

Color Palettes

Palettes are mathematical tables that define the color of a pixel displayed on the screen. The most common palettes are 1, 4, 8, 16, and 24 bits deep:

Color Depth	Colors Available
1-bit	Black and white (or any two colors)
4-bit	16 colors
8-bit	256 colors (good enough for color images)
16-bit	Thousands of colors (65,536; excellent for color images)
24-bit	More than 16 million colors (16,777,216; totally photo-realistic)

1. When color monitors became available for computers, managing the computations for displaying colors severely taxed the hardware and memory available at the time. 256-color, 8-bit images using a color lookuptable or palette were the best a computer could do.
2. 256 default system colors were statistically selected by Apple and Microsoft engineers (working independently) to be the colors and shades that are most “popular” in photographic images.
3. Two system palettes are, of course, different.
4. Web authorities also decided on a palette of 216 “web-safe” colors that would allow browsers to display images properly on both Macintosh and Windows computer.
5. GIF files using 256-color palettes are saved in a lossless format. The PNG format also uses palettes (24-bits or 32 bits if an

“alpha” mask is included for transparency), and is lossless. It was developed for the Internet(it supports only the RGB color space) to expand GIF’s limited 256 colors to millions of colors.

6. In 24-bit color systems, your computer works with three channels of 256 discrete shades of each color (red, green, and blue) represented as the three axes of a cube. This allows a total of 16,777,216 colors ($256 \cdot 256 \cdot 256$).

Image File Formats

- Most applications on any operating system can manage JPEG, GIF, PNG, and TIFF image formats.
- An older format used on the Macintosh, **PICT** (for Picture), is a complicated but versatile format developed by Apple where both bitmaps and vector-drawn objects can be used.
- The **device-independent bitmap (DIB)**, also known as a **BMP**, is a common Windows palette-based image file format similar to PNG. (Portable network Graphics)
- **PCX** files were originally developed for use in Z-Soft MS-DOS paint packages; these files can be opened and saved by almost all MS-DOS paint software and desktop publishing software.
- **TIFF**, or Tagged Interchange File Format, was designed to be a universal bitmapped image format and is also used extensively in desktop publishing packages.
- Adobe creates a PSD file for Photoshop and an AI file for Illustrator; Corel creates a CDR file(Coreldraw).
- **DXF** was developed by AutoDesk as an ASCII-based drawing interchange file for AutoCAD, but the format is used today by many computer-aided design applications.

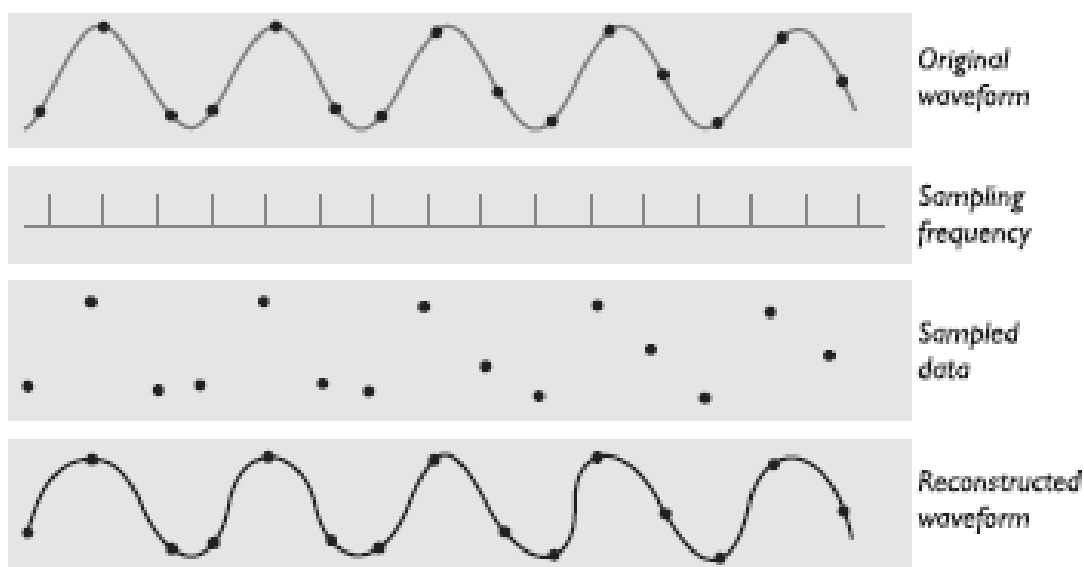
- **IGS** (or **IGES**, for **Initial Graphics Exchange Standard**) was developed by an industry committee as a broader standard for transferring CAD drawings. These formats are also used in 3-D rendering and animation programs.
- JPEG, PNG, and GIF images are the most common bitmap formats used on the Web and may be considered cross-platform, as all browsers will display them.
- Adobe's popular PDF (Portable Document File) file manages both bitmaps and drawn art (as well as text and other multimedia content).

Unit 4 -SOUND

Digital Audio

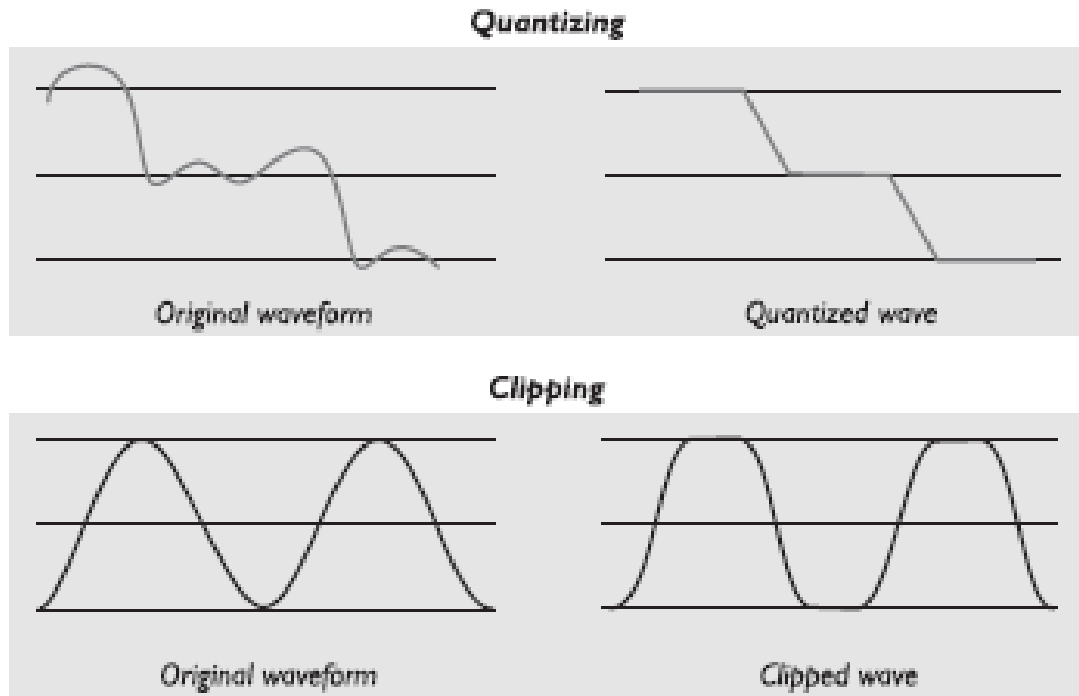
- **Digital audio** is created when you represent the characteristics of a sound wave using numbers—a process referred to as digitizing.
- You can digitize sound from a microphone, a synthesizer, existing recordings, live radio and television broadcasts, and popular CD and DVDs or from any natural or prerecorded source.
- Digitized sound is sampled sound. Every n th fraction of a second, a **sample** of sound is taken and stored as digital information in bits and bytes.
- The quality of this digital recording depends upon how often the samples are taken (**sampling rate** or frequency, measured in kilohertz, or thousands of samples per second) and how many numbers are used to represent the value of each sample (**bit depth**, **sample size**, resolution, or dynamic range).

- The more often you take a sample and the more data you store about that sample, the finer the resolution and quality of the captured sound when it is played back.
- Since the quality of your audio is based on the quality of your recording and not the device on which your end user will play the audio, digital audio is said to be **device independent**.
- The three sampling rates most often used in multimedia are 44.1 kHz (**CD-quality**), 22.05 kHz, and 11.025 kHz.
- Sample sizes are either 8 bits or 16 bits.
- The larger the sample size, the more accurately the data will describe the recorded sound. An 8-bit sample size provides 256 equal measurement units to describe the level and frequency of the sound in that slice of time.
- A 16-bit sample size, on the other hand, provides a staggering 65,536 equal units to describe the sound in that same slice of time frequencies, and each discrete sample is then stored either as 8 bits or 16 bits (or more) of data.



The value of each sample is rounded off to the nearest integer, This is called **quantization**.

and if the amplitude is greater than the intervals available, clipping of the top and bottom of the wave occurs.



Quantization can produce an unwanted background hissing noise, and clipping may severely distort the sound.

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