Course Project Phase 1

Team Number 27

Project Topic: Music Industry Mini World Introduction:

Music Industry Database is a comprehensive repository designed to capture and organize vital information related to the multifaceted world of music. It encompasses an extensive range of data, including details about songs, albums, artists, producers, and other influential figures in the music industry. By curating this wealth of information, we aim to provide users with a deeper understanding of the music landscape.

Purpose:

Music is a powerful medium for storytelling, offering a unique method to communicate intricate narratives and elicit profound emotions. Recognizing the captivating nature of this medium, we embarked on the journey to create a database dedicated to music. We aim to document the efforts of individuals involved in music production, serving as a valuable resource for newcomers to the industry. Our database caters to a diverse range of users, offering distinct perspectives to cater to their specific needs.

Users:

- **Designers and Administrators:** Team members responsible for updating the database.
- **Naive Users:** Recognized social media partners who can add or update data.
- **Sophisticated Users:** Critics, music producers, and reviewers who can view the database in different formats and request additional features.
- **Stand-Alone Users:** Rating platforms, streaming services, and social media entities who can contribute data, particularly ratings.
- **Casual Users:** Music fans and general audiences who can view the data but not edit it.

Applications:

1. Music Streaming Service: Provides song, album, and artist information with personalized recommendations and search functionality.
2. Artist and Producer Management: Tracks profiles, schedules releases, monitors success metrics, and coordinates collaborations.
3. Music Sales and Distribution: Manages release dates, tracks sales and streaming metrics, and coordinates marketing efforts.

4. Concert and Event Management: Schedules concerts, tracks performances, coordinates event planning, and manages ticket sales.
5. Music Review Platforms: Stores and manages reviews, aggregates ratings, and displays review trends.
6. Music Award Management: Tracks nominations and winners, manages award data, and coordinates selection processes.
7. Music Analytics: Analyses streaming data, generates performance reports, and provides insights on listener preferences.

Assumptions:

1. One of the attributes of Producer is #Album_ID which is an array of all the albums the producer owns till now. It is an array of albums.
2. Hits and flops is an attribute which is observed in Artist and Producer. The hits and flops attribute in an artist is the ratio of hits and flops of the artist. The hits and flops attribute in a producer is the ratio of hits and flops of the producer.
3. From debut year attribute in artist, we derive the experience.

Entity type	Attributes	Attribute type	Key attribute	Data type
Artist	Name	Composite	Stage name	Characters
	Stage name	Composite		Characters
	Debut Year			YYYY
	Role	Multi-Valued		Characters
	Experience	Derived		Integer
	Upcoming projects	Multi-Valued		Characters
	Hits and flops			Integer: Integer
Producer	Name	Composite	#Albums_ID, Name	Characters
	#Album_ID	Multi-Valued		Integer
	Debut Year			YYYY
	Upcoming projects	Multi-Valued		Characters
	Best album	Derived		Characters
	Experience	Derived		Integer
	Hits and flops			Integer: Integer
Album	Album ID		Name, Release year	Integer
	Duration			Integer
	Release year			Integer
	Genre	Multi-Values		Integer
	Budget			Integer

	Collections			Integer
Song	Name	Composite	Name, Producer Name	Characters
	Artist	Composite		Characters
	Lyrics	Multi-Valued		Characters
	Producer Name	Composite		Characters
	Media	Multi-Valued		Characters
Distribution	Name	Composite	Name, Release date	Characters
	#platforms			Integer
	Release date			Integer
Award	Name	Composite	Name, year	Characters
	Level			Integer
	Year			Integer
	Album ID	Multi-Valued		Characters
Album Review (Weak Entity)	Review ID		Review ID, Review Date	Integer
	Review Date			Integer
	Rating			Float
	Comments	Composite		Characters
	Album ID			Integer
Song Review (Weak Entity)	Review ID		Review ID, Review Date	Integer
	Review Date			Integer
	Rating			Float
	Comments	Composite		Characters
	Song Name			Integer
Concert (Weak Entity)	Concert ID		Concert ID	Integer
	Date			Integer
	Location	Composite		Characters
	Stage Name	Composite		Characters
	Album ID			Integer

Superclass: Artist Attributes:

Name (Characters)
Stage Name (Key, Characters)
Debut Year (YYYY)
Role (Characters)
Experience (Integer)
Upcoming Projects (Characters, Multi-Valued)
Hits and Flops (Integer: Integer, Multi-Valued)
Subclass: Singer Attributes:

Inherited from Artist:
Name
Stage Name

Debut Year
Role
Experience
Upcoming Projects
Hits and Flops Specific
to Singer:
Genre (Characters)
Vocal Range (Characters)

Superclass Artist: Contains general attributes applicable to all artists.
Subclass Singer: Inherits general attributes from Artist and adds specific attributes like Genre and Vocal Range.

Relationship type	Participating entities	Degree	Cardinality	Attributes
Performs	Artist, Song	2	M: N	
Composes	Artist, Album	2	1: N	
BelongsTo	Song, Album	2	M: N	
ProducedBy	Album, Producer	2	N:1	Name, Release Year (Composite), Best Album (Derived)
DistributedBy	Album, Distribution	2	N:1	
Features	Artist, Song, Album, Producer	4	M: N: K: 1	
AwardedTo	Album, Award	2	N: 1	Name, Year (Composite), TotalCollections (Derived)
Collaborates	Artist (Collaborator), Artist (Collaborate)	2	M: N	
ConcertBy (Identifying Relationship)	Artist, Album, Concert	3	M: N: K	Date, Location (Composite)
ReviewsAlbums (Identifying Relationship)	Album Review, Album	2	N:1	
ReviewsSongs (Identifying Relationship)	Song Review, Song	2	N:1	

Functional Requirements:

1. Retrieval
   a. Selection
      i. Query: Retrieve complete data tuples of artists with a Stage Name starting with 'A'.
      ii. SELECT *
      FROM Artist
      WHERE Stage Name LIKE 'A%';
   b. Projection
      i. Query: Names of all albums with a budget of ≥ $1 million.
      ii. SELECT Name
      FROM Album
      WHERE Budget >= 1000000;
   c. Aggregate Function
      - Query: Maximum collection of albums released in the year 2023.
      - SELECT MAX(Collections) AS MaxCollection
      FROM Album
      WHERE ReleaseYear = 2023;

   d. Search
      - Query: Search for artists with names matching the partial text 'John'.
      - SELECT *
      FROM Artist
      WHERE Name LIKE '%John%';
   e. Analysis
      i. Report 1
      - Query: Number of songs produced by each producer that have collections above average.
      - SELECT Producer.Name, COUNT(Song.Name) AS NumberOfSongs
      FROM Song
      JOIN Producer ON Song.ProducerName = Producer.Name
      WHERE Song.Collection > (SELECT AVG(Collection) FROM Song)
      GROUP BY Producer.Name;
      ii. Report 2
      - Query: List of albums by genre, showing the number of songs and total collections for each genre.

- SELECT Album.Genre, COUNT(Song.Name) AS NumberOfSongs, SUM(Album.Collections) AS TotalCollections
  FROM Album
  JOIN Song ON Album.Album_ID = Song.Album_ID
  GROUP BY Album.Genre;

2. Modification
   a. Insertion
      i. Operation: Insert new song information, ensuring no integrity constraints are violated (e.g., the producer must exist).
      - INSERT INTO Song (Name, Artist, Lyrics, Producer Name, Media)
        VALUES ('New Song', 'Artist Name', 'Lyrics here', 'Producer Name', 'Media link')
        WHERE EXISTS (SELECT * FROM Producer WHERE Name = 'Producer Name');
   b. Update
      i. Operation: Update the budget of an album, checking for data consistency.
      - UPDATE Album
        SET Budget = 1500000
        WHERE Album_ID = 3 AND Budget < 2000000;
   c. Deletion
      i. Operation: Delete an artist's record, ensuring all associated songs and albums are handled appropriately.

      - DELETE FROM Artist
        WHERE Stage Name = 'Artist Name'
        AND NOT EXISTS (SELECT * FROM Song WHERE Artist = 'Artist Name')
        AND NOT EXISTS (SELECT * FROM Album WHERE Artist = 'Artist Name');

Examples:

Entity/Relationship	Example
Artist	Name: 'John Doe', Stage Name: 'JD', Role: 'Singer', Experience: 6, Upcoming Projects: 'New Album', Hits and Flops: '10:2'

Producer	Name: 'Jane Smith', #Album_ID: {5798,16924,573,13874}, Upcoming Projects: 'Album XYZ', Best Album: 'Album ABC', Experience: 10, Hits and Flops: '15:5'
Album	Album ID: 6843, Duration: 60, Release Year: 2023, Genre:
	'Pop', Budget: 2000000, Collections: 7500000
Song	Name: 'Hit Song', Artist: 'JD', Lyrics: 'These are the lyrics...', Producer: 'Jane Smith', Media: 'MP3'
Distribution	Name: 'Spotify', #Platforms: 3, Release Date: 2023-01-01
Award	Name: 'Best New Artist', Level: 1, Year: 2023, Albums ID: 63959
Album Review (Weak Entity)	Review ID: 201, Review Date: 2024-01-15, Rating: 4.8, Comments: 'Excellent album!', Album ID: 101
Song Review (Weak Entity)	Review ID: 301, Review Date: 2024-01-20, Rating: 4.5, Comments: 'Great lyrics!', Song ID: 201
Concert (Weak Entity)	Concert ID: 401, Date: 2024-05-01, Location: 'Los Angeles', Artist ID: 101, Album ID: 201
Performs	Artist: 'JD', Song: 'Hit Song'
Composes	Artist: 'JD', Album: 'Greatest Hits'
BelongsTo	Song Name: 'Hit Song', Album: 'Greatest Hits'
ProducedBy	Album ID: 8644, Producer: 'Jane Smith'
DistributedBy	Album ID: 7842, Distribution: 'Spotify'
Features	Artist: 'JD', Song: 'Hit Song', Album: 'Greatest Hits', Producer: 'Jane Smith'

AwardedTo	Album: 'Greatest Hits', Award: 'Best New Album', Year: 2023
Collaborates	Artist (Collaborator): 'JD', Artist (Collaborate): 'Jane Smith'
ConcertBy	Artist: 'JD', Album ID: 4656, Concert: ID: 401
ReviewsAlbums	Album Review: Review ID = 201, Album: 'Greatest Hits'
ReviewsSongs	Song Review: Review ID = 301, Song: 'Hit Song'