

DGM 2341 Output For Digital Media

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Technology

Intro

When needing to know what format to use for media, having background knowledge in what size of device the image will display correctly on, or what is going to be used for to help know how high the quality needs to be. When someone asks you to have the video resolution support 4k or the audio be at 24 bits, the need to understand all the different quality's and resolutions comes in handy.

Codec

When looking at a computer, have you ever wondered what that .mp3 or .JPG means? That is the type of codecs used and is specific to the file you have. Codec Is a device or program that compresses and decompressing digital images and videos and it also converts audio from analog to digital.

Size	Bytes
bit	1
byte	8
Kilobyte	1024
Megabyte	1,048,576
Gigabyte	1,073,741,824
Terabyte	1,099,511,627,776
Petabyte	1,000,000,000,000,000
Exabyte	1,000,000,000,000,000,000

Storage

Quality also comes with size. When export a large video high resolution this might take up a lot of memory and not understand the different sizes might lead you to trouble. If you don't have enough storage. Nowadays storage prices have gone down, and you can buy a large hard drive for a relatively cheap price, but when streaming or using some other source outside of your local drive size might cause buffering issues. Size might play a role in what format you want to use on the file.

Bit Depth

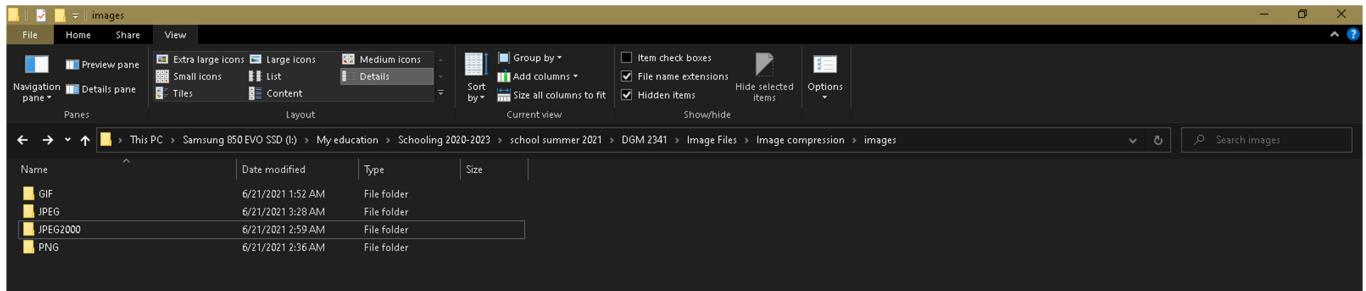
When talking about bits it can mean many different things. for example, with image/video it's talking about how many colors can be in that image. An example being 8 bits has 256 colors. When we talk about audio the bit depth it is sometimes referred as sample format deals with the audio resolution. Lossy compression usually will use lower bits and have sound/pitches missing. Lossless compression has high bits and no sounds/pitches are lost or missing.

Bits	Colors/Audio Bit Depth
2 - bits	4
4 - bits	16
8 - bits	256 / Phone Call
16 - bits	65,536 / CD Quality
24 - bits	16,777,216 / High Quality
32 - bits	4,294,967,296
64 - bits	=====
128 - bits	=====

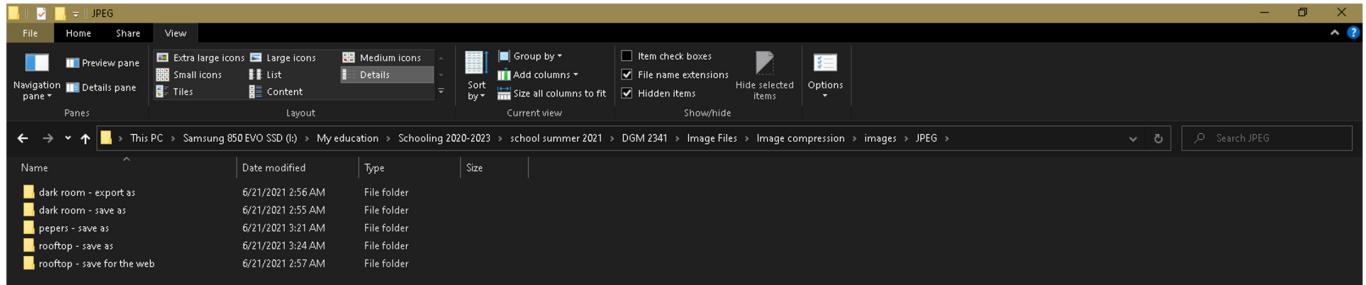
Asset Management

When storing and organizing files on your device. It is best practice to name file appropriately and put them in folders and subfolders with names that are relevant. I had an Algorithm Data Structure class that used a method called Tree Nodes with a similar technique that could be applied to organizing data. In that method, you would have a tree. In that tree there are main branches that are connected to smaller branches and so on until you get to the individual leaves . Each main branch is a parent to the smaller branch, and the smallest branches are parents to the leaves with each of them being related to one another. I have implemented this technique below to show you how I organize my files.

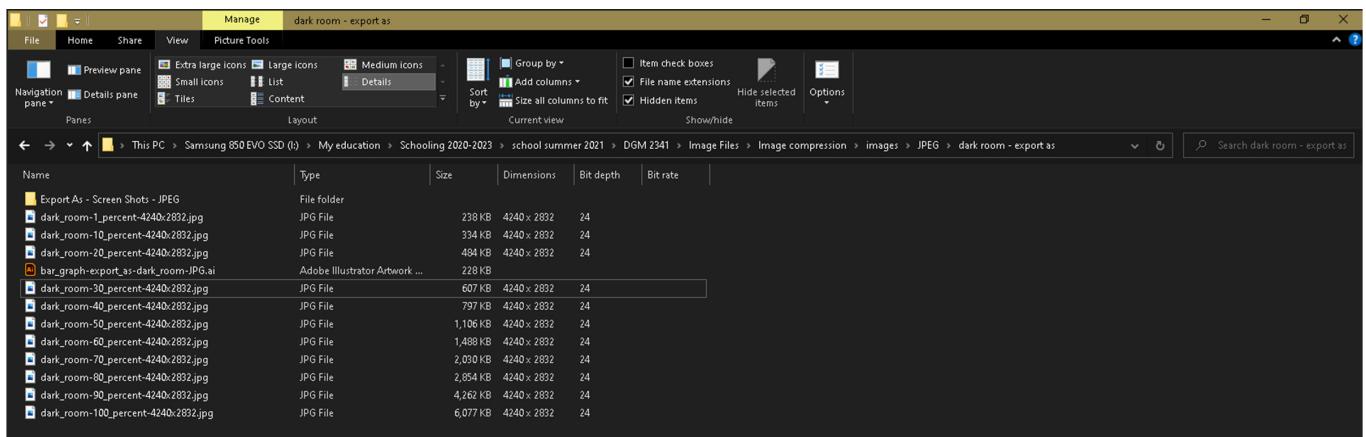
These are my main branches:



These are my smaller branches:



These are my individual leaves:



Audio Compression

Analog to Digital

Audio files are large when they are being converted from an electric wave to binary for the computer to read. and can take up around 34 MB per minute when sampling 24 bit/96khz.

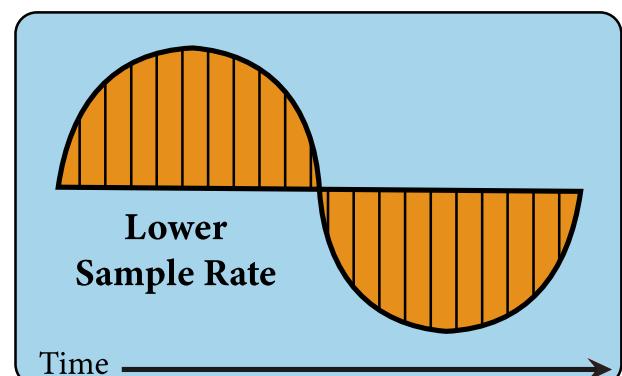
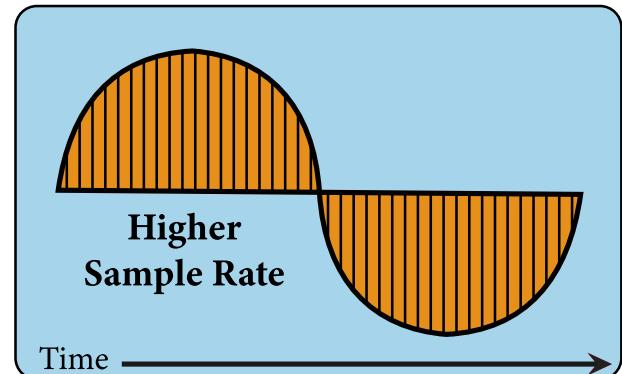
Lossy and Lossless

When using lossy compression, the audio sample rate is reduced. Samples contains information about the amplitude/frequency value of the signal waveform in time based. So, when reducing the sample rates, there will be a cut in frequency range kept in the compressed file.

Unlike Lossy, Lossless compression removes none of the data, but compresses by copying certain parts that are the same in frequency to save in file size but still takes up more memory comparing to lossy.

Audio Bits Per Second

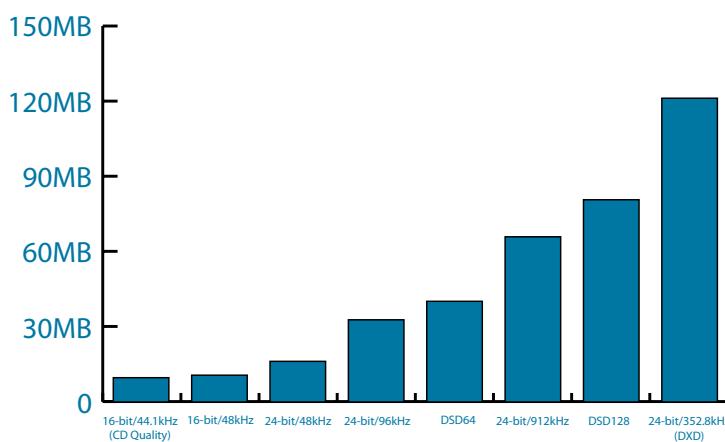
second is how we determined how smooth the sound wave will look when converting from digital to analog.



Common Audio Sizes:

16 bits: 44.1kHz, 48kHz

24 bits: 48kHz, 96kHz, 192kHz, 352.8kHz



Sample Rate

Samples contains information about the amplitude/frequency value of the signal waveform in time based. With less sample rates less frequency range you have.

Audio Bit Rate

This is how fast the data is read. The number of bits encoded per second or the number of bits transmitted /received per second. The more bits you have the better quality of audio. The Lower the Kilobits Per Second the more noise is introduced to the file (less frequencies are present and fullness).

Audio Compression

Formats

MP3

MPEG 1 layer 3, is a lossy compression used by the Moving Picture Experts group(MPEG) this is an older type of compression technique, but it is still commonly used.

FLAC

Free Lossless Audio Codec, is a lossless compression developed by Xiph.Org Foundation. Can reduce audio size by 40-50% but provides a bit perfect copies, but it's not supported by apple.

AIFF

Audio Interchange File Format, Lossless compression. This is an uncompressed file from apple. This file uses more disk space than the MP3 and is used for sampling for musical applications.

WMA

Windows Media Audio, Sample rate up to 96KHz and is developed by Microsoft started as a lossy compression type but now has 4 different types with one being lossless compression. Mostly used on windows operating systems

ALAC

is a proprietary format. Lossless compression. Support up to 32 bits with a sample rate up to 384,000Hz. This Is an apple created format that they are starting to use for their music. Is part 14 of the MPEG4 format and is the same as AAC.

AAC

Advanced Audio Coding, MPEG4 is high-resolution lossy compression but has lossless capabilities and is multichannel. This is a more efficient compression than MP3 and can give a 10.1 surround sound used for apple products.

OGG

is a high-quality lossy compression with a sample rate up to 192 KHz. Developed by Xiph.Org Foundation. Is used on real payer and is used with videos applications.

AIFC

is a compressed .AIFF file and is used by media players and gaming consoles. Some being vgmstream or Apple iTunes.

MQA

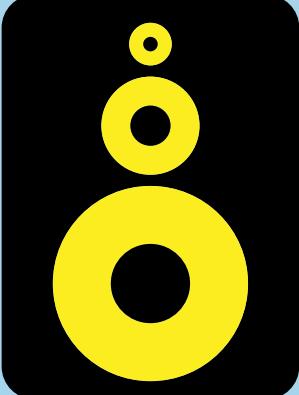
Master Quality Authenticated, is a high-resolution lossy compression, is used by title platform as their primary format and is small enough to stream or download. Also, ASUS had used .MQA for their new ROG headphones.

WAV

Waveform Audio File Format, Lossless file type with and sample rate us usually 44.1KHz. Developed by IBM and Microsoft. Wave is un-compressed type that is used to export audio samples. Some wave files can contain compression, but most are uncompressed and uses the LPCM – Linear Pulse-Code Modulation. WAV doesn't support metadata.

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Speaker Test



KRK ROKIT 10-3 SPEAKERS

Power Output: 300 Watts

Frequency Response: 26 - 40,000Hz

Impedance: 5.12 Kohms Balanced

Sound Pressure Level: 112 dB

Speakers

I noticed with the headphones that the instruments were louder than the vocals and, on the speakers, it was the opposite. The Headphones also sounded a little more spaced out than the Studio monitors even though the studio monitors has a higher frequency response than the headphones.

Listening

When doing this listening assignment, I decided to use my Skullcandy ANC Crushers Headphones without the bass feature turned on and compared the quality to my KRK Rokit 10-3 Studio monitor. My Skullcandy headphones come with an Audio personalization program that will adjust the frequencies based on your hearing.



SKULLCANDY ANC CRUSHERS

Typed: Closed

Transducer: Dynamic

Frequency Response: 20 - 20,000Hz

Impedance: 32ohms

Sound Pressure Level: 105 dB

Audio Platforms



Apple Music

Max Steaming: 320Kbps
Format: AAC, Ogg Vorbis

Apple music is one of the more popular audio streaming platforms. It is expected to have 75 million lossless audio tracks with no extra pricing. The membership pricing costs \$14.99/month for families and \$9.99/month for single subscriptions.

The screenshot shows the Apple Music mobile application. At the top left is the Apple Music logo. Below it is a navigation bar with three options: 'Listen Now' (highlighted), 'Browse' (selected), and 'Radio'. A 'Search' bar is at the top right. The main content area is titled 'Browse' and features a 'New Music Daily' section for Apple Music. It includes a large image of Ed Sheeran with the text 'Ed Sheeran is back with "Bad Habits"—in Spatial Audio.' To the right is a 'WATCH NOW' section featuring a video of Zane talking to Ed Sheeran. Below these are sections for 'Introducing Spatial Audio' (with Justin Bieber and F9 movie posters) and a 'PLAY' button.



Spotify Music

Max Steaming: 320Kbps
Format: AAC, Ogg Vorbis

Spotify has been around since 2006 and has over 356 million monthly users and 58 million paying subscribers. You can stream their music for free but has limitations and ads. The membership pricing costs \$9.99/month for single, \$12.99 for Duo(2-people) and \$15.99 for family of up to six.

The screenshot shows the Spotify mobile application. On the left is the Spotify logo and a sidebar with navigation links: Home, Search, Your Library, Recently Played, V ALBUM, N PLAYLIST, Discover Weekly PLAYLIST, Install App, and Chrunos. The main content area displays a playlist titled 'N' by Chrunos with 39 songs. The first song listed is 'Dancing On My Own' by Calum Scott from the album 'Only Human (Deluxe)'. Below the song list are five more songs: 'No Matter What' by Calum Scott, 'Bad At Love' by Halsey, 'Survivors - Acoustic' by Passenger, and 'Sugar' by Maroon 5. Each song entry includes a green 'Download' button. At the bottom of the screen is a playback control bar with icons for volume, play/pause, and track navigation.

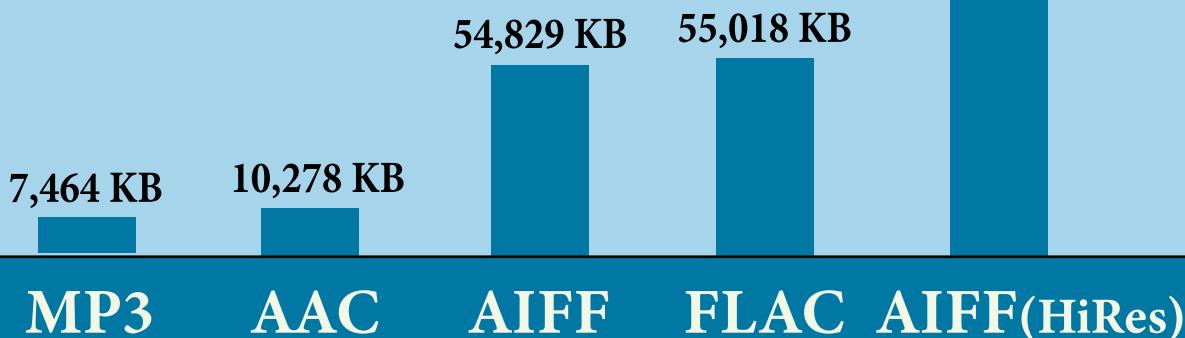
Audio Listening

Evaluation

Tears for Fear - <i>Songs from the Big Chair</i> Evaluation	Pink Floyd - <i>Momentry Laps of Reason</i> Evaluation
When listening to this album I did noticed a diffence. The backup vocals were more apperant in the higher quilty versions of this album. Another thing I noticed was the overall song got brigher when going up in quality. Backgound preccusions were more aprrent. I did not noticed much on the low frequency end.	Surprisingly this Album was one of the hardest for me to tell a huge difference. The parts I could tell a difference in is the guitar. With the higher quaily files it stuck out more than the lower qualty songs, especially in the song <i>Yet Another Movie/Round And Around</i> .
Tears for Fear - <i>Sowing the Seed of Love</i> Evaluation	Don Henley - <i>End of Innocence</i> Evaluation
One part of the album I noticed a differene on was the <i>BadMan's Song</i> . when the lady starts singing her voice is somewhat flatter in the lower quality files. When listening to it in the AIFF format it sounded almost fuller and brighter also.	You could deffinantly tell a difference in this ablum when listening to the MP3 compaired to the HighRes AIFF files. His voice is much brigher and more full. Also made it stick out from the piano more in <i>The End of The Innocence</i> song. I coundn't much difference on the low frequence end. The piano was brigther also in the HighRes AIFF file.
	Coldplay - <i>A Rush Of Blood To The Head</i> Evaluation
	In the song <i>The Scientist</i> , You could hear the reverb on his voice and the low end of the guitar was more present. In <i>Green Eyes</i> , The backup vocals were more present also the acoustic guitar was a little brigher in the AIFF file compaired to the MP3 and AAC. I noticed most of the album was brigther and more full with the higher quality than the lower.

FILE SIZE COMPARISON

Don Henley - The End of The Innocence(Track 1)



Images

Digital

Image come in a large variety of formats. When converting analog to digital the computer turns the image into bits. With more colors and more pixels, the image quality goes up, but the size of the file also increases. When using digital an image is made up of little colored squares called pixels.

Raster vs Vector

Raster images using a dot-matrix or pixel grid and is not scalable.

Vector images are design across multiple formats and can be scaled to any size without the worry of pixilation.



Pixels

Lossy vs Lossless

When converting analog to digital the computer turns the image into bits. With more colors and more pixels, the image quality goes up, but the size of the file also increases.

Lossy compression permanently removes bytes of that image that considered non noticeable.

Lossless compression keeps those bytes and can be restored to its original state but has a smaller compressed size.

Bits for Color

bits of color that construct an image.
The more bits of color you have the higher quality of image you will have.



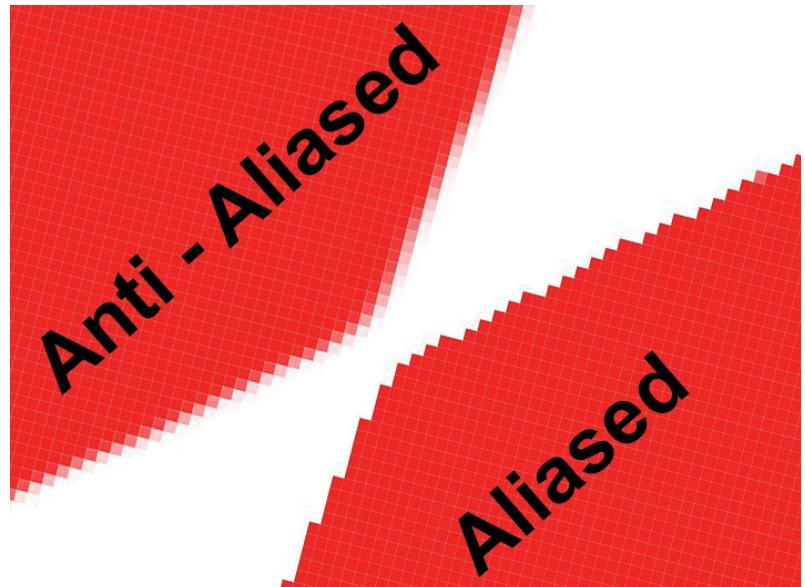
Image

Images

Aliased vs Anti

Aliasing often happens from under-sampling. This causes the image to have jagged pixelated edge.

Anti-Aliasing is a vector base that smoothens the jagged pixelated edge using different shades/ gradiences of that color.



Bit Depth Chart

1 bit: supports $2^1 = 2$ colors

2 bit: supports $2^2 = 4$ colors

3 bit: supports $2^3 = 8$ colors

4 bit: supports $2^4 = 16$ colors

5 bit: supports $2^5 = 32$ colors

6 bit: supports $2^6 = 64$ colors

7 bit: supports $2^7 = 256$ colors

8 bit: supports $2^8 = 256$ colors

16 bit: supports $2^{16} = 65,536$ colors

24 bit: supports $2^{24} = 16,777,216$ colors

32 bit: supports 16,777,215 colors. Alpha 4,294,976,269

Bit Depth Color

Image come in a large variety of formats. When converting analog to digital the computer turns the image into bits. With more colors and **more pixels**, the image **quality goes up**, but the size of the file also increases. When using digital an image is made up of little colored squares called pixels.

Image Formats

.PSD

Adobe Photoshop format. Used to store Photoshop files using raster graphics.

.AI

Adobe Illustrator format. Used to store Illustrator files using vector scaling.

.XMP

Extensible Metadata Platform, created by Adobe to customize metadata for digital documents and data sets. Ultimately saves you original work when uploading an image into Photoshop.

.PNG

Portable Network Graphic, uses lossless compression and is like GIF format. PNG can have transparent backgrounds. They are used in image editor, video editors and web browsers. PNG 8 signifies 8 bits supporting 256 colors. PNG-24 24 bit supporting 16,777,216 colors.

.JPEG(.JPG .JPE .JPEG)

Is a lossy compression format. Uses RGB using 8 bits a color and will total out to 16,777,216 colors. JPEG can support up to 4 gigapixels has many different extensions. JPEG is still used widely among the web and image editors.

.JPEG2000(.JPC .JPF .JPX .JP2 .J2K)

Is a lossy or lossless compression format. developed in the 2000's by Joint Photographic Experts Group. Standard supports up to 38 bits, but is not widely used today.

.DWG

autoCAD Drawing Database file, is a scaled vector file for 2D and 3D design. It can also be used for maps and photos. Is used with CAD programs and is widely used by engineers when designing plans.

.GIF

Graphics Interchange Format, created by CompuServe and uses lossless compression. 8 bits per pixel and having 256 colors for each frame. Used on Tumblr, Facebook, and Twitter.

.WMF

Windows Metafile, designed by Microsoft for vector scaled imaging and is similar to the SVG files. This is used in Word, PowerPoint, and Publisher.

.TIFF

Tag Image File Format, created by Aldus Corporation and uses raster graphics and has the potential for being lossless in format. Used with Image editors, web development, preprocessing....

.RAW

raw image file, named raw because it's not process and ready to print. Highest quality you can get out of a digital image to represent its original state. Has many different extensions. (Still compressed, but very little, and is viewed as non-compressed)

.ARW

raw image file format and is used by Sony Cameras. ARW are uncompressed are used for editing images.

.FXG

A graphics file format used in Illustrator and is a newer format. FXG must be under 16,777,216 pixels.

.PDF

Portable Document Format, was created by Adobe and is widely used for text and image formatting and is also used to save documentation. Also has the capability to do encryption and digital signatures.

.SVG (.SVGZ)

Scaled Vector Graphics, Is an Extensible Markup Language and use vector-based scaling. Uses a two-dimensional graphics and has the capability to do automation.

.EPS

Encapsulated PostScript, is a graphics file format and can be used for images and 2D vector graphics. Was used by photoshop but isn't supported anymore.

.BMP

Known as bitmap image files. Uses raster graphics image, but is old and isn't widely used.

.WMF

Windows Metafile, designed by Microsoft for vector scaled imaging and is similar to the SVG files. This is used in Word, PowerPoint, and Publisher.

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Image Compression And Export - JPG

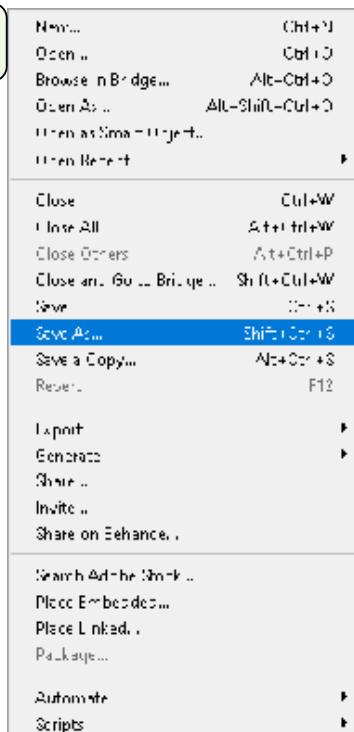
Save As JPG

A Exporting JPG using the save as feature inside photoshop, you will need to go to file>Save As...

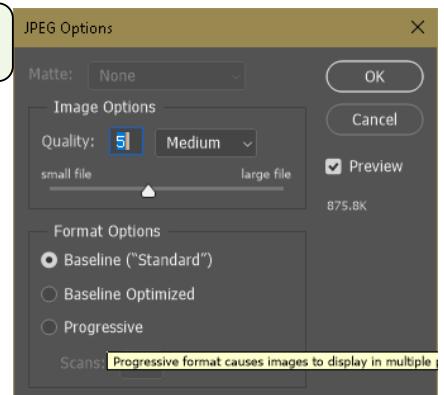
B A Box will appear with different setting Adobe has given to help make a decision compression size.

C File size Comparison based on settings.

A



B



C

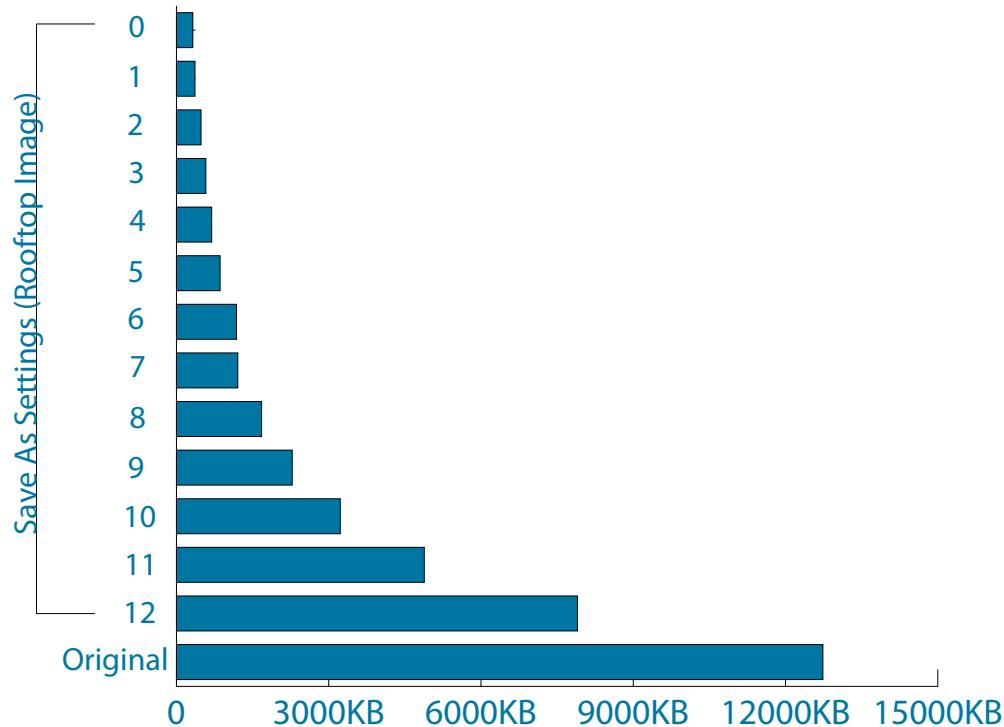


Image Compression And Export - JPG

Save As JPG

Below is an comparison of different Save As setting to see what ones start to pixelate when zooming in on the image.

There's not a big difference between the 8th and 12th setting but the file sizes are quite different.

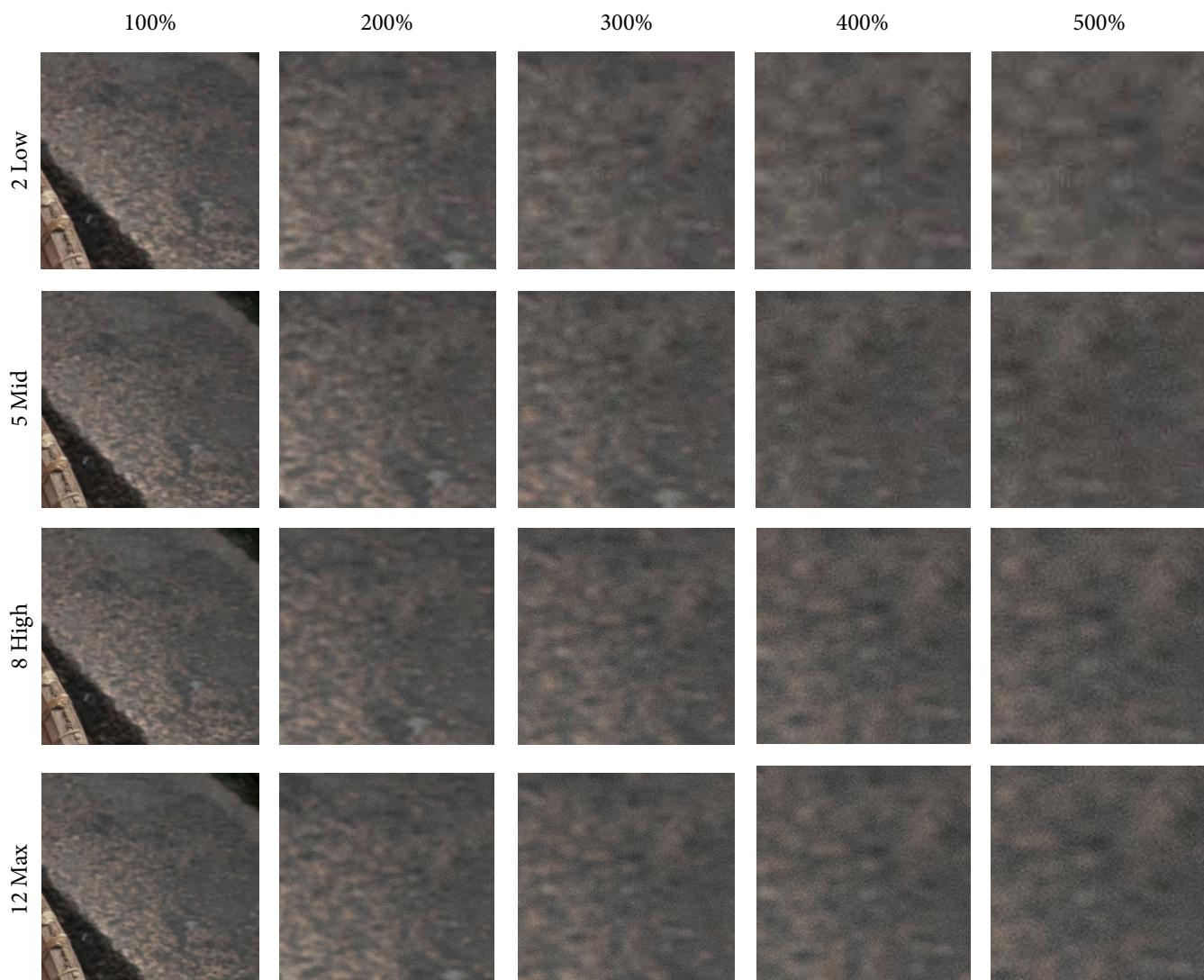


Image Compression And Export - JPG

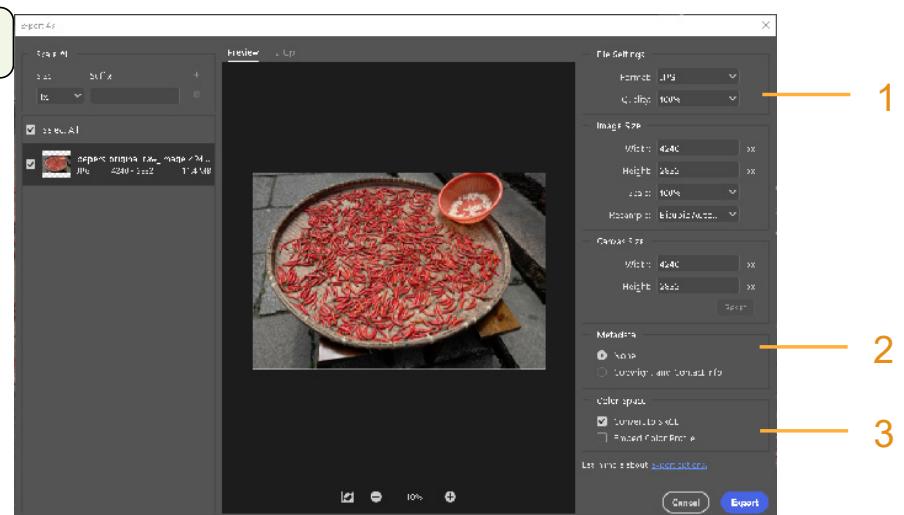
Export As JPG

A Exporting JPG using the Export As feature inside photoshop, you will need to go to File>Export>Export As

B When opening a box will appear with setting that can be altered.

B-1 Unlike Save As and Save For Web, you can adjust the quality from 0% - 100%

B-2 Leave metadata information about your project



B-3 Two option for changing the Color Space. One option converts to sRGB and the other will embed color profile.

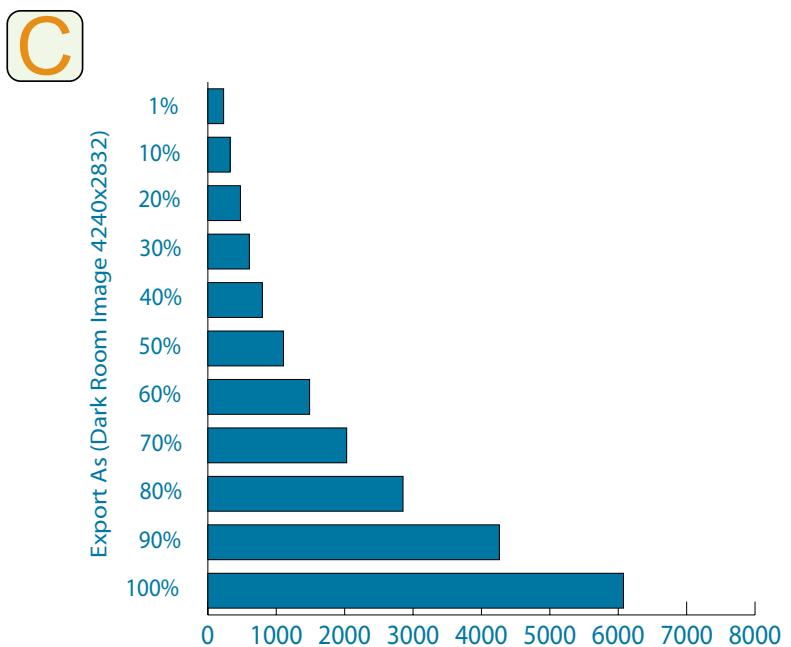
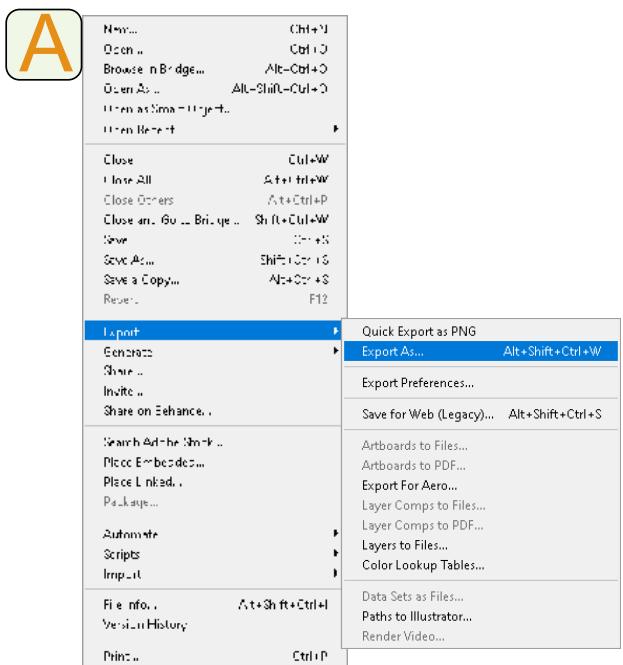
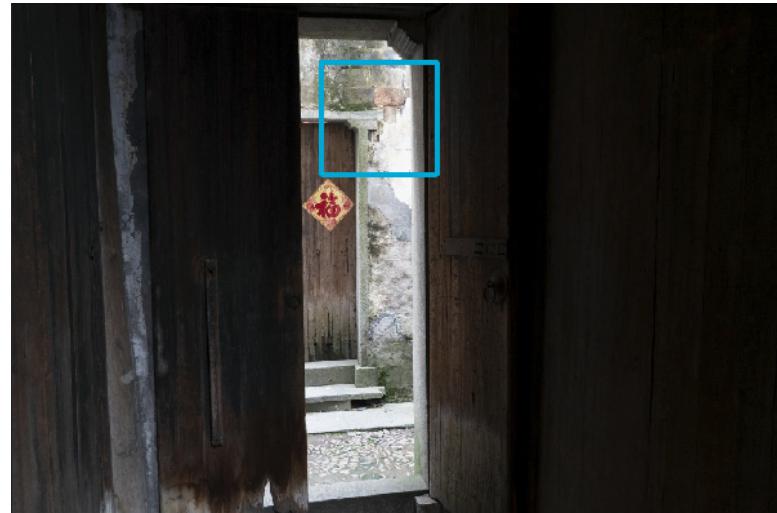


Image Compression And Export - JPG

Export As JPG

Below is an comparison of different Export As setting to see what ones start to pixelate when zooming in on the image.

There is a little pixelation in the 10% and 40% when zoomed in.



100%

200%

300%

400%

500%

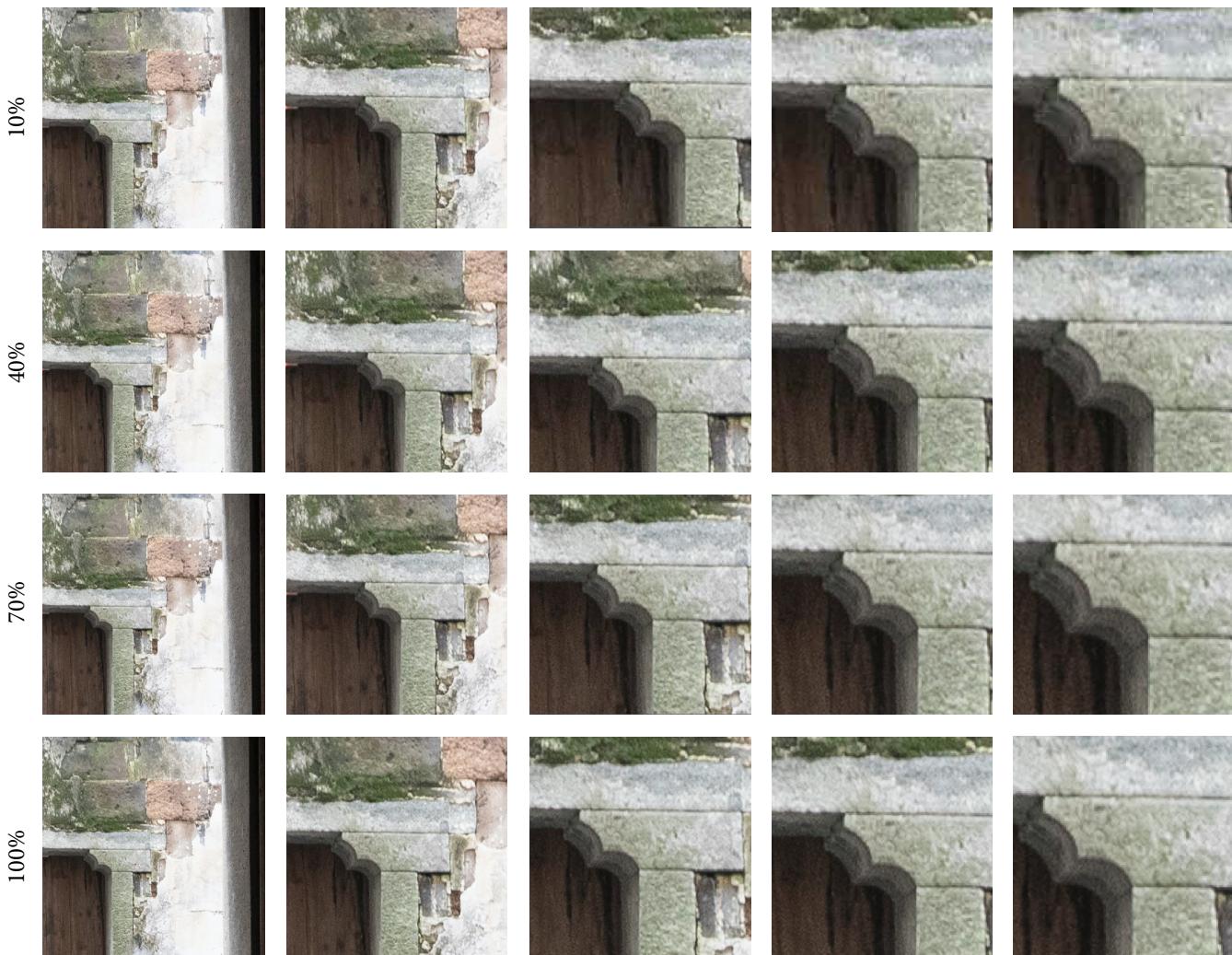


Image Compression And Export - JPG

Save For Web JPG

D Exporting JPG using the Save For Web feature inside photoshop, you will need to go to file>Export>Save For Web(legacy)

F When opening a box will appear with different setting you can customize your export.

F-1 There are three different compression setting for JPEG being Low, Medium, and High.

F-2 You can also compair the original version by selecting: Original, Optimized, 2-Up, 4-Up

F-3 Leave metadata information about your project

G Chart showing the difference between file sizes.

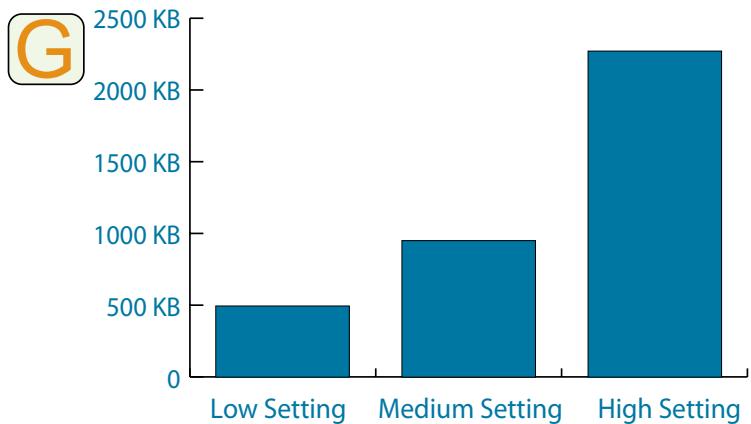
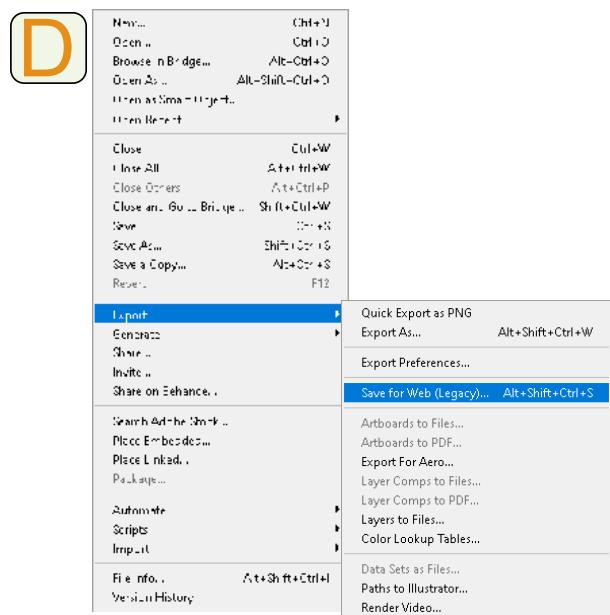
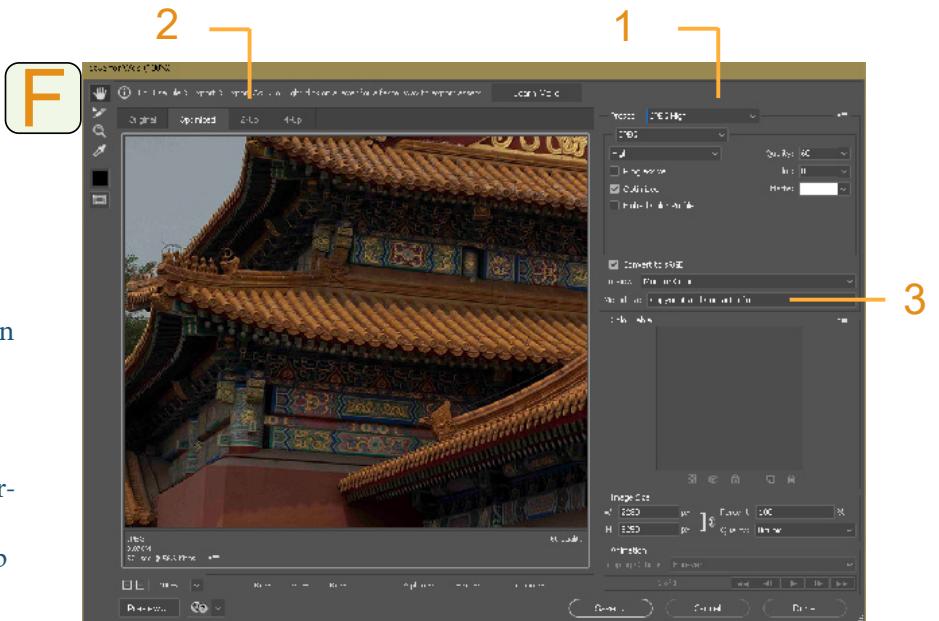


Image Compression And Export - JPG

Save For Web JPG

Below is an comparison of different Save For Web setting to see what ones start to pixelate when zooming in on the image.

When looking at the 500% zoomed in, You can definitely see the pixelation in

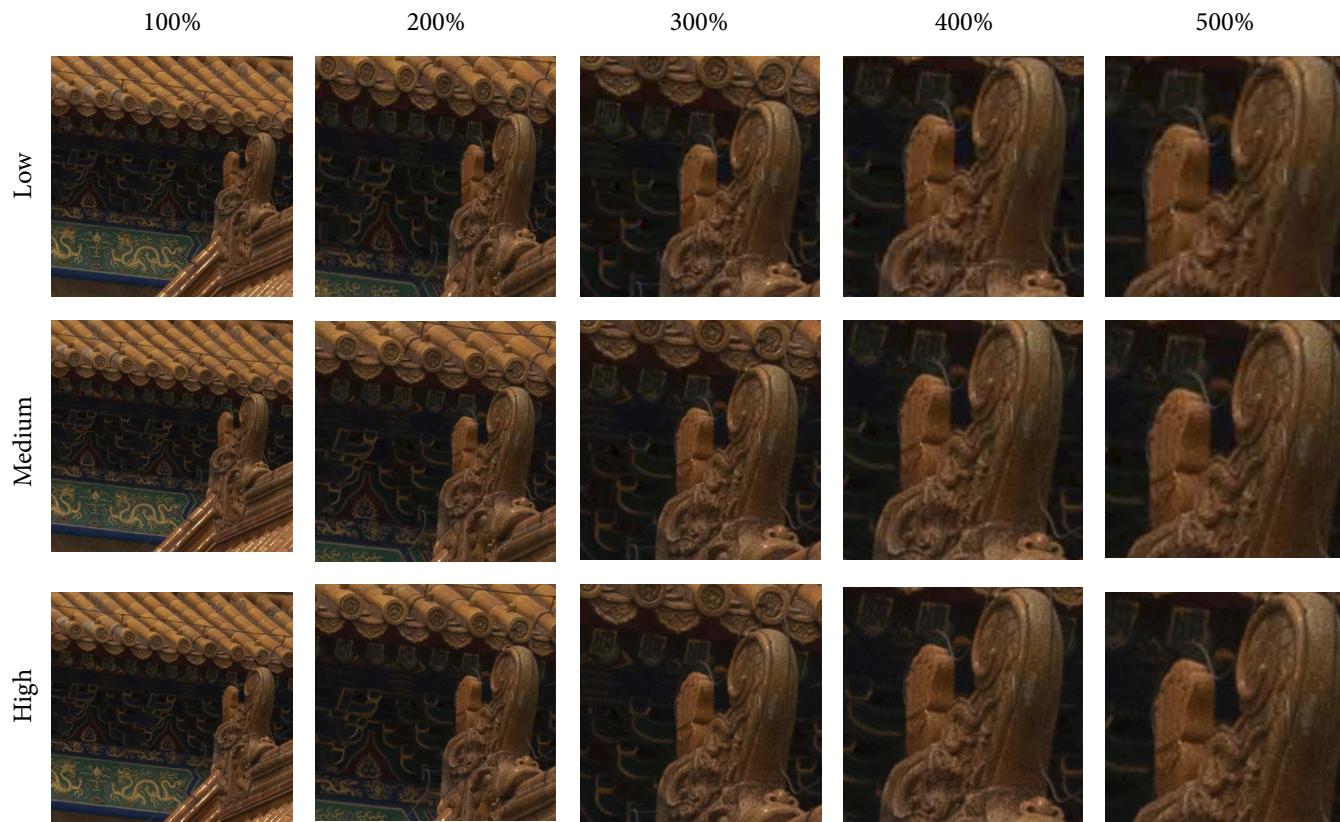
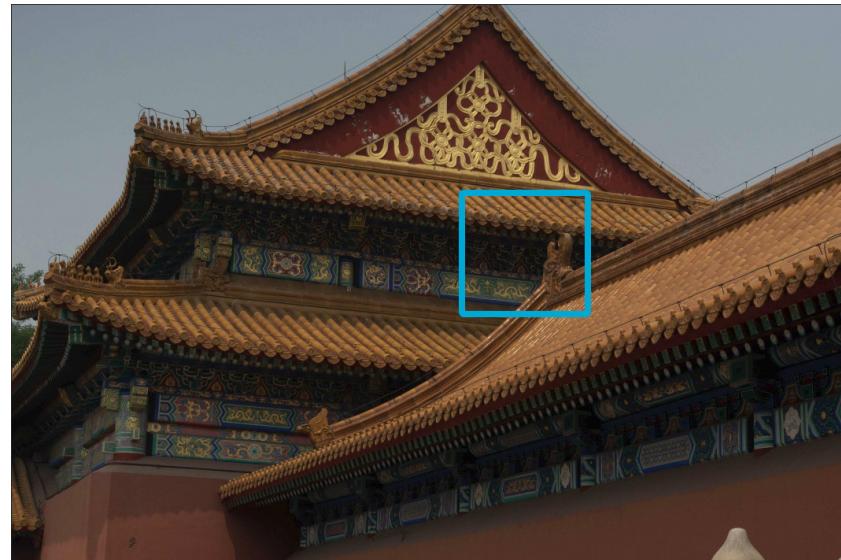


Image Compression And Export - JPG

Save As JPEG2000

D Exporting JPG2000 using the save as feature inside photoshop, you will need to go to file>Save As... and select the JPEG2000 from the dropdown menu.

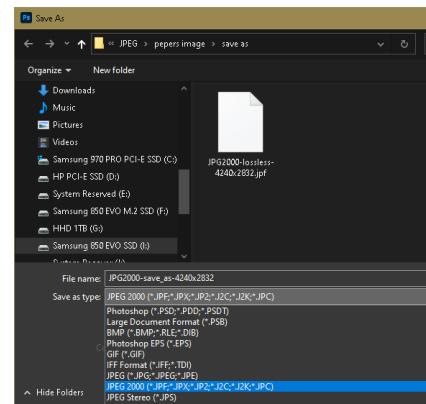
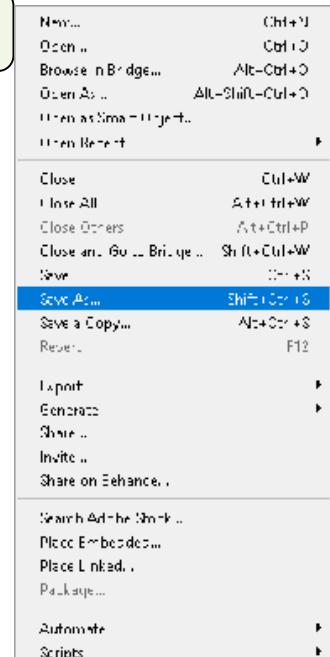
F A Box will appear with different setting Adobe has given to help make a decision compression size

F-1 Ajust the quality by choosing lossless or adjusting from 0% - 100%

F-2 Metatag and miscellaneous export settings

F-3 Optimazation settings. Can be enhance from 0 - 100.

D



F

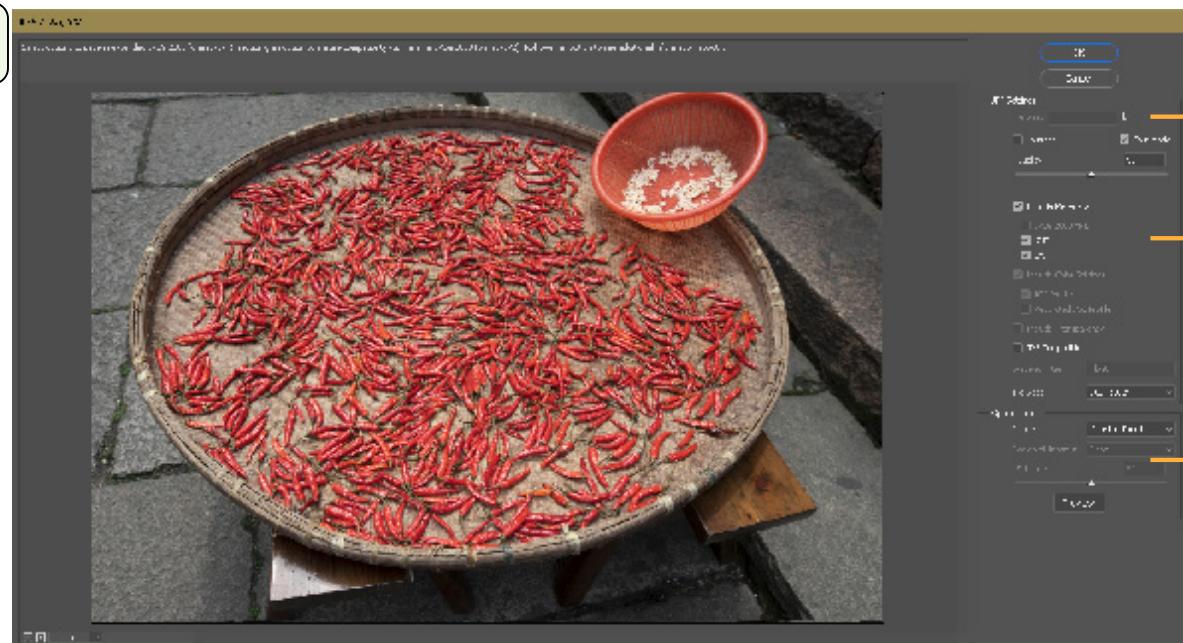


Image Compression And Export - JPG

Save As JPEG2000

Below is an comparison of different Save As setting to see what ones start to pixelate when zooming in on the image.

There is a big difference in pixelation when compairing the images zoomed at 500%. The 10% is definitely noticeable. I found that this is the hardest file to open with other software.



100%

200%

300%

400%

500%

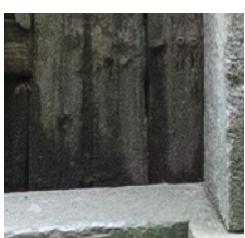
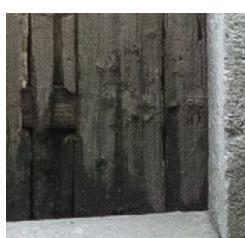
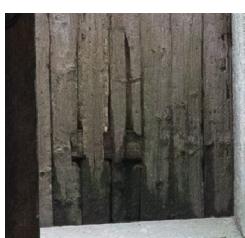
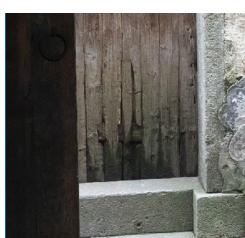
10%



50%



100%



Lossless

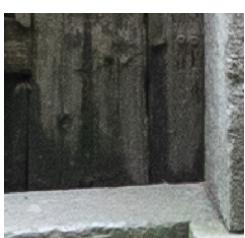
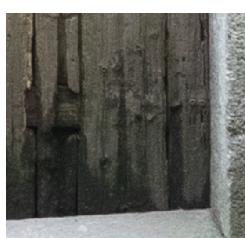
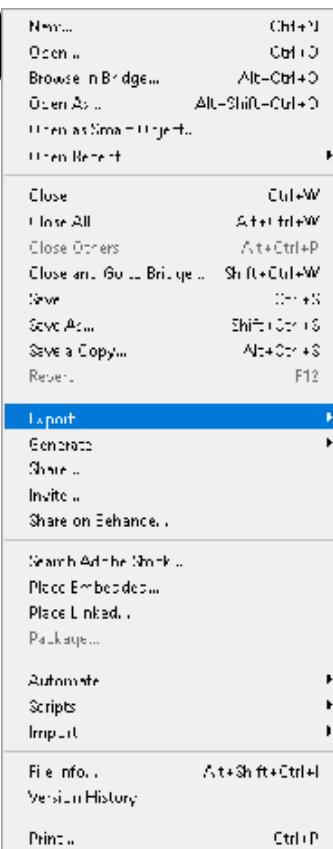


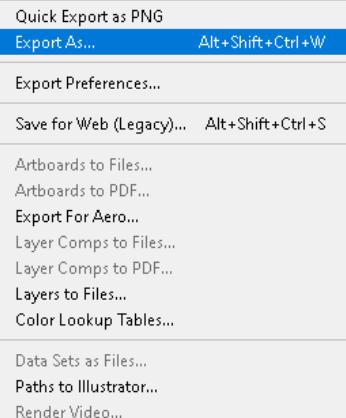
Image Compression And Export - PNG

Export As PNG

A Exporting as PNG using the [Export As](#) feature inside photoshop, you will need to go to file>Export>
Export As



Print... Ctrl+P

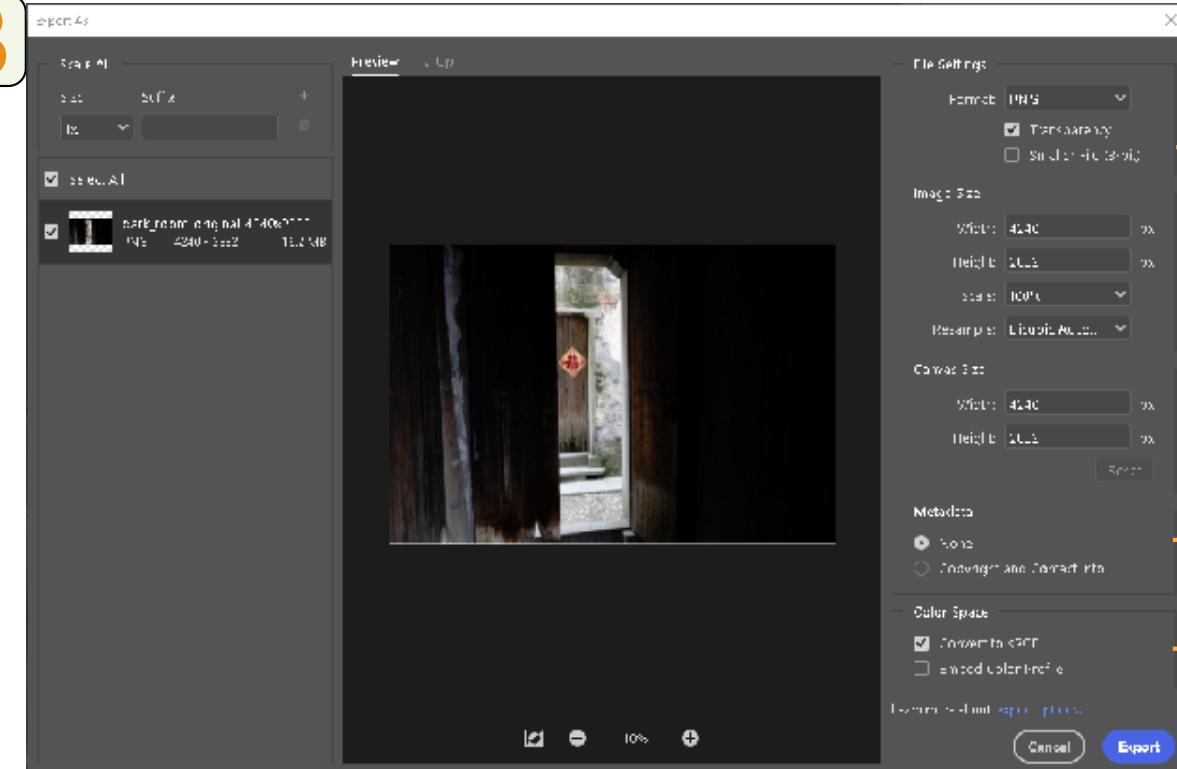


B When opening a box will appear with setting that can be altered.

B-1 There's not a lot of setting to adjust for quality. Only two check boxes for transparency and smaller file(8 bit)

B-2 Leave metadata information about your project

B-3 Two option for changing the Color Space. One option converts to sRGB and the other will embed color profile.



1

2

3

Image Compression And Export - PNG

Save As PNG

C Exporting JPG using the save as feature inside photoshop, you will need to go to file>Save As...

D A Box will appear with three different setting to chose from being large, medium, and small.

E File size Compairison based on settings.

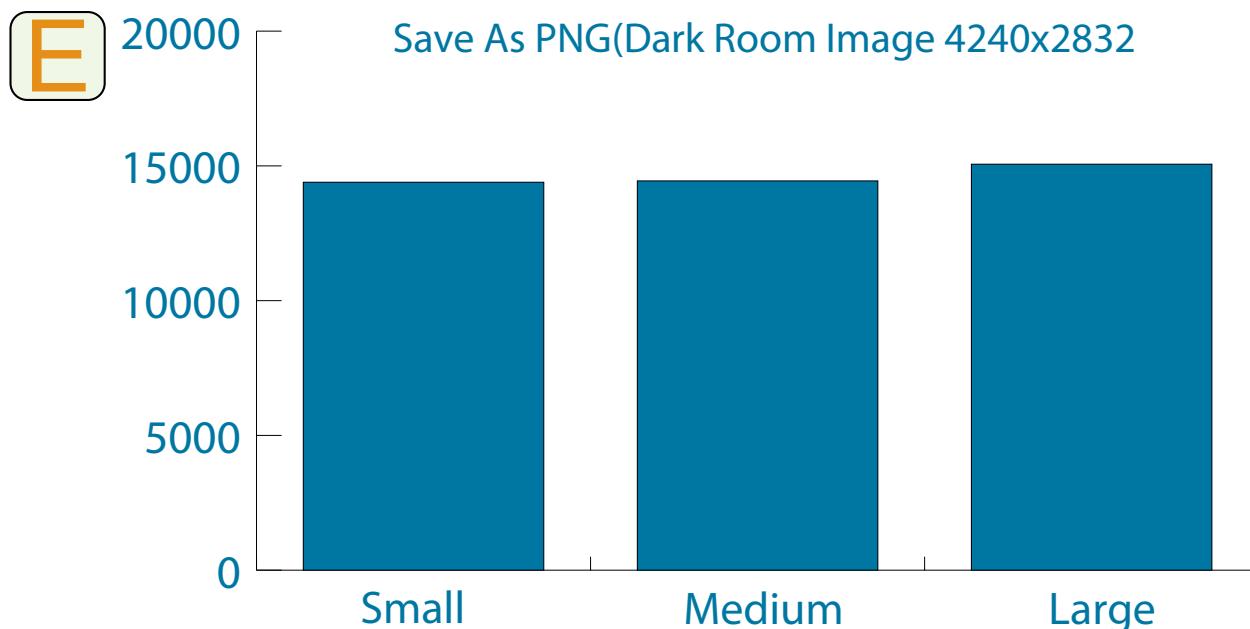
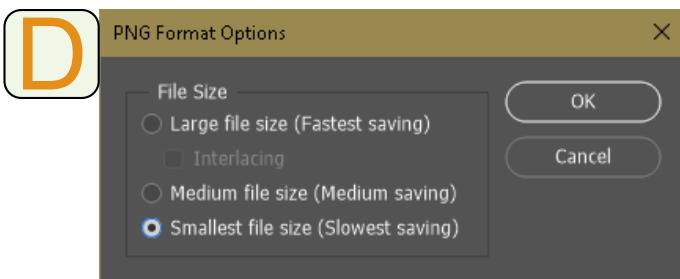
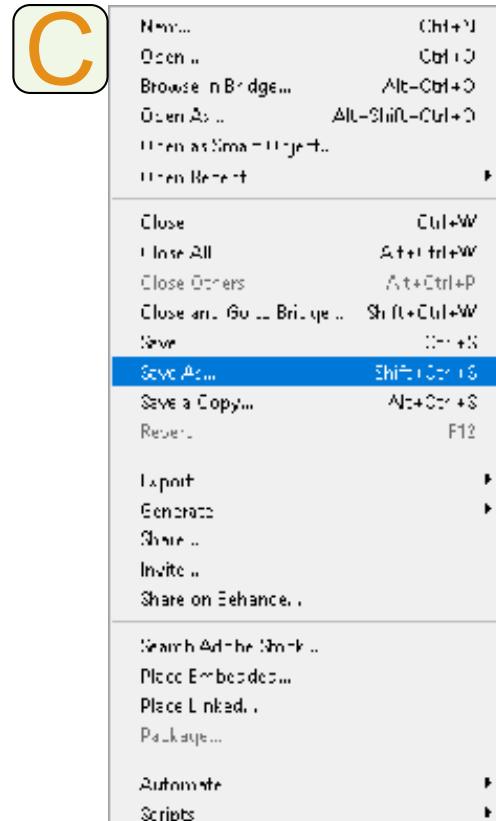


Image Compression And Export - JPG

Save As PNG

Below is an comparison of different Save As setting to see what ones start to pixelate when zooming in on the image for the PNG format.

It hard to tell a difference between these settings and the file sizes are not largely difference from one another.

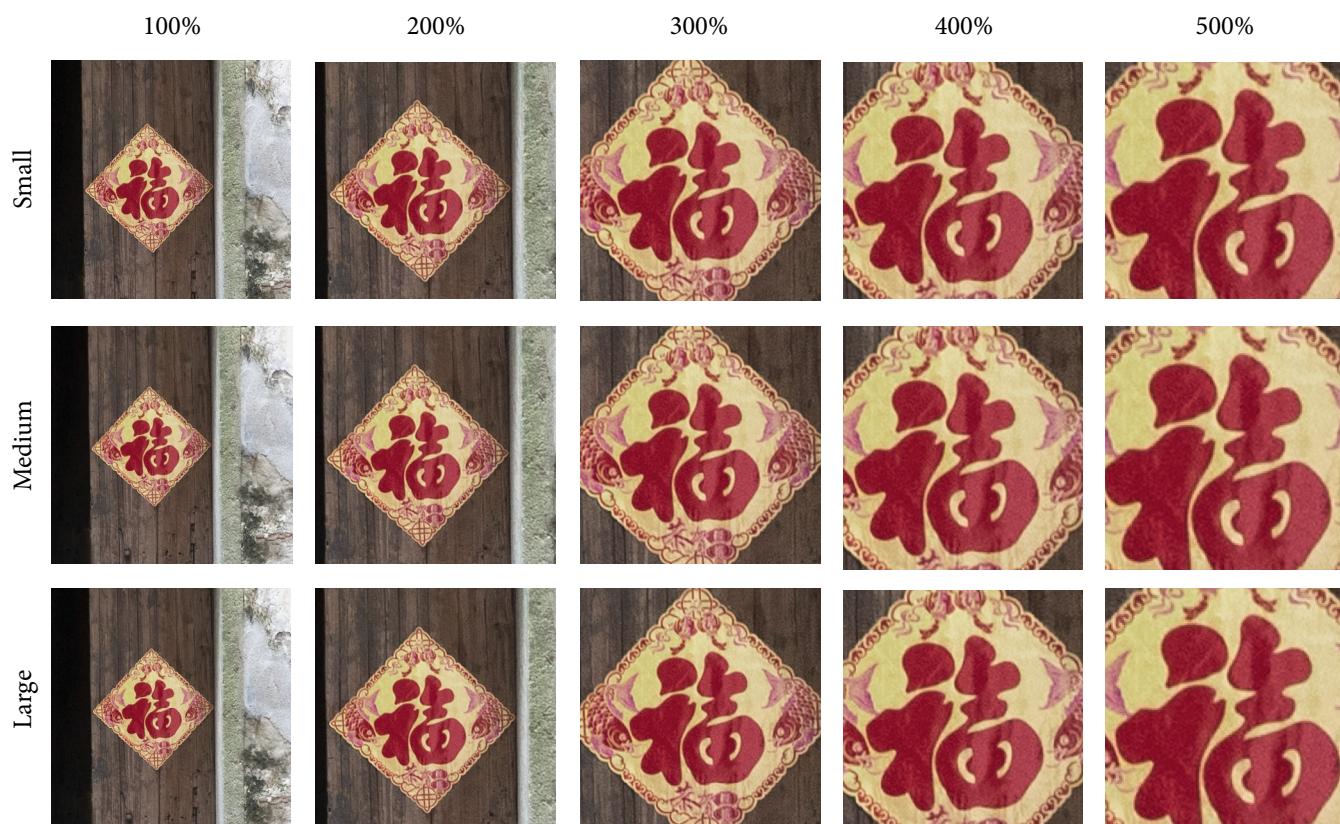


Image Compression And Export - GIF

Export As GIF

A Exporting as PNG using the Export As feature inside photoshop, you will need to go to [File>Export>Export As](#)

B When opening a box will appear with setting that can be altered.

B-1 Leave metadata information about your project

B-2 One option for changing the Color Space. Only converts to sRGB.

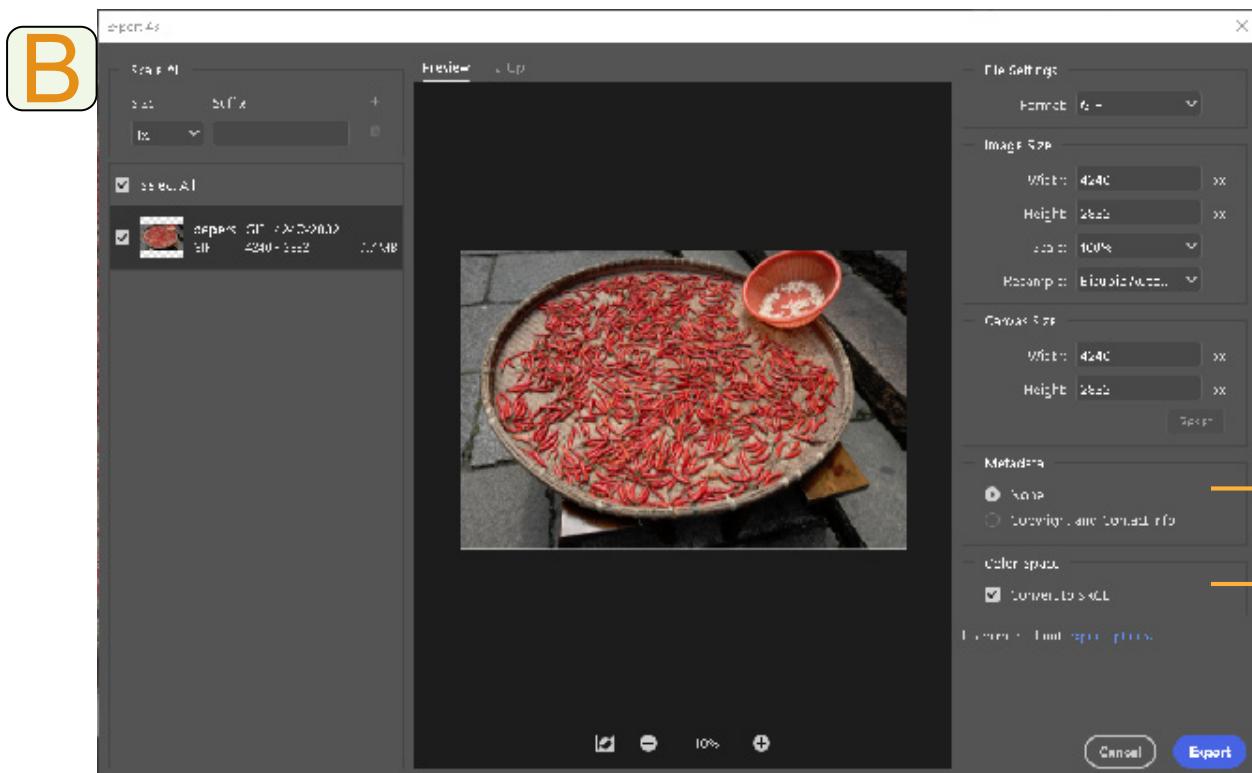
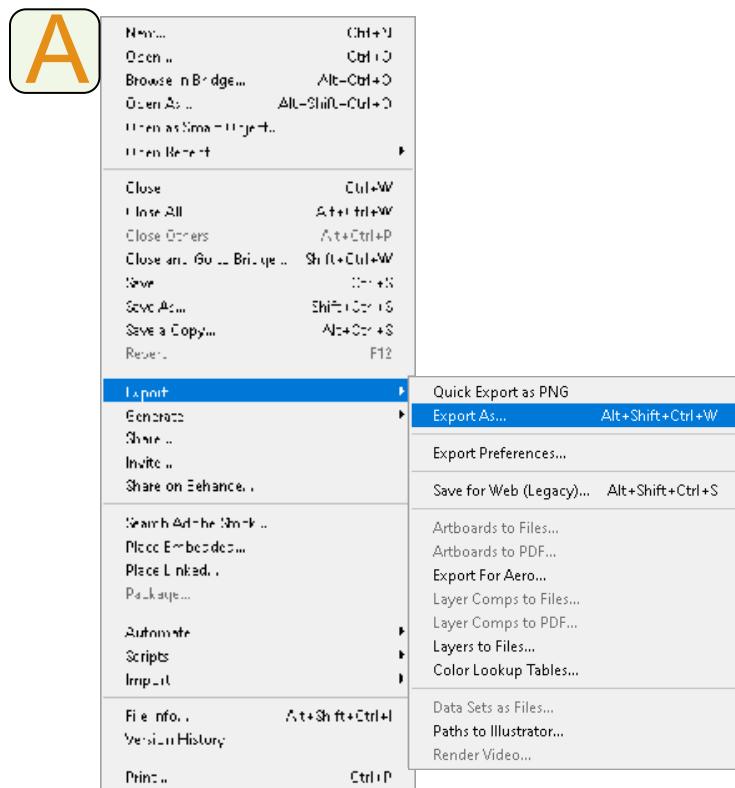


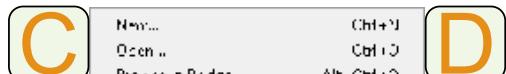
Image Compression And Export - GIF

Save As GIF

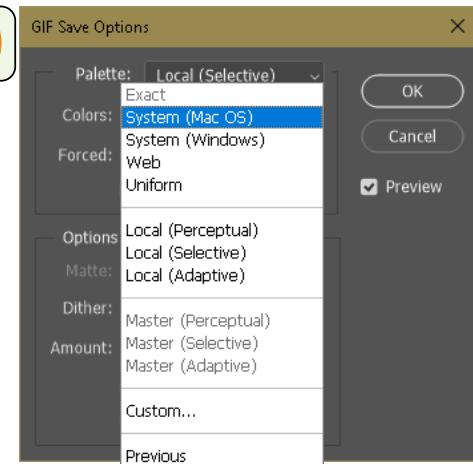
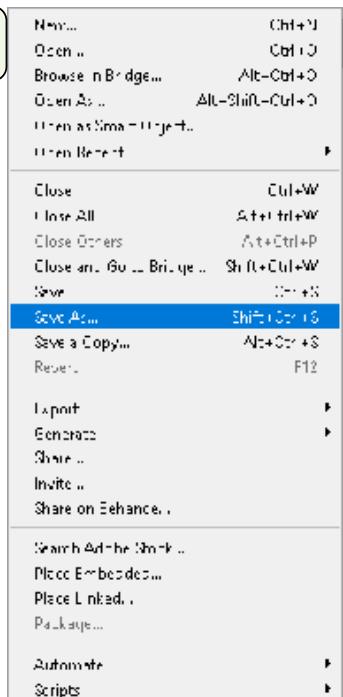
C Exporting PNG using the save as feature inside photoshop, you will need to go to [File>Save As...](#)



D A Box will appear with different setting when choosing a palette setting you get different options.



E File size Comparison based on settings.



Save As GIF(peper Image 4240x2832)

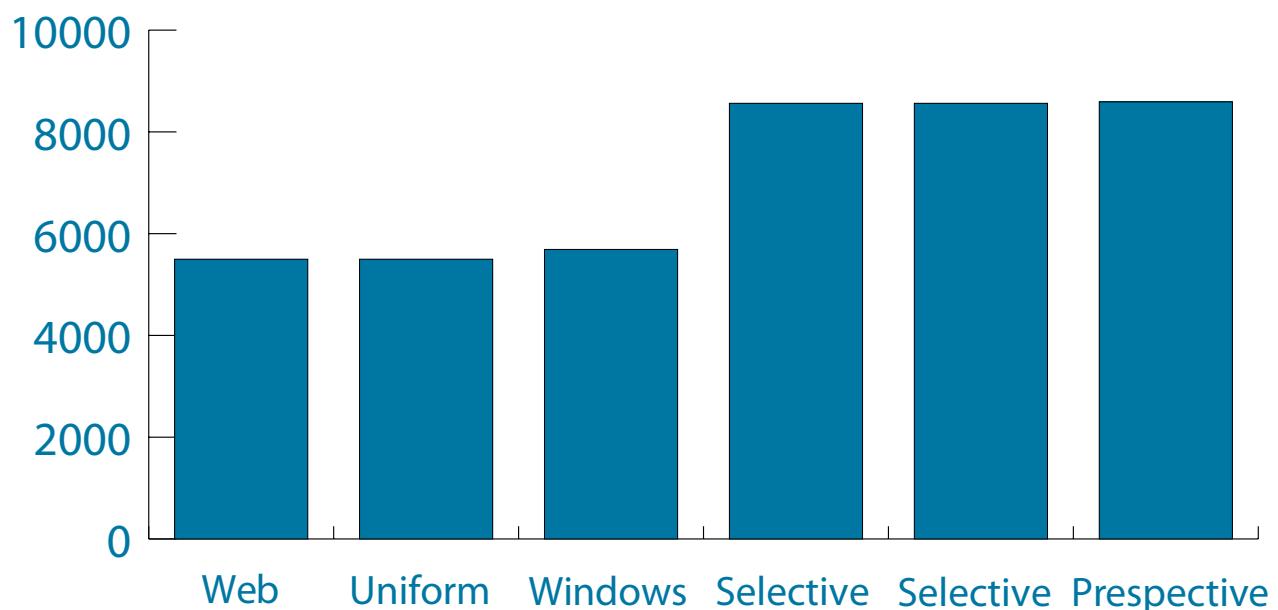


Image Compression And Export - GIF

Save As GIF

Below is an comparison of different export setting to see what ones start to pixelate when zooming in on the image.

This is also hard to tell a difference between these settings. I can tell a small difference in color but it's almost unnoticeable.

F



100%

200%

300%

400%

500%

Local (select)



local(preceptual)



local(adaptive)



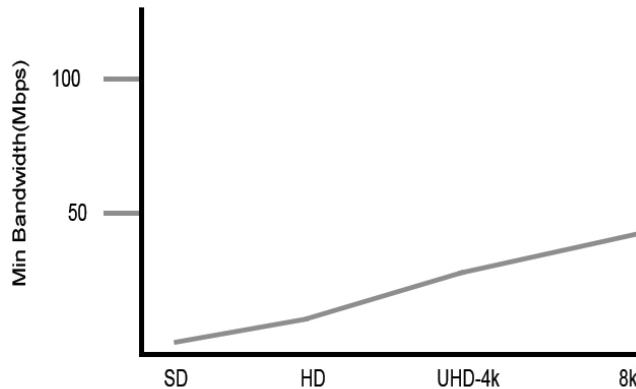
Video Compression

When watching a video, you are watching images flipping at a fast rate. The normal rate to which our eye is tricked into thinking that something is moving is 30 frames(pictures) a second and this standard speed and with higher frame rates comes better quality of the video. If the rate is less than 30, you might start noticing the video being not moving smoothly. On top of the frames you need audio playing at the same time. This can cause files to be quite large.

Compression

A way to shrink that file size is using Lossy and lossless compression. These use CODEC to compress and decompressing the files. Files Lossy Will take little parts of the video and audio out to compress the file size significantly reducing the size, but the parts taken out can't be recovered after deleted. With Lossless the parts that are taken out have similar parts that can be copied so nothing is deleted

that are specific to the file you are going to use.

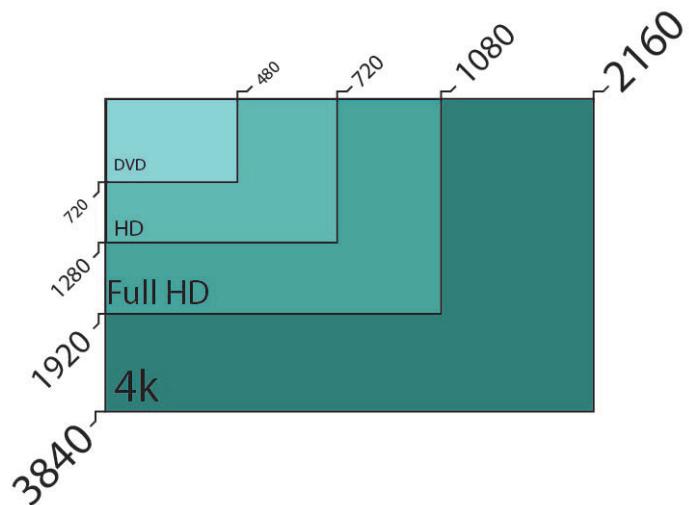


BandWidth

With most video services use streaming to let their members watch videos. Streaming needs to be fast enough to play the video/audio with the least amount of buffering time. A way to determine that is by Bandwidth. Bandwidth is used to measure the maximum rate of data transfer across time. If you Video file are large and it would take a lot of Bandwidth to stream it and cause problems if it's above the max.

Screen Resolution

Is the number of pixels a screen can show , both horizontally and vertically. The more pixels there are the higher the resolutions. Example, your viewing something on a 21" monitor with HD resolution and the same thing on a 15" monitor with HD resolution. Even though the 21" monitor is larger, it can't fix anything extra on it because the resolution is the same as the 15".



Video Compression

Formats

MPG

2K quality. Usually incorporate MPEG1 and MPEG2 compression.

MPEG2

Released in 1995. reads data at 15 Mbps with a bandwidth up to 40Mbps. (Extensions: mpg, .mpeg, .m2v, .mp3....)

MPEG4

Released in 1999 as a Digital Media Container format that can store audio, video, image, text separately. The most used type of format for video. Bandwidth around 64kbps (Extensions: mp4, .m4a, .m4b, .m4r, m4v....)

MPEG-H

Is going to replace MPEG-4 and is a new type of codec for video(HEVC) and 3D surround sound audio.

H.264

2.5K 1440p QHD, Most used format on blue ray.

H.265

UHD 4K Also has the smart ability to change frames to make it so the video runs smooth on when having low data.

MOV

Similar to the MPEG4 format. Developed by Apple for the QuickTime program. Stores audio video and text separately. .

WEBM

Googles version of MPEG4

AVI

Audio Visual Interleave, like the MP4 stores audio video and text separately. Supported by windows programs. Popular choice for being played on big screens.

AVI

Audio Visual Interleave, like the MP4 stores audio video and text separately. Supported by windows programs. Popular choice for being played on big screens.

FLV

Same as H.264. Is an Adobe Flash File that is less commonly used now. Works with VLC and Windows Media Player.

M4V

Same as H.264. Developed by Apple and is an extension for MPEG4. The big difference is it can be protected by DRM copy Protection.

M4A

Same as H.264. Developed by Apple and is an extension for MPEG4. The big difference is it can be protected by DRM copy Protection.

AAC

Is currently used in Blu-ray audio and will allow 10.1 channels.

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Video Streaming

NetFlix



that started first by being a DVD rental mailing company that transitioned into an online video streaming service company that has 200 million subscribers at the end of 2020. Prices starts at \$8.99 a month for the basic membership and \$13.99 for their Ultra HD.

Video Formats

H.264(AVC), VC-1, H.263, H.265(HEVC)

Audio Formats

Dolby Digital, Dolby Digital Plus, ACC, Ogg Vorbis

Platforms

Streaming Media Players, Smart TV, Smart Phones/Tables, PC, Set Top Box, Blue-Ray Player, Game Consoles

Data rates

Low: 0.3 GB/hr

Medium(standard): 0.7GB/hr

High: 3GB/hr normal subscription and 7GB/hr Ultra HD subscription

Data usage per screen

Auto

Default video and audio quality, and data usage

Low

Basic video and audio quality, up to 0.3 GB per hour

Medium

Standard video and audio quality, up to 0.7 GB per hour

High

Best video and audio quality, up to 3 GB per hour for HD, 7 G

Save

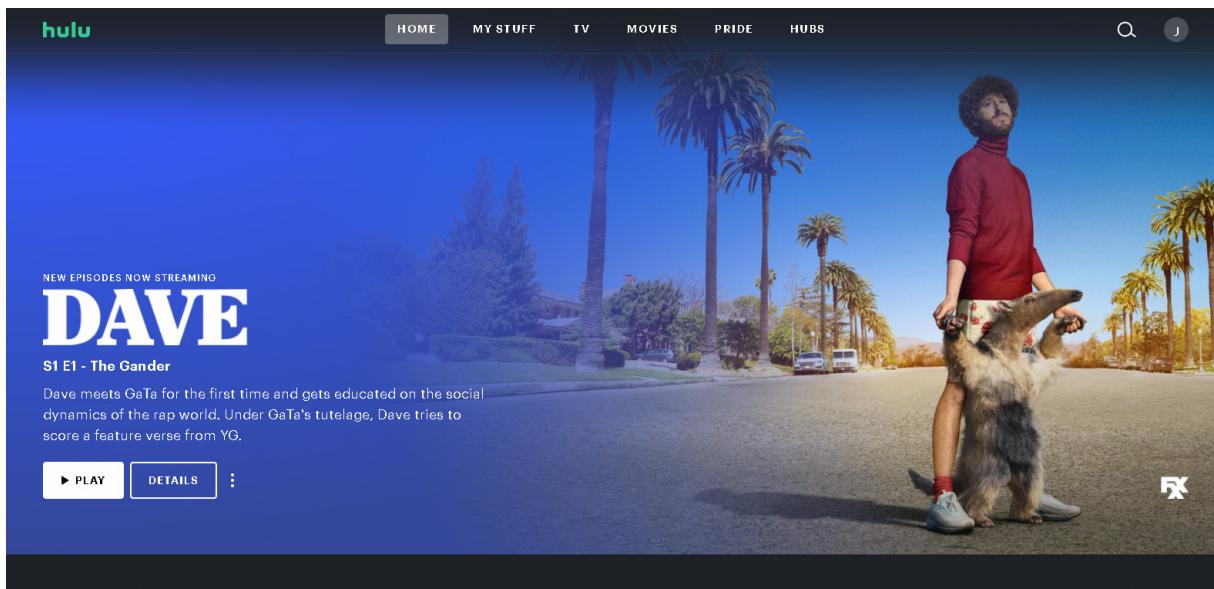
Cancel

Investigation

When watching in auto the quality was decent with little to no interruptions. I found out that Netflix might take up to 8 hours for setting changes to take effect so I couldn't watch in different settings. Auto setting the default setting and that's what I watch my show on. When the picture was a little dark, I noticed a little pixilation. Also, some parts of the show had more pixilation than others probably because of internet speed.

Video Streaming

Hulu



Hulu is an online video streaming service company owned by The Walt Disney Company. There are 41.6 million subscribers between 2019-2021. Prices starts at \$5.99 a month for Hulu with Ads, \$11.99 no Ads, \$64.99 for Hulu with Ads and live TV, and \$70.99 for Hulu Without Ads and live TV.

Video Formats

H.264(AVC), H.265(HEVC)

Audio Formats

Dolby Digital Plus 5.1

Platforms

Streaming Media Players, Smart TVs, Smart Phones/Tables, PC, Set Top Box, Casting devices, Game Consoles

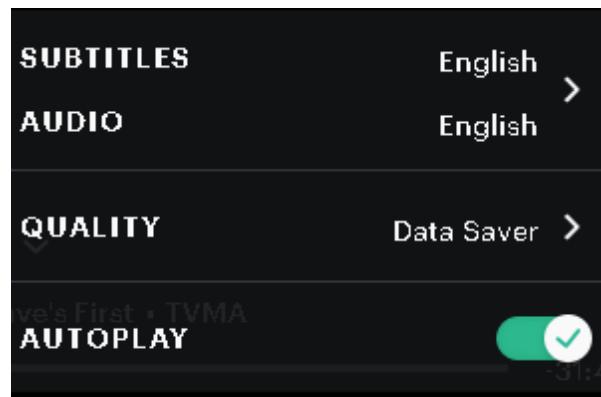
Data rates

Standard Definition: 1.5 Mbps

HD 720p: 3Mbps

HD 1080p: 6Mbps

4K Ultra HD: 16Mbps

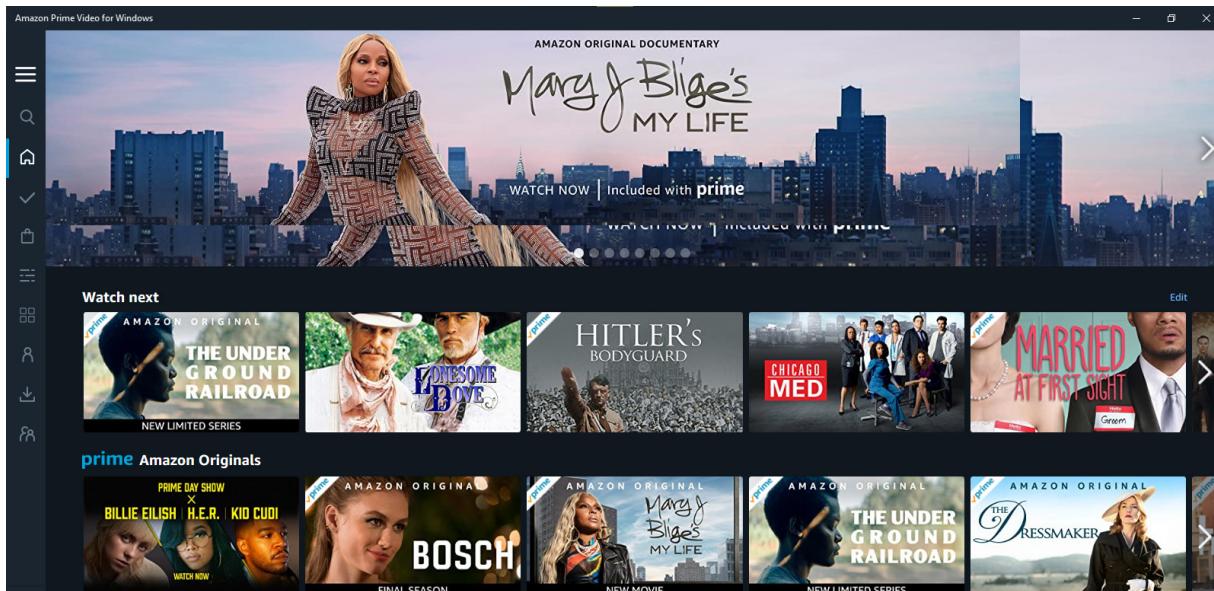


Investigation

When watching I could only find two setting and they were best Available and Data Saver at first. When changing between them I did not really notice any difference. Out of the three different streaming companies I investigated, Hulu had the least amount of setting to adjust your quality.

Video Streaming

Prime Video



Amazon started as an online bookstore in 1994 and expanded from book to everything else and became one of the world's top online shopping services. In 2006 Amazon introduced video streaming and named it Prime Video in 2008. Price for subscription is \$12.99 a month which includes a membership to prime shipping.

Video Formats

H.264(AVC), H.265(HEVC), Pro-Res 422, MPEG-2

Audio Formats

AC-3, AAC that supports 5.1 surround sound

Platforms

Smart Phones/Tablets, PC, Set Top Box, Blue-Ray Player

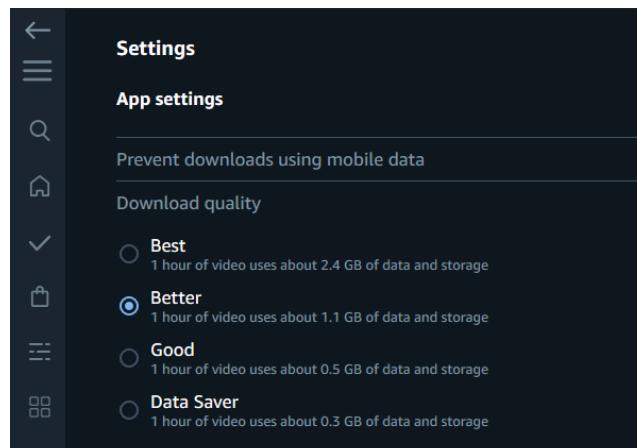
Data rates

Best: 1.82 GB/hr

Better: 0.72 GB/hr

Good: 0.18 GB/hr

Data Saver: 0.12GB/hr



Investigation

When watching on prime video the quality was nice with little to no interruptions. The even in Data Save setting there was very little pixilation. When watching in Best setting the video quality difference was noticeable from the Data Save setting, but I had two instance where the video stopped for buffering due to my internet speed being too low.

Conclusion

Audio

In conclusion, there is a large amount of different audio File types and they can differ in sizes. Audio files use lossy or lossless compression. By having smaller file sizes using lossy compression can reduce the quality of the audio.

Image

In conclusion, when converting to digital Images uncompressed images are large in size. Different formats were made to compress the image to save on file size. There are different image file formats that are used for certain applications and can vary based on what the image is being used for.

Video

In conclusion, Video files are very large and take up a lot of file space. With almost all video services using streaming you need to be aware about how large the video file is. Different formats were created to compress the size while trying to keep the original quality. It's important to understand what the differences are between the formats to help decide what to use for what application.

