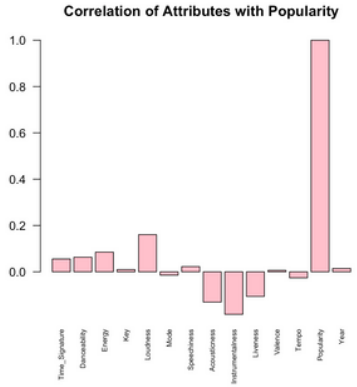
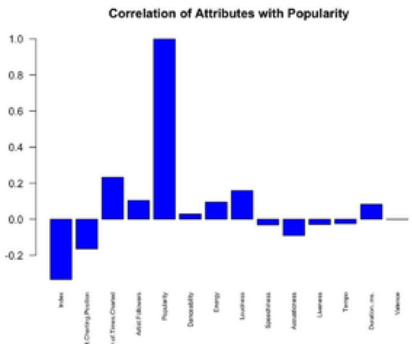
DATA ANALYSIS FOR 1980S SONGS

For 1980 songs:



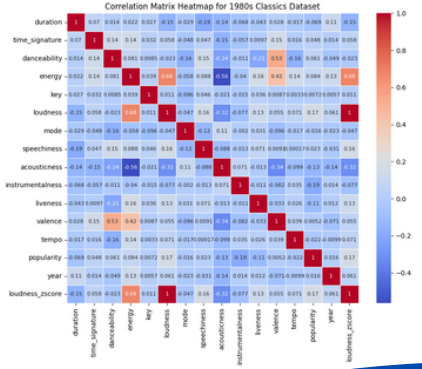
Based on the bar graph for the 1980s, Acousticness, Instrumentalness, Mode, Liveness and Tempo have negative correlation to the Popularity of the song, while the other attributes have a positive correlation.

For 2021 songs:

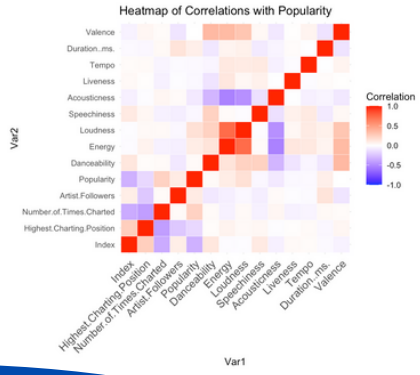


Based on the bar graph for 2021, Acousticness,Speediness, Liveness and Tempo have negative correlation to the Popularity of the song, while the other attributes have a positive correlation.

Heat Map of correlation of attributes for 1980s songs:



Heat Map of correlation of attributes 2021s songs:



CONCLUSION: Across decades, songs with high danceability, energy, and vocal presence (low instrumentalness) have consistently topped the charts, which is something that producers should continue to do. Tracks with unique acoustic or instrumental features cater to niche audiences, reflecting evolving yet enduring listener preferences from the 1980s to 2021.

Correlation index for 1980s songs:

	Year	Time_Signature	Danceability	Energy	Key	Loudness	Mode	Speechiness	Acousticness	Instrumentalness	Liveness	Valence	Tempo	Popularity
1	1980	3.93	0.63901	0.560261	5.27	-9.98078	0.74	0.070223	0.323945148	0.0465877867	0.161927	0.614271	120.92273	56.7
2	1981	3.96	0.61349	0.58844	4.85	-9.0427	0.75	0.048308	0.31615172	0.0329680238	0.202296	0.5906	116.71696	54.91
3	1982	3.9898989898989899	0.619656565656566	0.587121212121212	5.040404040404040	-8.986929292929929	0.6868686868686687	0.0583040404040404	0.311615707070707	0.0341277076767677	0.184881818181818	0.604036363636364	122.371070707071	55.969696969697
4	1983	4	0.65238	0.66188	5.61	-8.81235	0.6	0.067211	0.19297139	0.0268342165	0.167762	0.653523	124.56035	60.67
5	1984	3.93	0.64712	0.677837	5.3	-8.03542	0.66	0.05675	0.20692593	0.0270234319	0.204772	0.635587	123.62854	58.83
6	1985	3.99	0.63471	0.676849	5.4	-8.80694	0.64	0.05083	0.19601778	0.0600759752	0.139504	0.643082	121.27463	59.72
7	1986	3.97	0.60945	0.61769	5.04	-9.18737	0.78	0.054834	0.249552453	0.0464419678	0.171557	0.572634	118.991	60.7
8	1987	3.99	0.61778	0.669865	5.47	-8.39472	0.65	0.053162	0.210658752	0.0613009972	0.16207	0.587073	121.58504	57.99
9	1988	3.9595959595959596	0.625414141414141	0.625722222222222	4.989898989898989	-9.256494949494495	0.7373737373737373	0.0570979797979798	0.232397578787879	0.0485303989898899	0.185248484848485	0.581742424242424	120.434535353535	54.535353535353535
10	1989	3.95	0.6056	0.667418	5.28	-8.36224	0.65	0.059585	0.20661705	0.0418208053	0.206284	0.548236	118.56686	57.36

Correlation index for 2021s songs (dataset found online):

	Year	Time_Signature	Danceability	Energy	Key	Loudness	Mode	Speechiness	Acousticness	Instrumentalness	Liveness	Valence	Tempo	Popularity
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3	1982	3.9898989898989899	0.6196565656566566	0.5871212121212212	5.040404040404040	-8.986929292929929	0.6868686868686687	0.0583040404040404	0.3116157070707070	0.0341277076767677	0.1848818181818181	0.6040363636363364	122.3710707070071	55.9696969696697
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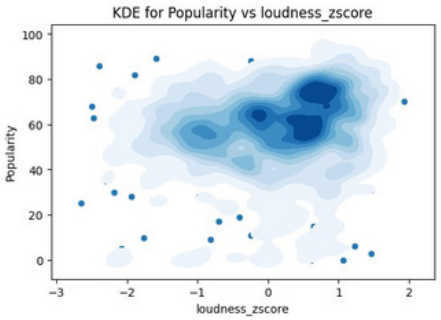
Why Kernel Density Plots (KDE) for data visualisation?

After trying out Histograms and Scatter plots, KDE was bettebecause it provided a smooth, continuous estimate of point concentration, making it easier to detect underlying patterns without the binning artifacts found in discrete plot and without overplotting, which would result in failure to find obscure trends.



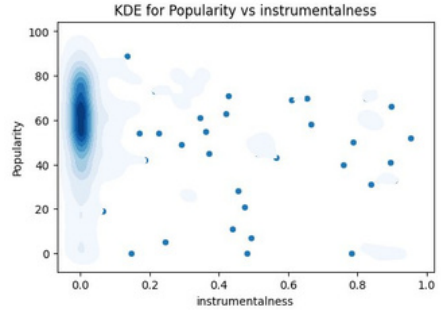
LOUDNESS AND POPULARITY OF A SONG (most positively correlated)

Clusters of Popularity:

The highest density (most common song characteristics) lies in the region where "loudness_zscore" is near zero and "Popularity" is between 50 and 80. This could suggest that maintaining a loudness level close to the average is a characteristic of more popular songs, or at least a characteristic found in many songs.

Outliers:

There are some points scattered in the outer areas (light density), indicating that there are a few songs that are either significantly quieter or louder than the mean and have varying popularity scores. These outliers may represent niche songs or genres that appeal to specific audiences.



INSTRUMENTALNESS AND POPULARITY OF A SONG (most negatively correlated)

Popularity and Instrumentalness Relationship:

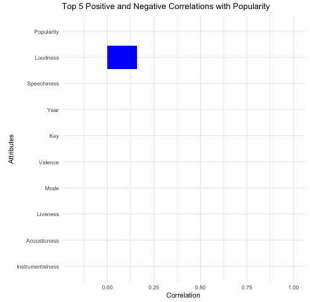
The plot suggests that songs with low instrumentalness (more likely to have vocals) are generally more popular. This shows that vocals are instrumental in the popularity of a song. There is a strong cluster of popular songs with very low instrumentalness, indicating a preference for songs that are not purely instrumental.

Outliers and Niche Popularity:

The plot also shows some individual points with varying levels of popularity across the entire range of instrumentalness. This could indicate niche markets or specific genres (like classical or electronic music) where instrumental tracks are more common and can still achieve a certain level of popularity.

Limited Popularity for Instrumental Tracks:

As instrumentalness increases, the popularity tends to be more spread out, with no strong concentration of high-popularity songs. This suggests that purely instrumental songs are less likely to be highly popular, at least within the dataset.The scattered points in the middle and higher ranges of instrumentalness reflect a niche audience or specialized genres where instrumental tracks might still have some popularity.



SORTING SONG ATTRIBUTES BASED ON YEAR

Based on the animted gif of the correlation bar graphs based on year, we found the mean of each song attribute for songs released in the same year in the 1980s.

It can be concluded that 1983 had the most Danceable songs, 1987 had the songs with the greatest Energy and so on.