In [134]:
```
# install necessary packages
import spotipy
from spotipy.oauth2 import SpotifyClientCredentials
from spotipy.oauth2 import SpotifyOAuth
import pandas as pd
import time
from sqlalchemy import create_engine
from datetime import datetime
```

In [135]:
```
# set up connection for accessing recent user info
sp = spotipy.Spotify(auth_manager=SpotifyOAuth(client_id="client id",
                                               client_secret="secret",
                                               redirect_uri='uri',
                                               scope='user-library-read, user-top-read, user-read-recently-played'))
```

In [136]:
```
# set up the connection to the aws database
MYSQL_HOST_aws = 'host'
MYSQL_USER_aws = 'user'
MYSQL_PASSWORD_aws = 'pw'
MYSQL_DB_aws = 'schema'

aws_write = create_engine(f'mysql+mysqlconnector://{MYSQL_USER_aws}:{MYSQL_PASSWORD_aws}@{MYSQL_HOST_aws}/{MYSQL_DB_aws}')
```

In [139]:

```
while(True):
    # pull 5 most recently played songs
    num_songs = 5
    recent_songs = sp.current_user_recently_played(limit=num_songs)

    # pull necessary info from recently played songs
    track_data = []
    for track in recent_songs['items']:
        track_id = track['track']['id']
        track_name = track['track']['name']
        track_dur = track['track']['duration_ms']
        artist_name = track['track']['artists'][0]['name']
        time_played = track['played_at']

        # Get audio features for the track using function from SpotiPy
        audio_features = sp.audio_features(track_id)[0]

        # Collect the relevant information
        track_info = {
            'track_id' : track_id,
            'user_id' : 1,
            'track_name': track_name,
            'artist_name': artist_name,
            'duration': track_dur,
            'time_played' : time_played,
            'acousticness' : audio_features['acousticness'],
            'danceability' : audio_features['danceability'],
            'energy' : audio_features['energy'],
            'instrumentalness' : audio_features['instrumentalness'],
            'liveness' : audio_features['liveness'],
            'loudness' : audio_features['loudness'],
            'speechiness' : audio_features['speechiness'],
            'valence' : audio_features['valence'],
            'tempo' : audio_features['tempo']
        }
        # append song and artist info to list
        track_data.append(track_info)

    # convert list of song features and artist to dataframe
    my_df = pd.DataFrame(track_data)

    # convert time played to Pacific Time
    my_df['time_played'] = pd.to_datetime(pd.to_datetime(my_df['time_played']).dt.tz_convert('US/Pacific').dt.strftime('%Y-%m-%


    # create dim and fact tables
    fact_listened = my_df[['user_id','track_id', 'artist_name', 'time_played', 'duration']]
    dim_track = my_df[['track_id', 'track_name', 'acousticness', 'danceability', 'energy', 'instrumentalness', 'liveness', 'lou
    dim_date = my_df[['time_played']].copy()

    # create day of week and hour columns in date dimension table
    dim_date['day_of_week'] = dim_date['time_played'].dt.dayofweek
    dim_date['hour'] = dim_date['time_played'].dt.hour

    # pull current dimension and fact tables from AWS
    og_dim_date = pd.read_sql('SELECT * FROM dim_date', con=aws_write)
    og_dim_track = pd.read_sql('SELECT * FROM dim_track', con=aws_write)
    og_fact_listened = pd.read_sql('SELECT * FROM fact_listened', con=aws_write)

    # append new fact and dim tables to tables from aws
    append_date = pd.concat([og_dim_date, dim_date], ignore_index=True)
    append_track = pd.concat([og_dim_track, dim_track], ignore_index=True)
    append_fact = pd.concat([og_fact_listened, fact_listened], ignore_index=True)

    # remove duplicates from all data frames
    clean_date = append_date.drop_duplicates()
    clean_track = append_track.drop_duplicates()
    clean_fact = append_fact.drop_duplicates()

    # send updated dataframes back to AWS
    clean_track.to_sql(name='dim_track', con=aws_write, if_exists='replace', index=False)
    clean_date.to_sql(name='dim_date', con=aws_write, if_exists='replace', index=False)
    clean_fact.to_sql(name='fact_listened', con=aws_write, if_exists='replace', index=False)

    # pause code for 5 minutes
    print(len(clean_fact), "songs in fact table at",datetime.now(),"\n")
    print("--"*20)
    time.sleep(300)
```

```
42 songs in fact table at 2024-04-27 00:53:30.119791

----------------------------------------
43 songs in fact table at 2024-04-27 00:58:37.164534

----------------------------------------
45 songs in fact table at 2024-04-27 01:03:44.683905

----------------------------------------
46 songs in fact table at 2024-04-27 01:08:51.882270

----------------------------------------
48 songs in fact table at 2024-04-27 01:13:58.982675

----------------------------------------
50 songs in fact table at 2024-04-27 01:19:03.648803

----------------------------------------
51 songs in fact table at 2024-04-27 01:24:07.067129

----------------------------------------
53 songs in fact table at 2024-04-27 01:29:14.044517

----------------------------------------
54 songs in fact table at 2024-04-27 01:34:21.251027

----------------------------------------
57 songs in fact table at 2024-04-27 01:39:25.208462

----------------------------------------
58 songs in fact table at 2024-04-27 01:44:30.809800

----------------------------------------
60 songs in fact table at 2024-04-27 01:49:38.050683

----------------------------------------
62 songs in fact table at 2024-04-27 01:54:45.281178

----------------------------------------
63 songs in fact table at 2024-04-27 01:59:52.179397

----------------------------------------
65 songs in fact table at 2024-04-27 02:04:55.209165

----------------------------------------
67 songs in fact table at 2024-04-27 02:09:58.437825

----------------------------------------
69 songs in fact table at 2024-04-27 02:15:02.530315

----------------------------------------
70 songs in fact table at 2024-04-27 02:20:07.398926

----------------------------------------
72 songs in fact table at 2024-04-27 02:25:14.539658

----------------------------------------
74 songs in fact table at 2024-04-27 02:30:21.872663

----------------------------------------
75 songs in fact table at 2024-04-27 02:35:29.258773

----------------------------------------
76 songs in fact table at 2024-04-27 02:40:33.189483

----------------------------------------
78 songs in fact table at 2024-04-27 02:45:41.930205

----------------------------------------
79 songs in fact table at 2024-04-27 02:50:46.237518

----------------------------------------
81 songs in fact table at 2024-04-27 02:55:49.849051

----------------------------------------
83 songs in fact table at 2024-04-27 03:00:53.378751

----------------------------------------
85 songs in fact table at 2024-04-27 03:05:56.867343

----------------------------------------
86 songs in fact table at 2024-04-27 03:10:59.351821

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

```
88 songs in fact table at 2024-04-27 03:16:03.681873

----------------------------------------
89 songs in fact table at 2024-04-27 03:21:09.026937

----------------------------------------
90 songs in fact table at 2024-04-27 03:26:12.624056

----------------------------------------
92 songs in fact table at 2024-04-27 03:31:16.325115

----------------------------------------
93 songs in fact table at 2024-04-27 03:36:19.786711

----------------------------------------
95 songs in fact table at 2024-04-27 03:41:23.346809

----------------------------------------
98 songs in fact table at 2024-04-27 03:46:28.465885

----------------------------------------
99 songs in fact table at 2024-04-27 03:51:35.929448

----------------------------------------
100 songs in fact table at 2024-04-27 03:56:38.458581

----------------------------------------
101 songs in fact table at 2024-04-27 04:01:42.410104

----------------------------------------
103 songs in fact table at 2024-04-27 04:06:46.641626

----------------------------------------
105 songs in fact table at 2024-04-27 04:11:53.899456

----------------------------------------
106 songs in fact table at 2024-04-27 04:17:01.650518

----------------------------------------
108 songs in fact table at 2024-04-27 04:22:07.033012

----------------------------------------
109 songs in fact table at 2024-04-27 04:27:10.501909

----------------------------------------
111 songs in fact table at 2024-04-27 04:32:18.001269

----------------------------------------
113 songs in fact table at 2024-04-27 04:37:21.683497

----------------------------------------
114 songs in fact table at 2024-04-27 04:42:29.130682

----------------------------------------
116 songs in fact table at 2024-04-27 04:47:36.051126

----------------------------------------
117 songs in fact table at 2024-04-27 04:52:40.200707

----------------------------------------
119 songs in fact table at 2024-04-27 04:57:47.561509

----------------------------------------
120 songs in fact table at 2024-04-27 05:02:51.194260

----------------------------------------
122 songs in fact table at 2024-04-27 05:07:54.794346

----------------------------------------
123 songs in fact table at 2024-04-27 05:12:58.215744

----------------------------------------
125 songs in fact table at 2024-04-27 05:18:01.895044

----------------------------------------
126 songs in fact table at 2024-04-27 05:23:07.148711

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