W04 – Database Design Practice

CASE STUDY – Reverse engineering a website into an ERD. To get some practice with taking a system that uses data of some sort and try to figure out how it was designed as a relational database.

Let's use https://www.churchofjesuschrist.org/music/library/hymns as an example.

8. Awake and Arise	8	
9. Come, Rejoice	9	
10. Come, Sing to the Lord	10	
11. What Was Witnessed in the Heavens?	11	
12. 'Twas Witnessed in the Morning Sky*	12	
13. An Angel from on High	13	
14. Sweet Is the Peace the Gospel Brings	14	
15. I Saw a Mighty Angel Fly*	15	
16. What Glorious Scenes Mine Eyes Behold	16	
17. Awake, Ye Saints of God, Awake!	17	
18. The Voice of God Again Is Heard	18	
19. We Thank Thee, O God, for a Prophet	19	
20. God of Power, God of Right	20	
21. Come, Listen to a Prophet's Voice	21	
22. We Listen to a Prophet's Voice	22	
23. We Ever Pray for Thee	23	
24. God Bless Our Prophet Dear	24	
25. Now We'll Sing with One Accord	25	

What entities might be used in the database that is supplying the information for this web page?

- The hymns themselves
- The author/composer of the hymns
- Topics of the hymns
- You could also include meter of the hymn but I'm not going to take it that far.

What are some of the attributes that would fit within each entity?

- Hymns
  - Title
  - First line
  - Number

- Author/Composer
    - Last name
    - First name
- Topic
    - Topic name

There might be more entities like scriptures that go with the hymns, etc. There could also have been more attributes like the years each author/composer was born and died in addition to their names, but I'm going to just focus on these 3 entities with these attributes for now to keep it simple. You can do the same and keep it simple when you reverse engineer an ERD for your homework this weekend.

What data type would be used for each attribute?

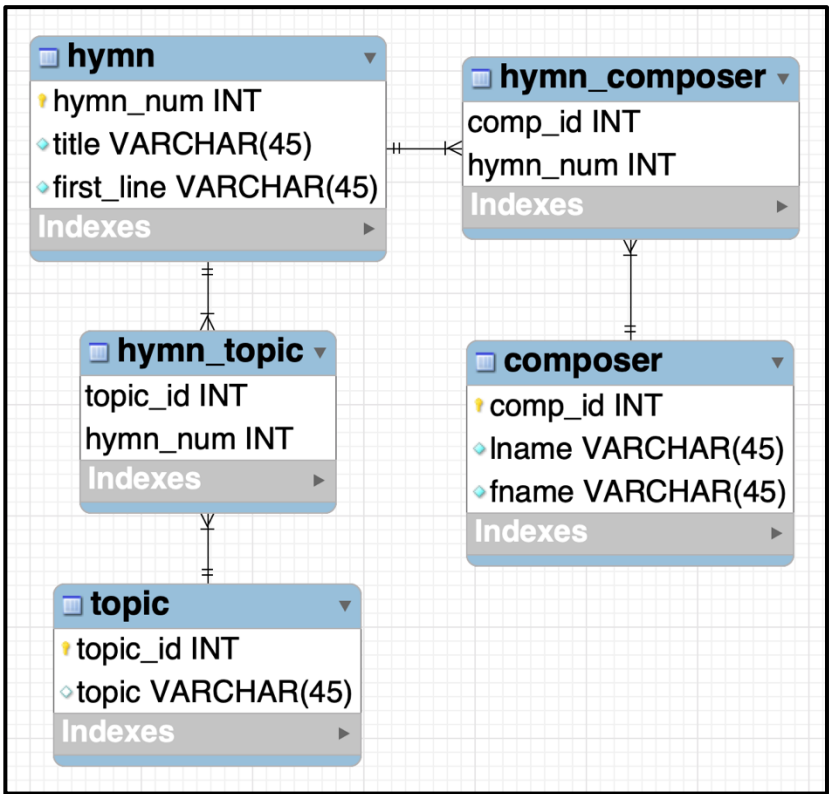
- Hymns
    - Title **VARCHAR(45)**
    - First line **VARCHAR(45)**
    - Number **INT**
- Author/Composer
    - Last name **VARCHAR(30)**
    - First name **VARCHAR(30)**
- Topic
    - Topic name **VARCHAR(20)**

How could the entities be related?

Let's look at the relationship between the hymns and the composers. Each hymn might have one or more composers and each composer may have composed one or more hymns. That's a many-to-many relationship. For example, the hymn "An Angel from on High" was written and composed by Parley P. Pratt and John E. Tullidge. Parley P. Pratt also wrote a number of other songs as well.

Let's look at the relationship between the hymn and the topic. Each hymn could have one or more topics associated with it and each topic could belong to one or more hymns. For example the hymn "An Angel from on High" is associated with the topics 'Book of Mormon', "Gathering of Israel', and 'Restoration of the Gospel'. But these topics could also be used for other songs as well. For example, "Israel, Israel, God it Calling" is also listed under the topic of "Gathering of Israel". So that one topic can have many hymns associated with it.

So here is the ERD that would fit with this data. Notice I have added a primary key for each of the 3 main entities. Hymn number seemed like a good primary key for the hymns.



The many-to-many relationships were resolved down to 2 one-to-many relationships automatically in Workbench as the ERD was created. The two linking tables contain a composite key with a primary key from each table.

You will do something similar for your homework this weekend; visiting any website and creating an ERD from the data you see there. It doesn't have to be perfect. I know for a fact that the real database used for the churchofjesuschrist.org hymn site was probably much more complex and had many more entities and attributes. But as long as you give it your best shot of how you think it is design, you will be good.