Title: **Aggregation Pipeline**

Aim: **Applying Aggregation pipeline using stages**

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NoSQL Lab 8

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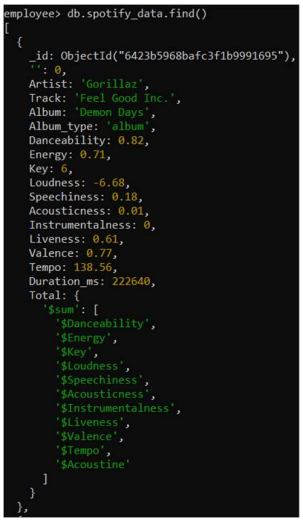
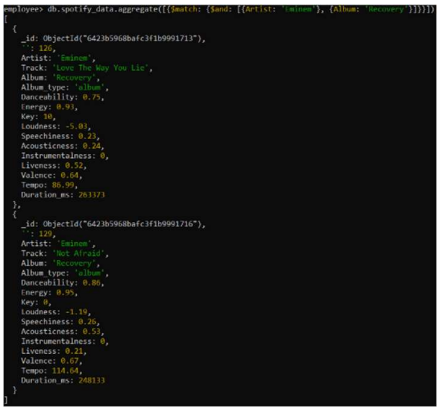
Reusing previously imported data



$match stage: The first stage to select only the matching documents from a collection. It is equivalent to the .find() method.

Syntax: db.spotify_data.aggregate([{$match: {$and: [{Artist: 'Eminem'}, {Album: 'Recovery'}]}}])

Retrieving the music data where the artist is 'Eminem' and the album is 'Recovery'.



$group stage: Groups the input documents by the specified _id expression and returns a single document containing the accumulated values for each distinct group.

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist'}}])

Grouping the Artist names with _id gives out a list of all the Artist present in the dataset.

Accumulation using $sum: It sums up all the values which were accumulated by the $group stage.

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}])

Grouping all the Artists together and computing the number of songs by each artist.

$skip: It is used to skip n number of documents and passes the remaining documents

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}])

Grouping all the Artists together and computing the number of songs by each artist wherein we skip the first 10 outputs.

```
employee> db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}])
[
  { _id: 'Taylor Swift', totalSongs: 10 },
  { _id: 'RM', totalSongs: 10 },
  { _id: 'Matisse', totalSongs: 10 },
  { _id: 'Bibi und Tina', totalSongs: 10 },
  { _id: 'Journey', totalSongs: 10 },
  { _id: 'Rochak Kohli', totalSongs: 10 },
  { _id: 'Lil Nas X', totalSongs: 10 },
  { _id: 'Aerosmith', totalSongs: 10 },
  { _id: 'Cascada', totalSongs: 10 },
  { _id: 'Parokya Ni Edgar', totalSongs: 10 },
  { _id: 'Los Ángeles Azules', totalSongs: 10 },
  { _id: 'Camille Saint-Saëns', totalSongs: 10 },
  { _id: 'Evanescence', totalSongs: 10 },
  { _id: 'The Kid LAROI', totalSongs: 10 },
  { _id: 'Edgardo Nuñez', totalSongs: 10 },
  { _id: 'Kato', totalSongs: 10 },
  { _id: 'Djavan', totalSongs: 10 },
  { _id: 'Sonu Nigam', totalSongs: 10 },
  { _id: 'Gilberto Santa Rosa', totalSongs: 10 },
  { _id: 'Hugh Jackman', totalSongs: 10 }
]
```

$limit: It is used to pass first n number of documents thus limiting them.

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}, {$limit: 10}])

Grouping all the Artists together and computing the number of songs by each artist wherein we skip the first 10 outputs and limit the output to only 10 entries.

```
employee> db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}, {$limit: 10}])
[
  { _id: 'Henrique & Juliano', totalSongs: 10 },
  { _id: 'A Day To Remember', totalSongs: 10 },
  { _id: 'Katy Perry', totalSongs: 10 },
  { _id: 'Matheus & Kauan', totalSongs: 10 },
  { _id: 'Bread', totalSongs: 10 },
  { _id: 'Zezé Di Camargo & Luciano', totalSongs: 10 },
  { _id: 'Erik Satie', totalSongs: 10 },
  { _id: 'Sting', totalSongs: 10 },
  { _id: 'REO Speedwagon', totalSongs: 10 },
  { _id: 'Christian Nodal', totalSongs: 10 }
]
```

$out: It is used to write resulting documents to a new collection

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}, {$limit: 10}, {$out: {db: 'employee', coll: 'spotify_data2'}}])

Creating a new collection which consists 10 values of Artists and their total number of songs ii the original dataframe.

```
employee> db.spotify_data.aggregate([{$group: {_id: '$Artist', totalSongs: {$sum: 1}}}, {$skip: 10}, {$limit: 10}])
[
  { _id: 'Henrique & Juliano', totalSongs: 10 },
  { _id: 'A Day To Remember', totalSongs: 10 },
  { _id: 'Katy Perry', totalSongs: 10 },
  { _id: 'Matheus & Kauan', totalSongs: 10 },
  { _id: 'Bread', totalSongs: 10 },
  { _id: 'Zezé Di Camargo & Luciano', totalSongs: 10 },
  { _id: 'Erik Satie', totalSongs: 10 },
  { _id: 'Sting', totalSongs: 10 },
  { _id: 'REO Speedwagon', totalSongs: 10 },
  { _id: 'Christian Nodal', totalSongs: 10 }
]
employee> db.spotify_data2.find()
[
  { _id: 'J4kGoldn', totalSongs: 10 },
  { _id: 'Red Hot Chili Peppers', totalSongs: 10 },
  { _id: 'Drake', totalSongs: 10 },
  { _id: 'Black Eyed Peas', totalSongs: 10 },
  { _id: 'Disturbed', totalSongs: 10 },
  { _id: 'Kris Kristofferson', totalSongs: 10 },
  { _id: 'Roddy Ricch', totalSongs: 10 },
  { _id: 'Zac Efron', totalSongs: 10 },
  { _id: 'MARINA', totalSongs: 10 },
  { _id: 'I Prevail', totalSongs: 10 }
]
```

Complex Queries: Setting up a condition to filter the data and then, sorting and accumulating the filtered data using $sort, $sum and $group.

Syntax: db.spotify_data.aggregate([{$match: {Duration_ms: {$gt: 150000}}}, {$group: {_id: '$Artist', totalDuration: {$sum: '$Duration_ms'}}}, {$sort: {$Artist: 1}}])

The $match stage filters the data with duration more than 150000ms, then $group groups the artists with their total duration of all the songs combined which is sorted in ascending order by their first name.

```
employee> db.spotify_data.aggregate([
... {$match: {Duration_ms: {$gt: 150000}}},
... {$group: {_id: '$Artist', totalDuration: {$sum: '$Duration_ms'}}},
... {$sort: {Artist: 1}}
... ])
[
  { _id: 'ROSALÍA', totalDuration: 1484701 },
  { _id: 'Stray Kids', totalDuration: 1931243 },
  { _id: 'Abel Pintos', totalDuration: 2267165 },
  { _id: 'Frank Sinatra', totalDuration: 1300893 },
  { _id: 'Ricky Montgomery', totalDuration: 2007006 },
  { _id: 'João Gilberto', totalDuration: 1399188 },
  { _id: 'Nekfeu', totalDuration: 2248760 },
  { _id: 'Michael Bublé', totalDuration: 1911016 },
  { _id: 'Pitbull', totalDuration: 2227880 },
  { _id: 'Metallica', totalDuration: 3544585 },
  { _id: 'Arcane', totalDuration: 1734626 },
  { _id: 'Marc Anthony', totalDuration: 2864087 },
  { _id: 'Cigarettes After Sex', totalDuration: 2692182 },
  { _id: 'Pritam', totalDuration: 2686438 },
  { _id: 'Niro', totalDuration: 2261574 },
  { _id: 'Bacilos', totalDuration: 2508354 },
  { _id: 'Trey Songz', totalDuration: 1966826 },
  { _id: 'Anderson .Paak', totalDuration: 2120984 },
  { _id: 'Gente De Zona', totalDuration: 2024062 },
  { _id: 'Kehlani', totalDuration: 1901218 }
]
```

Syntax: db.spotify_data.aggregate([{$group: {_id: '$Artist', Songs: {$count: {}}, TotalDuration: {$sum: '$Duration_ms'}, Loudness: {$avg: '$Loudness'}}}, {$sort: {Duration_ms: -1}}, {$out: {db: 'employee', coll: 'spotify_artist_info'}}])

Creating a new collection where each artist's name, count of songs, total duration of songs and average of loudness in each song in the dataset.

```
employee> db.spotify_data.aggregate([
... {$group: {_id: '$Artist', Songs: {$count: {}}, TotalDuration: {$sum: '$Duration_ms'}, Loudness: {$avg: '$Loudness'}}},
... {$sort: {Duration_ms: -1}},
... {$out: {db: 'employee', coll: 'spotify_artist_info'}}
... ])

employee> db.spotify_artist_info.find()
[
  {
    _id: 'Florence + The Machine',
    Songs: 10,
    TotalDuration: 2295408,
    Loudness: -5.181
  },
  {
    _id: 'Lil Tracy',
    Songs: 10,
    TotalDuration: 1570843,
    Loudness: -7.812
  },
```