

Preliminary research for a final project

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Abstract

With the advancement of technology, new malware technologies and ways to carry out attacks are emerging. MP4 is the most common video file format due to the fact that it provides high-quality video in a relatively small size compared to other video formats, and provides lossless compression after editing and re-saving the files. Video files are not generally considered malicious file types, but it is possible for malware to be embedded in a video file or disguised as a video file. Therefore, MP4 is considered a good candidate for embedding video malware. This paper will deal with the presentation of the various ways in which the use of video, in particular in the MP4 format, has been used to introduce malware, and the presentation of a learning machine designed to detect malware in video.

1 INTRODUCTION AND RELATED BACKGROUND

MP4 is a container file format that allows multiple data streams to be embedded in a single file and is extensible, meaning it does not define a strict structure and allows a custom structure and hierarchy for each media type. The data in an MP4 file is divided into two parts: (1) the media-related data: includes streams of video, audio, and subtitles; (2) metadata: specifies information about the original data which assists in identifying the nature and features of that data and making it easier to use, search, and manage the video such as flags, timestamps, bit rate and so forth.

The structures in MP4 are typically referred to as atoms or boxes and no data is outside a box. Atoms (or boxes) are data within the video file container that contain specific information about the parameters of the video file. These are descriptive atoms and are not the actual media data. Minimum atom size is 8 bytes as first 4 bytes specify size of the atom and next 4 bytes specify its type. There is a convention that the first box in an MP4 file is an ftyp box. ftyp box, identifying itself as an MP4 and providing additional compatibility

information - information about the file type, description, and the common data structures used. After the ftyp box usually comes a moov box, containing metadata organized in a nested structure of other - a few trak boxes which provide reference information for interpreting the encoded data streams. The trak including in addition offset information into the rest of the file (like pointers to a video player) about where the encoded streams can be found. The actual encoded bitstreams are, in turn, contained within the following mdat box , containing the audio or video payload.

In order to embed a malicious payload in MP4, you can try to use steganography . Steganography is the process of secretly embedding information inside a data source without changing its perceptual quality so it is difficult for the human eye to detect the hiding of information. The most common use of steganography is to hide information that can be a file, malicious code, message, image or video and usually converts them to alternative equivalent multimedia files such as images, video or audio. There are many attacks that exploit the structure of mp4 to carry out attacks. One of the possibilities to carry out an attack [8] is to use a new technique to insert the information into The mp4 video files. This technique is based on changing the GOP (group of pictures) structure and exchanging the streams in the video file. Other options include data hiding methods based on audio and video synchronization in the MP4 container [6] or method for data hiding in video by utilizing the least significant bit (LSB) method [13]. We will want to detect the introduction of malware using different detection methods to train our learning machine and make it recognize when a video file contains a malicious file.

2 RELATED WORK

There are many different ways to insert malicious code into a video, as a result different methods have been developed to detect them. We will first present works for methods of introducing malicious code and then methods for detection. The simplest method is to hide the data in the Least Significant Bits (LSB). [13] [12] Both presented a technique by utilizing the least significant bit (LSB) method. The first also used Using Knight Tour Algorithm while the second was based on Hash function. Another method [10] of embedding into a file used a random number generator function in a method called random pixel embedding to hide secret text over a video file. In addition, there is a method that called TCStego [9]. One of the latest weapons is a new technology that combines the power of TrueCrypt® (one of the best known and easy to use encryption programs) with a steganography twist. This latest advancement hides a TrueCrypt container inside an existing MP4 or QuickTime multimedia file. In this part of the book, an open source code of a simple script in the Python programming language that detects such anomalies is published.

In one of the articles on detection [2] they stated that while it is difficult to discover TCSteg, using their detection method it is possible to estimate the existence of the hidden volume. They also concluded that although there are

not many MP4 steganography analysis tools on the market, there are some already existing applications that can be used for this purpose. One of the studies [11] on the subject of a detection method discusses the detection of digital video manipulation while referring to blind methods for detecting video forgery. Different frameworks of video forgery detection methods are classified and generalized in this paper and the performance of some typical video forgery detection methods are compared. [7] Proposed a verification system for MP4 by jointly using data embedding in different media tracks (ie video and audio tracks) as well as different layers (ie compression/media and system layers). In another paper [4] proposed a passive forensic method for object-based video spoofing. [1] Reviewed journal articles from 2015 to 2021 for steganography and steganalysis using deep lean based algorithms. They analyzed the combination of image and video steganography using ML and DL algorithms to hide the data within media files such as audio, video, images, etc. [3] Proposed the use of color detection in the LSB bits (LSB Color Detection) to adjust ratios of concealing data according to respective pixel RGB values. In the article [5] present a survey on passive detection methods of video tampering. Passive video tampering detection methods are classified into the following three categories based on the type of spoofing they address: detection of double or multi-compressed videos, region tampering detection, and video inter-frame spoofing detection.

Our goal is to learn the possibilities of introducing malicious code and the possibilities of detecting so that we can classify with a learning machine every MP4 video file as to whether it contains malware or not.

3 DATASET DESCRIPTION

The dataset in this paper will be 55 videos in MP4 format. An MP4 is a common “container format” for video files that allows you to store a lot of video and audio information in a smaller file size. The minimum file size in the dataset is 17069 bits and the maximum 14637345 bits. Some videos contain malware and some don’t, we would like to develop a learning machine that will know how to recognize this. Damage in the video may be in 3 possible places: header, video data and end of file, therefore these will be part of our tests when we perform data exploration. MP4 videos can be played universally on any device, therefore we will present a warning regarding the dataset: it may contain viruses therefore the work environment in which we will test and investigate it will be a virtual machine in order not to damage the computer.

4 DATA EXPLORATION

After the paragraph ”References” the jupyter file in which the data exploration was performed will appear.

Hyperlink to the full work on GitHub (with the ipynb file): [Click This](#)

5 SUMMARY AND OPEN ISSUES

In this study we will present our learning machine for detecting malware in video (mp4 format). We will base on a dataset containing malicious videos and non-malicious videos. We would like to explore and test file characteristics and file behavior to train our learning machine to best classify each file. During the preliminary research, additional ideas and possibilities for "suspicious behaviors" were raised that we would like to investigate in order to achieve maximum results, among other things will be to go deeper into understanding the format and finding the options of inserting malware into a video.

References

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Data exploration

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```
[1]: import pandas as pd
from pathlib import Path
from tqdm import tqdm
import numpy as np
import sys
import os, time
import platform
import datetime
```

1 Data exploration

1.0.1 Explore the data, understand the features, statistics visualize the inputs

1.0.2 What is Data Exploration?

Data exploration definition: Data exploration refers to the initial step in data analysis in which data analysts use data visualization and statistical techniques to describe dataset characterizations, such as size, quantity, and accuracy, in order to better understand the nature of the data.

<https://www.heavy.ai/learn/data-exploration>

1.0.3 Why Is Data Exploration Important?

Exploration allows for deeper understanding of a dataset, making it easier to navigate and use the data later. The better an analyst knows the data they're working with, the better their analysis will be.

<https://www.alteryx.com/glossary/data-exploration>

1.1 Creation and update times of the files

```
[2]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
min=10000000
max=0
for file in files:
    (mode, ino, dev, nlink, uid, gid, size, atime, mtime, ctime) = os.stat(file)
    print("Last modified: %s" % time.ctime(os.path.getmtime(file)))
    print("Created: %s" % time.ctime(os.path.getctime(file)))
```

Last modified: Sat Nov 5 16:06:46 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:05:12 2022
Created: Mon Nov 21 19:46:48 2022
Last modified: Sat Nov 5 16:07:02 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:06:43 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:06:24 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:03 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:06:40 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:06:27 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:06:28 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:07:00 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:11:23 2022
Created: Mon Nov 21 20:40:20 2022
Last modified: Sat Nov 5 16:06:30 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:05:21 2022
Created: Mon Nov 21 19:46:47 2022
Last modified: Sat Nov 5 16:05:49 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:06:15 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:25 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:59 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:05:36 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:05:41 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:49 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:05:54 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:06:50 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:06:09 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:06:34 2022
Created: Mon Nov 21 19:46:49 2022

Last modified: Sat Nov 5 16:06:17 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:37 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:05:33 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:06:47 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:11:21 2022
Created: Mon Nov 21 20:40:19 2022
Last modified: Sat Nov 5 16:05:39 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:19 2022
Created: Mon Nov 21 19:46:47 2022
Last modified: Sat Nov 5 16:05:37 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:07:13 2022
Created: Mon Nov 21 19:46:50 2022
Last modified: Sat Nov 5 16:05:56 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:07:09 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:05:14 2022
Created: Mon Nov 21 19:46:47 2022
Last modified: Sat Nov 5 16:07:04 2022
Created: Mon Nov 21 19:46:48 2022
Last modified: Sat Nov 5 16:05:23 2022
Created: Tue Nov 22 17:39:49 2022
Last modified: Sat Nov 5 16:06:32 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:11:24 2022
Created: Mon Nov 21 20:40:17 2022
Last modified: Sat Nov 5 16:06:21 2022
Created: Mon Nov 21 19:46:48 2022
Last modified: Sat Nov 5 16:06:00 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:05:44 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:23 2022
Created: Mon Nov 21 19:46:52 2022
Last modified: Sat Nov 5 16:07:07 2022
Created: Mon Nov 21 19:46:51 2022
Last modified: Sat Nov 5 16:05:43 2022
Created: Mon Nov 21 19:46:49 2022
Last modified: Sat Nov 5 16:06:12 2022
Created: Mon Nov 21 19:46:48 2022
Last modified: Sat Nov 5 16:05:48 2022
Created: Mon Nov 21 19:46:49 2022

1.2 Files size

```
[3]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
    for file_name in files:
        file_stats = os.stat(file_name)
        print(file_stats)
        print(f'File Size in Bytes is {file_stats.st_size}')
```

```
os.stat_result(st_mode=33188, st_ino=5900592, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=1928491, st_atime=1669371717,
st_mtime=1667657206, st_ctime=1669052812)
```

File Size in Bytes is 1928491

```
os.stat_result(st_mode=33188, st_ino=5900496, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=832317, st_atime=1669371717,
st_mtime=1667657112, st_ctime=1669052808)
```

File Size in Bytes is 832317

```
os.stat_result(st_mode=33188, st_ino=5900584, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=197486, st_atime=1669371717,
st_mtime=1667657222, st_ctime=1669052812)
```

File Size in Bytes is 197486

```
os.stat_result(st_mode=33188, st_ino=5900550, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=992733, st_atime=1669371717,
st_mtime=1667657203, st_ctime=1669052810)
```

File Size in Bytes is 992733

```
os.stat_result(st_mode=33188, st_ino=5900518, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=53805, st_atime=1669371717,
st_mtime=1667657184, st_ctime=1669052809)
```

File Size in Bytes is 53805

```
os.stat_result(st_mode=33188, st_ino=5900582, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=478898, st_atime=1669371717,
st_mtime=1667657163, st_ctime=1669052812)
```

File Size in Bytes is 478898

```
os.stat_result(st_mode=33188, st_ino=5900538, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=1540303, st_atime=1669371717,
st_mtime=1667657200, st_ctime=1669052810)
```

File Size in Bytes is 1540303

```
os.stat_result(st_mode=33188, st_ino=5900568, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2227141, st_atime=1669371718,
st_mtime=1667657187, st_ctime=1669052811)
```

File Size in Bytes is 2227141

```
os.stat_result(st_mode=33188, st_ino=5900588, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2227087, st_atime=1669371718,
st_mtime=1667657188, st_ctime=1669052812)
```

File Size in Bytes is 2227087

```
os.stat_result(st_mode=33188, st_ino=5900540, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=29923, st_atime=1669371718,
st_mtime=1667657220, st_ctime=1669052810)
```

File Size in Bytes is 29923

```

os.stat_result(st_mode=33188, st_ino=5900528, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=7475193, st_atime=1669371718,
st_mtime=1667657483, st_ctime=1669056020)
File Size in Bytes is 7475193
os.stat_result(st_mode=33188, st_ino=5900536, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2226950, st_atime=1669371718,
st_mtime=1667657190, st_ctime=1669052810)
File Size in Bytes is 2226950
os.stat_result(st_mode=33188, st_ino=5900484, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=273280, st_atime=1669371718,
st_mtime=1667657121, st_ctime=1669052807)
File Size in Bytes is 273280
os.stat_result(st_mode=33188, st_ino=5900560, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=340276, st_atime=1669371718,
st_mtime=1667657149, st_ctime=1669052811)
File Size in Bytes is 340276
os.stat_result(st_mode=33188, st_ino=5900516, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2225965, st_atime=1669371718,
st_mtime=1667657175, st_ctime=1669052809)
File Size in Bytes is 2225965
os.stat_result(st_mode=33188, st_ino=5900526, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=53805, st_atime=1669371718,
st_mtime=1667657185, st_ctime=1669052809)
File Size in Bytes is 53805
os.stat_result(st_mode=33188, st_ino=5900508, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=930316, st_atime=1669371718,
st_mtime=1667657219, st_ctime=1669052809)
File Size in Bytes is 930316
os.stat_result(st_mode=33188, st_ino=5900552, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=5357207, st_atime=1669371718,
st_mtime=1667657136, st_ctime=1669052810)
File Size in Bytes is 5357207
os.stat_result(st_mode=33188, st_ino=5900506, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=507598, st_atime=1669371719,
st_mtime=1667657141, st_ctime=1669052809)
File Size in Bytes is 507598
os.stat_result(st_mode=33188, st_ino=5900500, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2355027, st_atime=1669371719,
st_mtime=1667657209, st_ctime=1669052809)
File Size in Bytes is 2355027
os.stat_result(st_mode=33188, st_ino=5900548, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=14637345, st_atime=1669371719,
st_mtime=1667657154, st_ctime=1669052810)
File Size in Bytes is 14637345
os.stat_result(st_mode=33188, st_ino=5900574, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=25131, st_atime=1669371719,
st_mtime=1667657210, st_ctime=1669052811)
File Size in Bytes is 25131

```

```

os.stat_result(st_mode=33188, st_ino=5900580, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=1321607, st_atime=1669371719,
st_mtime=1667657169, st_ctime=1669052812)
File Size in Bytes is 1321607
os.stat_result(st_mode=33188, st_ino=5900514, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=216120, st_atime=1669371719,
st_mtime=1667657194, st_ctime=1669052809)
File Size in Bytes is 216120
os.stat_result(st_mode=33188, st_ino=5900502, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2226158, st_atime=1669371719,
st_mtime=1667657177, st_ctime=1669052809)
File Size in Bytes is 2226158
os.stat_result(st_mode=33188, st_ino=5900546, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=17069, st_atime=1669371719,
st_mtime=1667657197, st_ctime=1669052810)
File Size in Bytes is 17069
os.stat_result(st_mode=33188, st_ino=5900544, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=304239, st_atime=1669371719,
st_mtime=1667657133, st_ctime=1669052810)
File Size in Bytes is 304239
os.stat_result(st_mode=33188, st_ino=5900572, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=252389, st_atime=1669371719,
st_mtime=1667657207, st_ctime=1669052811)
File Size in Bytes is 252389
os.stat_result(st_mode=33188, st_ino=5900534, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=568644, st_atime=1669371719,
st_mtime=1667657481, st_ctime=1669056019)
File Size in Bytes is 568644
os.stat_result(st_mode=33188, st_ino=5900510, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=98445, st_atime=1669371719,
st_mtime=1667657139, st_ctime=1669052809)
File Size in Bytes is 98445
os.stat_result(st_mode=33188, st_ino=5900478, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2226174, st_atime=1669371719,
st_mtime=1667657179, st_ctime=1669052807)
File Size in Bytes is 2226174
os.stat_result(st_mode=33188, st_ino=5900556, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=1517974, st_atime=1669371719,
st_mtime=1667657137, st_ctime=1669052811)
File Size in Bytes is 1517974
os.stat_result(st_mode=33188, st_ino=5900542, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=28696, st_atime=1669371720,
st_mtime=1667657233, st_ctime=1669052810)
File Size in Bytes is 28696
os.stat_result(st_mode=33188, st_ino=5900586, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=237320, st_atime=1669371720,
st_mtime=1667657156, st_ctime=1669052812)
File Size in Bytes is 237320

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os.stat_result(st_mode=33188, st_ino=5900566, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=4864537, st_atime=1669371720,
st_mtime=1667657229, st_ctime=1669052811)
File Size in Bytes is 4864537
os.stat_result(st_mode=33188, st_ino=5900482, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=520977, st_atime=1669371720,
st_mtime=1667657114, st_ctime=1669052807)
File Size in Bytes is 520977
os.stat_result(st_mode=33188, st_ino=5900492, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=83543, st_atime=1669371720,
st_mtime=1667657224, st_ctime=1669052808)
File Size in Bytes is 83543
os.stat_result(st_mode=33188, st_ino=5900562, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=563786, st_atime=1669371720,
st_mtime=1667657123, st_ctime=1669131589)
File Size in Bytes is 563786
os.stat_result(st_mode=33188, st_ino=5900504, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2228025, st_atime=1669371720,
st_mtime=1667657192, st_ctime=1669052809)
File Size in Bytes is 2228025
os.stat_result(st_mode=33188, st_ino=5905908, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=7539472, st_atime=1669371720,
st_mtime=1667657484, st_ctime=1669056017)
File Size in Bytes is 7539472
os.stat_result(st_mode=33188, st_ino=5900488, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2225919, st_atime=1669371720,
st_mtime=1667657181, st_ctime=1669052808)
File Size in Bytes is 2225919
os.stat_result(st_mode=33188, st_ino=5900554, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2226021, st_atime=1669371720,
st_mtime=1667657160, st_ctime=1669052811)
File Size in Bytes is 2226021
os.stat_result(st_mode=33188, st_ino=5900524, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=146401, st_atime=1669371720,
st_mtime=1667657144, st_ctime=1669052809)
File Size in Bytes is 146401
os.stat_result(st_mode=33188, st_ino=5900578, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2227136, st_atime=1669371720,
st_mtime=1667657183, st_ctime=1669052812)
File Size in Bytes is 2227136
os.stat_result(st_mode=33188, st_ino=5900570, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=1111800, st_atime=1669371720,
st_mtime=1667657227, st_ctime=1669052811)
File Size in Bytes is 1111800
os.stat_result(st_mode=33188, st_ino=5900498, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=5669912, st_atime=1669371720,
st_mtime=1667657143, st_ctime=1669052809)
File Size in Bytes is 5669912

```

```
os.stat_result(st_mode=33188, st_ino=5900490, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=2226825, st_atime=1669371721,
st_mtime=1667657172, st_ctime=1669052808)
```

File Size in Bytes is 2226825

```
os.stat_result(st_mode=33188, st_ino=5900512, st_dev=2053, st_nlink=1,
st_uid=1000, st_gid=1000, st_size=261076, st_atime=1669371721,
st_mtime=1667657148, st_ctime=1669052809)
```

File Size in Bytes is 261076

check min and max file size:

```
[4]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
min=10000000
max=0
for file in files:
    (mode, ino, dev, nlink, uid, gid, size, atime, mtime, ctime) = os.stat(file)
    if size<min:
        min=size
    if size>max:
        max=size

print(min)
print(max)
```

17069

14637345

1.3 Video Metadata

```
[5]: !conda install ffmpeg
```

Collecting package metadata (current_repodata.json): done

Solving environment: done

All requested packages already installed.

Retrieving notices: ...working... done

```
[6]: import ffmpeg
import sys
from pprint import pprint # for printing Python dictionaries in a human-readable
    ↪ way
from pathlib import Path

import json
```

```
[7]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
dict={}
```

```

i=0
#https://www.thepythoncode.com/article/extract-media-metadata-in-python
for file in files:
    pprint(ffmpeg.probe(file)["streams"])
    dict[i]=ffmpeg.probe(file)["streams"]
    i+=1

# https://www.geeksforgeeks.org/reading-and-writing-json-to-a-file-in-python/
json_object = json.dumps(dict)

# Writing to sample.json
with open("sample.json", "w") as outfile:
    outfile.write(json_object)

```

```

[{'avg_frame_rate': '30/1',
  'bit_rate': '1589049',
  'bits_per_raw_sample': '8',
  'chroma_location': 'left',
  'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '1/60',
  'codec_type': 'video',
  'coded_height': 1088,
  'coded_width': 1920,
  'color_primaries': 'bt709',
  'color_range': 'tv',
  'color_space': 'bt709',
  'color_transfer': 'bt709',
  'display_aspect_ratio': '16:9',
  'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
  'duration': '8.933333',
  'duration_ts': 137216,
  'has_b_frames': 1,
  'height': 1080,
  'index': 0,

```

```

'is_avc': 'true',
'level': 40,
'nal_length_size': '4',
'nb_frames': '268',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
         'language': 'und'},
'time_base': '1/15360',
'width': 1920},
{'avg_frame_rate': '0/0',
 'bit_rate': '127999',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '8.986122',
 'duration_ts': 396288,
 'index': 1,
 'max_bit_rate': '127999',
 'nb_frames': '387',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '44100',
 'start_pts': 0,

```

```

'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
        'language': 'und'},
'time_base': '1/44100']}
[{'avg_frame_rate': '0/0',
  'bit_rate': '191752',
  'bits_per_sample': 0,
  'channel_layout': 'stereo',
  'channels': 2,
  'codec_long_name': 'AAC (Advanced Audio Coding)',
  'codec_name': 'aac',
  'codec_tag': '0x6134706d',
  'codec_tag_string': 'mp4a',
  'codec_time_base': '1/48000',
  'codec_type': 'audio',
  'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
  'duration': '10.005333',
  'duration_ts': 480256,
  'index': 0,
  'max_bit_rate': '192000',
  'nb_frames': '469',
  'profile': 'LC',
  'r_frame_rate': '0/0',
  'sample_fmt': 'fltp',
  'sample_rate': '48000',
  'start_pts': 0,
  'start_time': '0.000000',
  'tags': {'creation_time': '2022-10-01T03:31:04.000000Z',
          'handler_name': 'Sound Media Handler',
          'language': 'eng'},
  'time_base': '1/48000'},
{'avg_frame_rate': '30000/1001',
  'bit_rate': '465636',
  'bits_per_raw_sample': '8',
  'chroma_location': 'left',
  'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
  'codec_name': 'h264',

```



```

'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1001/60000',
'codec_type': 'video',
'coded_height': 1088,
'coded_width': 1920,
'color_range': 'tv',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '10.043367',
'duration_ts': 301301,
'has_b_frames': 2,
'height': 1080,
'index': 1,
'is_avc': 'true',
'level': 40,
'nal_length_size': '4',
'nb_frames': '301',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30000/1001',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 1001,
'start_time': '0.033367',
'tags': {'creation_time': '2022-10-01T03:31:04.000000Z',
         'encoder': 'AVC Coding',
         'handler_name': 'Video Media Handler',
         'language': 'eng'},
'time_base': '1/30000',
'width': 1920}]
[{'avg_frame_rate': '1474560/27817',
 'bit_rate': '153430',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',

```

```

'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '27817/2949120',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 736,
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '7.184010',
'duration_ts': 137933,
'has_b_frames': 3,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '384',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '60000/1001',
'refs': 1,
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/19200',
'width': 728},
{'avg_frame_rate': '0/0',
 'bit_rate': '40690',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,

```

```

        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '9.758912',
'duration_ts': 430368,
'index': 1,
'max_bit_rate': '65259',
'nb_frames': '276',
'profile': 'HE-AAC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100']}
[{'avg_frame_rate': '66360/1147',
'bit_rate': '788592',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1147/132720',
'codec_type': 'video',
'coded_height': 640,
'coded_width': 528,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '33:40',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,

```

```

        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '9.558333',
'duration_ts': 5735,
'has_b_frames': 1,
'height': 640,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '553',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '59/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2019-12-10T19:51:50.000000Z',
        'handler_name': 'Core Media Video',
        'language': 'und'},
'time_base': '1/600',
'width': 528},
{'avg_frame_rate': '0/0',
 'bit_rate': '31457',
 'bits_per_sample': 0,
 'channel_layout': 'mono',
 'channels': 1,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,

```

```

        'visual_impaired': 0},
'duration': '9.502766',
'duration_ts': 419072,
'index': 1,
'max_bit_rate': '32000',
'nb_frames': '412',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2019-12-10T19:51:50.000000Z',
        'handler_name': 'Core Media Audio',
        'language': 'und'},
'time_base': '1/44100']}
[{'avg_frame_rate': '30/1',
'bit_rate': '84244',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 368,
'coded_width': 368,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '1:1',
'disposition': {'attached_pic': 0,
                'clean_effects': 0,
                'comment': 0,
                'default': 1,
                'dub': 0,
                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
'duration': '1.733333',
'duration_ts': 26624,
'has_b_frames': 2,

```

```

'height': 360,
'index': 0,
'is_avc': 'true',
'level': 21,
'nal_length_size': '4',
'nb_frames': '52',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
         'language': 'und'},
'time_base': '1/15360',
'width': 360},
{'avg_frame_rate': '0/0',
 'bit_rate': '125573',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '1.856000',
 'duration_ts': 89088,
 'index': 1,
 'max_bit_rate': '128000',
 'nb_frames': '88',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',

```

```

'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
        'language': 'und'},
'time_base': '1/48000']}
[{'avg_frame_rate': '2088960/139259',
  'bit_rate': '11703',
  'bits_per_raw_sample': '8',
  'chroma_location': 'left',
  'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '139259/4177920',
  'codec_type': 'video',
  'coded_height': 480,
  'coded_width': 480,
  'display_aspect_ratio': '1:1',
  'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
  'duration': '18.132682',
  'duration_ts': 278518,
  'has_b_frames': 0,
  'height': 474,
  'index': 0,
  'is_avc': 'true',
  'level': 22,
  'nal_length_size': '4',
  'nb_frames': '272',
  'pix_fmt': 'yuv420p',
  'profile': 'Main',
  'r_frame_rate': '15/1',
  'refs': 1,
  'sample_aspect_ratio': '1:1',
  'start_pts': 0,
  'start_time': '0.000000',
  'tags': {'handler_name': 'VideoHandler', 'language': 'und'},

```

```

    'time_base': '1/15360',
    'width': 474},
{'avg_frame_rate': '0/0',
 'bit_rate': '195869',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '18.112000',
 'duration_ts': 869376,
 'index': 1,
 'max_bit_rate': '195869',
 'nb_frames': '849',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '48000',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
 'time_base': '1/48000'}]
[{'avg_frame_rate': '30000/1001',
 'bit_rate': '4304012',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '1001/60000',
 'codec_type': 'video',

```



```

'coded_height': 1088,
'coded_width': 1440,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '2.736067',
'duration_ts': 82082,
'has_b_frames': 1,
'height': 1080,
'index': 0,
'is_avc': 'true',
'level': 42,
'nal_length_size': '4',
'nb_frames': '82',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30000/1001',
'refs': 1,
'sample_aspect_ratio': '4:3',
'start_pts': 0,
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'tags': {'creation_time': '2020-02-07T16:12:23.000000Z',
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         'handler_name': '\\x1fMainconcept Video Media Handler',
         'language': 'eng'},
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'width': 1440},
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 'channels': 2,
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 'codec_name': 'aac',

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'codec_time_base': '1/48000',
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                 'comment': 0,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
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'duration': '2.736063',
'duration_ts': 131331,
'index': 1,
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'profile': 'LC',
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'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2020-02-07T16:12:23.000000Z',
         'handler_name': '#Mainconcept MP4 Sound Media Handler',
         'language': 'eng'},
'time_base': '1/48000']}
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 'bit_rate': '11397433',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '1/60',
 'codec_type': 'video',
 'coded_height': 720,
 'coded_width': 1280,
 'color_primaries': 'bt709',
 'color_range': 'tv',
 'color_space': 'bt709',
 'color_transfer': 'bt709',
 'display_aspect_ratio': '16:9',

```

```

'disposition': {'attached_pic': 0,
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                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
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'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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         'language': 'und',
         'timecode': '01:00:00:00'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
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 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
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                  'comment': 0,

```

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        'forced': 0,
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        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.536000',
'duration_ts': 73728,
'index': 1,
'max_bit_rate': '197598',
'nb_frames': '72',
'profile': 'LC',
'r_frame_rate': '0/0',
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'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'und'},
'time_base': '1/48000'},
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'codec_tag_string': 'tmcd',
'codec_type': 'data',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 0,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'index': 2,
'nb_frames': '1',
'r_frame_rate': '0/0',
'start_pts': 0,
'start_time': '0.000000',

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'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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'time_base': '1/15360']]
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  'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '1/60',
  'codec_type': 'video',
  'coded_height': 720,
  'coded_width': 1280,
  'color_primaries': 'bt709',
  'color_range': 'tv',
  'color_space': 'bt709',
  'color_transfer': 'bt709',
  'display_aspect_ratio': '16:9',
  'disposition': {'attached_pic': 0,
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                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
  'duration': '1.533333',
  'duration_ts': 23552,
  'has_b_frames': 2,
  'height': 720,
  'index': 0,
  'is_avc': 'true',
  'level': 31,
  'nal_length_size': '4',
  'nb_frames': '46',
  'pix_fmt': 'yuv420p',
  'profile': 'High',
  'r_frame_rate': '30/1',
  'refs': 1,
  'sample_aspect_ratio': '1:1',

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 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
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 'codec_type': 'audio',
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                  'comment': 0,
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                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '1.536000',
 'duration_ts': 73728,
 'index': 1,
 'max_bit_rate': '197598',
 'nb_frames': '72',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '48000',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'und'},
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{'avg_frame_rate': '30/1',
 'bit_rate': '20',

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'codec_tag': '0x64636d74',
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                 'comment': 0,
                 'default': 0,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'index': 2,
'nb_frames': '1',
'r_frame_rate': '0/0',
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'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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         'language': 'eng',
         'timecode': '01:00:00:00'},
'time_base': '1/15360']}
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 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '3/173',
 'codec_type': 'video',
 'coded_height': 224,
 'coded_width': 512,
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
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                  'forced': 0,
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                  'lyrics': 0,

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```

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        'visual_impaired': 0},
'duration': '1.283237',
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'height': 218,
'index': 0,
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'level': 21,
'nal_length_size': '4',
'nb_frames': '37',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '173/6',
'refs': 1,
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/11072',
'width': 500}]
[{'avg_frame_rate': '18694/625',
'bit_rate': '5219735',
'chroma_location': 'left',
'codec_long_name': 'MPEG-4 part 2',
'codec_name': 'mpeg4',
'codec_tag': '0x64697678',
'codec_tag_string': 'xvid',
'codec_time_base': '625/18694',
'codec_type': 'video',
'coded_height': 540,
'coded_width': 960,
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
'clean_effects': 0,
'comment': 0,
'default': 0,
'dub': 0,
'forced': 0,
'hearing_impaired': 0,
'karaoke': 0,
'lyrics': 0,
'original': 0,
'timed_thumbnails': 0,
'visual_impaired': 0},
'divx_packed': 'false',
'duration': '11.166684',
'duration_ts': 334,

```



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'has_b_frames': 0,
'height': 540,
'index': 0,
'level': 3,
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'profile': 'Simple Profile',
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'r_frame_rate': '18694/625',
'refs': 1,
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'start_time': '0.000000',
'time_base': '625/18694',
'width': 960},
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'channels': 2,
'codec_long_name': 'MP3 (MPEG audio layer 3)',
'codec_name': 'mp3',
'codec_tag': '0x0055',
'codec_tag_string': 'U[0][0][0]',
'codec_time_base': '1/44100',
'codec_type': 'audio',
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                 'comment': 0,
                 'default': 0,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '11.206531',
'duration_ts': 429,
'index': 1,
'nb_frames': '429',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'time_base': '32/1225'}]

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  'bits_per_raw_sample': '8',
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  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '1/60',
  'codec_type': 'video',
  'coded_height': 720,
  'coded_width': 1280,
  'color_primaries': 'bt709',
  'color_range': 'tv',
  'color_space': 'bt709',
  'color_transfer': 'bt709',
  'display_aspect_ratio': '16:9',
  'disposition': {'attached_pic': 0,
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                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
  'duration': '1.533333',
  'duration_ts': 23552,
  'has_b_frames': 2,
  'height': 720,
  'index': 0,
  'is_avc': 'true',
  'level': 31,
  'nal_length_size': '4',
  'nb_frames': '46',
  'pix_fmt': 'yuv420p',
  'profile': 'High',
  'r_frame_rate': '30/1',
  'refs': 1,
  'sample_aspect_ratio': '1:1',
  'start_pts': 0,
  'start_time': '0.000000',
  'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
           'handler_name': 'VideoHandler',
           'language': 'und',
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    'width': 1280},
{'avg_frame_rate': '0/0',
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 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '1.536000',
 'duration_ts': 73728,
 'index': 1,
 'max_bit_rate': '197598',
 'nb_frames': '72',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '48000',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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          'language': 'und'},
 'time_base': '1/48000'},
{'avg_frame_rate': '30/1',
 'bit_rate': '20',
 'codec_tag': '0x64636d74',
 'codec_tag_string': 'tmcd',
 'codec_type': 'data',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,

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```

        'comment': 0,
        'default': 0,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'index': 2,
'nb_frames': '1',
'r_frame_rate': '0/0',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'eng',
        'timecode': '01:00:00:00'},
'time_base': '1/15360']}
[{'avg_frame_rate': '30/1',
 'bit_rate': '300866',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '1/60',
 'codec_type': 'video',
 'coded_height': 640,
 'coded_width': 640,
 'color_primaries': 'bt470bg',
 'color_range': 'tv',
 'color_space': 'smpte170m',
 'color_transfer': 'smpte170m',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,

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        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '6.000000',
'duration_ts': 92160,
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'height': 640,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '180',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30/1',
'refs': 1,
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/15360',
'width': 640},
{'avg_frame_rate': '0/0',
'bit_rate': '64503',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '4.922993',
'duration_ts': 217104,
'index': 1,
'max_bit_rate': '64503',
'nb_frames': '214',

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```

'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100'}]
[{'avg_frame_rate': '24/1',
'bit_rate': '171138',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/48',
'codec_type': 'video',
'coded_height': 320,
'coded_width': 320,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
'duration': '12.791667',
'duration_ts': 7675,
'has_b_frames': 2,
'height': 320,
'index': 0,
'is_avc': 'true',
'level': 21,
'nal_length_size': '4',
'nb_frames': '307',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '24/1',

```

```

'refs': 1,
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         'encoder': 'AVC Coding',
         'handler_name': 'Vireo Eyes v2.9.0',
         'language': 'und'},
'time_base': '1/600',
'width': 320},
{'avg_frame_rate': '0/0',
 'bit_rate': '32998',
 'bits_per_sample': 0,
 'channel_layout': 'mono',
 'channels': 1,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '12.792744',
 'duration_ts': 564160,
 'index': 1,
 'max_bit_rate': '36784',
 'nb_frames': '551',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '44100',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-05-22T01:24:42.000000Z',
          'handler_name': 'Vireo Ears v2.9.0',
          'language': 'und'},
 'time_base': '1/44100'}}]
[{'avg_frame_rate': '30/1',

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```

'bit_rate': '11397433',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
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'color_range': 'tv',
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'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'has_b_frames': 2,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
         'handler_name': 'VideoHandler',
         'language': 'und',
         'timecode': '01:00:00:00'},

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 'bits_per_sample': 0,
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 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
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 'duration_ts': 73728,
 'index': 1,
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 'nb_frames': '72',
 'profile': 'LC',
 'r_frame_rate': '0/0',
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 'sample_rate': '48000',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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          'language': 'und'},
 'time_base': '1/48000'},
{'avg_frame_rate': '30/1',
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 'codec_tag_string': 'tmcd',
 'codec_type': 'data',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,

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        'default': 0,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'index': 2,
'nb_frames': '1',
'r_frame_rate': '0/0',
'start_pts': 0,
'start_time': '0.000000',
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        'language': 'eng',
        'timecode': '01:00:00:00'},
'time_base': '1/15360']}
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 368,
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'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '1:1',
'disposition': {'attached_pic': 0,
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        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,

```

```

        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.733333',
'duration_ts': 26624,
'has_b_frames': 2,
'height': 360,
'index': 0,
'is_avc': 'true',
'level': 21,
'nal_length_size': '4',
'nb_frames': '52',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
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'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                'clean_effects': 0,
                'comment': 0,
                'default': 1,
                'dub': 0,
                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
'duration': '1.856000',
'duration_ts': 89088,
'index': 1,

```

```

'max_bit_rate': '128000',
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'profile': 'LC',
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'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
         'language': 'und'},
'time_base': '1/48000']}
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 'bits_per_raw_sample': '8',
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '269/17880',
 'codec_type': 'video',
 'coded_height': 576,
 'coded_width': 1040,
 'color_primaries': 'bt709',
 'color_range': 'tv',
 'color_space': 'bt709',
 'color_transfer': 'bt709',
 'display_aspect_ratio': '259:144',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '8.966667',
 'duration_ts': 137728,
 'has_b_frames': 2,
 'height': 576,
 'index': 0,
 'is_avc': 'true',
 'level': 32,
 'nal_length_size': '4',

```

```

'nb_frames': '298',
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'profile': 'High',
'r_frame_rate': '60/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
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'width': 1036},
{'avg_frame_rate': '0/0',
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'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '9.008005',
'duration_ts': 397253,
'index': 1,
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'nb_frames': '198',
'profile': 'HE-AACv2',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100'}}]
[{'avg_frame_rate': '30/1',

```

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'bit_rate': '2119170',
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 1280,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '19.033333',
'duration_ts': 292352,
'has_b_frames': 1,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '571',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-10-02T18:26:57.000000Z',
         'handler_name': 'ISO Media file produced by Google Inc. Created on: '
                        '10/02/2022.',
         'language': 'und'},

```

```

    'time_base': '1/15360',
    'width': 1280},
{'avg_frame_rate': '0/0',
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 'bits_per_sample': 0,
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 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
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 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '19.040363',
 'duration_ts': 839680,
 'index': 1,
 'nb_frames': '820',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '44100',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-10-02T18:26:57.000000Z',
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                          '10/02/2022.',
          'language': 'und'},
 'time_base': '1/44100'}}]
[{'avg_frame_rate': '30/1',
 'bit_rate': '665745',
 'bits_per_raw_sample': '8',
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',

```

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'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
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'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '5.033333',
'duration_ts': 77312,
'has_b_frames': 2,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '151',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
 'bit_rate': '128435',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'AAC (Advanced Audio Coding)',
 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',

```



```

'codec_time_base': '1/48000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '5.034000',
'duration_ts': 241632,
'index': 1,
'max_bit_rate': '128435',
'nb_frames': '237',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/48000']}
[{'avg_frame_rate': '2997/100',
 'bit_rate': '1142210',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '50/2997',
 'codec_type': 'video',
 'coded_height': 720,
 'coded_width': 1280,
 'color_primaries': 'bt709',
 'color_range': 'tv',
 'color_space': 'bt709',
 'color_transfer': 'bt709',
 'display_aspect_ratio': '16:9',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,

```

```

        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '14.781031',
'duration_ts': 177195,
'has_b_frames': 1,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '443',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '2997/100',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2020-04-30T11:47:30.000000Z',
        'handler_name': 'ISO Media file produced by Google Inc. Created on: '
        '04/30/2020.',
        'language': 'und'},
'time_base': '1/11988',
'width': 1280},
{'avg_frame_rate': '0/0',
'bit_rate': '128298',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,

```

```

        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
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'duration_ts': 652288,
'index': 1,
'nb_frames': '637',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2020-04-30T11:47:30.000000Z',
        'handler_name': 'ISO Media file produced by Google Inc. Created on: '
        '04/30/2020.',
        'language': 'eng'},
'time_base': '1/44100']}
[{'avg_frame_rate': '24/1',
'bit_rate': '608730',
'bits_per_raw_sample': '8',
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'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/48',
'codec_type': 'video',
'coded_height': 480,
'coded_width': 864,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '427:240',
'disposition': {'attached_pic': 0,
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        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,

```

```

        'visual_impaired': 0},
'duration': '157.666667',
'duration_ts': 14190000,
'has_b_frames': 1,
'height': 480,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '3784',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '24/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 3690,
'start_time': '0.041000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/90000',
'width': 854},
{'avg_frame_rate': '0/0',
'bit_rate': '127999',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '157.733152',
'duration_ts': 6956032,
'index': 1,
'max_bit_rate': '129505',
'nb_frames': '6793',

```

```

'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100'}]
[{'avg_frame_rate': '30/1',
'bit_rate': '5658960',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 368,
'coded_width': 544,
'color_range': 'tv',
'color_space': 'bt470bg',
'display_aspect_ratio': '1048317:699424',
'disposition': {'attached_pic': 0,
'clean_effects': 0,
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'dub': 0,
'forced': 0,
'hearing_impaired': 0,
'karaoke': 0,
'lyrics': 0,
'original': 0,
'timed_thumbnails': 0,
'visual_impaired': 0},
'duration': '0.033333',
'duration_ts': 512,
'has_b_frames': 0,
'height': 360,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '1',
'pix_fmt': 'yuv420p',
'profile': 'Constrained Baseline',
'r_frame_rate': '30/1',
'refs': 1,

```

```

'sample_aspect_ratio': '8546:8521',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
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'width': 538}]
[{'avg_frame_rate': '454421/18925',
'bit_rate': '72746',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '18925/908842',
'codec_type': 'video',
'coded_height': 480,
'coded_width': 480,
'display_aspect_ratio': '1:1',
'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
'duration': '31.567973',
'duration_ts': 605600,
'has_b_frames': 2,
'height': 480,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '758',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '1199/50',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},

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    'time_base': '1/19184',
    'width': 480},
{'avg_frame_rate': '0/0',
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 'bits_per_sample': 0,
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 'channels': 2,
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '31.579002',
 'duration_ts': 1392634,
 'index': 1,
 'max_bit_rate': '256000',
 'nb_frames': '1361',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '44100',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
 'time_base': '1/44100'}}]
[{'avg_frame_rate': '30/1',
 'bit_rate': '133900',
 'bits_per_raw_sample': '8',
 'chroma_location': 'left',
 'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '1/60',
 'codec_type': 'video',

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'color_primaries': 'bt470bg',
'color_range': 'tv',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '8.233333',
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'has_b_frames': 2,
'height': 360,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '247',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30/1',
'refs': 1,
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'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
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 'channels': 2,
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,

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        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '8.266304',
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'index': 1,
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'nb_frames': '356',
'profile': 'LC',
'r_frame_rate': '0/0',
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'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100']}
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 1280,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
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'default': 1,
'dub': 0,
'forced': 0,
'hearing_impaired': 0,
'karaoke': 0,
'lyrics': 0,

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        'original': 0,
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        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
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'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'und',
        'timecode': '01:00:00:00'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
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'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
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                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},

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'duration': '1.536000',
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'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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         'language': 'und'},
'time_base': '1/48000'},
{'avg_frame_rate': '30/1',
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 'codec_tag_string': 'tmcd',
 'codec_type': 'data',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 0,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
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 'duration_ts': 23552,
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 'nb_frames': '1',
 'r_frame_rate': '0/0',
 'start_pts': 0,
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 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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          'language': 'eng',
          'timecode': '01:00:00:00'},
 'time_base': '1/15360']}
[{'avg_frame_rate': '30/1',
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  'bits_per_raw_sample': '8',
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'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
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'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '6.200000',
'duration_ts': 95232,
'has_b_frames': 2,
'height': 178,
'index': 0,
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'level': 41,
'nal_length_size': '4',
'nb_frames': '186',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/15360',
'width': 248}]
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  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',

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```

'codec_time_base': '1/60',
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'coded_width': 1280,
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'color_range': 'tv',
'color_space': 'smpte170m',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
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                 'visual_impaired': 0},
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'duration_ts': 107520,
'has_b_frames': 1,
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'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '210',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
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'start_time': '0.000000',
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         'language': 'und'},
'time_base': '1/15360',
'width': 1280},
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 'bits_per_sample': 0,
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 'channels': 2,

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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
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'codec_type': 'audio',
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '7.012426',
'duration_ts': 309248,
'index': 1,
'nb_frames': '302',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
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'start_time': '0.000000',
'tags': {'creation_time': '2022-09-01T05:23:46.000000Z',
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         'language': 'und'},
'time_base': '1/44100']}
[{'avg_frame_rate': '3559/125',
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 'bits_per_raw_sample': '8',
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '125/7118',
 'codec_type': 'video',
 'coded_height': 480,
 'coded_width': 656,
 'color_range': 'tv',
 'color_space': 'bt709',
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```

```

'disposition': {'attached_pic': 0,
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                 'comment': 0,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '4.074178',
'duration_ts': 58000,
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'level': 30,
'nal_length_size': '4',
'nb_frames': '116',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '3559/125',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'eng'},
'time_base': '1/14236',
'width': 648},
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 'bits_per_sample': 0,
 'channel_layout': 'stereo',
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,

```

```

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        'karaoke': 0,
        'lyrics': 0,
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'duration_ts': 182265,
'index': 1,
'max_bit_rate': '128000',
'nb_frames': '179',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
         'language': 'und'},
'time_base': '1/44100']]
[{'avg_frame_rate': '10/1',
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 'codec_name': 'rawvideo',
 'codec_tag': '0x0000',
 'codec_tag_string': '[0][0][0][0]',
 'codec_time_base': '1/10',
 'codec_type': 'video',
 'coded_height': 40,
 'coded_width': 260,
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 0,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '1.700000',
 'duration_ts': 17,
 'has_b_frames': 0,
 'height': 40,
 'index': 0,
 'level': -99,

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'nb_frames': '17',
'pix_fmt': 'bgr24',
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'refs': 1,
'start_pts': 0,
'start_time': '0.000000',
'time_base': '1/10',
'width': 260},
{'avg_frame_rate': '0/0',
'bit_rate': '128000',
'bits_per_sample': 0,
'channels': 2,
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'codec_name': 'mp3',
'codec_tag': '0x0055',
'codec_tag_string': 'U[0][0][0]',
'codec_time_base': '1/147',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 0,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'index': 1,
'nb_frames': '71',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '147',
'start_pts': 0,
'start_time': '0.000000',
'time_base': '3/125'}}]
[{'avg_frame_rate': '156160/8081',
'bit_rate': '217735',
'bits_per_raw_sample': '8',
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '8081/312320',
'codec_type': 'video',

```

```

'coded_height': 608,
'coded_width': 864,
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'color_range': 'tv',
'color_space': 'smpte170m',
'color_transfer': 'smpte170m',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '3.156641',
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'has_b_frames': 2,
'height': 602,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '61',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30/1',
'refs': 1,
'start_pts': 707,
'start_time': '0.046029',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/15360',
'width': 854},
{'avg_frame_rate': '0/0',
 'bit_rate': '61739',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,

```

```

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        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.155442',
'duration_ts': 50955,
'index': 1,
'max_bit_rate': '61743',
'nb_frames': '48',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100']}
[{'avg_frame_rate': '30/1',
'bit_rate': '11397433',
'bits_per_raw_sample': '8',
'chroma_location': 'left',
'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 1280,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,

```

```

        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'has_b_frames': 2,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'und',
        'timecode': '01:00:00:00'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
'bit_rate': '197598',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,

```

```

        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.536000',
'duration_ts': 73728,
'index': 1,
'max_bit_rate': '197598',
'nb_frames': '72',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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        'language': 'und'},
'time_base': '1/48000'},
{'avg_frame_rate': '30/1',
'bit_rate': '20',
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'codec_type': 'data',
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        'comment': 0,
        'default': 0,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
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'index': 2,
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'start_pts': 0,
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        'language': 'eng',
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'codec_name': 'h264',
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'codec_tag_string': 'avc1',
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'color_space': 'bt470bg',
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                 'comment': 0,
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
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                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '32.480000',
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'height': 306,
'index': 0,
'is_avc': 'true',
'level': 21,
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'nb_frames': '812',
'pix_fmt': 'yuvj420p',
'profile': 'High',
'r_frame_rate': '25/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2010-05-20T08:21:12.000000Z',
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'width': 544},
{'avg_frame_rate': '0/0',
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
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'index': 1,
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'nb_frames': '1401',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
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'start_time': '0.000000',
'tags': {'creation_time': '2010-05-20T08:21:12.000000Z',
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'time_base': '1/44100']}
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '1/20',
 'codec_type': 'video',
 'coded_height': 352,
 'coded_width': 352,

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'disposition': {'attached_pic': 0,
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                 'karaoke': 0,
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                 'visual_impaired': 0},
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'has_b_frames': 2,
'height': 350,
'index': 0,
'is_avc': 'true',
'level': 21,
'nal_length_size': '4',
'nb_frames': '10',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '10/1',
'refs': 1,
'start_pts': 0,
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'width': 350}]
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 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
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 'codec_type': 'video',
 'coded_height': 224,
 'coded_width': 480,
 'display_aspect_ratio': '237:109',
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
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```



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        'lyrics': 0,
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        'visual_impaired': 0},
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'height': 218,
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'level': 21,
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'nb_frames': '89',
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'profile': 'Main',
'r_frame_rate': '10/1',
'refs': 1,
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'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/15360',
'width': 474},
{'avg_frame_rate': '0/0',
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'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
'clean_effects': 0,
'comment': 0,
'default': 1,
'dub': 0,
'forced': 0,
'hearing_impaired': 0,
'karaoke': 0,
'lyrics': 0,
'original': 0,
'timed_thumbnails': 0,

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        'visual_impaired': 0},
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'index': 1,
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'nb_frames': '413',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '48000',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/48000'}]
[{'avg_frame_rate': '25/1',
'bit_rate': '484305',
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/50',
'codec_type': 'video',
'coded_height': 1088,
'coded_width': 1920,
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'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
'clean_effects': 0,
'comment': 0,
'default': 1,
'dub': 0,
'forced': 0,
'hearing_impaired': 0,
'karaoke': 0,
'lyrics': 0,
'original': 0,
'timed_thumbnails': 0,
'visual_impaired': 0},
'duration': '28.960000',
'duration_ts': 370688,
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'height': 1080,
'index': 0,

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'is_avc': 'true',
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'profile': 'High',
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'refs': 1,
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'start_time': '0.000000',
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'time_base': '1/12800',
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'channels': 2,
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/96000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '28.960000',
'duration_ts': 2780160,
'index': 1,
'max_bit_rate': '1000000',
'nb_frames': '2716',
'profile': 'LC',
'r_frame_rate': '0/0',
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'sample_rate': '96000',
'start_pts': 0,
'start_time': '0.000000',

```

```

    'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
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  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '500/29901',
  'codec_type': 'video',
  'coded_height': 480,
  'coded_width': 704,
  'display_aspect_ratio': '23:16',
  'disposition': {'attached_pic': 0,
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                   'comment': 0,
                   'default': 1,
                   'dub': 0,
                   'forced': 0,
                   'hearing_impaired': 0,
                   'karaoke': 0,
                   'lyrics': 0,
                   'original': 0,
                   'timed_thumbnails': 0,
                   'visual_impaired': 0},
  'duration': '1.003311',
  'duration_ts': 30000,
  'has_b_frames': 2,
  'height': 480,
  'index': 0,
  'is_avc': 'true',
  'level': 40,
  'nal_length_size': '4',
  'nb_frames': '30',
  'pix_fmt': 'yuv420p',
  'profile': 'High',
  'r_frame_rate': '29901/1000',
  'refs': 1,
  'sample_aspect_ratio': '1:1',
  'start_pts': 0,
  'start_time': '0.000000',
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'bits_per_sample': 0,
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'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
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                 'comment': 0,
                 'default': 1,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'duration': '1.239819',
'duration_ts': 54676,
'index': 1,
'max_bit_rate': '128000',
'nb_frames': '55',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
'time_base': '1/44100']}
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '3/100',
 'codec_type': 'video',
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 'coded_width': 800,
 'disposition': {'attached_pic': 0,
                  'clean_effects': 0,

```

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        'comment': 0,
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        'dub': 0,
        'forced': 0,
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        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '1.200000',
'duration_ts': 15360,
'has_b_frames': 2,
'height': 630,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '20',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '50/3',
'refs': 1,
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'VideoHandler', 'language': 'und'},
'time_base': '1/12800',
'width': 790}]
[{'avg_frame_rate': '3317760/125089',
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'bits_per_raw_sample': '8',
'chroma_location': 'left',
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'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '125089/6635520',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 1280,
'color_primaries': 'bt470bg',
'color_range': 'tv',
'color_space': 'smpte170m',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
'clean_effects': 0,
'comment': 0,

```

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        'dub': 0,
        'forced': 0,
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        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
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'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '216',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
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'start_time': '0.000000',
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        'language': 'und'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
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'channels': 2,
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,

```

```

        'karaoke': 0,
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        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
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'duration_ts': 272384,
'index': 1,
'max_bit_rate': '127999',
'nb_frames': '266',
'profile': 'LC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc. Created on: '
        '06/20/2022.',
        'language': 'und'},
'time_base': '1/44100']}
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'bit_rate': '11397433',
'bits_per_raw_sample': '8',
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'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
'codec_name': 'h264',
'codec_tag': '0x31637661',
'codec_tag_string': 'avc1',
'codec_time_base': '1/60',
'codec_type': 'video',
'coded_height': 720,
'coded_width': 1280,
'color_primaries': 'bt709',
'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
'disposition': {'attached_pic': 0,
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        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,

```



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        'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'has_b_frames': 2,
'height': 720,
'index': 0,
'is_avc': 'true',
'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
'pix_fmt': 'yuv420p',
'profile': 'High',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
        'handler_name': 'VideoHandler',
        'language': 'und',
        'timecode': '01:00:00:00'},
'time_base': '1/15360',
'width': 1280},
{'avg_frame_rate': '0/0',
'bit_rate': '197598',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
                'clean_effects': 0,
                'comment': 0,
                'default': 1,
                'dub': 0,
                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
'duration': '1.536000',
'duration_ts': 73728,

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'index': 1,
'max_bit_rate': '197598',
'nb_frames': '72',
'profile': 'LC',
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'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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         'language': 'und'},
'time_base': '1/48000'},
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 'codec_tag_string': 'tmcd',
 'codec_type': 'data',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
                  'default': 0,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '1.533333',
 'duration_ts': 23552,
 'index': 2,
 'nb_frames': '1',
 'r_frame_rate': '0/0',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
          'handler_name': 'TimeCodeHandler',
          'language': 'eng',
          'timecode': '01:00:00:00'},
 'time_base': '1/15360'}}]
[{'avg_frame_rate': '18694/625',
 'bit_rate': '5219735',
 'chroma_location': 'left',
 'codec_long_name': 'MPEG-4 part 2',
 'codec_name': 'mpeg4',
 'codec_tag': '0x64697678',

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'codec_tag_string': 'xvid',
'codec_time_base': '625/18694',
'codec_type': 'video',
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'coded_width': 960,
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'disposition': {'attached_pic': 0,
                 'clean_effects': 0,
                 'comment': 0,
                 'default': 0,
                 'dub': 0,
                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
'divx_packed': 'false',
'duration': '11.166684',
'duration_ts': 334,
'has_b_frames': 0,
'height': 540,
'index': 0,
'level': 3,
'nb_frames': '334',
'pix_fmt': 'yuv420p',
'profile': 'Simple Profile',
'quarter_sample': 'false',
'r_frame_rate': '18694/625',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'time_base': '625/18694',
'width': 960},
{'avg_frame_rate': '0/0',
 'bit_rate': '128000',
 'bits_per_sample': 0,
 'channel_layout': 'stereo',
 'channels': 2,
 'codec_long_name': 'MP3 (MPEG audio layer 3)',
 'codec_name': 'mp3',
 'codec_tag': '0x0055',
 'codec_tag_string': 'U[0][0][0]',
 'codec_time_base': '1/44100',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,

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        'comment': 0,
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        'dub': 0,
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        'lyrics': 0,
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        'comment': 0,
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        'lyrics': 0,
        'original': 0,

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'profile': 'High',
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'refs': 1,
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'channels': 2,
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
'codec_type': 'audio',
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                'forced': 0,
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 'codec_type': 'data',
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                  'karaoke': 0,
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                  'original': 0,
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 'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
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          'language': 'eng',
          'timecode': '01:00:00:00'},
 'time_base': '1/15360'}}]
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'color_space': 'bt709',
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'disposition': {'attached_pic': 0,
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'profile': 'High',
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'codec_tag_string': 'mp4a',
'codec_time_base': '1/48000',
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                 'forced': 0,
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                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
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 'codec_tag_string': 'tmcd',
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                  'comment': 0,
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'codec_tag_string': 'avc1',
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'codec_type': 'video',
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'disposition': {'attached_pic': 0,
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        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
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        'original': 0,
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'level': 31,

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'profile': 'High',
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'codec_name': 'mp3',
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'codec_type': 'audio',
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                  'comment': 0,
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                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
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'index': 1,
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'start_time': '0.000000',
'tags': {'handler_name': 'SoundHandler', 'language': 'und'},
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'color_range': 'tv',
'color_space': 'bt709',
'color_transfer': 'bt709',
'display_aspect_ratio': '16:9',
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                 'forced': 0,
                 'hearing_impaired': 0,
                 'karaoke': 0,
                 'lyrics': 0,
                 'original': 0,
                 'timed_thumbnails': 0,
                 'visual_impaired': 0},
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'height': 720,
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'level': 31,
'nal_length_size': '4',
'nb_frames': '46',
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'profile': 'High',
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'refs': 1,
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 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
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 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
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                  'forced': 0,
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                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
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 'duration_ts': 73728,
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{'avg_frame_rate': '30/1',
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 'codec_tag': '0x64636d74',
 'codec_tag_string': 'tmcd',
 'codec_type': 'data',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
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'duration_ts': 23552,
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        'timecode': '01:00:00:00'},
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 'codec_name': 'h264',
 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
 'codec_time_base': '500/16757',
 'codec_type': 'video',
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 'color_range': 'tv',
 'color_space': 'bt709',
 'color_transfer': 'bt709',
 'display_aspect_ratio': '2:3',
 'disposition': {'attached_pic': 0,
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'profile': 'Main',
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'refs': 1,
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'start_time': '0.000000',
'tags': {'creation_time': '2020-09-19T20:22:11.000000Z',
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'width': 240},
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'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
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                'comment': 0,
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                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
'duration': '30.928980',
'duration_ts': 1363968,

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'start_time': '0.000000',
'tags': {'creation_time': '2020-09-19T20:22:11.000000Z',
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         'language': 'eng'},
'time_base': '1/44100']}
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 'codec_tag': '0x31637661',
 'codec_tag_string': 'avc1',
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 'codec_type': 'video',
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 'coded_width': 576,
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 'disposition': {'attached_pic': 0,
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                  'comment': 0,
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                  'forced': 0,
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                  'original': 0,
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                  'visual_impaired': 0},
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 'nal_length_size': '4',
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```

```

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         'language': 'und'},
'time_base': '1/30000',
'width': 576},
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 'codec_name': 'aac',
 'codec_tag': '0x6134706d',
 'codec_tag_string': 'mp4a',
 'codec_time_base': '1/48000',
 'codec_type': 'audio',
 'disposition': {'attached_pic': 0,
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                  'comment': 0,
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                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
                  'timed_thumbnails': 0,
                  'visual_impaired': 0},
 'duration': '5.013333',
 'duration_ts': 240640,
 'index': 1,
 'max_bit_rate': '192000',
 'nb_frames': '235',
 'profile': 'LC',
 'r_frame_rate': '0/0',
 'sample_fmt': 'fltp',
 'sample_rate': '48000',
 'start_pts': 0,
 'start_time': '0.000000',
 'tags': {'creation_time': '2022-10-03T05:57:20.000000Z',
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  'codec_tag_string': 'avc1',
  'codec_time_base': '1/60',
  'codec_type': 'video',
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  'coded_width': 1280,
  'color_primaries': 'bt709',
  'color_range': 'tv',
  'color_space': 'bt709',
  'color_transfer': 'bt709',
  'display_aspect_ratio': '16:9',
  'disposition': {'attached_pic': 0,
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                  'forced': 0,
                  'hearing_impaired': 0,
                  'karaoke': 0,
                  'lyrics': 0,
                  'original': 0,
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                  'visual_impaired': 0},
  'duration': '1.533333',
  'duration_ts': 23552,
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  'height': 720,
  'index': 0,
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  'level': 31,
  'nal_length_size': '4',
  'nb_frames': '46',
  'pix_fmt': 'yuv420p',
  'profile': 'High',
  'r_frame_rate': '30/1',
  'refs': 1,
  'sample_aspect_ratio': '1:1',
  'start_pts': 0,
  'start_time': '0.000000',
  'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',

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     'channels': 2,
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     'codec_name': 'aac',
     'codec_tag': '0x6134706d',
     'codec_tag_string': 'mp4a',
     'codec_time_base': '1/48000',
     'codec_type': 'audio',
     'disposition': {'attached_pic': 0,
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                     'comment': 0,
                     'default': 1,
                     'dub': 0,
                     'forced': 0,
                     'hearing_impaired': 0,
                     'karaoke': 0,
                     'lyrics': 0,
                     'original': 0,
                     'timed_thumbnails': 0,
                     'visual_impaired': 0},
     'duration': '1.536000',
     'duration_ts': 73728,
     'index': 1,
     'max_bit_rate': '197598',
     'nb_frames': '72',
     'profile': 'LC',
     'r_frame_rate': '0/0',
     'sample_fmt': 'fltp',
     'sample_rate': '48000',
     'start_pts': 0,
     'start_time': '0.000000',
     'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
              'handler_name': 'SoundHandler',
              'language': 'und'},
     'time_base': '1/48000'},
    {'avg_frame_rate': '30/1',
     'bit_rate': '20',
     'codec_tag': '0x64636d74',
     'codec_tag_string': 'tmcd',
     'codec_type': 'data',

```

```

'disposition': {'attached_pic': 0,
                'clean_effects': 0,
                'comment': 0,
                'default': 0,
                'dub': 0,
                'forced': 0,
                'hearing_impaired': 0,
                'karaoke': 0,
                'lyrics': 0,
                'original': 0,
                'timed_thumbnails': 0,
                'visual_impaired': 0},
'duration': '1.533333',
'duration_ts': 23552,
'index': 2,
'nb_frames': '1',
'r_frame_rate': '0/0',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'creation_time': '2022-08-31T17:37:54.000000Z',
         'handler_name': 'TimeCodeHandler',
         'language': 'eng',
         'timecode': '01:00:00:00'},
'time_base': '1/15360']}
[{'avg_frame_rate': '30/1',
  'bit_rate': '249886',
  'bits_per_raw_sample': '8',
  'chroma_location': 'left',
  'codec_long_name': 'H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10',
  'codec_name': 'h264',
  'codec_tag': '0x31637661',
  'codec_tag_string': 'avc1',
  'codec_time_base': '1/60',
  'codec_type': 'video',
  'coded_height': 368,
  'coded_width': 480,
  'color_primaries': 'bt709',
  'color_range': 'tv',
  'color_space': 'bt709',
  'color_transfer': 'bt709',
  'display_aspect_ratio': '4:3',
  'disposition': {'attached_pic': 0,
                  'clean_effects': 0,
                  'comment': 0,
                  'default': 1,
                  'dub': 0,
                  'forced': 0,
                  'hearing_impaired': 0,

```

```

        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},
'duration': '7.233333',
'duration_ts': 111104,
'has_b_frames': 1,
'height': 360,
'index': 0,
'is_avc': 'true',
'level': 30,
'nal_length_size': '4',
'nb_frames': '217',
'pix_fmt': 'yuv420p',
'profile': 'Main',
'r_frame_rate': '30/1',
'refs': 1,
'sample_aspect_ratio': '1:1',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
        'language': 'und'},
'time_base': '1/15360',
'width': 480},
{'avg_frame_rate': '0/0',
'bit_rate': '30720',
'bits_per_sample': 0,
'channel_layout': 'stereo',
'channels': 2,
'codec_long_name': 'AAC (Advanced Audio Coding)',
'codec_name': 'aac',
'codec_tag': '0x6134706d',
'codec_tag_string': 'mp4a',
'codec_time_base': '1/44100',
'codec_type': 'audio',
'disposition': {'attached_pic': 0,
        'clean_effects': 0,
        'comment': 0,
        'default': 1,
        'dub': 0,
        'forced': 0,
        'hearing_impaired': 0,
        'karaoke': 0,
        'lyrics': 0,
        'original': 0,
        'timed_thumbnails': 0,
        'visual_impaired': 0},

```

```

'duration': '7.383946',
'duration_ts': 325632,
'index': 1,
'max_bit_rate': '30721',
'nb_frames': '159',
'profile': 'HE-AAC',
'r_frame_rate': '0/0',
'sample_fmt': 'fltp',
'sample_rate': '44100',
'start_pts': 0,
'start_time': '0.000000',
'tags': {'handler_name': 'ISO Media file produced by Google Inc.',
         'language': 'und'},
'time_base': '1/44100'}]]

```

1.4 DataFrame head and tail

First I will show an example of another file and then of all the files together.

```
[8]: df = pd.DataFrame(ffmpeg.probe("/home/raz/Downloads/mal_mp4/mal_mp4/
↳2a195ea405ea3f1a25d93c6f7ccca043dc80badfbbf1b663c15a60d62c97779a")["streams"])
```

pandas. head () function is used to access the first n rows of a dataframe or series. It returns a smaller version of the caller object with the first few entries.

```
[9]: df.head()
```

```
[9]:
```

	index	codec_name		codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High		
1	1	aac	AAC (Advanced Audio Coding)	LC		

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	50/2997	avc1	0x31637661	1280.0	720.0	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	

	...	bit_rate	bits_per_raw_sample	nb_frames	\
0	...	1142210	8	443	
1	...	128298	NaN	637	

		disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...		
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...		

		tags	sample_fmt	sample_rate	\
0	{'creation_time': '2020-04-30T11:47:30.000000Z...		NaN	NaN	
1	{'creation_time': '2020-04-30T11:47:30.000000Z...		fltp	44100	

	channels	channel_layout	bits_per_sample
--	----------	----------------	-----------------

0	NaN	NaN	NaN
1	2.0	stereo	0.0

[2 rows x 42 columns]

pandas.DataFrame.tail DataFrame.tail(n=5) -> Return the last n rows.

This function returns last n rows from the object based on position. It is useful for quickly verifying data, for example, after sorting or appending rows.

For negative values of n, this function returns all rows except the first |n| rows, equivalent to df[|n|:]. If n is larger than the number of rows, this function returns all rows.

[10]: df.tail()

```
[10]:      index codec_name          codec_long_name profile \
0         0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1         1       aac          AAC (Advanced Audio Coding)        LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0         video         50/2997          avc1 0x31637661  1280.0   720.0
1         audio         1/44100          mp4a 0x6134706d    NaN     NaN

      ... bit_rate  bits_per_raw_sample  nb_frames \
0      ...  1142210                8          443
1      ...   128298              NaN          637

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt  sample_rate \
0  {'creation_time': '2020-04-30T11:47:30.000000Z...    NaN          NaN
1  {'creation_time': '2020-04-30T11:47:30.000000Z...   fltp          44100

      channels channel_layout bits_per_sample
0         NaN          NaN          NaN
1         2.0        stereo          0.0

[2 rows x 42 columns]
```

```
[11]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
#https://www.thepythoncode.com/article/extract-media-metadata-in-python
for file in files:
    df = pd.DataFrame(ffmpeg.probe(file)["streams"])
    ↵
    ↪ print("-----")
    print(df.head())
```

```
↳ print("-----
```

```
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1      1        aac          AAC (Advanced Audio Coding)      LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video           1/60              avc1 0x31637661 1920.0 1080.0
1      audio           1/44100            mp4a 0x6134706d   NaN    NaN

... bits_per_raw_sample nb_frames \
0 ...              8        268
1 ...             NaN        387

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...   NaN    NaN
1 {'language': 'und', 'handler_name': 'ISO Media... fltp   44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN              NaN              NaN        NaN
1      2.0              stereo            0.0        127999
```

```
[2 rows x 43 columns]
```

```
-----
index codec_name          codec_long_name profile \
0      0        aac          AAC (Advanced Audio Coding)      LC
1      1      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main

codec_type codec_time_base codec_tag_string  codec_tag sample_fmt \
0      audio           1/48000            mp4a 0x6134706d   fltp
1      video           1001/60000          avc1 0x31637661   NaN

sample_rate ... sample_aspect_ratio display_aspect_ratio pix_fmt level \
0      48000 ...              NaN              NaN    NaN    NaN
1      NaN ...              1:1              16:9  yuv420p 40.0

color_range chroma_location refs is_avc nal_length_size \
0      NaN              NaN    NaN    NaN        NaN
```

```

1          tv          left  1.0  true          4

bits_per_raw_sample
0          NaN
1          8

[2 rows x 40 columns]
-----
-----
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac      AAC (Advanced Audio Coding)  HE-AAC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video      27817/2949120          avc1  0x31637661  728.0  720.0  ...
1      audio          1/44100          mp4a  0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0          8          384
1          NaN         276

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN   NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp   44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN          NaN          NaN          NaN
1      2.0          stereo          0.0          65259

[2 rows x 37 columns]
-----
-----
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac      AAC (Advanced Audio Coding)  LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video      1147/132720          avc1  0x31637661  528.0  640.0  ...
1      audio          1/44100          mp4a  0x6134706d   NaN   NaN   ...

```



```

bits_per_raw_sample  nb_frames  \
0                    8          553
1                   NaN          412

                                disposition  \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate  \
0 {'creation_time': '2019-12-10T19:51:50.000000Z...      NaN      NaN
1 {'creation_time': '2019-12-10T19:51:50.000000Z...      fltp      44100

channels channel_layout bits_per_sample max_bit_rate
0        NaN           NaN           NaN           NaN
1        1.0          mono           0.0          32000

[2 rows x 43 columns]
-----
-----
-----

index codec_name                                codec_long_name profile  \
0      0        h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1      1         aac              AAC (Advanced Audio Coding)      LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ...  \
0      video           1/60              avc1  0x31637661  360.0  360.0  ...
1      audio          1/48000             mp4a  0x6134706d    NaN    NaN  ...

bits_per_raw_sample  nb_frames  \
0                    8          52
1                   NaN          88

                                disposition  \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate  \
0 {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...      fltp      48000

channels channel_layout bits_per_sample max_bit_rate
0        NaN           NaN           NaN           NaN
1        2.0          stereo           0.0          128000

[2 rows x 43 columns]
-----
-----

```

```

-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1         1         aac          AAC (Advanced Audio Coding)         LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video  139259/4177920                avc1  0x31637661  474.0  474.0  ...
1         audio           1/48000                mp4a  0x6134706d   NaN   NaN   ...

      bits_per_raw_sample  nb_frames \
0                        8          272
1                       NaN          849

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN       NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp       48000

      channels channel_layout  bits_per_sample max_bit_rate
0         NaN             NaN             NaN             NaN
1         2.0           stereo             0.0           195869

[2 rows x 39 columns]

```

```

-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1         1         aac          AAC (Advanced Audio Coding)         LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  \
0         video  1001/60000                avc1  0x31637661 1440.0 1080.0
1         audio           1/48000                mp4a  0x6134706d   NaN   NaN

      ... bits_per_raw_sample  nb_frames \
0  ...                        8          82
1  ...                       NaN          130

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \

```

0	{'creation_time': '2020-02-07T16:12:23.000000Z...	NaN	NaN
1	{'creation_time': '2020-02-07T16:12:23.000000Z...	fltp	48000

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	242625

[2 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

index	codec_name	codec_long_name	profile	\
-------	------------	-----------------	---------	---

```

0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac          AAC (Advanced Audio Coding)          LC
2      2      NaN                                  NaN          NaN

      codec_type codec_time_base codec_tag_string      codec_tag      width      height \
0      video          1/60          avc1 0x31637661      1280.0      720.0
1      audio          1/48000        mp4a 0x6134706d          NaN          NaN
2      data          NaN          tmcd 0x64636d74          NaN          NaN

      ... bits_per_raw_sample      nb_frames \
0      ...          8          46
1      ...          NaN          72
2      ...          NaN          1

                                disposition \
0      {'default': 1, 'dub': 0, 'original': 0, 'comme...
1      {'default': 1, 'dub': 0, 'original': 0, 'comme...
2      {'default': 0, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0      {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN          NaN
1      {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp          48000
2      {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN          NaN

      channels channel_layout bits_per_sample max_bit_rate
0      NaN          NaN          NaN          NaN
1      2.0          stereo          0.0          197598
2      NaN          NaN          NaN          NaN

[3 rows x 43 columns]

-----
-----
-----

      index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High

      codec_type codec_time_base codec_tag_string      codec_tag      width      height      ... \
0      video          3/173          avc1 0x31637661          500          218      ...

      time_base      start_pts      start_time      duration_ts      duration      bit_rate \
0      1/11072          0          0.000000          14208      1.283237      173586

      bits_per_raw_sample      nb_frames \
0          8          37

                                disposition \
0      {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

```

                                tags
0 {'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 31 columns]
-----
-----
-----
      index codec_name          codec_long_name      profile codec_type \
0         0      mpeg4          MPEG-4 part 2  Simple Profile      video
1         1         mp3  MP3 (MPEG audio layer 3)           NaN      audio

      codec_time_base codec_tag_string  codec_tag  width  height  ... \
0          625/18694          xvid  0x64697678  960.0   540.0  ...
1          1/44100      U[0][0][0]    0x0055    NaN    NaN  ...

      duration_ts  duration  bit_rate nb_frames \
0             334  11.166684   5219735      334
1             429  11.206531   128000      429

                                disposition sample_fmt  sample_rate \
0 {'default': 0, 'dub': 0, 'original': 0, 'comme...      NaN      NaN
1 {'default': 0, 'dub': 0, 'original': 0, 'comme...      fltp      44100

      channels  channel_layout bits_per_sample
0         NaN          NaN          NaN
1         2.0          stereo          0.0

```

```

[2 rows x 36 columns]
-----
-----
-----
      index codec_name          codec_long_name      profile \
0         0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1         1       aac          AAC (Advanced Audio Coding)         LC
2         2       NaN                               NaN          NaN

      codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0       video          1/60          avc1  0x31637661  1280.0   720.0
1       audio          1/48000         mp4a  0x6134706d    NaN    NaN
2       data           NaN          tmcd  0x64636d74    NaN    NaN

      ...  bits_per_raw_sample  nb_frames \
0  ...             8             46
1  ...           NaN             72
2  ...           NaN             1

```

```

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

    channels channel_layout bits_per_sample max_bit_rate
0          NaN           NaN           NaN           NaN
1          2.0          stereo           0.0          197598
2          NaN           NaN           NaN           NaN

[3 rows x 43 columns]
-----
-----
-----
    index codec_name                                codec_long_name profile \
0        0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      Main
1        1        aac                                AAC (Advanced Audio Coding)      LC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0        video           1/60                avc1  0x31637661  640.0   640.0  ...
1        audio           1/44100              mp4a  0x6134706d    NaN    NaN  ...

    bits_per_raw_sample  nb_frames \
0                8          180
1               NaN          214

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

    channels channel_layout bits_per_sample max_bit_rate
0          NaN           NaN           NaN           NaN
1          2.0          stereo           0.0          64503

[2 rows x 41 columns]
-----
-----

```

```

-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1         1         aac          AAC (Advanced Audio Coding)         LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video          1/48             avc1 0x31637661  320.0  320.0  ...
1         audio          1/44100           mp4a 0x6134706d   NaN   NaN   ...

      bits_per_raw_sample  nb_frames \
0                        8         307
1                       NaN         551

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags  sample_fmt sample_rate \
0 {'creation_time': '2022-05-22T01:24:42.000000Z...   NaN       NaN
1 {'creation_time': '2022-05-22T01:24:42.000000Z...   fltp      44100

      channels channel_layout bits_per_sample max_bit_rate
0         NaN          NaN          NaN          NaN
1         1.0          mono          0.0        36784

[2 rows x 41 columns]

```

```

-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1         1         aac          AAC (Advanced Audio Coding)         LC
2         2         NaN                               NaN          NaN

      codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0         video          1/60             avc1 0x31637661 1280.0  720.0
1         audio          1/48000           mp4a 0x6134706d   NaN   NaN
2         data           NaN              tmcd 0x64636d74   NaN   NaN

      ... bits_per_raw_sample  nb_frames \
0  ...                        8         46
1  ...                       NaN         72
2  ...                       NaN          1

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

```

1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

```

```

                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...'      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...'      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...'      NaN      NaN

```

```

    channels channel_layout bits_per_sample max_bit_rate
0         NaN           NaN           NaN           NaN
1         2.0         stereo           0.0        197598
2         NaN           NaN           NaN           NaN

```

[3 rows x 43 columns]

```

-----
-----
-----
index codec_name                                codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1      1       aac              AAC (Advanced Audio Coding)      LC

```

```

    codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video           1/60          avc1  0x31637661  360.0  360.0  ...
1      audio          1/48000         mp4a  0x6134706d   NaN   NaN   ...

```

```

    bits_per_raw_sample  nb_frames \
0              8           52
1             NaN           88

```

```

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

```

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...'      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...'      fltp      48000

```

```

    channels channel_layout bits_per_sample max_bit_rate
0         NaN           NaN           NaN           NaN
1         2.0         stereo           0.0        128000

```

[2 rows x 43 columns]

```

-----
-----
-----
index codec_name                                codec_long_name  profile \

```



```

0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)  HE-AACv2

  codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video      269/17880      avc1  0x31637661  1036.0  576.0
1      audio      1/44100      mp4a  0x6134706d      NaN      NaN

  ...  bits_per_raw_sample  nb_frames \
0  ...      8      298
1  ...      NaN      198

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0  {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
1  {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

  channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      32256

[2 rows x 43 columns]
-----
-----
-----
-----
  index codec_name      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)      LC

  codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video      1/60      avc1  0x31637661  1280.0  720.0
1      audio      1/44100      mp4a  0x6134706d      NaN      NaN

  ...  bit_rate  bits_per_raw_sample  nb_frames \
0  ...  2119170      8      571
1  ...  127999      NaN      820

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0  {'creation_time': '2022-10-02T18:26:57.000000Z...      NaN      NaN
1  {'creation_time': '2022-10-02T18:26:57.000000Z...      fltp      44100

```

```

    channels channel_layout bits_per_sample
0      NaN          NaN          NaN
1      2.0          stereo          0.0

[2 rows x 42 columns]
-----
-----
-----
    index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac      AAC (Advanced Audio Coding)      LC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video          1/60          avc1  0x31637661  1280.0  720.0
1      audio          1/48000        mp4a  0x6134706d    NaN    NaN

    ... bits_per_raw_sample  nb_frames \
0  ...          8          151
1  ...          NaN          237

    disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

    tags sample_fmt sample_rate \
0  {'language': 'und', 'handler_name': 'VideoHand...    NaN    NaN
1  {'language': 'und', 'handler_name': 'SoundHand...  fltp    48000

    channels channel_layout bits_per_sample max_bit_rate
0      NaN          NaN          NaN          NaN
1      2.0          stereo          0.0          128435

[2 rows x 42 columns]
-----
-----
-----
    index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac      AAC (Advanced Audio Coding)      LC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video          50/2997          avc1  0x31637661  1280.0  720.0
1      audio          1/44100          mp4a  0x6134706d    NaN    NaN

    ... bit_rate  bits_per_raw_sample  nb_frames \
0  ...  1142210          8          443

```

```

1 ... 128298 NaN 637

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'creation_time': '2020-04-30T11:47:30.000000Z... NaN NaN
1 {'creation_time': '2020-04-30T11:47:30.000000Z... fltp 44100

channels channel_layout bits_per_sample
0 NaN NaN NaN
1 2.0 stereo 0.0

[2 rows x 42 columns]
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0 video 1/48 avc1 0x31637661 854.0 480.0 ...
1 audio 1/44100 mp4a 0x6134706d NaN NaN ...

bits_per_raw_sample nb_frames \
0 8 3784
1 NaN 6793

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand... NaN NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp 44100

channels channel_layout bits_per_sample max_bit_rate
0 NaN NaN NaN NaN
1 2.0 stereo 0.0 129505

[2 rows x 43 columns]
-----
-----
-----

```

```

    index codec_name                                codec_long_name \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10

    profile codec_type codec_time_base codec_tag_string \
0  Constrained Baseline      video      1/60      avc1

    codec_tag width height ... time_base start_pts start_time \
0 0x31637661    538    360 ...    1/15360      0    0.000000

    duration_ts duration bit_rate bits_per_raw_sample nb_frames \
0          512  0.033333  5658960      8          1

    disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...

    tags
0 {'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 35 columns]
-----
-----
-----
-----
    index codec_name                                codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)      LC

    codec_type codec_time_base codec_tag_string codec_tag width height ... \
0      video    18925/908842      avc1 0x31637661 480.0 480.0 ...
1      audio      1/44100      mp4a 0x6134706d   NaN   NaN ...

    bits_per_raw_sample nb_frames \
0          8          758
1         NaN         1361

    disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

    tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN   NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp   44100

    channels channel_layout bits_per_sample max_bit_rate
0         NaN         NaN         NaN         NaN
1         2.0        stereo         0.0       256000

[2 rows x 39 columns]

```

```

-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0 video 1/60 avc1 0x31637661 640.0 360.0 ...
1 audio 1/44100 mp4a 0x6134706d NaN NaN ...

bits_per_raw_sample nb_frames \
0 8 247
1 NaN 356

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand... NaN NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp 44100

channels channel_layout bits_per_sample max_bit_rate
0 NaN NaN NaN NaN
1 2.0 stereo 0.0 64000

```

[2 rows x 39 columns]

```

-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC
2 2 NaN NaN NaN

codec_type codec_time_base codec_tag_string codec_tag width height \
0 video 1/60 avc1 0x31637661 1280.0 720.0
1 audio 1/48000 mp4a 0x6134706d NaN NaN
2 data NaN tmcd 0x64636d74 NaN NaN

... bits_per_raw_sample nb_frames \
0 ... 8 46
1 ... NaN 72
2 ... NaN 1

```

```

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

    channels channel_layout bits_per_sample max_bit_rate
0          NaN           NaN           NaN           NaN
1          2.0         stereo           0.0         197598
2          NaN           NaN           NaN           NaN

[3 rows x 43 columns]
-----
-----
-----
    index codec_name                                codec_long_name profile \
0        0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High

    codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video           1/60             avc1 0x31637661   248   178  ...

    time_base  start_pts  start_time duration_ts  duration bit_rate \
0    1/15360           0    0.000000      95232  6.200000   17051

    bits_per_raw_sample nb_frames \
0                        8       186

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags
0 {'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 33 columns]
-----
-----
-----
    index codec_name                                codec_long_name profile \
0        0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1        1          aac              AAC (Advanced Audio Coding)      LC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height \

```

```

0      video          1/60          avc1 0x31637661 1280.0 720.0
1      audio          1/44100        mp4a 0x6134706d   NaN   NaN

... bit_rate bits_per_raw_sample nb_frames \
0 ... 213834          8          210
1 ... 128471          NaN         302

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-09-01T05:23:46.000000Z...   NaN   NaN
1 {'creation_time': '2022-09-01T05:23:46.000000Z...  fltp  44100

channels channel_layout bits_per_sample
0      NaN          NaN          NaN
1      2.0          stereo        0.0

[2 rows x 42 columns]
-----
-----
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac      AAC (Advanced Audio Coding)          LC

codec_type codec_time_base codec_tag_string  codec_tag width height ... \
0      video          125/7118          avc1 0x31637661 648.0 480.0 ...
1      audio          1/44100          mp4a 0x6134706d   NaN   NaN ...

bits_per_raw_sample nb_frames \
0          8          116
1          NaN         179

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'eng', 'handler_name': 'VideoHand...   NaN   NaN
1 {'language': 'und', 'handler_name': 'ISO Media...  fltp  44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN          NaN          NaN          NaN
1      2.0          stereo        0.0          128000

```

[2 rows x 41 columns]

```
-----
-----
-----
index codec_name          codec_long_name codec_type codec_time_base \
0      0      rawvideo          raw video      video          1/10
1      1          mp3  MP3 (MPEG audio layer 3)      audio          1/147

codec_tag_string codec_tag width height coded_width ... start_time \
0      [0][0][0][0]  0x0000 260.0  40.0      260.0  ...  0.000000
1      U[0][0][0]  0x0055  NaN   NaN      NaN   ...  0.000000

duration_ts duration bit_rate nb_frames \
0          17.0  1.700000  2652000      17
1          NaN   NaN   128000      71

disposition sample_fmt sample_rate \
0 {'default': 0, 'dub': 0, 'original': 0, 'comme...  NaN      NaN
1 {'default': 0, 'dub': 0, 'original': 0, 'comme...  fltp      147

channels bits_per_sample
0      NaN      NaN
1      2.0      0.0
```

[2 rows x 29 columns]

```
-----
-----
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  Main
1      1      aac          AAC (Advanced Audio Coding)      LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0      video      8081/312320          avc1 0x31637661 854.0  602.0  ...
1      audio          1/44100          mp4a 0x6134706d  NaN   NaN   ...

bits_per_raw_sample nb_frames \
0          8          61
1          NaN          48

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...  NaN      NaN
```



```
1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100
```

```
    channels channel_layout bits_per_sample max_bit_rate
0         NaN             NaN             NaN             NaN
1         2.0           stereo             0.0           61743
```

```
[2 rows x 41 columns]
```

```
-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1         1        aac                      AAC (Advanced Audio Coding)   LC
2         2        NaN                               NaN       NaN
```

```
      codec_type codec_time_base codec_tag_string   codec_tag   width  height \
0         video             1/60              avc1 0x31637661 1280.0  720.0
1         audio             1/48000            mp4a 0x6134706d   NaN    NaN
2         data              NaN              tmcd 0x64636d74   NaN    NaN
```

```
      ... bits_per_raw_sample  nb_frames \
0      ...                   8          46
1      ...                  NaN          72
2      ...                  NaN           1
```

```
                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...
```

```
                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...   NaN       NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...   fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...   NaN       NaN
```

```
    channels channel_layout bits_per_sample max_bit_rate
0         NaN             NaN             NaN             NaN
1         2.0           stereo             0.0           197598
2         NaN             NaN             NaN             NaN
```

```
[3 rows x 43 columns]
```

```
-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
```

```

1      1      aac      AAC (Advanced Audio Coding)      LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ...  \
0      video      1/50      avc1  0x31637661  544.0  306.0  ...
1      audio      1/44100      mp4a  0x6134706d      NaN      NaN  ...

      bits_per_raw_sample  nb_frames  \
0      8      812
1      NaN      1401

      disposition  \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

      tags sample_fmt sample_rate  \
0  {'creation_time': '2010-05-20T08:21:12.000000Z...      NaN      NaN
1  {'creation_time': '2010-05-20T08:21:12.000000Z...      fltp      44100

      channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      1.0      mono      0.0      94850

[2 rows x 41 columns]
-----
-----
-----
-----
      index codec_name      codec_long_name profile  \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ...  \
0      video      1/20      avc1  0x31637661      350      350  ...

      time_base  start_pts  start_time duration_ts  duration bit_rate  \
0      1/10240      0      0.000000      10240  1.000000  107904

      bits_per_raw_sample  nb_frames  \
0      8      10

      disposition  \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...

      tags
0  {'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 31 columns]
-----
-----

```

```

-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1         1         aac                      AAC (Advanced Audio Coding)   LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video   134651/2734080                avc1  0x31637661  474.0   218.0   ...
1         audio    1/48000                      mp4a  0x6134706d   NaN    NaN    ...

      bits_per_raw_sample  nb_frames \
0                          8         89
1                         NaN        413

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN    NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp    48000

      channels channel_layout  bits_per_sample max_bit_rate
0         NaN             NaN             NaN             NaN
1         2.0            stereo             0.0            196389

```

[2 rows x 39 columns]

```

-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1         1         aac                      AAC (Advanced Audio Coding)   LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  \
0         video    1/50                avc1  0x31637661 1920.0 1080.0
1         audio    1/96000             mp4a  0x6134706d   NaN    NaN

      ... bits_per_raw_sample  nb_frames \
0  ...             8         724
1  ...             NaN        2716

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \

```

0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	96000

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	1000000

[2 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	500/29901	avc1	0x31637661	690.0	480.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	30	
1	NaN	55	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	128000

[2 rows x 39 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	3/100	avc1	0x31637661	790	630	...	

	time_base	start_pts	start_time	duration_ts	duration	bit_rate	\
--	-----------	-----------	------------	-------------	----------	----------	---

```
0    1/12800          0    0.000000          15360  1.200000  544500
```

```
    bits_per_raw_sample nb_frames \
0              8          20
```

```
                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
```

```
                                tags
0 {'language': 'und', 'handler_name': 'VideoHand...
```

```
[1 rows x 31 columns]
```

```
-----
-----
-----
```

```
    index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac          AAC (Advanced Audio Coding)      LC
```

```
    codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video  125089/6635520          avc1  0x31637661  1280.0  720.0
1      audio          1/44100          mp4a  0x6134706d    NaN    NaN
```

```
    ... bits_per_raw_sample nb_frames \
0  ...              8          216
1  ...              NaN          266
```

```
                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
```

```
                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...    NaN    NaN
1 {'language': 'und', 'handler_name': 'ISO Media...    fltp    44100
```

```
    channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0    127999
```

```
[2 rows x 43 columns]
```

```
-----
-----
-----
```

```
    index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10  High
1      1      aac          AAC (Advanced Audio Coding)      LC
```

```

2      2      NaN      NaN      NaN

      codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video      1/60      avc1  0x31637661  1280.0  720.0
1      audio      1/48000      mp4a  0x6134706d      NaN      NaN
2      data      NaN      tmcd  0x64636d74      NaN      NaN

      ...  bits_per_raw_sample  nb_frames \
0  ...      8      46
1  ...      NaN      72
2  ...      NaN      1

      disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...
2  {'default': 0, 'dub': 0, 'original': 0, 'comme...

      tags sample_fmt sample_rate \
0  {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1  {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2  {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

      channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      197598
2      NaN      NaN      NaN      NaN

[3 rows x 43 columns]

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-----

      index codec_name      codec_long_name      profile codec_type \
0      0      mpeg4      MPEG-4 part 2  Simple Profile      video
1      1      mp3      MP3 (MPEG audio layer 3)      NaN      audio

      codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      625/18694      xvid  0x64697678  960.0  540.0  ...
1      1/44100      U[0][0][0]      0x0055      NaN      NaN  ...

      duration_ts  duration  bit_rate nb_frames \
0      334  11.166684  5219735  334
1      429  11.206531  128000  429

      disposition sample_fmt  sample_rate \
0  {'default': 0, 'dub': 0, 'original': 0, 'comme...      NaN      NaN
1  {'default': 0, 'dub': 0, 'original': 0, 'comme...      fltp      44100

```

	channels	channel_layout	bits_per_sample
0	NaN	NaN	NaN
1	2.0	stereo	0.0

[2 rows x 36 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	mp3	MP3 (MPEG audio layer 3)	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	1/60	avc1	0x31637661	640.0	640.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	62	
1	NaN	80	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
--	------	------------	-------------	---

0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	44100

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	128000

[2 rows x 37 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	NaN

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

index	codec_name	codec_long_name	profile	\
-------	------------	-----------------	---------	---

0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main
1	1	aac	AAC (Advanced Audio Coding)	LC

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	500/16757	avc1	0x31637661	240.0	360.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bit_rate	bits_per_raw_sample	nb_frames	\
0	156249		8	518
1	127999	NaN		1332

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2020-09-19T20:22:11.000000Z...	NaN	NaN	
1	{'creation_time': '2020-09-19T20:22:11.000000Z...	fltp	44100	

	channels	channel_layout	bits_per_sample	\
0	NaN	NaN	NaN	
1	2.0	stereo	0.0	

[2 rows x 42 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	1/60	avc1	0x31637661	576.0	1024.0	...	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	147	
1	NaN	235	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-10-03T05:57:20.000000Z...	NaN	NaN	
1	{'creation_time': '2022-10-03T05:57:20.000000Z...	fltp	48000	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	192000

[2 rows x 39 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main	
1	1	aac	AAC (Advanced Audio Coding)	HE-AAC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	1/60	avc1	0x31637661	480.0	360.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	217	
1	NaN	159	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'ISO Media...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'ISO Media...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	30721

[2 rows x 43 columns]

```
[12]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
#https://www.thepythoncode.com/article/extract-media-metadata-in-python
for file in files:
    df = pd.DataFrame(ffmpeg.probe(file)["streams"])
    print("-----")
    print(df.tail())
    print("-----")
```

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1920.0	1080.0	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	268	
1	...	NaN	387	

```

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...      fltp      44100

    channels channel_layout bits_per_sample max_bit_rate
0          NaN          NaN          NaN          NaN
1          2.0          stereo          0.0          127999

```

[2 rows x 43 columns]

```

-----
-----
-----
    index codec_name                                codec_long_name profile \
0        0          aac                        AAC (Advanced Audio Coding)      LC
1        1          h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      Main

    codec_type codec_time_base codec_tag_string  codec_tag sample_fmt \
0        audio          1/48000              mp4a  0x6134706d      fltp
1        video          1001/60000             avc1  0x31637661      NaN

    sample_rate ... sample_aspect_ratio display_aspect_ratio  pix_fmt level \
0        48000 ...              NaN              NaN      NaN      NaN
1         NaN ...              1:1              16:9  yuv420p  40.0

    color_range chroma_location  refs is_avc  nal_length_size \
0          NaN          NaN      NaN      NaN              NaN
1          tv          left    1.0    true              4

    bits_per_raw_sample
0              NaN
1              8

```

[2 rows x 40 columns]

```

-----
-----
-----
    index codec_name                                codec_long_name profile \
0        0          h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1        1          aac                        AAC (Advanced Audio Coding)  HE-AAC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height ... \
0        video  27817/2949120             avc1  0x31637661  728.0   720.0 ...

```

```

1      audio      1/44100      mp4a  0x6134706d      NaN      NaN      ...

      bits_per_raw_sample  nb_frames  \
0          8          384
1          NaN          276

      disposition  \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

      tags  sample_fmt  sample_rate  \
0 {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

      channels  channel_layout  bits_per_sample  max_bit_rate
0          NaN          NaN          NaN          NaN
1          2.0          stereo          0.0          65259

[2 rows x 37 columns]
-----
-----
-----
-----
      index  codec_name      codec_long_name  profile  \
0          0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1          1          aac      AAC (Advanced Audio Coding)      LC

      codec_type  codec_time_base  codec_tag_string  codec_tag  width  height  ...  \
0          video      1147/132720      avc1  0x31637661  528.0  640.0  ...
1          audio      1/44100      mp4a  0x6134706d      NaN      NaN  ...

      bits_per_raw_sample  nb_frames  \
0          8          553
1          NaN          412

      disposition  \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

      tags  sample_fmt  sample_rate  \
0 {'creation_time': '2019-12-10T19:51:50.000000Z...      NaN      NaN
1 {'creation_time': '2019-12-10T19:51:50.000000Z...      fltp      44100

      channels  channel_layout  bits_per_sample  max_bit_rate
0          NaN          NaN          NaN          NaN
1          1.0          mono          0.0          32000

[2 rows x 43 columns]

```

```

-----
-----
-----
index codec_name                      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1      1      aac      AAC (Advanced Audio Coding)             LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video           1/60              avc1 0x31637661 360.0  360.0  ...
1      audio           1/48000            mp4a 0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0                    8         52
1                   NaN         88

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...   NaN   NaN
1 {'language': 'und', 'handler_name': 'ISO Media... fltp  48000

channels channel_layout bits_per_sample max_bit_rate
0      NaN           NaN           NaN           NaN
1      2.0          stereo          0.0          128000

```

[2 rows x 43 columns]

```

-----
-----
-----
index codec_name                      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1      1      aac      AAC (Advanced Audio Coding)             LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video  139259/4177920            avc1 0x31637661 474.0  474.0  ...
1      audio           1/48000            mp4a 0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0                    8         272
1                   NaN         849

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	48000	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	195869

[2 rows x 39 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1001/60000	avc1	0x31637661	1440.0	1080.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	82	
1	...	NaN	130	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2020-02-07T16:12:23.000000Z...	NaN	NaN	
1	{'creation_time': '2020-02-07T16:12:23.000000Z...	fltp	48000	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	242625

[2 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

```
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...
```

```
tags sample_fmt sample_rate \  
0 {'creation_time': '2022-08-31T17:37:54.000000Z...' NaN NaN  
1 {'creation_time': '2022-08-31T17:37:54.000000Z...' fltp 48000  
2 {'creation_time': '2022-08-31T17:37:54.000000Z...' NaN NaN
```

```
channels channel_layout bits_per_sample max_bit_rate  
0 NaN NaN NaN NaN  
1 2.0 stereo 0.0 197598  
2 NaN NaN NaN NaN
```

```
[3 rows x 43 columns]
```

```
-----  
-----  
-----  
index codec_name codec_long_name profile \  
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High  
  
codec_type codec_time_base codec_tag_string codec_tag width height ... \  
0 video 3/173 avc1 0x31637661 500 218 ...
```

```
time_base start_pts start_time duration_ts duration bit_rate \  
0 1/11072 0 0.000000 14208 1.283237 173586
```

```
bits_per_raw_sample nb_frames \  
0 8 37
```

```
disposition \  
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
```

```
tags  
0 {'language': 'und', 'handler_name': 'VideoHand...
```

```
[1 rows x 31 columns]
```

```
-----  
-----  
-----  
index codec_name codec_long_name profile codec_type \  
0 0 mpeg4 MPEG-4 part 2 Simple Profile video  
1 1 mp3 MP3 (MPEG audio layer 3) NaN audio  
  
codec_time_base codec_tag_string codec_tag width height ... \  
0 625/18694 xvid 0x64697678 960.0 540.0 ...  
1 1/44100 U[0][0][0] 0x0055 NaN NaN ...
```

	duration_ts	duration	bit_rate	nb_frames	\
0	334	11.166684	5219735	334	
1	429	11.206531	128000	429	

	disposition	sample_fmt	sample_rate	\
0	{'default': 0, 'dub': 0, 'original': 0, 'comme...	NaN	NaN	
1	{'default': 0, 'dub': 0, 'original': 0, 'comme...	fltp	44100	

	channels	channel_layout	bits_per_sample
0	NaN	NaN	NaN
1	2.0	stereo	0.0

[2 rows x 36 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

```

-----
-----
-----
index codec_name                      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1      1      aac      AAC (Advanced Audio Coding)             LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video              1/60              avc1  0x31637661  640.0  640.0  ...
1      audio              1/44100             mp4a  0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0                      8        180
1                     NaN        214

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN   NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp  44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN              NaN              NaN              NaN
1      2.0              stereo            0.0             64503

```

[2 rows x 41 columns]

```

-----
-----
-----
index codec_name                      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   Main
1      1      aac      AAC (Advanced Audio Coding)             LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video              1/48              avc1  0x31637661  320.0  320.0  ...
1      audio              1/44100             mp4a  0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0                      8        307
1                     NaN        551

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-05-22T01:24:42.000000Z...	NaN	NaN	
1	{'creation_time': '2022-05-22T01:24:42.000000Z...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	1.0	mono	0.0	36784

[2 rows x 41 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

```

-----
      index codec_name          codec_long_name profile \
0         0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1         1         aac          AAC (Advanced Audio Coding)          LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video          1/60          avc1  0x31637661  360.0  360.0  ...
1         audio          1/48000         mp4a  0x6134706d   NaN   NaN   ...

      bits_per_raw_sample  nb_frames \
0                          8         52
1                         NaN         88

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...   NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...  fltp    48000

      channels channel_layout bits_per_sample max_bit_rate
0         NaN          NaN          NaN          NaN
1         2.0          stereo          0.0        128000

[2 rows x 43 columns]

```

```

-----
-----
-----
      index codec_name          codec_long_name  profile \
0         0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1         1         aac          AAC (Advanced Audio Coding)  HE-AACv2

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  \
0         video          269/17880          avc1  0x31637661  1036.0  576.0
1         audio          1/44100          mp4a  0x6134706d   NaN   NaN

      ... bits_per_raw_sample  nb_frames \
0  ...              8         298
1  ...             NaN         198

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...   NaN      NaN

```

```

1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

      channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      32256

[2 rows x 43 columns]
-----
-----
-----
      index codec_name      codec_long_name profile \
0      0      h264      H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)      LC

      codec_type codec_time_base codec_tag_string      codec_tag      width      height \
0      video      1/60      avc1      0x31637661      1280.0      720.0
1      audio      1/44100      mp4a      0x6134706d      NaN      NaN

      ...      bit_rate      bits_per_raw_sample      nb_frames \
0      ...      2119170      8      571
1      ...      127999      NaN      820

      disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

      tags sample_fmt      sample_rate \
0 {'creation_time': '2022-10-02T18:26:57.000000Z...      NaN      NaN
1 {'creation_time': '2022-10-02T18:26:57.000000Z...      fltp      44100

      channels channel_layout bits_per_sample
0      NaN      NaN      NaN
1      2.0      stereo      0.0

[2 rows x 42 columns]
-----
-----
-----
      index codec_name      codec_long_name profile \
0      0      h264      H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)      LC

      codec_type codec_time_base codec_tag_string      codec_tag      width      height \
0      video      1/60      avc1      0x31637661      1280.0      720.0
1      audio      1/48000      mp4a      0x6134706d      NaN      NaN

```

```

... bits_per_raw_sample nb_frames \
0 ... 8 151
1 ... NaN 237

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand... NaN NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp 48000

channels channel_layout bits_per_sample max_bit_rate
0 NaN NaN NaN NaN
1 2.0 stereo 0.0 128435

[2 rows x 42 columns]
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height \
0 video 50/2997 avc1 0x31637661 1280.0 720.0
1 audio 1/44100 mp4a 0x6134706d NaN NaN

... bit_rate bits_per_raw_sample nb_frames \
0 ... 1142210 8 443
1 ... 128298 NaN 637

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'creation_time': '2020-04-30T11:47:30.000000Z... NaN NaN
1 {'creation_time': '2020-04-30T11:47:30.000000Z... fltp 44100

channels channel_layout bits_per_sample
0 NaN NaN NaN
1 2.0 stereo 0.0

[2 rows x 42 columns]
-----
-----

```



```

-----
-----
      index codec_name                                codec_long_name profile \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      Main
1         1         aac      AAC (Advanced Audio Coding)                LC

      codec_type codec_time_base codec_tag_string  codec_tag width height ... \
0         video           1/48             avc1 0x31637661 854.0  480.0  ...
1         audio           1/44100          mp4a 0x6134706d   NaN   NaN   ...

      bits_per_raw_sample nb_frames \
0                 8         3784
1                 NaN        6793

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

      channels channel_layout bits_per_sample max_bit_rate
0         NaN           NaN           NaN           NaN
1         2.0          stereo          0.0          129505

[2 rows x 43 columns]
-----
-----
-----
      index codec_name                                codec_long_name \
0         0         h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10

                                profile codec_type codec_time_base codec_tag_string \
0 Constrained Baseline      video           1/60             avc1

      codec_tag width height ... time_base start_pts start_time \
0 0x31637661    538    360 ...    1/15360          0    0.000000

      duration_ts duration bit_rate  bits_per_raw_sample nb_frames \
0          512  0.033333  5658960              8          1

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags
0 {'language': 'und', 'handler_name': 'VideoHand...

```

[1 rows x 35 columns]

```
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0 video 18925/908842 avc1 0x31637661 480.0 480.0 ...
1 audio 1/44100 mp4a 0x6134706d NaN NaN ...

bits_per_raw_sample nb_frames \
0 8 758
1 NaN 1361

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand... NaN NaN
1 {'language': 'und', 'handler_name': 'SoundHand... fltp 44100

channels channel_layout bits_per_sample max_bit_rate
0 NaN NaN NaN NaN
1 2.0 stereo 0.0 256000
```

[2 rows x 39 columns]

```
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0 video 1/60 avc1 0x31637661 640.0 360.0 ...
1 audio 1/44100 mp4a 0x6134706d NaN NaN ...

bits_per_raw_sample nb_frames \
0 8 247
1 NaN 356

disposition \
```

```

0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
1 {'language': 'und', 'handler_name': 'SoundHand...      fltp      44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN           NaN           NaN           NaN
1      2.0         stereo           0.0         64000

[2 rows x 39 columns]
-----
-----
-----
-----
index codec_name                                codec_long_name profile \
0      0          h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1      1          aac              AAC (Advanced Audio Coding)      LC
2      2          NaN                                NaN      NaN

codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video           1/60          avc1  0x31637661  1280.0  720.0
1      audio           1/48000        mp4a  0x6134706d      NaN    NaN
2      data            NaN            tmcd  0x64636d74      NaN    NaN

... bits_per_raw_sample nb_frames \
0 ...              8          46
1 ...             NaN          72
2 ...             NaN          1

                                disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

channels channel_layout bits_per_sample max_bit_rate
0      NaN           NaN           NaN           NaN
1      2.0         stereo           0.0         197598
2      NaN           NaN           NaN           NaN

[3 rows x 43 columns]
-----

```

```

-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High

      codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0         video           1/60           avc1  0x31637661    248    178  ...

      time_base  start_pts  start_time duration_ts  duration bit_rate \
0      1/15360          0      0.000000      95232  6.200000    17051

      bits_per_raw_sample nb_frames \
0                          8        186

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags
0  {'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 33 columns]
-----
-----
-----
      index codec_name                      codec_long_name profile \
0         0         h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10   High
1         1         aac                      AAC (Advanced Audio Coding)    LC

      codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0         video           1/60           avc1  0x31637661  1280.0  720.0
1         audio           1/44100          mp4a  0x6134706d    NaN    NaN

      ... bit_rate  bits_per_raw_sample  nb_frames \
0  ...    213834              8          210
1  ...    128471             NaN          302

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt  sample_rate \
0  {'creation_time': '2022-09-01T05:23:46.000000Z...    NaN    NaN
1  {'creation_time': '2022-09-01T05:23:46.000000Z...    fltp    44100

      channels channel_layout bits_per_sample
0         NaN              NaN              NaN

```

```
1      2.0      stereo      0.0
```

```
[2 rows x 42 columns]
```

```
-----
-----
-----
index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High
1      1      aac      AAC (Advanced Audio Coding)      LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video      125/7118      avc1  0x31637661  648.0  480.0  ...
1      audio      1/44100      mp4a  0x6134706d   NaN   NaN   ...

bits_per_raw_sample  nb_frames \
0          8          116
1         NaN          179

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'eng', 'handler_name': 'VideoHand...   NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...   fltp      44100

channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      128000
```

```
[2 rows x 41 columns]
```

```
-----
-----
-----
index codec_name          codec_long_name codec_type codec_time_base \
0      0  rawvideo      raw video      video      1/10
1      1      mp3  MP3 (MPEG audio layer 3)      audio      1/147

codec_tag_string codec_tag  width  height  coded_width  ...  start_time \
0      [0][0][0][0]  0x0000  260.0  40.0      260.0  ...  0.000000
1      U[0][0][0]  0x0055   NaN   NaN      NaN   ...  0.000000

duration_ts  duration  bit_rate  nb_frames \
0      17.0  1.700000  2652000      17
1      NaN   NaN   128000      71
```

	disposition	sample_fmt	sample_rate	\
0	{'default': 0, 'dub': 0, 'original': 0, 'comme...	NaN	NaN	
1	{'default': 0, 'dub': 0, 'original': 0, 'comme...	fltp	147	

	channels	bits_per_sample
0	NaN	NaN
1	2.0	0.0

[2 rows x 29 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	8081/312320	avc1	0x31637661	854.0	602.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	61	
1	NaN	48	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	61743

[2 rows x 41 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
--	------------	-----------------	------------------	-----------	-------	--------	---

0	video	1/60	avc1	0x31637661	1280.0	720.0
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN
2	data	NaN	tmcd	0x64636d74	NaN	NaN

	bits_per_raw_sample	nb_frames	\
0	...	8	46
1	...	NaN	72
2	...	NaN	1

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	1/50	avc1	0x31637661	544.0	306.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	812	
1	NaN	1401	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2010-05-20T08:21:12.000000Z...	NaN	NaN	
1	{'creation_time': '2010-05-20T08:21:12.000000Z...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	1.0	mono	0.0	94850

[2 rows x 41 columns]

```

-----
-----
-----
index codec_name                                codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    High

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video              1/20              avc1    0x31637661    350    350    ...

time_base  start_pts  start_time duration_ts  duration bit_rate \
0    1/10240          0      0.000000      10240    1.000000    107904

bits_per_raw_sample nb_frames \
0                      8          10

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags
0 {'language': 'und', 'handler_name': 'VideoHand...

```

[1 rows x 31 columns]

```

-----
-----
-----
index codec_name                                codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10    Main
1      1      aac          AAC (Advanced Audio Coding)          LC

codec_type codec_time_base codec_tag_string  codec_tag  width  height  ... \
0      video  134651/2734080              avc1    0x31637661    474.0    218.0    ...
1      audio          1/48000              mp4a    0x6134706d     NaN     NaN     ...

bits_per_raw_sample nb_frames \
0                      8          89
1                      NaN        413

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

```


	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	48000	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	196389

[2 rows x 39 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/50	avc1	0x31637661	1920.0	1080.0	
1	audio	1/96000	mp4a	0x6134706d	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	724	
1	...	NaN	2716	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	96000	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	1000000

[2 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
--	------------	-----------------	------------------	-----------	-------	--------	-----	---

0	video	500/29901	avc1	0x31637661	690.0	480.0	...
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...

	bits_per_raw_sample	nb_frames	\
0	8	30	
1	NaN	55	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	128000

[2 rows x 39 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	3/100	avc1	0x31637661	790	630	...	

	time_base	start_pts	start_time	duration_ts	duration	bit_rate	\
0	1/12800	0	0.000000	15360	1.200000	544500	

	bits_per_raw_sample	nb_frames	\
0	8	20	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags
0	{'language': 'und', 'handler_name': 'VideoHand...

[1 rows x 31 columns]

	index	codec_name	codec_long_name	profile	\
--	-------	------------	-----------------	---------	---

```

0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac          AAC (Advanced Audio Coding)          LC

    codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video  125089/6635520          avc1  0x31637661  1280.0  720.0
1      audio          1/44100          mp4a  0x6134706d      NaN      NaN

    ...  bits_per_raw_sample  nb_frames \
0  ...          8          216
1  ...          NaN          266

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0  {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1  {'language': 'und', 'handler_name': 'ISO Media...      fltp      44100

    channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      127999

[2 rows x 43 columns]
-----
-----
-----
-----
    index codec_name          codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac          AAC (Advanced Audio Coding)          LC
2      2      NaN          NaN          NaN

    codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video          1/60          avc1  0x31637661  1280.0  720.0
1      audio          1/48000          mp4a  0x6134706d      NaN      NaN
2      data          NaN          tmcd  0x64636d74      NaN      NaN

    ...  bits_per_raw_sample  nb_frames \
0  ...          8          46
1  ...          NaN          72
2  ...          NaN          1

                                disposition \
0  {'default': 1, 'dub': 0, 'original': 0, 'comme...
1  {'default': 1, 'dub': 0, 'original': 0, 'comme...
2  {'default': 0, 'dub': 0, 'original': 0, 'comme...

```

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	codec_type	\
0	0	mpeg4	MPEG-4 part 2	Simple Profile	video	
1	1	mp3	MP3 (MPEG audio layer 3)	NaN	audio	

	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	625/18694	xvid	0x64697678	960.0	540.0	...	
1	1/44100	U[0][0][0]	0x0055	NaN	NaN	...	

	duration_ts	duration	bit_rate	nb_frames	\
0	334	11.166684	5219735	334	
1	429	11.206531	128000	429	

	disposition	sample_fmt	sample_rate	\
0	{'default': 0, 'dub': 0, 'original': 0, 'comme...	NaN	NaN	
1	{'default': 0, 'dub': 0, 'original': 0, 'comme...	fltp	44100	

	channels	channel_layout	bits_per_sample
0	NaN	NaN	NaN
1	2.0	stereo	0.0

[2 rows x 36 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	

```

2      data      NaN      tmcd  0x64636d74      NaN      NaN

... bits_per_raw_sample  nb_frames  \
0 ...      8      46
1 ...      NaN      72
2 ...      NaN      1

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      197598
2      NaN      NaN      NaN      NaN

[3 rows x 43 columns]
-----
-----
-----
-----
index codec_name      codec_long_name profile \
0      0      h264  H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      High
1      1      aac      AAC (Advanced Audio Coding)      LC
2      2      NaN      NaN      NaN

codec_type codec_time_base codec_tag_string  codec_tag  width  height \
0      video      1/60      avc1  0x31637661  1280.0  720.0
1      audio      1/48000      mp4a  0x6134706d      NaN      NaN
2      data      NaN      tmcd  0x64636d74      NaN      NaN

... bits_per_raw_sample  nb_frames  \
0 ...      8      46
1 ...      NaN      72
2 ...      NaN      1

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \

```

0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	mp3	MP3 (MPEG audio layer 3)	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	1/60	avc1	0x31637661	640.0	640.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bits_per_raw_sample	nb_frames	\
0	8	62	
1	NaN	80	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'language': 'und', 'handler_name': 'VideoHand...	NaN	NaN	
1	{'language': 'und', 'handler_name': 'SoundHand...	fltp	44100	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	128000

[2 rows x 37 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	High	
1	1	aac	AAC (Advanced Audio Coding)	LC	
2	2	NaN	NaN	NaN	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	\
0	video	1/60	avc1	0x31637661	1280.0	720.0	
1	audio	1/48000	mp4a	0x6134706d	NaN	NaN	
2	data	NaN	tmcd	0x64636d74	NaN	NaN	

	...	bits_per_raw_sample	nb_frames	\
0	...	8	46	
1	...	NaN	72	
2	...	NaN	1	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
2	{'default': 0, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	
1	{'creation_time': '2022-08-31T17:37:54.000000Z...	fltp	48000	
2	{'creation_time': '2022-08-31T17:37:54.000000Z...	NaN	NaN	

	channels	channel_layout	bits_per_sample	max_bit_rate
0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	197598
2	NaN	NaN	NaN	NaN

[3 rows x 43 columns]

	index	codec_name	codec_long_name	profile	\
0	0	h264	H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10	Main	
1	1	aac	AAC (Advanced Audio Coding)	LC	

	codec_type	codec_time_base	codec_tag_string	codec_tag	width	height	...	\
0	video	500/16757	avc1	0x31637661	240.0	360.0	...	
1	audio	1/44100	mp4a	0x6134706d	NaN	NaN	...	

	bit_rate	bits_per_raw_sample	nb_frames	\
0	156249	8	518	
1	127999	NaN	1332	

	disposition	\
0	{'default': 1, 'dub': 0, 'original': 0, 'comme...	
1	{'default': 1, 'dub': 0, 'original': 0, 'comme...	

	tags	sample_fmt	sample_rate	\
0	{'creation_time': '2020-09-19T20:22:11.000000Z...	NaN	NaN	

```

1 {'creation_time': '2020-09-19T20:22:11.000000Z...' fltp 44100

channels channel_layout bits_per_sample
0 NaN NaN NaN
1 2.0 stereo 0.0

[2 rows x 42 columns]
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
1 1 aac AAC (Advanced Audio Coding) LC

codec_type codec_time_base codec_tag_string codec_tag width height ... \
0 video 1/60 avc1 0x31637661 576.0 1024.0 ...
1 audio 1/48000 mp4a 0x6134706d NaN NaN ...

bits_per_raw_sample nb_frames \
0 8 147
1 NaN 235

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'creation_time': '2022-10-03T05:57:20.000000Z...' NaN NaN
1 {'creation_time': '2022-10-03T05:57:20.000000Z...' fltp 48000

channels channel_layout bits_per_sample max_bit_rate
0 NaN NaN NaN NaN
1 2.0 stereo 0.0 192000

[2 rows x 39 columns]
-----
-----
-----
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC
2 2 NaN NaN NaN

codec_type codec_time_base codec_tag_string codec_tag width height \
0 video 1/60 avc1 0x31637661 1280.0 720.0
1 audio 1/48000 mp4a 0x6134706d NaN NaN

```



```

2      data      NaN      tmc  0x64636d74      NaN      NaN

... bits_per_raw_sample nb_frames \
0 ...      8      46
1 ...      NaN      72
2 ...      NaN      1

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 {'default': 0, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN

channels channel_layout bits_per_sample max_bit_rate
0      NaN      NaN      NaN      NaN
1      2.0      stereo      0.0      197598
2      NaN      NaN      NaN      NaN

[3 rows x 43 columns]
-----
-----
-----
-----
index codec_name      codec_long_name profile \
0      0      h264      H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10      Main
1      1      aac      AAC (Advanced Audio Coding)      HE-AAC

codec_type codec_time_base codec_tag_string      codec_tag      width      height      ... \
0      video      1/60      avc1      0x31637661      480.0      360.0      ...
1      audio      1/44100      mp4a      0x6134706d      NaN      NaN      ...

bits_per_raw_sample nb_frames \
0      8      217
1      NaN      159

disposition \
0 {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 {'default': 1, 'dub': 0, 'original': 0, 'comme...

tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...      fltp      44100

channels channel_layout bits_per_sample max_bit_rate

```

0	NaN	NaN	NaN	NaN
1	2.0	stereo	0.0	30721

[2 rows x 43 columns]

1.4.1 As you can see, we discovered in the tail that not all files contain only audio or video, some also contain other types of files, such as data, which should make us suspect that this is a malicious video.

1.5 Data type

pandas.DataFrame.dtypes property DataFrame.dtypes[source] Return the dtypes in the DataFrame.

This returns a Series with the data type of each column. The result's index is the original DataFrame's columns. Columns with mixed types are stored with the object dtype. See the User Guide for more.

```
[13]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
      #https://www.thepythoncode.com/article/extract-media-metadata-in-python
      for file in files:
          df = pd.DataFrame(ffmpeg.probe(file)["streams"])
          ↵
          ↪print("-----")
          print(df.dtypes)
          ↵
          ↪print("-----")
```

```
-----
index                int64
codec_name            object
codec_long_name       object
profile              object
codec_type            object
codec_time_base       object
codec_tag_string      object
codec_tag             object
width                float64
height               float64
coded_width           float64
coded_height          float64
has_b_frames          float64
sample_aspect_ratio   object
display_aspect_ratio  object
pix_fmt              object
level                 float64
color_range            object
```

color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object

duration_ts	int64
duration	object
bit_rate	object
max_bit_rate	object
nb_frames	object
disposition	object
tags	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
bits_per_raw_sample	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
pix_fmt	object
level	float64
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object

time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object

time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object

time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64

duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64

duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
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profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
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height	float64
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coded_height	float64
has_b_frames	float64
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pix_fmt	object
level	float64
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color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
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nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64

duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
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sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
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codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
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height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
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avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64

duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
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sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
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codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
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height	int64
coded_width	int64
coded_height	int64
has_b_frames	int64
pix_fmt	object
level	int64
chroma_location	object
refs	int64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object

dtype: object

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index                int64  
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codec_long_name      object  
profile              object  
codec_type            object  
codec_time_base      object  
codec_tag_string     object  
codec_tag            object  
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height               float64  
coded_width           float64  
coded_height          float64  
has_b_frames          float64  
sample_aspect_ratio  object  
display_aspect_ratio object  
pix_fmt              object  
level                 float64  
chroma_location       object  
refs                  float64  
quarter_sample        object  
divx_packed           object  
r_frame_rate          object  
avg_frame_rate        object  
time_base             object  
start_pts             int64  
start_time            object  
duration_ts           int64  
duration              object  
bit_rate              object  
nb_frames             object  
disposition           object  
sample_fmt            object  
sample_rate           object  
channels              float64  
channel_layout        object  
bits_per_sample       float64  
dtype: object  
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index                int64  
codec_name           object
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codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
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height	float64
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coded_height	float64
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display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
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avg_frame_rate	object
time_base	object
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start_time	object
duration_ts	int64
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bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
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sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object

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profile	object
codec_type	object
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coded_height	float64
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color_space	object
color_transfer	object
color_primaries	object
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max_bit_rate	object
dtype:	object

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codec_type	object
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height	float64
coded_width	float64
coded_height	float64
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level	float64
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color_transfer	object
color_primaries	object
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avg_frame_rate	object
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start_time	object
duration_ts	int64
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nb_frames	object
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sample_rate	object
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max_bit_rate	object
dtype: object	

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duration_ts	int64
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dtype:	object

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color_space	object
color_transfer	object
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avg_frame_rate	object
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duration_ts	int64
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bits_per_raw_sample	object
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dtype: object	

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color_space	object
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refs	float64
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avg_frame_rate	object
time_base	object
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duration_ts	int64
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nb_frames	object
disposition	object
tags	object
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channel_layout	object
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dtype: object	

index	int64
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codec_time_base	object

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display_aspect_ratio	object
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level	float64
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nb_frames	object
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sample_rate	object
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channel_layout	object
bits_per_sample	float64
dtype: object	

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codec_tag	object
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coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
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pix_fmt	object
level	float64
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color_space	object
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codec_tag	object

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bits_per_raw_sample	object
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bits_per_sample	float64
dtype:	object

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codec_tag	object
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height	float64
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coded_height	float64
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sample_aspect_ratio	object
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pix_fmt	object
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avg_frame_rate	object
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duration_ts	int64
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dtype:	object

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coded_height	int64
has_b_frames	int64
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display_aspect_ratio	object
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avg_frame_rate	object
time_base	object
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level	float64

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duration_ts	int64
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color_transfer	object
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r_frame_rate	object
avg_frame_rate	object
time_base	object
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start_time	object
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dtype:	object

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codec_tag	object
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coded_height	int64
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display_aspect_ratio	object
pix_fmt	object
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r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64

start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
dtype:	object

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profile	object
codec_type	object
codec_time_base	object
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codec_tag	object
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coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
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level	float64
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start_time	object
duration_ts	int64
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bit_rate	object
bits_per_raw_sample	object
nb_frames	object

disposition	object
tags	object
sample_fmt	object
sample_rate	object
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channel_layout	object
bits_per_sample	float64
dtype:	object

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nb_frames	object
disposition	object
tags	object
sample_fmt	object

sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

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duration_ts	float64
duration	object
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sample_rate	object
channels	float64
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dtype:	object

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tags	object
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sample_rate	object
channels	float64
channel_layout	object
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max_bit_rate	object
dtype: object	

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codec_type	object
codec_time_base	object

codec_tag_string	object
codec_tag	object
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color_transfer	object
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start_time	object
duration_ts	int64
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bits_per_raw_sample	object
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disposition	object
tags	object
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sample_rate	object
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bits_per_sample	float64
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dtype: object	

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codec_tag	object
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avg_frame_rate	object
time_base	object
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duration_ts	int64
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nb_frames	object
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dtype:	object

index	int64
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codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object

width	int64
height	int64
coded_width	int64
coded_height	int64
has_b_frames	int64
pix_fmt	object
level	int64
chroma_location	object
refs	int64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
chroma_location	object
refs	float64
is_avc	object

nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object

nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object

start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	int64
height	int64
coded_width	int64
coded_height	int64
has_b_frames	int64
pix_fmt	object
level	int64
chroma_location	object
refs	int64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object

nb_frames	object
disposition	object
tags	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64

channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64

channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
chroma_location	object
refs	float64
quarter_sample	object
divx_packed	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
nb_frames	object
disposition	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
dtype:	object


```

-----
index                int64
codec_name            object
codec_long_name       object
profile              object
codec_type            object
codec_time_base       object
codec_tag_string      object
codec_tag             object
width                float64
height               float64
coded_width           float64
coded_height          float64
has_b_frames          float64
sample_aspect_ratio   object
display_aspect_ratio  object
pix_fmt              object
level                float64
color_range           object
color_space           object
color_transfer        object
color_primaries       object
chroma_location       object
refs                 float64
is_avc                object
nal_length_size       object
r_frame_rate          object
avg_frame_rate        object
time_base             object
start_pts             int64
start_time            object
duration_ts           int64
duration              object
bit_rate              object
bits_per_raw_sample   object
nb_frames             object
disposition           object
tags                  object
sample_fmt            object
sample_rate           object
channels              float64
channel_layout        object
bits_per_sample       float64
max_bit_rate          object
dtype: object
-----
-----
-----

```



```

-----
index                int64
codec_name           object
codec_long_name      object
profile             object
codec_type           object
codec_time_base      object
codec_tag_string     object
codec_tag            object
width               float64
height              float64
coded_width          float64
coded_height         float64
has_b_frames         float64
sample_aspect_ratio  object
display_aspect_ratio object
pix_fmt             object
level               float64
color_range          object
color_space          object
color_transfer       object
color_primaries      object
chroma_location      object
refs                float64
is_avc              object
nal_length_size      object
r_frame_rate         object
avg_frame_rate       object
time_base            object
start_pts            int64
start_time           object
duration_ts          int64
duration             object
bit_rate             object
bits_per_raw_sample  object
nb_frames            object
disposition          object
tags                 object
sample_fmt           object
sample_rate          object
channels             float64
channel_layout        object
bits_per_sample      float64
max_bit_rate         object
dtype: object
-----
-----
-----

```

```

-----
index                int64
codec_name            object
codec_long_name       object
profile              object
codec_type            object
codec_time_base       object
codec_tag_string      object
codec_tag             object
width                float64
height               float64
coded_width           float64
coded_height          float64
has_b_frames          float64
pix_fmt              object
level                float64
chroma_location       object
refs                 float64
is_avc                object
nal_length_size       object
r_frame_rate          object
avg_frame_rate        object
time_base             object
start_pts             int64
start_time            object
duration_ts           int64
duration              object
bit_rate              object
bits_per_raw_sample   object
nb_frames             object
disposition           object
tags                  object
sample_fmt            object
sample_rate           object
channels              float64
channel_layout         object
bits_per_sample       float64
max_bit_rate           object
dtype: object

```

```

-----
-----
-----
index                int64
codec_name            object
codec_long_name       object
profile              object
codec_type            object

```

codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object

codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
dtype: object	

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object

codec_tag_string	object
codec_tag	object
width	float64
height	float64
coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64

coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

index	int64
codec_name	object
codec_long_name	object
profile	object
codec_type	object
codec_time_base	object
codec_tag_string	object
codec_tag	object
width	float64
height	float64

coded_width	float64
coded_height	float64
has_b_frames	float64
sample_aspect_ratio	object
display_aspect_ratio	object
pix_fmt	object
level	float64
color_range	object
color_space	object
color_transfer	object
color_primaries	object
chroma_location	object
refs	float64
is_avc	object
nal_length_size	object
r_frame_rate	object
avg_frame_rate	object
time_base	object
start_pts	int64
start_time	object
duration_ts	int64
duration	object
bit_rate	object
bits_per_raw_sample	object
nb_frames	object
disposition	object
tags	object
sample_fmt	object
sample_rate	object
channels	float64
channel_layout	object
bits_per_sample	float64
max_bit_rate	object
dtype:	object

1.5.1 Adding data to a Pandas DataFrame with a for loop on all files

```
[14]: # Import DictWriter class from CSV module
from csv import DictWriter
files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
tmp = pd.DataFrame()

for file in files:
    df = pd.DataFrame(ffmpeg.probe(file)["streams"])
```

```
tmp = tmp.append(df)

tmp.to_csv('re.csv')
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

```
tmp = tmp.append(df)
```

/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is deprecated and will be removed from pandas in a future version. Use pandas.concat instead.

[illegible]

[illegible]

```

tmp = tmp.append(df)
/tmp/ipykernel_14658/3791045286.py:9: FutureWarning: The frame.append method is
deprecated and will be removed from pandas in a future version. Use
pandas.concat instead.
tmp = tmp.append(df)

```

```

[15]: import matplotlib.pyplot as plt
import seaborn as sns
tmp

```

```

[15]:
index codec_name codec_long_name profile \
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC
0 0 aac AAC (Advanced Audio Coding) LC
1 1 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
.. ..
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 High
1 1 aac AAC (Advanced Audio Coding) LC
2 2 NaN NaN NaN
0 0 h264 H.264 / AVC / MPEG-4 AVC / MPEG-4 part 10 Main
1 1 aac AAC (Advanced Audio Coding) HE-AAC

codec_type codec_time_base codec_tag_string codec_tag width height \
0 video 1/60 avc1 0x31637661 1920.0 1080.0
1 audio 1/44100 mp4a 0x6134706d NaN NaN
0 audio 1/48000 mp4a 0x6134706d NaN NaN
1 video 1001/60000 avc1 0x31637661 1920.0 1080.0
0 video 27817/2949120 avc1 0x31637661 728.0 720.0
.. ..
0 video 1/60 avc1 0x31637661 1280.0 720.0
1 audio 1/48000 mp4a 0x6134706d NaN NaN
2 data NaN tmcd 0x64636d74 NaN NaN
0 video 1/60 avc1 0x31637661 480.0 360.0
1 audio 1/44100 mp4a 0x6134706d NaN NaN

... disposition \
0 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
0 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
0 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
.. ..
0 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
1 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...
2 ... {'default': 0, 'dub': 0, 'original': 0, 'comme...
0 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...

```

```

1 ... {'default': 1, 'dub': 0, 'original': 0, 'comme...

                                tags sample_fmt sample_rate \
0 {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...      fltp      44100
0 {'creation_time': '2022-10-01T03:31:04.000000Z...      fltp      48000
1 {'creation_time': '2022-10-01T03:31:04.000000Z...      NaN      NaN
0 {'language': 'und', 'handler_name': 'VideoHand...      NaN      NaN
..
0 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
1 {'creation_time': '2022-08-31T17:37:54.000000Z...      fltp      48000
2 {'creation_time': '2022-08-31T17:37:54.000000Z...      NaN      NaN
0 {'language': 'und', 'handler_name': 'ISO Media...      NaN      NaN
1 {'language': 'und', 'handler_name': 'ISO Media...      fltp      44100

    channels channel_layout bits_per_sample max_bit_rate quarter_sample \
0          NaN          NaN          NaN          NaN          NaN
1          2.0          stereo          0.0          127999          NaN
0          2.0          stereo          0.0          192000          NaN
1          NaN          NaN          NaN          NaN          NaN
0          NaN          NaN          NaN          NaN          NaN
..          ...          ...          ...          ...          ...
0          NaN          NaN          NaN          NaN          NaN
1          2.0          stereo          0.0          197598          NaN
2          NaN          NaN          NaN          NaN          NaN
0          NaN          NaN          NaN          NaN          NaN
1          2.0          stereo          0.0          30721          NaN

    divx_packed
0          NaN
1          NaN
0          NaN
1          NaN
0          NaN
..          ...
0          NaN
1          NaN
2          NaN
0          NaN
1          NaN

```

[102 rows x 45 columns]

```
[16]: tmp.shape
```

```
[16]: (102, 45)
```

skew:

In probability theory and statistics, skewness is a measure of the asymmetry of the probability

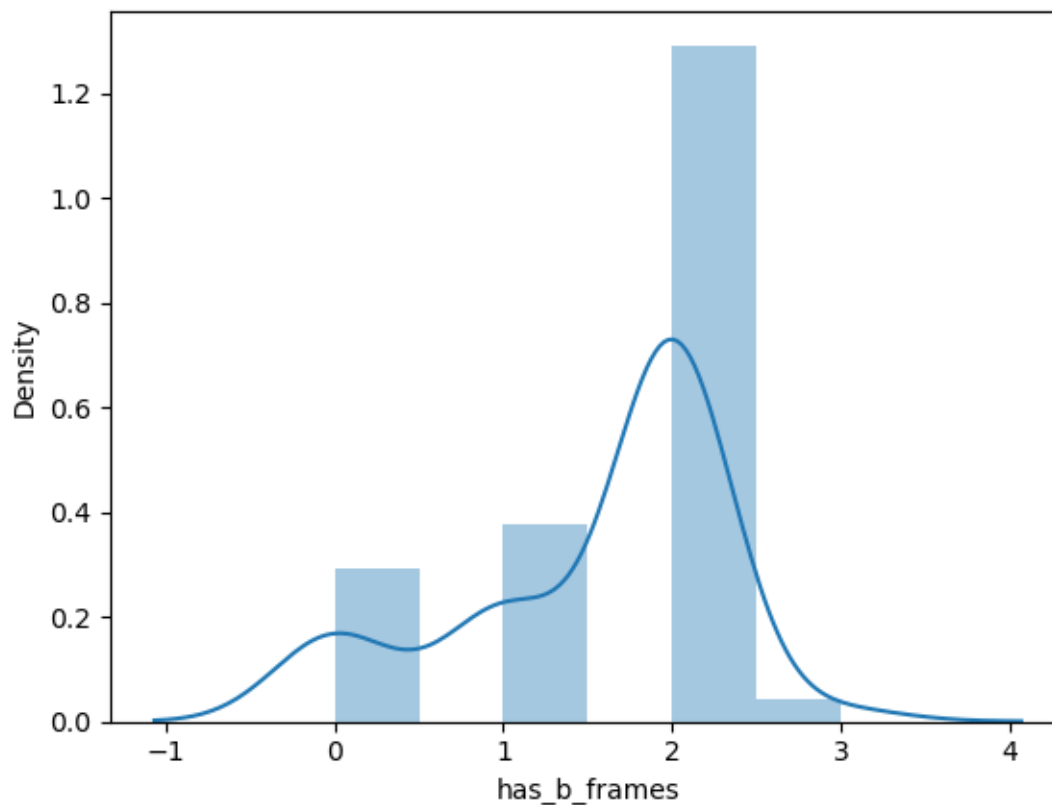
```
[17]: sns.distplot(tmp['has_b_frames'])
print("Skewness: %f" % tmp['has_b_frames'].skew())
print("Kurtosis: %f" % tmp['has_b_frames'].kurt())
```

/home/raz/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619:
FutureWarning: `distplot` is a deprecated function and will be removed in a
future version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).

```
warnings.warn(msg, FutureWarning)
```

Skewness: -1.018152

Kurtosis: -0.035136



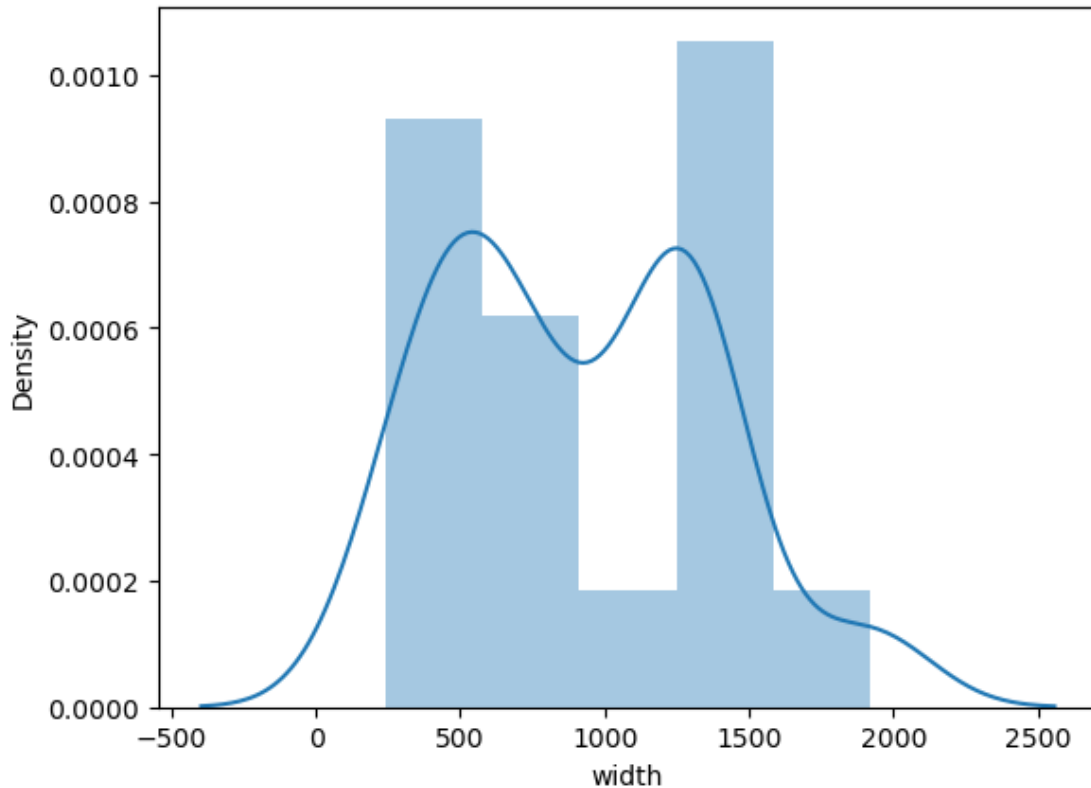
```
[18]: sns.distplot(tmp['width'])
print("Skewness: %f" % tmp['width'].skew())
print("Kurtosis: %f" % tmp['width'].kurt())
```

Skewness: 0.382721

Kurtosis: -0.666320

```
/home/raz/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619:
FutureWarning: `distplot` is a deprecated function and will be removed in a
future version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).
```

```
warnings.warn(msg, FutureWarning)
```

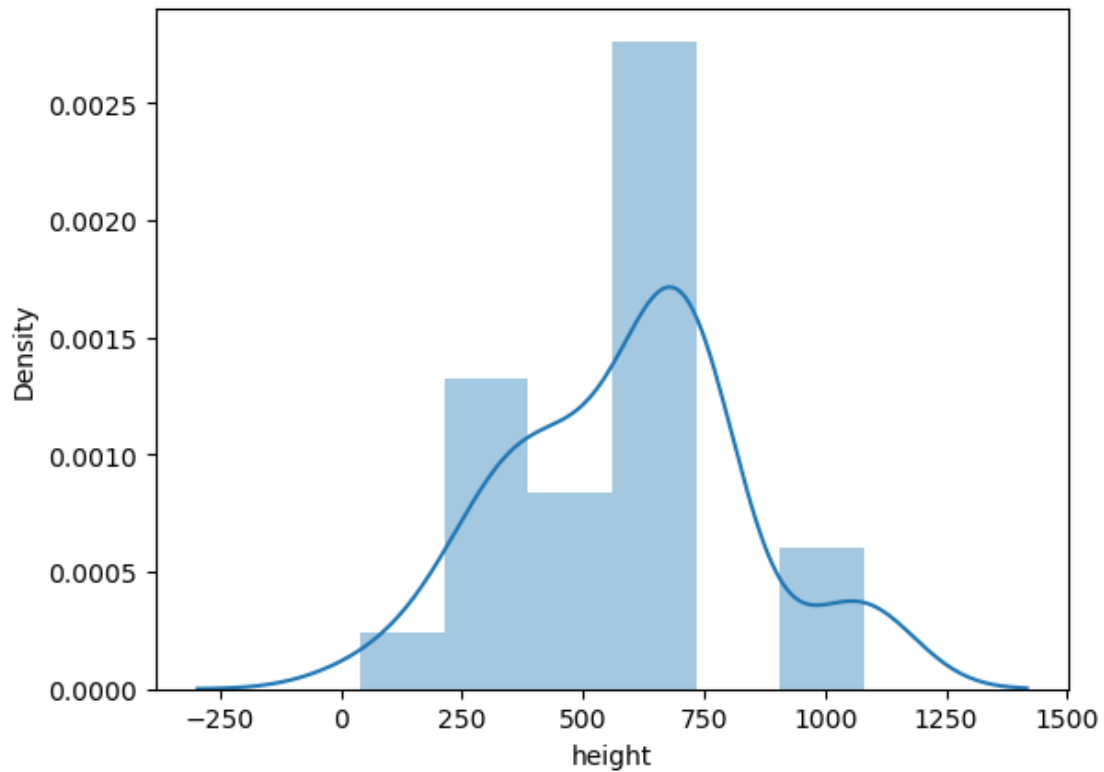


```
[19]: sns.distplot(tmp['height'])
print("Skewness: %f" % tmp['height'].skew())
print("Kurtosis: %f" % tmp['height'].kurt())
```

```
/home/raz/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619:
FutureWarning: `distplot` is a deprecated function and will be removed in a
future version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).
```

```
warnings.warn(msg, FutureWarning)
```

```
Skewness: 0.107058
Kurtosis: -0.040207
```



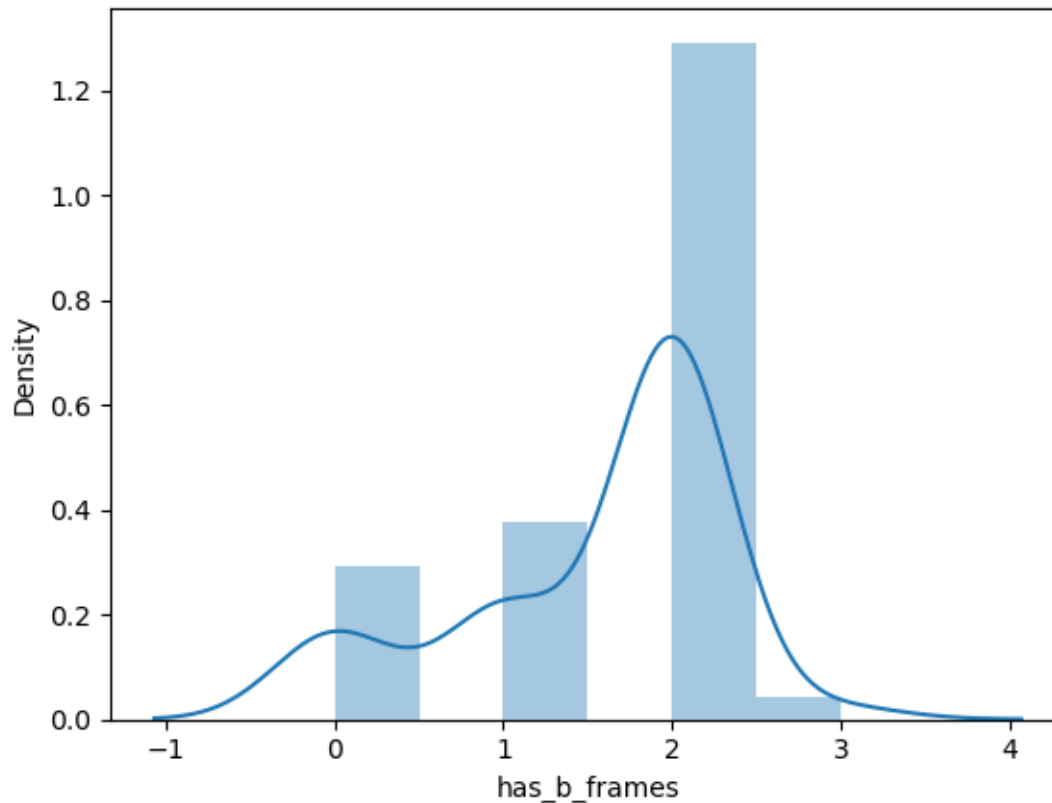
```
[20]: sns.distplot(tmp['has_b_frames'])
print("Skewness: %f" % tmp['has_b_frames'].skew())
print("Kurtosis: %f" % tmp['has_b_frames'].kurt())
```

/home/raz/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619:
FutureWarning: `distplot` is a deprecated function and will be removed in a
future version. Please adapt your code to use either `displot` (a figure-level
function with similar flexibility) or `histplot` (an axes-level function for
histograms).

```
warnings.warn(msg, FutureWarning)
```

Skewness: -1.018152

Kurtosis: -0.035136



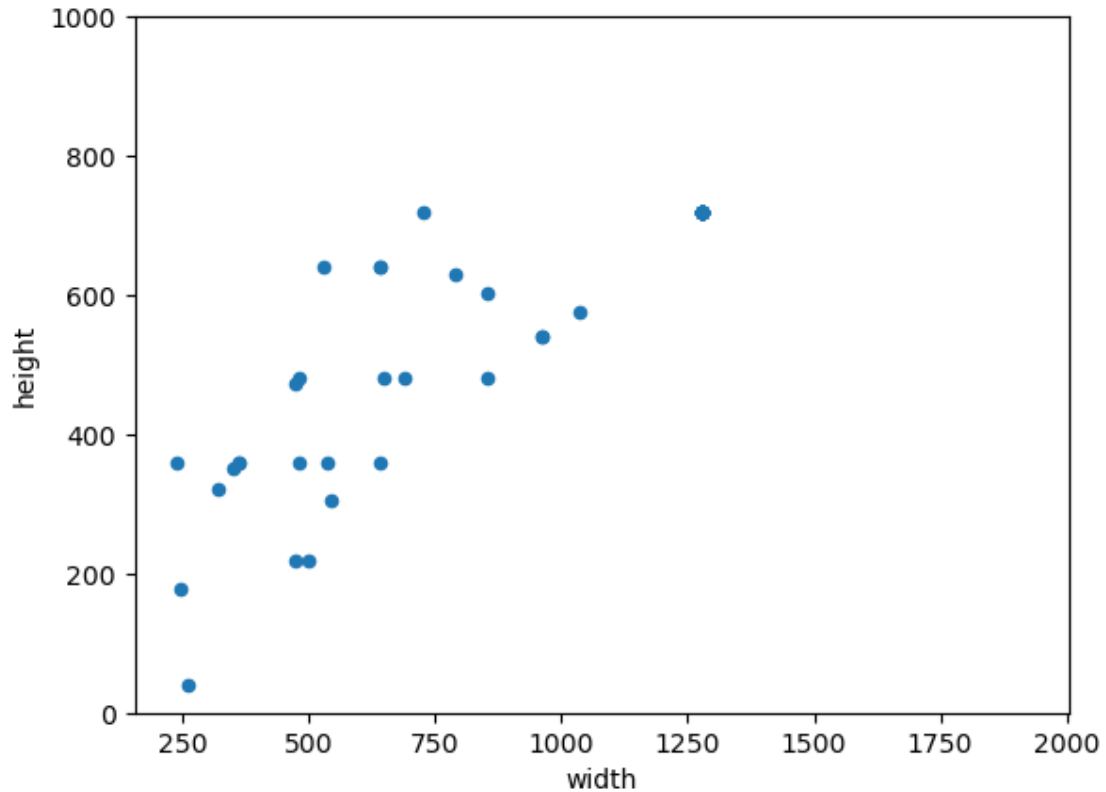
1.6 Memory Heat Map (MHM)

According to the article: http://www.cs.yale.edu/homes/yoon-man-ki/DAC2015_MemoryHeatMap.pdf, The efficiency can be seen in the Memory Heat Map (MHM) to characterize the memory behavior of the operating system and to identify an anomaly in a real-time system.

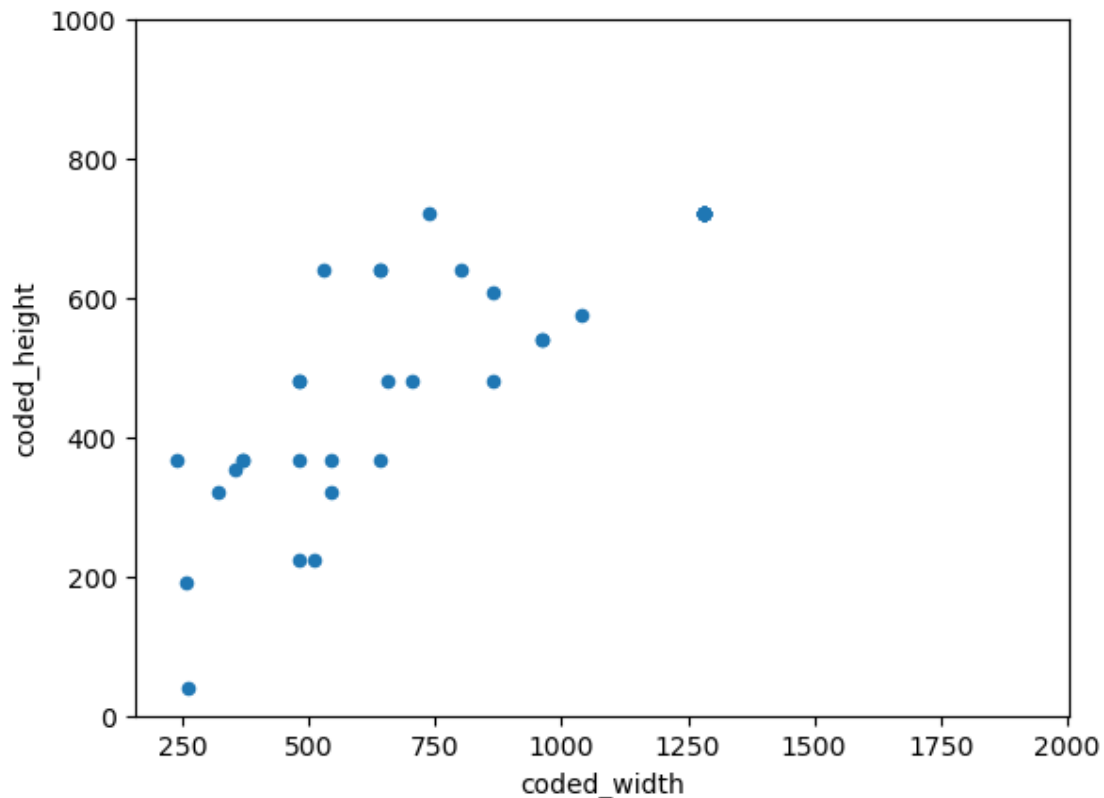
```
[21]: # Increase the size of the heatmap.
plt.figure(figsize=(16, 6))
# Store heatmap object in a variable to easily access it when you want to
# include more features (such as title).
# Set the range of values to be displayed on the colormap from -1 to 1, and set
# the annotation to True to display the correlation values on the heatmap.
heatmap = sns.heatmap(tmp.corr(), vmin=-1, vmax=1, annot=True)
# Give a title to the heatmap. Pad defines the distance of the title from the
# top of the heatmap.
heatmap.set_title('Correlation Heatmap', fontdict={'fontsize':12});
```



```
[22]: #scatter plot totalbsmtsf/saleprice
var = 'width'
data = pd.concat([tmp['height'], tmp[var]], axis=1)
data.plot.scatter(x=var, y='height', ylim=(0,1000));
```



```
[23]: #scatter plot totalbsmtsf/saleprice
var = 'coded_width'
data = pd.concat([tmp['coded_height'], tmp[var]], axis=1)
data.plot.scatter(x=var, y='coded_height', ylim=(0,1000));
```



1.7 Reading Videos using OpenCV-Frame rate

Frame rate is the measurement of how quickly a number of frames appears within a second, which is why it's also called FPS (frames per second).

```
[24]: !pip install opencv-python
```

Requirement already satisfied: opencv-python in ./anaconda3/lib/python3.9/site-packages (4.6.0.66)

Requirement already satisfied: numpy>=1.19.3 in ./anaconda3/lib/python3.9/site-packages (from opencv-python) (1.21.5)

```
[25]: import cv2
```

we want to check for the `avg_frame_rate` parameter of the desired video stream. If the value of this parameter is a fraction like this

“`avg_frame_rate`”: “1205285219/50270287” with a denominator that is not 1 then the video file *has* a variable frame rate.

If the value is like this

“`avg_frame_rate`”: “25/1” with a denominator that is 1 then the video file *has no* a variable frame rate.

we need to check if the stream has a constant frame rate.

<https://superuser.com/questions/1487401/how-can-i-tell-if-a-video-has-a-variable-frame-rate>

```
[27]: files = Path("/home/raz/Downloads/mal_mp4/mal_mp4").glob('*')
      for file in files:
          head, tail = os.path.split(file)
          ↵
          ↪ print("-----")
          print(tail)
          info = ffmpeg.probe(file)
          print(f"duration={info['format']['duration']}")
          print(f"framerate={info['streams'][0]['avg_frame_rate']}")
```

```
-----
-----
32f0219a692eb44353a279a19d276d7e635425ef40b791fb2d7fbd5901b2086c
duration=8.987000
framerate=30/1
-----
```

```
-----
-----
5aa9b4c0cb45c5c16f1d930f6d25231f067e88094fff15b38dbec061236520ed
duration=10.043367
framerate=0/0
-----
```

```
-----
-----
0f6bf20fbab3ab0a9f47b076810cfa6461b044f7aa9bf12e9f0814f2b7402a44
duration=9.759000
framerate=1474560/27817
-----
```

```
-----
-----
1f3a3a7337d4166803cdcb29aee69989d1dc2b28b8750e987397e0c4843d38ea
duration=9.558345
framerate=66360/1147
-----
```

```
-----
-----
e5f1b5af79c348ed96bacec94e35c7513db3ec600105f91b4a0f9661f3728ab4
duration=1.856000
framerate=30/1
```


0c7e4f6ae9ea98340f8b8600aff3a049578c74d14e6fe7f03bdf3f3c16bf6e4b
duration=18.133000
framerate=2088960/139259

f53b74d6c081d397544dcbf05a704a0a883647ac9819117b4192210cb1073fc
duration=2.773333
framerate=30000/1001

8c94997ec49dd1eed1a6a4b18918388047452030ee956c7435ffc9492510773
duration=1.533333
framerate=30/1

e945a52d48442d48a6be078f8e41b94ea9d8083b75ddc5ea9825536c95a0dcaf
duration=1.533333
framerate=30/1

963f4c9aab02cc120788ebfa1d80bf8fb340106d7967df2cb4683447302d529c
duration=1.284000
framerate=173/6

c632aa8d19066b5b03953e93272655f994587a87413511bd9e3d9d51646258f2
duration=11.206531
framerate=18694/625

6387ae2cd3cdb45cf75fb77aa7318b91dab896288593cb45c9837cebf694088b
duration=1.533333
framerate=30/1

593ea8aa80de8f0816d747f9f46ba96fdc2722b38dbea0a1a0ad949a4d3deabb
duration=6.000000
framerate=30/1

39cc749232a7ceaea5b893e2cb5ece28e291790b5f1a8d0899859d0f7c47188e
duration=12.792744
framerate=24/1

558ab6ff4e8543790b9d4e541d10e287b60dd779759d45c74622ef7d94db4949

duration=1.533333

framerate=30/1

6d9ddcb115850b60558c5d2a49667b4bc0fcd52e8df26fd6830dbef8b87022df

duration=1.856000

framerate=30/1

d727438838827600fef7aef5487f31b3002947f0d8e11355d93763958429bd03

duration=9.170000

framerate=8940/269

e48ea4ea16316314e61e1f8dceff22fb71181f3e3375289a04b6b604c70eb816

duration=19.040299

framerate=30/1

b9f9d77dd0befd264ca46ae599234df661b24c17c8c04657f188830fd648bcd8

duration=5.056000

framerate=30/1

2a195ea405ea3f1a25d93c6f7ccca043dc80badfbbf1b663c15a60d62c97779a

duration=14.791000

framerate=2997/100

9b35715e65e913d4d8b7d3079b6d073a098cdfacce57c4a9bccbef3106a4e819

duration=157.734000

framerate=24/1

bf6216764dd5c322a7f9f74a739dd2c6b904be5023875f8bc7db6197b96066e4

duration=0.034000

framerate=30/1

bbe4819b20574dc38f24d568b5ce1864f5a1564898800a12a3000a96181e31bc

duration=31.603000

framerate=454421/18925

6e5af36586f68892b4d1995e91dcaf398e081fe00cf33d53d18d94d85c3286ba

duration=8.267000

framerate=30/1

517a264d08fff8a6fc1d6464d3273bf722f22cdf90b3358a681c289a103b3302
duration=1.533333
framerate=30/1

4f38e86dbc55c085c3e6b4d873701e1c2cff889e9d011f302b5eb56989016a99
duration=4278190080.000000
framerate=30/1

e4078a0799045f42f935d881fe968424127ae46824f16a03c7ca7c959c1ee3ec
duration=7.012370
framerate=30/1

c2facde610cfa2b658bb980b6f201404310f3b9986e25ad96d4e67d1af71f4c6
duration=4.134000
framerate=3559/125

216584a08f60c0b9346757585ec03222451e0c15622c1fcf3f6ed73ad677f90e
duration=1.700000
framerate=10/1

aa63d104c2f53ca24cbdf763eeefcc2677cd011b14e078daeb78a0edeabb5952b
duration=3.157000
framerate=156160/8081

b7c0b46837f6239c022df02a6f63c0482eb83daa9ddf8b3e61e2da0629432382
duration=1.533333
framerate=30/1

d48d5c32be3139c6d99db7e49b4c7c3f29926f6c722382f45ab470b5eae1ad98
duration=32.508000
framerate=25/1

b2c7e676f5c03726672e6b9444fd9c5a8d1b2701d09b3c2fd14da656fb21ba33
duration=1.000000
framerate=10/1

97a698ea73cac39210293236e28fe199d19327a12770c9692b7b39349b046351
duration=8.811000

framerate=1367040/134651

84d703e54bfb8d7841db0d1992d4ee7284181c2364a1cf03bc1c87b1861361bb
duration=28.971000
framerate=25/1

dd236e0b138795153b33b674ebe202004985a4a70bbfc91692d759c8cc094aaa
duration=1.240000
framerate=29901/1000

7e8e25b780b28f31854ab23c44a91af363edd35074977470f1947265cbf105ee
duration=1.200000
framerate=50/3

cc993ef9466f3e7ded495e25837fb4b30c74123db4fd6b6f28390e076190fa8f
duration=8.144000
framerate=3317760/125089

1d4c8d258199dd6de8b3bd8818136ba2d3e4df9bd89c31dd9fb13b06eb404f66
duration=1.533333
framerate=30/1

33c80e2ab380af81c0f89c7194c2715561fb399f75ed095a9de33b57b68f2383
duration=11.206531
framerate=18694/625

c868a8801513237240eb497e428187a0d7718f9877c51b9bfb2ae5d425cc2cfb
duration=1.533333
framerate=30/1

a885c2fa6e6f735c22b037dc53f004b0076f25b211161186de541d8f94d9f5a9
duration=1.533333
framerate=30/1

114534cc587ec7bc903928050eb0242f09c559d398de78e10066a93c70089461
duration=2.090000
framerate=30/1

a4e8c30871b248ad6d6d10c3a596a213ff9a5c5616e3851a450577f984eb638f
duration=1.533333
framerate=30/1

5ed4315600f5e21846065ae696c468a35b662b8d89e5af40499e11b20f9a0111
duration=30.928925
framerate=16757/1000

e56d019a11f7433d7b4f4e3da04700bae337223b4039c69f90291a817bbe52d8
duration=5.060000
framerate=30/1

e4967ffaf5b93ae23059e0c22fd5ad4d8dbe3122ffdc6b5224580dba17f0a04
duration=1.533333
framerate=30/1

09e5a7a8bd4c6e259bb12ecaad4b23d6657b564a0d6915e14991ed1e22035794
duration=7.384000
framerate=30/1

[]: