1. **What is an Encoding format List down encoding formats for various types of data  ( Text, Number, Photo, Audio, Video).**
2. An Encoding is the process of converting data from one format to another for storage, transmission, or processing. It's like translating information into a language that computers can understand.

**Encoding Formats for Different Data Types**

**Text Encoding**

* **ASCII:** American Standard Code for Information Interchange, used for English characters.
* **UTF-8:** Unicode Transformation Format-8, most commonly used for representing text in websites and applications.
* **UTF-16:** Unicode Transformation Format-16, used for languages with larger character sets.
* **ISO-8859-1:** Latin-1, used for Western European languages.

**Real-World Applications of Text Encoding**

* **Web pages:** UTF-8 is the standard for representing text in HTML, allowing for the display of characters from various languages.
* **Email:** Text-based emails often use ASCII or UTF-8 encoding.
* **Document formats:** Text documents like .txt, .doc, and .pdf use specific text encodings.

**Number Encoding**

* **Integer:** Stores whole numbers (e.g., int, long, short).
* **Floating-point:** Stores real numbers with decimal points (e.g., float, double).
* **Fixed-point:** Represents fractional numbers with a fixed number of decimal places.
* **Binary Coded Decimal (BCD):** Represents decimal digits using binary code.

**Applications of Number Encoding**

* **Scientific calculations:** Floating-point numbers are essential for precise calculations in fields like physics and engineering.
* **Financial data:** Fixed-point numbers are often used for currency values to avoid rounding errors.
* **Image processing:** Numbers represent pixel values in image formats.

**Image Encoding**

* **JPEG:** Joint Photographic Experts Group, lossy compression for photographs.
* **PNG:** Portable Network Graphics, lossless compression for images with transparent backgrounds.
* **GIF:** Graphics Interchange Format, supports animation and transparency, but often limited color palette.
* **BMP:** Bitmap, uncompressed image format.
* **TIFF:** Tagged Image File Format, supports various image types and compression methods.

**Real-World Applications of Image Encoding**

* **Digital photography:** JPEG is widely used due to its efficient compression, while PNG is preferred for images with transparent backgrounds.
* **Medical imaging:** TIFF is often used for storing medical images like X-rays and MRIs.
* **Web graphics:** GIF and PNG are popular for web-based graphics.

**Audio Encoding**

* **MP3:** MPEG-1 Audio Layer 3, lossy compression for music.
* **AAC:** Advanced Audio Coding, often used for higher quality audio.
* **WAV:** Waveform Audio File Format, uncompressed audio format.
* **FLAC:** Free Lossless Audio Codec, lossless compression for audio.

**Real-World Applications of Audio Encoding**

* **Music streaming:** MP3 and AAC are commonly used for streaming music due to their balance of quality and compression.
* **Audio production:** WAV and FLAC are preferred for high-quality audio recordings and production.
* **Voice communication:** Various codecs are used for voice calls and video conferencing.

**Video Encoding**

* **H.264/AVC:** Advanced Video Coding, widely used for video compression.
* **HEVC/H.265:** High-Efficiency Video Coding, newer standard offering better compression.
* **VP9:** Open-source video codec developed by Google.
* **AV1:** Royalty-free video codec with improved compression efficiency.

**Real-World Applications of Video Encoding**

* **Online video streaming:** H.264 is widely used for platforms like YouTube and Netflix.
* **Video conferencing:** H.264 and VP9 are common choices.
* **Video editing:** High-quality codecs like ProRes or DNxHD are used for professional video production.

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