

Name: Please print Last name (Lastname, Firstname) \_\_\_\_\_ *Lynch, Connor* \_\_\_\_\_**Homework #4: Normalization****Normalization (75 pts)****Due Date (See MyCourses ASSIGNMENTS)****Assignment Box HW04**

Note: submissions must be made to the appropriate Assignment Box in PDF format – see below.

**What you need to do:**

The "MUSIC" relation below is not normalized. Your "Mission" is to first determine the functional and partial dependencies (step 1) and transitive dependencies (step 2) in the MUSIC relation based on the business rules found on page 3. Then, using the functional dependencies you listed, normalize the relation to BCNF (step 3). Then you have to create a script that contains a database with all the correct tables needed to normalize the MUSIC database. Insert some data into the tables that you create in your script for question #4.

NOTE: not all rows in each table necessarily need to be filled.

**The Relation:**

MUSIC( Title, Artist, NumGrpMembers, Year, Producer, ProducerURL, Category, CategorySales, Media, MediaPrice )

**Your mission:**

- (16 pts) List ALL **functional** dependencies for the MUSIC relation listed above, according to the business rules found on page 3. Use the format  $A \rightarrow B$ . Then, examine each functional dependency to see if it causes a partial dependency. If a functional dependency causes a partial dependency in the relation above, place an X in the "Partial?" column of for that row. For "Rule #", you will note the business rule number from which the functional dependency was derived. **Partial dependencies are dependencies on only a portion of the primary key.**

Functional Dependencies	Partial?	Rule #
Title $\rightarrow$ Year	X	3
Title $\rightarrow$ Producer	X	4
Producer $\rightarrow$ ProducerURL	NO	5
Title $\rightarrow$ Artist	X	7
Title $\rightarrow$ Category	X	9
Category $\rightarrow$ CategorySales	NO	11
Media $\rightarrow$ MediaPrice	X	14
Artist $\rightarrow$ NumGrpMembers	NO	2

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2. (9 pts) List all **transitive** dependencies ( $A \rightarrow B$ ) for the relation, according to the business rules. If none, state why. Transitive dependencies are when you have nonkey attributes determined by another nonkey attribute.

Transitive Dependencies
Producer $\rightarrow$ ProducerURL
Category $\rightarrow$ CategorySales
Artist $\rightarrow$ NumGrpMembers

3. (25 pts) Normalize the MUSIC relation into BCNF. List all of your relations below. Use all the dependencies you listed in the previous steps as a guide. Use the relational notation: RELNAME( KeyAttr, Attr1, Attr2, *FK* ). *Italicize* or dash underline your foreign keys.

Normalized Relations
PRODUCER( <u>Producer</u> , ProducerURL)
CATEGORY( <u>Category</u> , CategorySales)
PRICE( <u>Media</u> , MediaPrice)
ARTIST( <u>Artist</u> , NumGrpMembers)
ALBUM( <u>Title</u> , <i>Artist</i> , <i>Year</i> , <i>Producer</i> , <i>Category</i> )
PRODUCT( <u>Title</u> , <u>Media</u> )

4. (25 points) From the normalized relations found in Question 3, create the normalized database named LastName\_FirstName\_Homework04.sql and make sure it includes **EVERY** required relation. Also, include in your script INSERT statements into every relation found in question 3. Make sure you upload this document in PDF format and Question 4 in an .sql file to the correct assignment box.

**Business Rules for the Music Model****Notes:**

- The key of the original MUSIC relation is underlined (and note that it is a composite key).
- Do not infer any business rules yourself...use only those specified.

**MUSIC( Title, Artist, NumGrpMembers, Year, Producer, ProducerURL, Category, CategorySales, Media, MediaPrice )**

1. Each “album” (CD) is uniquely identified by its title. Note that, for the rest of the business rules, the “Title” attribute of MUSIC refers to the name of the “album”.
2. An artist may either be a single person or a band made up of multiple members (the count being recorded in NumGrpMembers, which can be 1).
3. Each album has one release year.
4. Each album is produced by one music production company (producer).
5. Each producer has one company URL.
6. A production company can produce many albums.
7. A specific album has only one artist.
8. An artist can make many albums.
9. Each album is classified into one music category (Rock, Country, etc.)
10. There are multiple albums in a given music category.
11. Each category is associated with one category sales value, which is the year-to-date sales for that given category.
12. An album can be distributed on several different media (CD, cassette, DVD).
13. A media type (CD, cassette, DVD) can be used for multiple albums.
14. For convenience, the music company sells all of its music at the same price based on the media type. For example, all cassettes are \$9.99, all CDs are \$16.99, etc.

**Submit your work** To get credit for this homework you will need to submit THIS document in PDF format with all your answers typed or hand written in the boxes provided. And you have to create a Script for Question #4. It is a good idea to create a TEE file after you write your script for question #4 to verify everything works in your .sql file. **Upload this document to the Assignment / drop box named HW04.** Also, **UPLOAD your script file .sql created in question #4**