CS-322 Introduction to Database Systems
Project Deliverable #2

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

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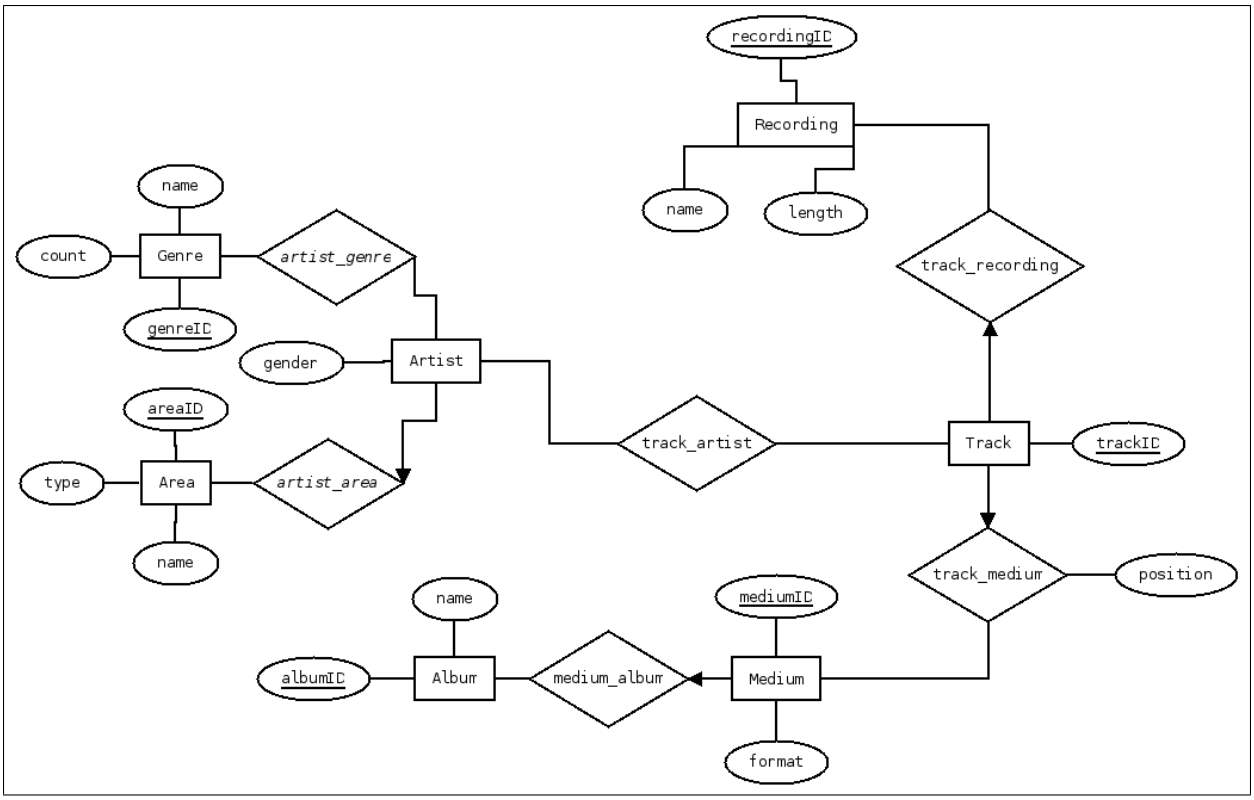
ER model for music database



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' but do not have to. 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    arti.name
FROM      artists arti, areas area
WHERE     arti.areaID=area.areaID AND area.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
                           ) medi
                     ON    track.mediumid = medi.medium
                ) track
           ON         trackarti.trackid = track.trackid
```

```
            GROUP BY  ArtistId
            ORDER BY  num DESC
      ) artiId
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(CASE WHEN arti.gender = 'Male' THEN 1 END) AS males
      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