```
In [10]: import numpy as np
         import pandas as pd
         import matplotlib.pyplot as plt
         import seaborn as sns
         import requests
         import json
         import time
         from datetime import datetime
         import matplotlib.patches as mpatches
         API_KEY = '670856810f366a1dce53a40a4d69e0df'
         USER_AGENT = 'Mozilla/5.0'
         USERNAME = 'R1ZEN'
In [11]: def lastfm_get(payload):
             headers = {'user-agent': USER_AGENT}
             url = 'http://ws.audioscrobbler.com/2.0/'
             payload['user'] = USERNAME
             payload['api_key'] = API_KEY
             payload['format'] = 'json'
             response = requests.get(url, headers=headers, params=payload)
             return response
         # Initialize an empty dictionary as cache
         artist_tags_cache = {}
         def get_artist_top_tags(artist):
             # Check if the artist's tags are already in the cache
             if artist in artist_tags_cache:
                  return artist_tags_cache[artist]
             # If not, fetch the tags from the API
             payload = {
                  'method': 'artist.getTopTags',
                  'artist': artist
             response = lastfm_get(payload)
             if response.status_code != 200:
                 return None
             json_response = response.json()
             if 'toptags' in json_response and 'tag' in json_response['toptags']:
                 tags = [tag['name'] for tag in json_response['toptags']['tag'][:3]]
             else:
                 tags = []
             time.sleep(0.5) # Delay to avoid overwhelming the API
             # Save the tags in the cache
             artist_tags_cache[artist] = ', '.join(tags)
             return artist_tags_cache[artist]
         def jprint(obj):
             text = json.dumps(obj, sort_keys=True, indent=4)
             print(text)
         def get_paginated_data(method, total_pages):
```

Loading [MathJax]/extensions/Safe.js

```
while page <= total_pages:</pre>
    payload = {
        'method': method,
        'page': page
    }
    print(f"Retrieving page {page}")
    response = lastfm_get(payload)
    if response.status_code != 200:
        print(f"Request failed for page {page}")
        break
    json_response = response.json()
    if page <= 3: # print the JSON data for first 3 pages</pre>
        jprint(json_response)
    yield json_response
    page += 1
    time.sleep(0.5) # delay between requests
```

```
In [12]: # Get the total number of pages
    response = lastfm_get({'method': 'user.getrecenttracks'})
    # Setting total_pages to 2 to get only the first two pages
    total_pages = 1

# Get the data for these pages
    data = []
    for page_data in get_paginated_data('user.getrecenttracks', total_pages):
        data.append(page_data)
```

```
Retrieving page 1
{
    "recenttracks": {
        "@attr": {
            "page": "1"
            "perPage": "50",
            "total": "138218",
            "totalPages": "2765",
            "user": "R1ZEN"
        },
        "track": [
            {
                "@attr": {
                    "nowplaying": "true"
                },
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                    "mbid": ""
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D"
            },
                "album": {
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                    "mbid": "19a1b784-496f-444f-8043-f0ac97c541bf"
                },
                "artist": {
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                    "mbid": "000fc734-b7e1-4a01-92d1-f544261b43f5"
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                    "uts": "1691533977"
                },
```

```
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```
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```

```
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                "url": "https://www.last.fm/music/Pink+Floyd/_/Us+and+Them"
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```

```
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],

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},

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                        "size": "small"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/64s/598cc2f62e84
5f67981ab8d7191ec19a.jpg",
                        "size": "medium"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/174s/598cc2f62e8
45f67981ab8d7191ec19a.jpg",
                        "size": "large"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/300x300/598cc2f6
2e845f67981ab8d7191ec19a.jpg",
                        "size": "extralarge"
                    }
                "mbid": "9f8b73e1-68d3-42b0-a3c7-e399b15aab25",
                "name": "I'll be there",
                "streamable": "0",
                "url": "https://www.last.fm/music/Loona/_/I%27ll+be+there"
            },
                "album": {
                    "#text": "The Perfect Red Velvet - The 2nd Album Repackage",
                    "mbid": ""
                },
                "artist": {
                    "#text": "Red Velvet",
                    "mbid": ""
                },
                "date": {
                    "#text": "08 Aug 2023, 18:37",
                    "uts": "1691519846"
                "image": [
                         "#text": "https://lastfm.freetls.fastly.net/i/u/34s/d31c361f1d65
```

<u>a46ed1d6aeaa9</u>9a23b9a.jpg",

```
"size": "small"
                    },
                         "#text": "https://lastfm.freetls.fastly.net/i/u/64s/d31c361f1d65
a46ed1d6aeaa99a23b9a.jpg",
                        "size": "medium"
                    },
                         "#text": "https://lastfm.freetls.fastly.net/i/u/174s/d31c361f1d6
5a46ed1d6aeaa99a23b9a.jpg",
                        "size": "large"
                    },
                         "#text": "https://lastfm.freetls.fastly.net/i/u/300x300/d31c361f
1d65a46ed1d6aeaa99a23b9a.jpg",
                        "size": "extralarge"
                    }
                ],
                "mbid": "4b56a1d9-887f-41e2-a090-d63334921a7c",
                "name": "Perfect 10",
                "streamable": "0",
                "url": "https://www.last.fm/music/Red+Velvet/_/Perfect+10"
            },
                "album": {
                    "#text": "RePorpoised Phantasies",
                    "mbid": ""
                },
                "artist": {
                    "#text": "Machine Girl",
                    "mbid": "c7df5ec5-380a-40f9-856f-28fb4a33d946"
                },
"date": {
                    "#text": "08 Aug 2023, 18:31",
                    "uts": "1691519494"
                "image": [
                         "#text": "https://lastfm.freetls.fastly.net/i/u/34s/83d4edbc3375
405fb307339a701540d0.jpg",
                         "size": "small"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/64s/83d4edbc3375
405fb307339a701540d0.jpg",
                        "size": "medium"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/174s/83d4edbc337
5405fb307339a701540d0.jpg",
                        "size": "large"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/300x300/83d4edbc
3375405fb307339a701540d0.jpg",
                        "size": "extralarge"
                    }
                ],
                "mbid": "3442cb97-fa98-4093-9c6a-c0b2bac2e3d0",
                "name": "Infinite Potentiality",
                "streamable": "0",
                "url": "https://www.last.fm/music/Machine+Girl/_/Infinite+Potentiality"
            },
```

```
"album": {
                    "#text": "FLASH DESIRE",
                    "mbid": "f89bc3aa-8309-4a7c-a166-80741108cda3"
                },
                "artist": {
                    "#text": "YABUJIN",
                    "mbid": "2791a048-7546-450e-aeda-a692a74f65c0"
                },
                "date": {
                    "#text": "08 Aug 2023, 18:30",
                    "uts": "1691519436"
                "image": [
                        "#text": "https://lastfm.freetls.fastly.net/i/u/34s/830f22af153d
98f3eea3ed26676993be.jpg",
                        "size": "small"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/64s/830f22af153d
98f3eea3ed26676993be.jpg",
                        "size": "medium"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/174s/830f22af153
d98f3eea3ed26676993be.jpg",
                        "size": "large"
                    },
                         "#text": "https://lastfm.freetls.fastly.net/i/u/300x300/830f22af
153d98f3eea3ed26676993be.jpg",
                        "size": "extralarge"
                ],
                "mbid": "b71e9115-0185-4aa2-88d8-ca42df7363c7",
                "name": "drugs in her room",
                "streamable": "0",
                "url": "https://www.last.fm/music/YABUJIN/_/drugs+in+her+room"
            },
                "album": {
                    "#text": "Discovery",
                    "mbid": "098060d4-ba3c-469d-88b0-08642261c7ab"
                },
"artist": {
                    "#text": "Daft Punk",
                    "mbid": "056e4f3e-d505-4dad-8ec1-d04f521cbb56"
                },
                "date": {
                    "#text": "08 Aug 2023, 18:26",
                    "uts": "1691519175"
                },
                "image": [
                        "#text": "https://lastfm.freetls.fastly.net/i/u/34s/1340e9e1082c
f0dc748583b7eefce6d5.jpg",
                         "size": "small"
                    },
                        "#text": "https://lastfm.freetls.fastly.net/i/u/64s/1340e9e1082c
f0dc748583b7eefce6d5.jpg",
                        "size": "medium"
                    },
```

{

```
"#text": "https://lastfm.freetls.fastly.net/i/u/174s/1340e9e1082
            cf0dc748583b7eefce6d5.jpg",
                                    "size": "large"
                                },
                                    "#text": "https://lastfm.freetls.fastly.net/i/u/300x300/1340e9e1
            082cf0dc748583b7eefce6d5.jpg",
                                    "size": "extralarge"
                            ],
                            "mbid": "1dea8b17-c944-3542-96d0-f74da5d817f3",
                            "name": "Face to Face",
                            "streamable": "0",
                            "url": "https://www.last.fm/music/Daft+Punk/_/Face+to+Face"
                        }
                    ]
               }
            }
   In [5]: # Cell 4
            # Convert the nested JSON into a flat table
            df = pd.json_normalize([item for sublist in [page['recenttracks']['track'] for page in d
            # Drop unnecessary columns
            df.drop(columns=['@attr.nowplaying', 'image', 'streamable', 'url', 'mbid', 'album.mbid',
            # Extract '#text' from 'artist', 'album' and 'date' if they exist
            if 'artist.#text' in df.columns:
                df['artist'] = df['artist.#text']
            if 'album.#text' in df.columns:
                df['album'] = df['album.#text']
            if 'date.#text' in df.columns:
                df['date'] = df['date.#text']
            # Drop the original 'artist', 'album' and 'date' columns
            df.drop(columns=['artist.#text', 'album.#text', 'date.#text', 'date.uts'], errors='ignor
            # Rename 'name' to 'track'
            df.rename(columns={'name': 'track'}, inplace=True)
            # Display a sample of the cleaned data
            print(df.sample(5))
                                                                track
                                                                             artist \
                                                                               セキトオ・シゲオ
                                                               イエスタディ
            74852
            44564
                                                                  kit
                                                                               Julie
            56351
                                                              Come in
                                                                         Weatherday
            137057 Layla - Acoustic; Live at MTV Unplugged, Bray ... Eric Clapton
            8253
                                                                             Cortex
                                                               Datura
                                         album
                                                              date
                            華麗なるエレクトーン -ザ・ワード- 28 Aug 2021, 20:40
            74852
            44564
                                  starjump/kit 08 Jul 2022, 22:43
                                       Come In 07 Apr 2022, 19:28
            56351
            137057 Unplugged (Deluxe Edition) 01 Apr 2020, 05:40
            8253
                                Cortex, Vol. 2 29 Apr 2023, 01:45
   In [6]: # Cell 5
            # Get a list of unique artists
            unique_artists = df['artist'].unique()
            # Get the top tags for each unique artist
            artist_tags = {artist: get_artist_top_tags(artist) for artist in unique_artists}
Loading [MathJax]/extensions/Safe.js | ist column to the genre tags
```

```
df['tags'] = df['artist'].map(artist_tags)
# Display a sample of the cleaned data with tags
print(df.sample(5))
# Save the DataFrame to a CSV file
df.to_csv('lastfm_data2.csv', index=False)
                             track
                                         artist \
78861
                      etoile et toi
                                         物語シリーズ
68952
                   Falling for You
                                        Weezer
135697
                            Eclipse Pink Floyd
76454
                      Meat Grinder
                                    Madvillain
114693 Blue Monday - 2016 Remaster
                                     New Order
                                                    album
                                                                         date \
       Kizumonogatari Gekihanongakushu (Original Soun...
                                                           12 Jul 2021, 04:29
78861
68952
                                                Pinkerton
                                                           26 Nov 2021, 03:59
135697
                                The Dark Side of the Moon 08 Apr 2020, 20:30
76454
                                              Madvillainy
                                                           10 Aug 2021, 01:37
114693
                                  Singles (2016 Remaster)
                                                           13 Sep 2020, 18:51
                                                    tags
78861
                             Soundtrack, j-pop, japanese
68952
                    rock, alternative, alternative rock
135697 Progressive rock, classic rock, Psychedelic Rock
76454
                       Hip-Hop, underground hip-hop, rap
114693
                         new wave, electronic, post-punk
```