production

In pre-production, every step of actually creating the film is carefully designed and planned. The production company is created and a production office established. The film is pre-visualized by the director, and may be storyboarded with the help of illustrators and concept artists. A production budget is drawn up to plan expenditures for the film. For major productions, insurance is procured to protect against accidents.

The nature of the film, and the budget, determine the size and type of crew used during filmmaking. Many Hollywood blockbusters employ a cast and crew of hundreds, while a low-budget, independent film may be made by a skeleton crew of eight or nine (or fewer). These are typical crew positions:

- Storyboard artist: creates visual images to help the director and production designer communicate their ideas to the production team.
- Director: is primarily responsible for the storytelling, creative decisions and acting of the film.
 - Assistant director (AD): manages the shooting schedule and logistics of the production, among other tasks. There are several types of AD, each with different responsibilities.
- Film producer: hires the film's crew.
- Unit production manager: manages the production budget and production schedule. They also report, on behalf of the production office, to the studio executives or financiers of the film.
 - Location manager: finds and manages film locations. Nearly all pictures feature segments that are shot in the controllable environment of a studio sound stage, while outdoor sequences call for filming on location.
- Production designer: the one who creates the visual conception of the film, working with the art director, who manages the art department, which makes production sets.
 - Costume designer: creates the clothing for the characters in the film working closely with the actors, as well as other departments.
 - Makeup and hair designer: works closely with the costume designer in order to create a certain look for a character.
- Casting director: finds actors to fill the parts in the script. This normally requires that actors audition.
 - Choreographer: creates and coordinates the movement and dance - typically for musicals. Some films also credit a fight choreographer.
- Director of photography (DP): the head of the photography of the entire film, supervises all cinematographers and Camera Operators.
- Production sound mixer: the head of the sound department during the production stage of filmmaking. They record and mix the audio on set - dialogue, presence and sound effects in mono and ambience in stereo. They work with the boom operator, Director, DA, DP, and First AD.

- Sound designer: creates the aural conception of the film, working with the supervising sound editor. On Bollywood-style Indian productions the sound designer plays the role of a director of audiography.
- Composer: creates new music for the film. (usually not until post-production)

Production

Steven Spielberg (standing) with Chandran Rutnam in Sri Lanka, during the production of "Indiana Jones and the Temple of Doom" (released 1984)

See also: Cinematography, Audiography, and Principal photography

In production, the film is created and shot. More crew will be recruited at this stage, such as the property master, script supervisor, assistant directors, stills photographer, picture editor, and sound editors. These are just the most common roles in filmmaking; the production office will be free to create any unique blend of roles to suit the various responsibilities possible during the production of a film.

A typical day's shooting begins with the crew arriving on the set/location by their call time. Actors usually have their own separate call times. Since set construction, dressing and lighting can take many hours or even days, they are often set up in advance.

The grip, electric and production design crews are typically a step ahead of the camera and sound departments: for efficiency's sake, while a scene is being filmed, they are already preparing the next one.

While the crew prepare their equipment, the actors don their costumes and attend the hair and make-up departments. The actors rehearse the script and blocking with the director, and the camera and sound crews rehearse with them and make final tweaks. Finally, the action is shot in as many takes as the director wishes. Most American productions follow a specific procedure:

The assistant director (AD) calls "picture is up!" to inform everyone that a take is about to be recorded, and then "quiet, everyone!" Once everyone is ready to shoot, the AD calls "roll sound" (if the take involves sound), and the production sound mixer will start their equipment, record a verbal slate of the take's information, and announce "sound speed", or just "speed", when they are ready. The AD follows with "roll camera", answered by "speed!" by the camera operator once the camera is recording. The clapper, who is already in front of the camera with the clapperboard, calls "marker!" and slaps it shut. If the take

involves extras or background action, the AD will cue them ("action background!"), and last is the director, telling the actors "action!". The AD may echo "action" louder on large sets.

A take is over when the director calls "cut!", and camera and sound stop recording. The script supervisor will note any continuity issues and the sound and camera teams log technical notes for the take on their respective report sheets. If the director decides additional takes are required, the whole process repeats. Once satisfied, the crew moves on to the next camera angle or "setup," until the whole scene is "covered." When shooting is finished for the scene, the assistant director declares a "wrap" or "moving on," and the crew will "strike," or dismantle, the set for that scene.

At the end of the day, the director approves the next day's shooting schedule and a daily progress report is sent to the production office. This includes the report sheets from continuity, sound, and camera teams. Call sheets are distributed to the cast and crew to tell them when and where to turn up the next shooting day. Later on, the director, producer, other department heads, and, sometimes, the cast, may gather to watch that day or yesterday's footage, called *dailies*, and review their work.

With workdays often lasting 14 or 18 hours in remote locations, film production tends to create a team spirit. When the entire film is *in the can*, or in the completion of the production phase, it is customary for the production office to arrange a wrap party, to thank all the cast and crew for their efforts.

For the production phase on live-action films, synchronizing work schedules of key cast and crew members is very important, since for many scenes, several cast members and most of the crew must be physically present at the same place at the same time (and bankable stars may need to rush from one project to another). Animated films have different workflow at the production phase, in that voice talent can record their takes in the recording studio at different times and may not see one another until the film's premiere, while most physical live-action tasks are either unnecessary or are simulated by various types of animators.

Post-production

Here the video/film is assembled by the film editor. The shot film material is edited. The production sound (dialogue) is also edited; music tracks and songs are composed and recorded if a film is sought to have a score; sound effects are designed and recorded. Any computer-graphic visual effects are digitally added

by an artist. Finally, all sound elements are mixed into "stems", which are then married to picture, and the film is fully completed ("locked").

Animation:

Introduction of animation. History and origin of animation. Principles Basics of animation, Principle and use of animation in multimedia. Early examples. Animation techniques.

Animation is a dynamic medium in which images or objects are manipulated to appear as moving images. In traditional animation the images were drawn (or painted) by hand on cels to be photographed and exhibited on film. Nowadays most animations are made with computer-generated imagery (CGI). Computer animation can be very detailed 3D animation, while 2D computer animation can be used for stylistic reasons, low bandwidth or faster real-time renderings. Other common animation methods apply a stop motion technique to two and three-dimensional objects like paper cutouts, puppets or clay figures. The stop motion technique where live actors are used as a frame-by-frame subject is known as pixilation.

Commonly the effect of animation is achieved by a rapid succession of sequential images that minimally differ from each other. The illusion—as in motion pictures in general—is thought to rely on the phi phenomenon and beta movement, but the exact causes are still uncertain. Analog mechanical animation media that rely on the rapid display of sequential images include the phénakisticope, zoetrope, flip book, praxinoscope and film. Television and video are popular electronic animation media that originally were analog and now operate digitally. For display on the computer, techniques like animated GIF and Flash animation were developed.

Apart from short films, feature films, animated gifs and other media dedicated to the display moving images, animation is also heavily used for video games, motion graphics and special effects.

The physical movement of image parts through simple mechanics in for instance the moving images in magic lantern shows can also be considered animation. Mechanical animation of actual robotic devices is known as animatronics.

Animators are artists who specialize in creating animation.

The history of animation started long before the development of cinematography. Humans have probably attempted to depict motion as far back as the paleolithic

period. Shadow play and the magic lantern offered popular shows with moving images as the result of manipulation by hand and/or some minor mechanics. In 1833 the phenakistiscope introduced the stroboscopic principle of modern animation, which would also provide the basis for the zoetrope (1866), the flip book (1868), the praxinoscope (1877) and cinematography.

Charles-Émile Reynaud further developed his projection praxinoscope into the Théâtre Optique with transparent hand-painted colorful pictures in a long perforated strip wound between two spools, patented in December 1888. From 28 October 1892 to March 1900 Reynaud gave over 12,800 shows to a total of over 500,000 visitors at the Musée Grévin in Paris. His *Pantomimes Lumineuses* series of animated films each contained 300 to 700 frames that were manipulated back and forth to last 10 to 15 minutes per film. Piano music, song and some dialogue were performed live, while some sound effects were synchronized with an electromagnet.

When film became a common medium some manufacturers of optical toys adapted small magic lanterns into toy film projectors for short loops of film. By 1902 they were producing many chromolithography film loops, usually by tracing live-action film footage (much like the later rotoscoping technique).

Some early filmmakers, including J. Stuart Blackton, Arthur Melbourne-Cooper, Segundo de Chomón and Edwin S. Porter experimented with stop-motion animation, possibly since around 1899. Blackton's *The Haunted Hotel* (1907) was the first huge success that baffled audiences with objects apparently moving by themselves and inspired other filmmakers to try the technique for themselves.

J. Stuart Blackton also experimented with animation drawn on blackboards and some cutout animation in *Humorous Phases of Funny Faces* (1906).

In 1908 Émile Cohl's *Fantasmagorie* was released with a white-on-black chalkline look created with negative prints from black ink drawings on white paper. The film largely consists of a stick figure moving about and encountering all kinds of morphing objects, including a wine bottle that transforms into a flower.

Inspired by Émile Cohl's stop-motion film *Les allumettes animées [Animated Matches]* (1908), Ladislav Starevich started making his influential puppet animations in 1910.

Winsor McCay's *Little Nemo* (1911) showcased very detailed drawings. His *Gertie the Dinosaur* (1914) was also an early example of character development in drawn animation.

During the 1910s, the production of animated short films typically referred to as "cartoons", became an industry of its own and cartoon shorts were produced for showing in movie theaters. The most successful producer at the time was John Randolph Bray, who, along with animator Earl Hurd, patented the cel animation process that dominated the animation industry for the rest of the decade.

El Apóstol (Spanish: "The Apostle") was a 1917 Argentine animated film utilizing cutout animation, and the world's first animated feature film. Unfortunately, a fire that destroyed producer Federico Valle's film studio incinerated the only known copy of *El Apóstol*, and it is now considered a lost film.

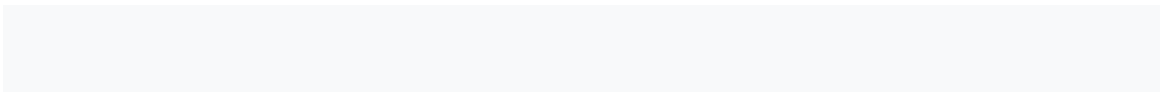
In 1932, the first short animated film created entirely with Technicolor (using red/green/blue photographic filters and three strips of film) was Walt Disney's *Flowers and Trees*, directed by Burt Gillett. But, the first feature film that was done with this technique, apart from the movie *The Vanities Fair* (1935), by Rouben Mamoulian, was "Snow White and the Seven Dwarfs", also by Walt Disney.

In 1958, Hanna-Barbera released *The Huckleberry Hound Show*, the first half hour television program to feature only in animation. Terrytoons released *Tom Terrific* that same year. Television significantly decreased public attention to the animated shorts being shown in theaters.

Computer animation has become popular since *Toy Story* (1995), the first feature-length animated film completely made using this technique.^[17]

In 2008, the animation market was worth US\$68.4 billion.^[18] Animation as an art and industry continues to thrive as of the mid-2010s because well-made animated projects can find audiences across borders and in all four quadrants. Animated feature-length films returned the highest gross margins (around 52%) of all film genres in the 2004–2013 timeframe.

Techniques



Traditional animation (also called cel animation or hand-drawn animation) was the process used for most animated films of the 20th century. The individual frames of a traditionally animated film are photographs of drawings, first drawn on paper. To create the illusion of movement, each drawing differs slightly from the one before it. The animators' drawings are traced or photocopied onto transparent acetate sheets called cels, which are filled in with paints in assigned colors or tones on the side opposite the line drawings. The completed character cels are photographed one-by-one against a painted background by a rostrum camera onto motion picture film.

The traditional cel animation process became obsolete by the beginning of the 21st century. Today, animators' drawings and the backgrounds are either scanned into or drawn directly into a computer system. Various software programs are used to color the drawings and simulate camera movement and effects. The final animated piece is output to one of several delivery media, including traditional 35 mm film and newer media with digital video. The "look" of traditional cel animation is still preserved, and the character animators' work has remained essentially the same over the past 70 years. Some animation producers have used the term "tradigital" (a play on the words "traditional" and "digital") to describe cel animation that uses significant computer technology.

Examples of traditionally animated feature films include *Pinocchio* (United States, 1940), *Animal Farm* (United Kingdom, 1954), and *The Illusionist* (British-French, 2010). Traditionally animated films produced with the aid of computer technology include *The Lion King* (US, 1994), *The Prince of Egypt* (US, 1998), *Akira* (Japan, 1988), *Spirited Away* (Japan, 2001), *The Triplets of Belleville* (France, 2003), and *The Secret of Kells* (Irish-French-Belgian, 2009).

Full animation

Full animation refers to the process of producing high-quality traditionally animated films that regularly use detailed drawings and plausible movement, having a smooth animation. Fully animated films can be made in a variety of styles, from more realistically animated works like those produced by the Walt Disney studio (*The Little Mermaid*, *Beauty and the Beast*, *Aladdin*, *The Lion King*) to the more 'cartoon' styles of the Warner Bros. animation studio. Many of the Disney animated features are examples of full animation, as are non-Disney works, *The Secret of NIMH* (US, 1982), *The Iron Giant* (US, 1999), and *Nocturna* (Spain, 2007). Fully animated films are animated at 24 frames per

second, with a combination of animation on ones and twos, meaning that drawings can be held for one frame out of 24 or two frames out of 24.^[34]

Limited animation

Limited animation involves the use of less detailed or more stylized drawings and methods of movement usually a choppy or "skippy" movement animation. Limited animation uses fewer drawings per second, thereby limiting the fluidity of the animation. This is a more economic technique. Pioneered by the artists at the American studio United Productions of America, limited animation can be used as a method of stylized artistic expression, as in *Gerald McBoing-Boing* (US, 1951), *Yellow Submarine* (UK, 1968), and certain anime produced in Japan. Its primary use, however, has been in producing cost-effective animated content for media for television (the work of Hanna-Barbera, Filmation, and other TV animation studios) and later the Internet (web cartoons).

Rotoscoping

Rotoscoping is a technique patented by Max Fleischer in 1917 where animators trace live-action movement, frame by frame. The source film can be directly copied from actors' outlines into animated drawings, as in *The Lord of the Rings* (US, 1978), or used in a stylized and expressive manner, as in *Waking Life* (US, 2001) and *A Scanner Darkly* (US, 2006). Some other examples are *Fire and Ice* (US, 1983), *Heavy Metal* (1981), and *Aku no Hana* (2013).

Live-action/animation

Live-action/animation is a technique combining hand-drawn characters into live action shots or live action actors into animated shots. One of the earlier uses was in *Koko the Clown* when Koko was drawn over live action footage. Other examples include *Who Framed Roger Rabbit* (US, 1988), *Space Jam* (US, 1996) and *Osmosis Jones* (US, 2001).

Stop motion animation

Stop-motion animation is used to describe animation created by physically manipulating real-world objects and photographing them one frame of film at a

time to create the illusion of movement. There are many different types of stop-motion animation, usually named after the medium used to create the animation. Computer software is widely available to create this type of animation; traditional stop motion animation is usually less expensive but more time-consuming to produce than current computer animation.

- **Puppet animation** typically involves stop-motion puppet figures interacting in a constructed environment, in contrast to real-world interaction in model animation. The puppets generally have an armature inside of them to keep them still and steady to constrain their motion to particular joints. Examples include *The Tale of the Fox* (France, 1937), *The Nightmare Before Christmas* (US, 1993), *Corpse Bride* (US, 2005), *Coraline* (US, 2009), the films of Jiří Trnka and the adult animated sketch-comedy television series *Robot Chicken* (US, 2005–present).
 - **Puppetoon**, created using techniques developed by George Pal, are puppet-animated films that typically use a different version of a puppet for different frames, rather than simply manipulating one existing puppet.
- **Clay animation**, or Plasticine animation (often called *claymation*, which, however, is a trademarked name), uses figures made of clay or a similar malleable material to create stop-motion animation. The figures may have an armature or wire frame inside, similar to the related puppet animation (below), that can be manipulated to pose the figures. Alternatively, the figures may be made entirely of clay, in the films of Bruce Bickford, where clay creatures morph into a variety of different shapes. Examples of clay-animated works include *The Gumby Show* (US, 1957–1967), *Mio Mao* (Italy, 1974–2005), *Morph* shorts (UK, 1977–2000), *Wallace and Gromit* shorts (UK, as of 1989), Jan Švankmajer's *Dimensions of Dialogue* (Czechoslovakia, 1982), *The Trap Door* (UK, 1984). Films include *Wallace & Gromit: The Curse of the Were-Rabbit*, *Chicken Run* and *The Adventures of Mark Twain*.
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 - **Strata-cut animation**, Strata-cut animation is most commonly a form of clay animation in which a long bread-like "loaf" of clay, internally packed tight and loaded with varying imagery, is sliced into thin sheets, with the animation camera taking a frame of the end of the loaf for each cut, eventually revealing the movement of the internal images within.^[54]

- **Cutout animation** is a type of stop-motion animation produced by moving two-dimensional pieces of material paper or cloth. Examples include Terry Gilliam's animated sequences from *Monty Python's Flying Circus* (UK, 1969–1974); *Fantastic Planet* (France/Czechoslovakia, 1973) ; *Tale of Tales* (Russia, 1979), The pilot episode of the adult television sitcom series (and sometimes in episodes) of *South Park* (US, 1997) and the music video Live for the moment, from Verona Riots band (produced by Alberto Serrano and Nívola Uyá, Spain 2014).
- **Silhouette animation** is a variant of cutout animation in which the characters are backlit and only visible as silhouettes. Examples include *The Adventures of Prince Achmed* (Weimar Republic, 1926) and *Princes et princesses* (France, 2000).
- **Model animation** refers to stop-motion animation created to interact with and exist as a part of a live-action world. Intercutting, matte effects and split screens are often employed to blend stop-motion characters or objects with live actors and settings. Examples include the work of Ray Harryhausen, as seen in films, *Jason and the Argonauts*(1963), and the work of Willis H. O'Brien on films, *King Kong* (1933).
- **Go motion** is a variant of model animation that uses various techniques to create motion blur between frames of film, which is not present in traditional stop-motion. The technique was invented by Industrial Light & Magic and Phil Tippett to create special effect scenes for the film *The Empire Strikes Back* (1980). Another example is the dragon named "Vermithrax" from *Dragonslayer* (1981 film).
- **Object animation** refers to the use of regular inanimate objects in stop-motion animation, as opposed to specially created items.

- **Graphic animation** uses non-drawn flat visual graphic material (photographs, newspaper clippings, magazines, etc.), which are sometimes manipulated frame-by-frame to create movement. At other times, the graphics remain stationary, while the stop-motion camera is moved to create on-screen action.

Brickfilm are a subgenre of object animation involving using Lego or other similar brick toys to make an animation. These have had a recent boost in popularity with the advent of video sharing sites, YouTube and the availability of cheap cameras and animation software.

- **Pixilation** involves the use of live humans as stop motion characters. This allows for a number of surreal effects, including disappearances and reappearances, allowing people to appear to slide across the ground, and other effects. Examples of pixilation include *The Secret Adventures of Tom Thumb* and *Angry Kid* shorts.

Computer animation

Computer animation encompasses a variety of techniques, the unifying factor being that the animation is created digitally on a computer. 2D animation techniques tend to focus on image manipulation while 3D techniques usually build virtual worlds in which characters and objects move and interact. 3D animation can create images that seem real to the viewer.

2D animation

A 2D animation of two circles joined by a chain

2D animation figures are created or edited on the computer using 2D bitmap graphics and 2D vector graphics. This includes automated computerized versions of traditional animation techniques, interpolated morphing, onion skinning and interpolated rotoscoping.

2D animation has many applications, including analog computer animation, Flash animation, and PowerPoint animation. Cinemagraphs are still photographs in the form of an animated GIF file of which part is animated.

Final line advection animation is a technique used in 2D animation, to give artists and animators more influence and control over the final product as everything is done within the same department. Speaking about using this approach in *Paperman*, John Kahrs said that "Our animators can change things, actually erase away the CG underlayer if they want, and change the profile of the arm."

3D animation

3D animation is digitally modeled and manipulated by an animator. The animator usually starts by creating a 3D polygon mesh to manipulate. A mesh typically includes many vertices that are connected by edges and faces, which give the visual appearance of form to a 3D object or 3D environment. Sometimes, the mesh is given an internal digital skeletal structure called an armature that can be used to control the mesh by weighting the vertices. This process is called rigging and can be used in conjunction with keyframes to create movement.

Other techniques can be applied, mathematical functions (e.g., gravity, particle simulations), simulated fur or hair, and effects, fire and water simulations. These techniques fall under the category of 3D dynamics.

3D terms

- **Cel-shaded animation** is used to mimic traditional animation using computer software. Shading looks stark, with less blending of colors. Examples include *Skyland* (2007, France), *The Iron Giant* (1999, United States), *Futurama* (Fox, 1999) *Appleseed Ex Machina* (2007, Japan), *The Legend of Zelda: The Wind Waker* (2002, Japan), *The Legend of Zelda: Breath of the Wild* (2017, Japan)
- **Machinima** – Films created by screen capturing in video games and virtual worlds. The term originated from the software introduction in the 1980s demoscene, as well as the 1990s recordings of the first-person shooter video game *Quake*.
- **Motion capture** is used when live-action actors wear special suits that allow computers to copy their movements into CG characters. Examples include *Polar Express* (2004, US), *Beowulf* (2007, US), *A Christmas Carol* (2009, US), *The Adventures of Tintin* (2011, US) *kochadiiyan* (2014, India).

- **Photo-realistic animation** is used primarily for animation that attempts to resemble real life, using advanced rendering that mimics in detail skin, plants, water, fire, clouds, etc. Examples include *Up* (2009, US), *How to Train Your Dragon*(2010, US), *Ice Age* (2002, US).

Animation Styles covered: (techniques)

1. **Traditional animation**
2. **2D Vector-based animation**
3. **3D computer animation**
4. **Motion graphics**
5. **Stop motion**

Traditional animation, sometimes referred to as cel animation, is one of the older forms of animation, in it the animator draws every frame to create the animation sequence. Just like they used to do in the old days of Disney. If you've ever had one of those flip-books when you were a kid, you'll know what I mean. Sequential drawings screened quickly one after another create the illusion of movement.

In traditional animation, animators draw images on a transparent piece of paper fitted on a peg using a colored pencil, one frame at the time. Animators usually test animations with very rough drawings to see how many frames they would need for the action to work. The animation process of traditional animation can be lengthy and costly. Once the clean-up and the in-between drawings are complete, the production would move on to photographing each individual frame. Today, though, traditional animation can be done on a computer using a tablet, and does not require actual photography of individual frames.

2D animation is the term often used when referring to traditional hand-drawn animation, but it can also refer to computer vector animations that adopts the techniques of traditional animation.

Vector-based animations, meaning computer generated 2D animations, uses the exact same techniques as traditional animation, but benefits from the lack of physical objects needed to make traditional 2D animations, as well as the ability to use computer interpolation to same time.

3D animation works in a completely different way than traditional animation. They both require an understanding of the same principles of movement and composition, but the technical skill set is very different for each task. While traditional animation requires you to be an amazing draftsman, computer animation doesn't. 3D animation is more similar to playing with puppets rather than drawing.

3D animation, also referred to as CGI, or just CG, is made by generating images using computers. That series of images are the frames of an animated shot.

The animation techniques of 3D animation has a lot of similarities with stop-motion animation, as they both deal with animating and posing models, and still conforms to the frame-by-frame approach of 2D animation, but it is a lot more controllable since it's in a digital work-space.

Instead of drawn or constructed with clay, characters in 3D animation are digitally modeled in the program, and then fitted with a 'skeleton' that allows animators to move the models.

Animation is done by posing the models on certain key frames, after which the computer will calculate and perform an interpolation between those frames to create movement.

When the modeling and/or animation is complete, the computer will render each frame individually, which can be very time-consuming, depending on the quality of the images and the quantity of polygons in the scene.

A 3D animator will spend most of their time looking at curves that represent the movement of different body parts over time.

Another big difference with 3D animation is that unlike traditional animation, the character's body parts are always present and should be taken into consideration.

While still considered a form of animation, **motion graphics** is quite different from the other types of animation. Unlike the other types on our list it is not character or story driven. It's the art of creatively moving graphic elements or texts, usually for commercial or promotional purposes.

Think animated logos, explainer videos, app commercials, television promos or even film opening titles.

The skills for motion graphics don't necessarily translate to the other types of animation, since they don't require knowledge of body mechanics or acting, but they do have some attributes in common such as understanding good composition and the all important camera motion.

The process of creating Motion Graphics depends on the programs used, since video editing softwares often have different UI or settings, but the idea is the same. Motion Graphics usually involves animating images, texts or video clips using key framing that are tweened to make a smooth motion between frames.

Stop motion is done by taking a photo of an object, and then moving it just a little bit and taking another photo. The process is repeated and when the photos are played back one after another they give the illusion of movement. This is similar to traditional animation but it uses real life materials instead of drawings.

Stop-Motion animation can be referred to any animation that uses objects that are photographed in a sequence to create the illusion of movement.

The process of stop-motion animation is very long, as each object has to be carefully moved inch by inch, while it's being photographed every frame, to create a fluid sequence of animation.

Here are the different types of stop-motion animation:

Claymation

One of the most popular stop-motion form is Claymation. Working with clay or play-doh characters that can easily be manipulated for animation. Advanced claymation (such as *The Neverhood* or *Armikrog*) uses metal skeletons on which the clay is then molded for more sturdy rigs.

Puppets

Some animators use regular Puppets instead of clay ones, usually also built with some sort of skeleton rig. The faces of the characters can be replaced based on the expression, or controlled within the rig.

Cut-Out

Another popular form of stop-motion is cut-out. Using construction paper or cardboard characters and placing them on paper while shooting the animation from above (that's how *South Park* was made before they switched to computers). The cardboard is then moved a little each frame to create the illusion of movement.

Silhouette

Similar to cutout animation, silhouette animation uses cardboard or some kind of flat material, but the objects are all black and the shot is depicted with silhouettes only. This is one of the oldest forms of stop motion and is rarely used today.

Action Figures / Lego

Some use action figures or lego characters for animation. This genre is very popular on YouTube with many channels dedicated to creating funny skits with Lego characters. *Robot Chicken* is a great example of that. They use famous action figures to make fun of pop culture.

Pixelation

Pixelation is a form of stop motion that uses real people and real environments to create unreal videos. It uses the stop motion method of taking a still photo, moving things around, and then taking another photo, but the subject matter is usually real people instead of puppets.