Purple Rain (Taylor's Version)

Instructions

Taylor Swift is contemplating re-releasing three of her albums (Midnights, folklore, and 1989). She has done a cover of Prince's "*Purple Rain*" and wants to include it on one of the re-released albums. Because she ❤️s statistics, T-Swift wants to include it on the album that the song is most similar to based on their musical properties. After hearing about your prodigious skills in classification, she would like your help in determining which album to put the track on.

Spotify collects data on nine musical properties, but for now we will only consider two:

- **Danceability:** Measure of how suitable a track is for dancing based on a combination of musical elements including tempo, rhythm stability, beat strength, and overall regularity. Higher values indicate the song is more danceable.
- **Loudness:** The overall loudness of a track in decibels (dB). Loudness values are averaged across the entire track and are useful for comparing relative loudness of tracks.

The Spotify metrics for the cover song Taylor Swift wants to add to her re-released albums.

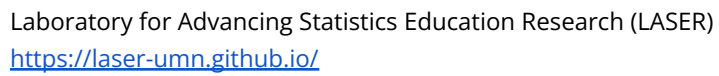| Track	Danceability	Loudness
Purple Rain	13.48	47.39

Measuring Similarity in Two Dimensions

1. The Danceability and Loudness metric for two of Taylor Swift's songs (*Lavender Haze* and *cardigan*) are given below. Create a two-dimensional plot of the Danceability (*x*-axis) and Loudness (*y*-axis) metrics that includes these two songs, as well as, *Purple Rain*. Label all three tracks in the plot.

Track	Album	Danceability	Loudness
Lavender Haze	Midnights	84.96	46.76
cardigan	folklore	61.52	64.57

2. Based on the Danceability and Loudness metrics, is *Purple Rain* more similar to *Lavender Haze* or *cardigan?* Explain by referring to your plot.

3. Come up with a way to quantify how similar two songs are. Use your method to compute how similar *Purple Rain* is to *Lavender Haze.* Also compute how similar *Purple Rain* is to *cardigan.*

4. Remember, Tay-Tay wants to add each cover song to the album based on similarity to other songs on the album's musical properties. Based on your values from the previous question, which album should Tay-Tay add *Purple Rain* to? Explain.