Projectors

Projector Types

Most common used projector types

1. LCD Projectors

LCD projectors, or Liquid Crystal Display projectors, utilize a system of liquid crystal panels to project images. These projectors offer vibrant colors and sharp image quality.

They are commonly used in classrooms, boardrooms, and home theaters. However, LCD projectors may suffer from the "screen door effect" and have limited contrast compared to other types.

2. DLP Projectors

DLP projectors, or Digital Light Processing projectors, employ tiny mirrors to reflect light and create images. They offer excellent contrast, high brightness, and smooth motion reproduction. DLP projectors are popular for home theaters and large venues. One drawback is the possibility of the "rainbow effect" that can be perceived by some individuals.

3. LCoS Projectors

LCoS projectors, or Liquid Crystal on Silicon projectors, combine the best features of LCD and DLP technologies. They provide high-resolution images, deep blacks, and accurate color reproduction.

LCoS projectors are well-suited for professional installations and high-end home theaters. However, they tend to be more expensive than other types.

4. Short-Throw Projectors

Short-throw projectors are designed to project large images in close proximity to the screen or wall. They are ideal for small rooms or environments where space is limited.

These projectors reduce the risk of shadows and provide a more immersive experience. However, they may have limited zoom capabilities and can be more expensive than regular projectors.

5. Ultra-Short-Throw Projectors

Ultra-short-throw projectors take the concept of short-throw projectors a step further by allowing even closer placement to the screen or wall. They offer convenience and versatility, making them suitable for interactive displays and interactive whiteboards. Ultra-short-throw projectors are widely used in classrooms and collaborative workspaces.

6. Laser Projectors

Laser projectors utilize laser diodes to generate light, resulting in vibrant colors, high brightness, and excellent image quality. They offer long-lasting performance with minimal maintenance requirements.

Laser projectors are known for their wide color gamut and superior color accuracy. They are commonly used in professional settings such as theaters, museums, and auditoriums.

7. LED Projectors

LED projectors use light-emitting diodes as the light source. They offer energy efficiency, long lamp life, and compact designs.

LED projectors are known for their quick start-up and cool-down times, making them convenient for on-the-go usage. These projectors are popular for portable applications, outdoor movie nights, and casual home entertainment setups.

8. 4K Projectors

4K projectors provide ultra-high-definition image quality with a resolution of 3840 x 2160 pixels. They deliver incredible detail and clarity, resulting in a truly immersive viewing experience.

4K projectors are favored by cinephiles, gamers, and professionals who require precise image reproduction. They offer a future-proof investment for those seeking the best visual performance.

9. Portable Projectors

Portable projectors are compact and lightweight, making them easy to carry and set up in different locations. They are designed for on-the-go usage, allowing users to project images and videos anywhere.

Portable projectors are popular for business presentations, outdoor events, and personal entertainment. They often come with built-in batteries and wireless connectivity options for added convenience.

Source: https://thepiqoprojector.com/blogs/news/types-of-projectors

Information resources about projector and image related topics

Websites

Common terminology used when working with projectors and video in general:

https://www.projectorcentral.com/glossary.cfm

Throw calculator when calculating the optimum projection distance of different brands and types of projectors:

https://www.projectorcentral.com/projection-calculator-pro.cfm

Overview of projector topics to take into consideration when using projectors:

https://bookstack.hku.nl/books/projection-mapping-oKq/page/choosing-video-projection-hardware-space

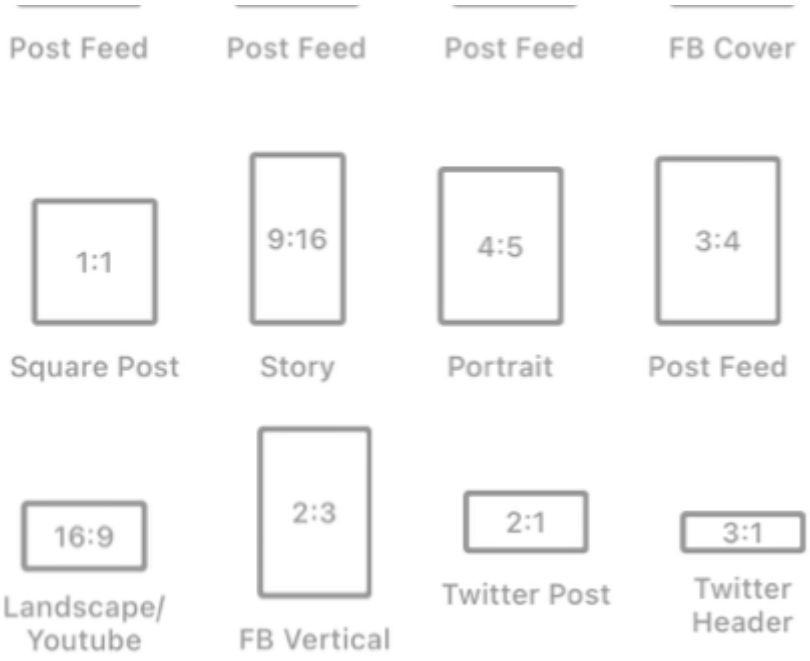
Websites for resolution, pixel and aspect ratio calculations:

https://calculateaspectratio.com/

https://pixelcalculator.com/en/index.php

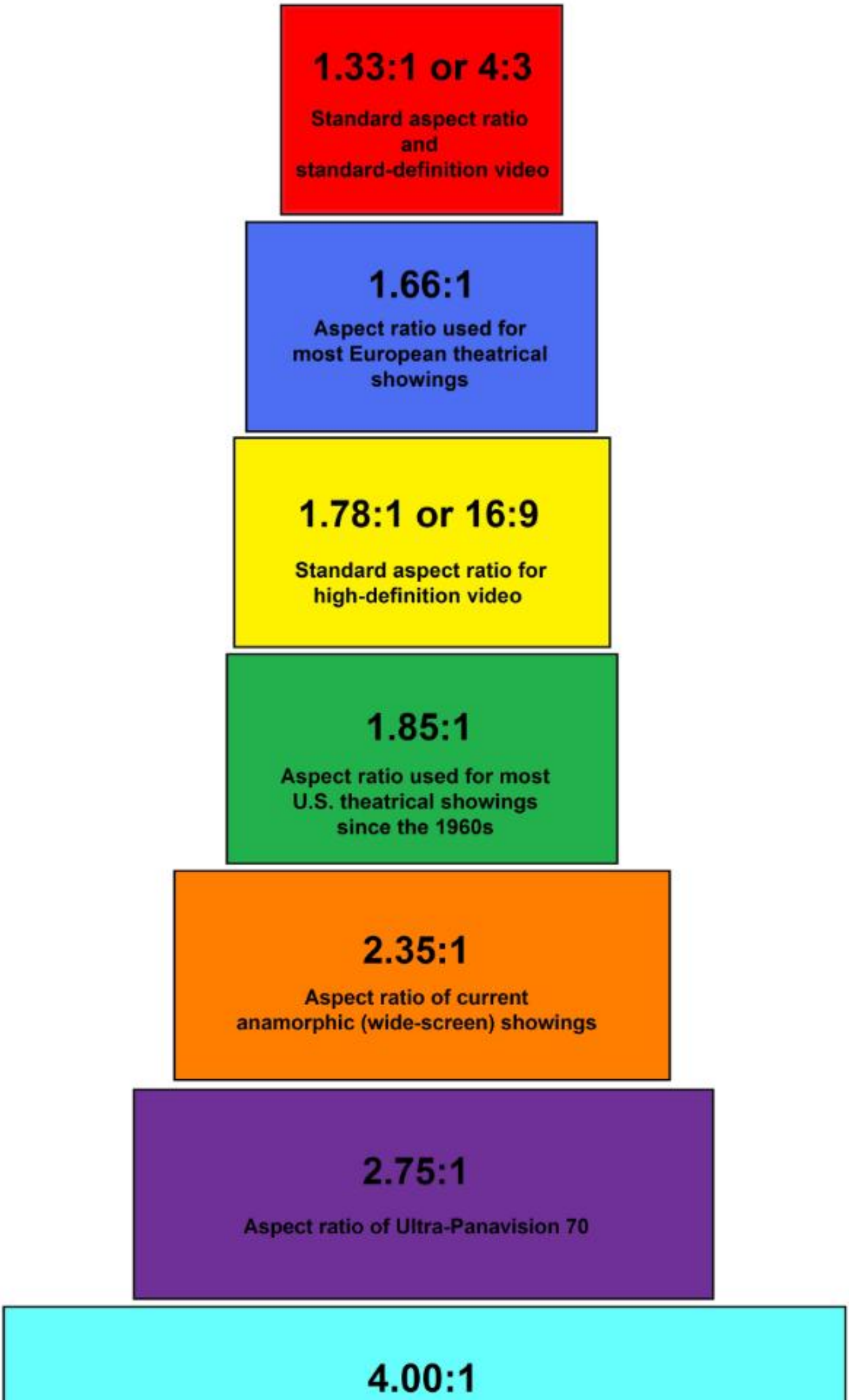
Different aspect ratio diagrams

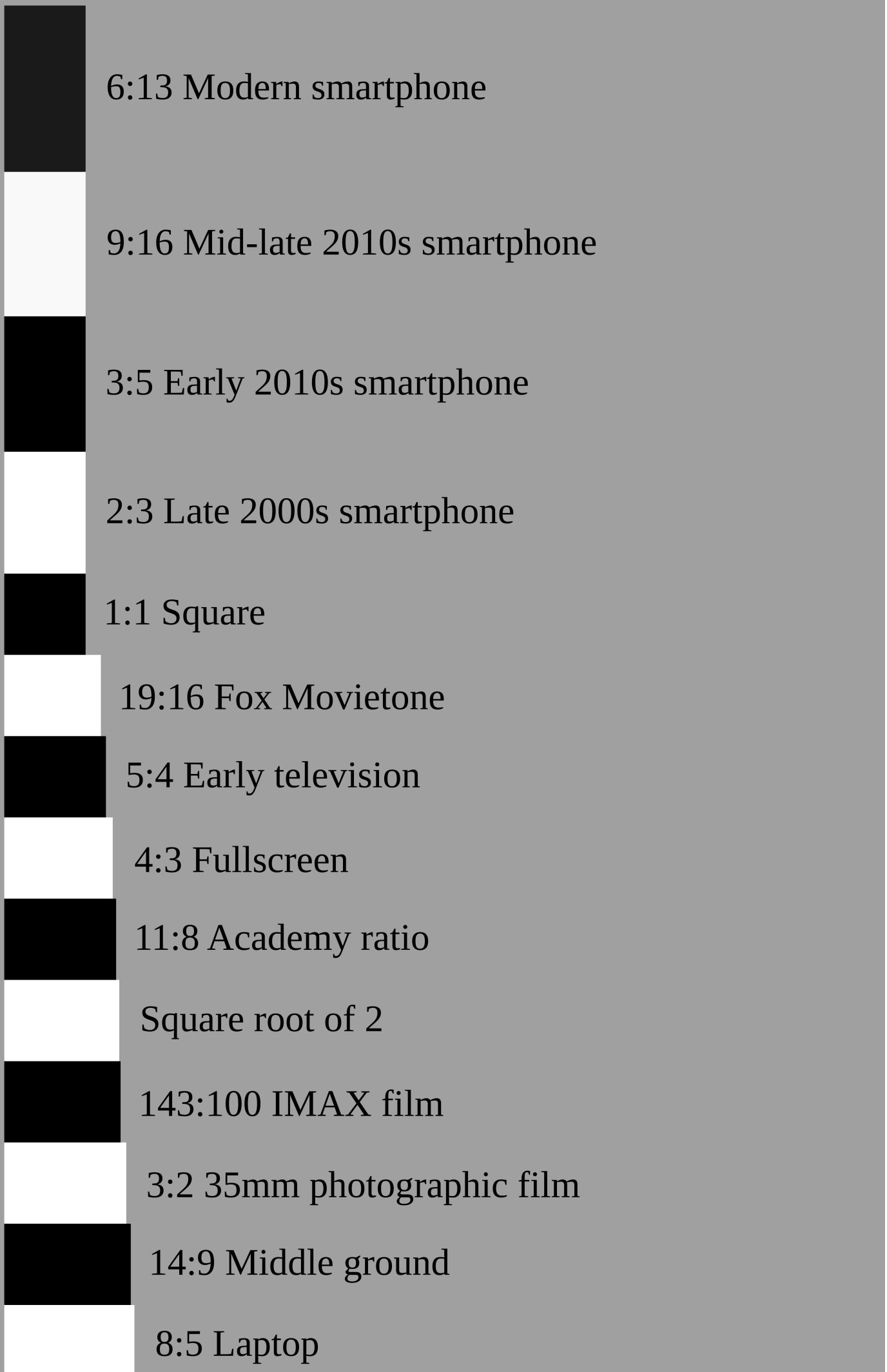
Most common used aspect ratio's:



source: https://collart.app/choose-aspect-ratio-social-media-guide/

Aspect ratio's used in film:


1.33:1 or 4:3
Standard aspect ratio and standard-definition video
1.66:1
Aspect ratio used for most European theatrical showings
1.78:1 or 16:9
Standard aspect ratio for high-definition video
1.85:1
Aspect ratio used for most U.S. theatrical showings since the 1960s
2.35:1
Aspect ratio of current anamorphic (wide-screen) showings
2.75:1
Aspect ratio of Ultra-Panavision 70
4.00:1


6:13 Modern smartphone
9:16 Mid-late 2010s smartphone
3:5 Early 2010s smartphone
2:3 Late 2000s smartphone
1:1 Square
19:16 Fox Movietone
5:4 Early television
4:3 Fullscreen
11:8 Academy ratio
Square root of 2
143:100 IMAX film
3:2 35mm photographic film
14:9 Middle ground
8:5 Laptop

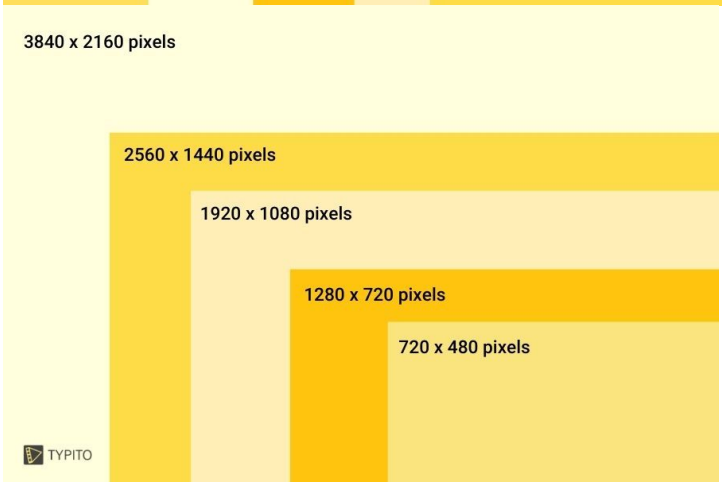
Source: https://en.wikipedia.org/wiki/Aspect_ratio_(image)

Resolution & Aspect Ratio

What is Resolution in video?

Resolution in video refers to the number of pixels that make up each frame, typically expressed as width x height in pixels (e.g., 1920 x 1080). Higher resolution means more pixels, resulting in clearer and more detailed image.

Resolution Type	Common Name	Aspect Ratio	Pixel Size
SD (Standard Definition)	480p	4:3	640 x 480
HD (High Definition)	720p	16:9	1280 x 720
Full HD (FHD)	1080p	16:9	1920 x 1080
QHD (Quad HD)	1440p	16:9	2560 x 1440
2K video	1080p	1:1.77	2048 x 1080
4K video or Ultra HD (UHD)	4K or 2160p	1:1.9	3840 x 2160
8K video or Full Ultra HD	8K or 4320p	16?9	7680 x 4320



The size of the projection, depends on the distance between the projector and the screen and the type of lens used (throw factor) To Calculate the real life size of your screen in (centi)meters depending on the projector specs; use this tool:

https://www.projectorcentral.com/projection-calculator-pro.cfm

Other Websites for resolution, pixel and aspect ratio calculations:

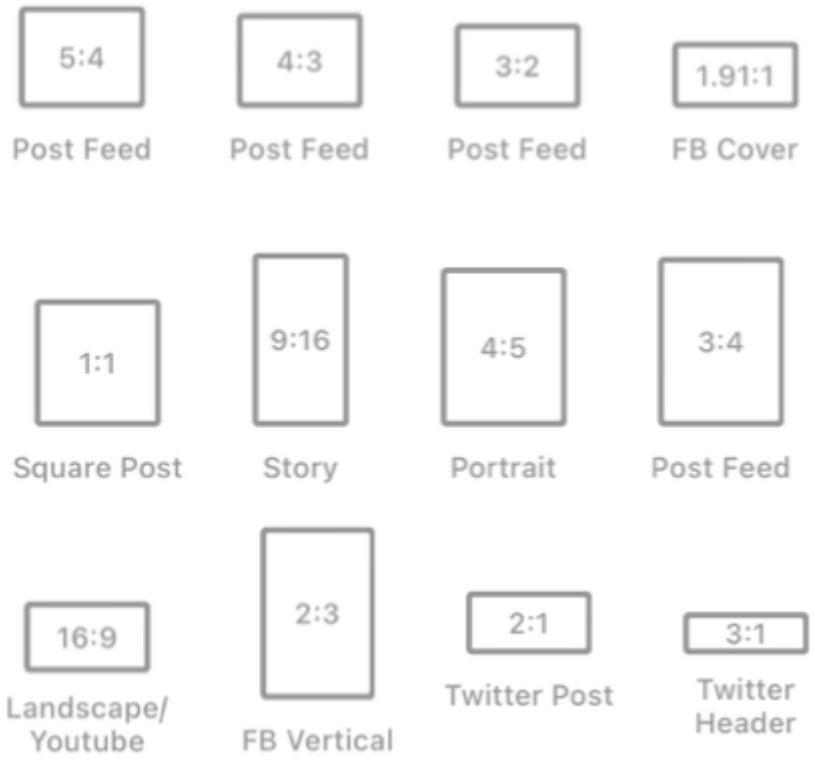
https://calculateaspectratio.com/

https://pixelcalculator.com/en/index.php

Different aspect ratio diagrams

An aspect ratio is the relationship between a video's width and height, typically expressed as two numbers separated by a colon (e.g., 16:9). Common aspect ratios include 16:9 for widescreen and 4:3 for standard television.

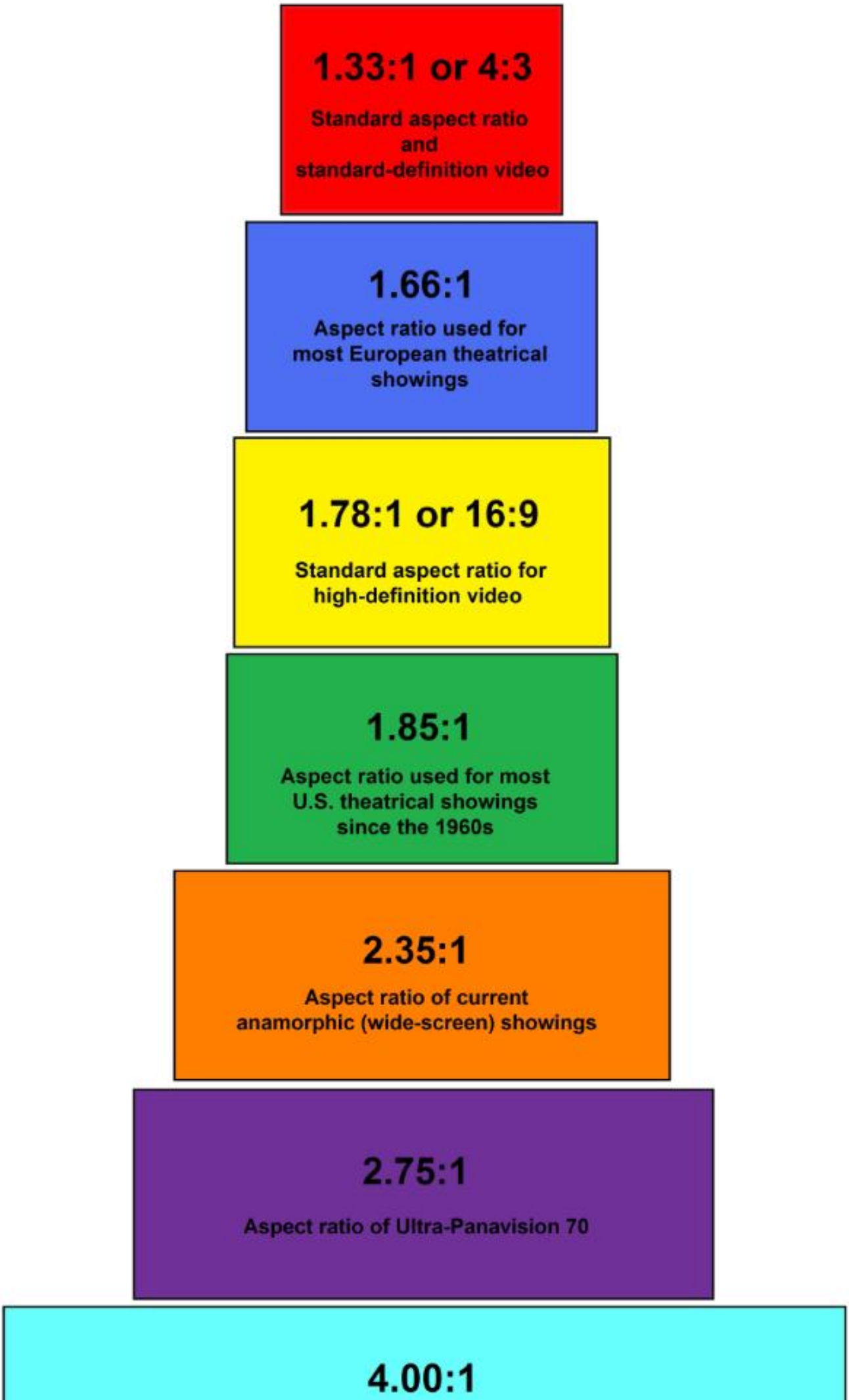
These are all measured in square pixels. (when working with analogue video systems there was temporarily a time we used anamorphic pixels to squish 16:9 content into 4:3 and unsquish it in the edit. A herritage (to do with changing standards, expensive sensors & lenses that solve the .)



source: https://collart.app/choose-aspect-ratio-social-media-guide/

Aspect ratio's used in film:


4:3 (1,33:1)
1,75:1
1,85:1
2,39:1 ("Scope")
1,66:1
16:9 (1,77:1)
2:1 (Univisium)
2,39:1 ("Scope")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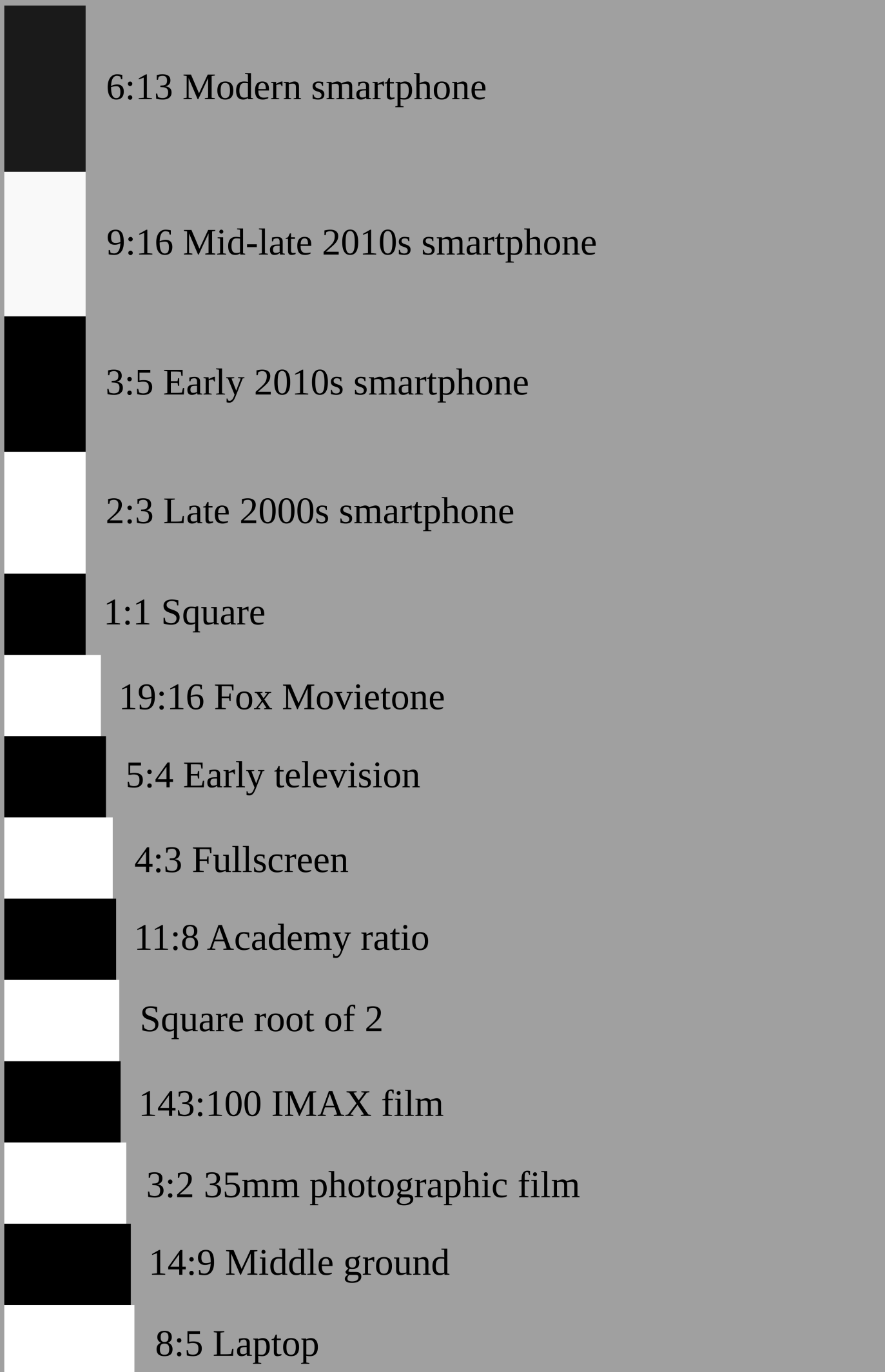
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Square root of 2
143:100 IMAX film
3:2 35mm photographic film
14:9 Middle ground
8:5 Laptop

Source: https://en.wikipedia.org/wiki/Aspect_ratio_(image)

What Do "p" and "i" Mean in Resolution?

People specify just the height (often referred to as either ‘p' or ‘i') when talking about resolutions. This implies that the height and width have a standard 16:9 aspect ratio.

- The "i" denotes the use of interlaced scanning, with video quality being lower when compared to the entire frame transmission,
- While the "p" signifies progressive scan.

p = Progressive video	**i = Interlaced video**
A video source listed with the letter "p" is known as Progressive scan.	A video source listed with the letter "i" is known as Interlaced scan.
Example: 1080p, 720p, or 480p.	Example: 1080i or 480i.
Displays both odd and even scan lines (the complete video frame) simultaneously. You need a HDMI Cable (of high speed) to transmit the video signal in 1080p.	Displays odd and even scan lines as individual fields. First, the screen draws even scan lines, followed by odd scan lines. Two odd and even scan line fields result in one video frame.

Choosing a projector

Factors to Consider When Choosing a Projector for Your Room

When selecting a projector for your room, there are several factors you should consider:

1. Brightness

The brightness of the projector is measured in lumens. The higher the lumen count, the brighter the projected image will be. Consider the ambient light conditions in your room and choose a projector with sufficient brightness to overcome any potential glare or washed-out images.

2. Resolution

The **resolution** of the projector determines the level of detail and clarity in the projected image. Common resolutions include 1080p (Full HD) and 4K Ultra HD. Higher-resolution projectors offer more detailed and sharper images, but they also come at a higher cost.

3. Contrast Ratio

The **contrast** ratio measures the difference between the darkest and brightest parts of the image. A higher contrast ratio results in more vibrant and lifelike images with better color accuracy.

4. Throw Distance

The **throw** distance refers to the distance between the projector and the screen. It is important to choose a projector with the right throw distance for your room size to ensure that the image fits perfectly on the screen.

5. Zoom

The **zoom** feature allows you to adjust the size of the projected image without moving the projector. This is useful if you need to change the image size frequently or if you have limited placement options.

6. Orientation options

360° orientation means a projector is designed to operate in any rotational position, including projecting straight down onto a floor or straight up onto a ceiling. This matters because projectors rely on carefully designed airflow to cool the light engine and electronics; if the unit is used in an unsupported orientation, heat accumulates incorrectly, causing fans to run loudly or the projector to throttle or shut down. When selecting a projector for floor projection, check the specifications for terms like **“360° installation,” “any-angle mounting,” or “portrait/vertical projection supported,”** which indicate the cooling system is designed to work in all orientations.

6. Mounting possibilities

Mounting refers to the physical way a projector is installed or fixed in a space, such as on a ceiling mount, wall mount, truss, shelf, or floor stand. The mounting method determines the projector’s orientation (tabletop, ceiling, portrait, vertical, or angled) and must support both the weight and stability of the device while keeping the lens aligned with the projection surface. When choosing or designing a mounting setup, check that the projector supports the intended installation orientation, ensure clear airflow around intake and exhaust vents, use a mount with sufficient load capacity and fine adjustment (tilt, rotation, height), and position the projector so that keystone correction is minimized by physically aligning the lens with the image plane. Use a safety when mounting anything above head hight

also check this page on mounting possibilities & suggestions.