CS-322 Introduction to Database Systems
Project Deliverable #2

Due on Sunday, May 4^{th}, 2014

Group 24
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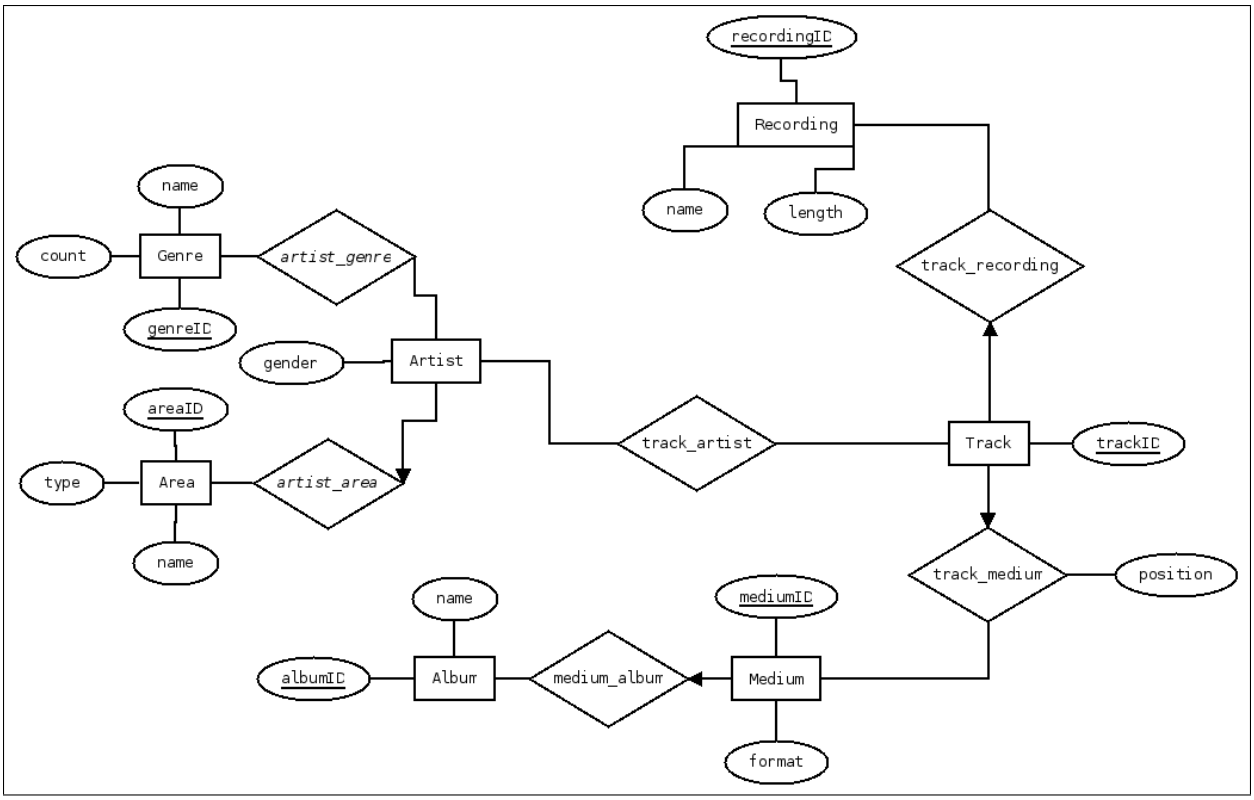
ER model for music database



SQL DDL code for table creations

```
CREATE TABLE Areas (
  areaID INTEGER,
  name VARCHAR(255) NOT NULL,
  type VARCHAR(255),
  PRIMARY KEY (areaID) ) ;

CREATE TABLE Genres (
  genreID INTEGER,
  name VARCHAR(255) NOT NULL,
  count INTEGER DEFAULT 0,
  PRIMARY KEY (genreID) ) ;

CREATE TABLE Artists (
  artistID INTEGER,
  name VARCHAR(255) NOT NULL,
  areaID INTEGER,
  gender CHAR(1),
  PRIMARY KEY (artistID),
  FOREIGN KEY (areaID) REFERENCES Areas ) ;


CREATE TABLE Recordings (
  recordingID INTEGER,
```

```
  name VARCHAR(255) ,
  length INTEGER,
  PRIMARY KEY (recordingID) ) ;



CREATE TABLE Albums (
  albumID INTEGER,
  name VARCHAR(255) NOT NULL,
  PRIMARY KEY (albumID) ) ;

CREATE TABLE Mediums (
  mediumID INTEGER,
  albumID INTEGER,
  format VARCHAR(255),
  PRIMARY KEY (mediumID),
  FOREIGN KEY (albumID) REFERENCES Albums ) ;


CREATE TABLE Tracks (
  trackID INTEGER,
  mediumID INTEGER,
  recordingID INTEGER,
  position INTEGER,
  PRIMARY KEY (trackID),
  FOREIGN KEY (mediumID) REFERENCES Mediums,
  FOREIGN KEY (recordingID) REFERENCES Recordings ) ;
```

SQL script for entities table creation

```
CREATE TABLE Artist_genre (
  artistID INTEGER,
  genreID INTEGER,
  PRIMARY KEY (artistID, genreID),
  FOREIGN KEY (artistID) REFERENCES Artists,
  FOREIGN KEY (genreID) REFERENCES Genres ) ;


CREATE TABLE Track_artist (
  artistID INTEGER,
  trackID INTEGER,
  PRIMARY KEY (artistID, trackID),
  FOREIGN KEY (trackID) REFERENCES Tracks ,
  FOREIGN KEY (artistID) REFERENCES Artists ) ;
```

SQL script for relations table creation

Design choices & data constraints

There are three main concepts in our music database : **Song**, **Artist** and **Album**. Both **Song** and **Album** were divided between their descriptive data (Recording, Release) and their physical incarnation (Track, Medium). Since data is often incomplete, most of the entities 'can be related'. We put a NOT NULL constraint on most of the name attributes of the entities, with the exception of **Recording** for the reason just stated. Since they are not required fields to describe music, they should have a valid name when they are in fact used.

- A **Track** is related to:

  Recording: A track can be a physical incarnation of a known recording.

  Artist: A track can exist without known artists, but can also have several artists to describe collaborations.

  Medium: A track can be recorded on some medium. Their relation is characterized by the track position on the medium.

- An **Artist** is defined by a:

  Genre: A genre can regroup multiple artists, whereas an artist can be difficult to define as catering to a specific genre, or crossing boundaries between genres nullifying the need for a constraint. We kept the count attribute, choosing small update costs over on-demand higher computation costs.

  Area: An artist's location can be pinpointed to a specific creation grounds, hence can be expressed by a foreign key constraint. But several artists can be compelled to share their musical feelings in the same studio.

- A **Release** is the logical aggregation of songs, labeled by a title, and can be recorded on multiple mediums. Conversely, a medium identifies a singular recording of an album, enforced by a foreign key constraint.

The integrity of the count attribute in **Genre**, are not guaranteed by the table creation. It will later be enforced later on by the import and delete data commands.

Design changes from deliverable 1

We removed all of our 'at least one' constraints to facilitate the import of new data. For the same reason, we also changed our model to be closer to the given data, so that one can easily add any information into the database and not just track-related information like we initially had in mind. That is, in our first model, everything had to be related to a track to be relevant but now every entities are independent.

SQL Queries

```
SELECT a.name
FROM artists a, areas l
WHERE a.areaID=l.areaID AND l.name='Switzerland' ;
```

SQL script for query A

```
SELECT area.name
FROM Areas area
WHERE area.areaid = (    SELECT AreaId areafemale
                              FROM (    SELECT AreaId , count(*) c
                                        FROM Artists
                                        WHERE (gender = 'Male')
                                        GROUP BY AreaId
                                        ORDER BY c DESC                    )
                              WHERE ROWNUM <=1                                  ) ;
```

SQL script for query B

```
SELECT * FROM(
     SELECT Name
     FROM Artists arti
     INNER JOIN  (  SELECT ArtistId
                         FROM (    SELECT ArtistId  , count(*) numb
                                   FROM TRACK_ARTIST
                                   GROUP BY ArtistId
                                   ORDER BY numb DESC )) artiId
     ON arti.ArtistId = artiId.ArtistId
     WHERE arti.Type = "GROUP"
)
WHERE ROWNUM <=10  ;
```

SQL script for query C

```
SELECT name
FROM Artists arti
INNER JOIN  (  SELECT ArtistId, COUNT(DISTINCT AlbumId) num
                    FROM track_artist trackarti
                    INNER JOIN  (  SELECT *
                                   FROM Tracks track
                                   INNER JOIN  (  SELECT mediums.mediumid, mediums.albumid
                                                  FROM Mediums
                                                  INNER JOIN Albums
                                                  ON mediums.albumid = albums.albumid
                                   ON track.mediumid = medi.mediumid
                    ON trackarti.trackid = track.trackid
                    GROUP BY ArtistId
                    ORDER BY num DESC
ON arti.ArtistId = artiId.ArtistId
WHERE ROWNUM <=10  ;
```

SQL script for query D

```
SELECT name
FROM Artists arti
INNER JOIN  (  SELECT arti.artistid, COUNT(DISTINCT genre.genreid) numb
                    FROM Artists arti
                    INNER JOIN Artist_Genre genre
                    ON arti.artistId = genre.artistId
```

```
                    WHERE arti.gender = 'Female'
                    GROUP BY arti.ArtistId
                    ORDER BY numb DESC                                    ) artigenre
ON arti.artistid = artigenre.artistid
WHERE ROWNUM <=1  ;
```

SQL script for query E

```
SELECT AreaId
FROM  (   SELECT city.areaid, count(CASE WHEN arti.gender = 'Female' THEN 1 END) AS females, count(CA
          FROM Artists arti
          INNER JOIN Areas city
          ON city.areaid = arti.areaId
          WHERE city.type = 'City'
          GROUP BY city.areaId ) areamalefemale
WHERE areamalefemale.Females > areamalefemale.Males
```

SQL script for query F

```
SELECT medi.albumid, count(DISTINCT track.trackid)
FROM Tracks track
INNER JOIN  (  SELECT mediums.mediumid ,mediums.albumid
                    FROM Mediums
                    INNER JOIN Albums ON mediums.albumid = albums.albumid   ) medi
ON track.mediumid = medi.mediumid
GROUP BY medi.albumid ;
```

SQL script for query G

Interface