CS 348 - Homework 3: ER Diagrams and Google Cloud Platform

(90 Points)

Fall 2020

Due on: **10/09/2020 at 11:59 pm**

This assignment is to be completed by individuals. You should only talk to the instructor, and the TA about this assignment. You may also post questions (and not answers) to Campuswire.

There will be a 10% penalty if the homework is submitted 24 hours after the due date, a 15% penalty if the homework is submitted 48 hours after the due date, or a 20% penalty if the homework is submitted 72 hours after the due date. The homework will not be accepted after 72 hours, as a solution will be posted by then.

Submission Instruction: Write your answers on the word file and generate a pdf file. **Upload the pdf file to Gradescope**.

Part I: Creating ER Diagrams

Question 1 (40 points):

Consider the following information about a television series. You are required to draw an ERD diagram to depict ***only the information included in the underlined text***. Assume other entities can be added (e.g., other TV series and other actors can be added).

The Walking Dead (source: Wikipedia. This is a modified version from the Wikipedia page for the Walking Dead TV Show)

The Walking Dead is an American horror drama television series developed by Frank Darabont, based on the comic book series of the same name by Robert Kirkman, Tony Moore, and Charlie Adlard. Andrew Lincoln plays the show's lead character, sheriff's deputy Rick Grimes,[3] who awakens from a coma discovering a world overrun by zombies, commonly referred to as "walkers".[4] Grimes reunites with his family and becomes the leader of a group he forms with other survivors. Together they struggle to survive and adapt in a post-apocalyptic world filled with walkers and opposing groups of survivors, who are often more dangerous than the walkers themselves.[5]

Much of the series takes place within the Atlanta, Georgia metro area and surrounding countryside. Later, the setting transitions to other parts of the country, including Alexandria, Virginia.[4][6]

The Walking Dead premiered in the United States on October 31, 2010, exclusively shown on cable television channel AMC and internationally on Fox International Channels.

The Walking Dead	
Genre	Horror Serial drama Zombie apocalypse
Based on	*The Walking Dead (comic Book)* by Robert Kirkman Tony Moore Charlie Adlard
Starring	Andrew Lincoln Jon Bernthal Sarah Wayne Callies Laurie Holden Jeffrey DeMunn Steven Yeun
No. of seasons	10
Related TV shows	*Fear the Walking Dead* *The Running Dead!!*

Season	Episodes	Originally aired	
		First aired	**Last aired**
1	6	October 31, 2010	December 5, 2010

	2	13	October 16, 2011	March 18, 2012
	3	16	October 14, 2012	March 31, 2013
	4	16	October 13, 2013	March 30, 2014

Characters:

- Andrew Lincoln as Rick Grimes: The series' protagonist and a former sheriff's deputy who is the leader of the main group of survivors. He becomes a more cold and calculating leader over the course of the series. (season 1–season 7)
- Jon Bernthal as Shane Walsh: Rick's former police partner and close friend. He becomes unhinged in season two, becoming a threat to the group. (seasons 1–2; guest season 3)
- Sarah Wayne Callies as Lori Grimes: Rick's wife, who has an affair with Shane when she believes Rick is dead. (seasons 1–3)
- Lennie James as Morgan Jones: The first survivor Rick encounters in season one. After suffering a psychological break, he comes to peace with the world around him. (seasons 6–season 7; recurring seasons 4, 5; guest seasons 1, 3)
- Sonequa Martin-Green as Sasha Williams: Tyreese's fiery younger sister and a former firefighter who is the group's sharpshooter. After several personal losses, she suffers from PTSD. (recurring season 3)

Notes:

- Actors/actresses in the walking dead may work in other TV Shows.
- All TV shows have one or more seasons labeled as season 1, season 2, … etc.
- It is possible that some entities have the same names (same value for the name attribute). For example, multiple actors may have the same name. Since this is not very common, you can assume that names are unique.
- You can make your own assumptions regarding cardinalities not clarified in the example. However, your assumptions should not contradict the sample data provided.

For Questions 2-4 you should modify your ER diagram from Question 1 to handle the following changes. Do each question as a separate change from the original diagram. You only need to show the parts of the diagram that change.

Question 2 (5 points): Other TV shows may not be based on a book; one writer writes those TV shows. A writer can write books or TV shows.

Question 3 (5 points): An actor/actress can have a family relationship with another actor/actress. The type of relationship can be married, siblings, cousins, and parent-child.

Question 4 (10 points): In a TV show, an actor/actress can be related to another actor/actress. For example, in the walking dead, Andrew Lincoln is married to Sarah Wayne Callies. Also, Sonequa Martin-Green is the sister of Chad L. Coleman.

Part II: Attributes versus Entities

Questions 5-8 all concern a student entity (with studentID, name and email). Each student has a faculty advisor (with name and department) who is first assigned in a particular academic semester (for example, Fall 2020).

Question 5 (5 points): Give an ER diagram that represents advisor information only using attributes. Do not use composite attributes.

Question 6 (5 points): Give an ER diagram that represents advisor information using a relationship and relationship attributes.

Question 7 (5 points): Give an ER diagram that represents advisor information using a 3-way relationship.

Question 8 (5 points): Suppose a student can have multiple advisors (possibly with different assigned dates). Which of your ER diagrams in Questions 5-7 could represent this situation (possibly with a change of cardinality constriants)? You do not need to redraw the diagrams, just the list the diagrams that can be changed to represent the new situation.

Part III: Google Cloud Platform

Question 9 (10 points): Create a MySQL instance in Google Cloud Platform (GCP). Create a database and a table with a schema of your choice. Insert data or upload a data set (you can check the data.gov portal for free data sets in .csv format). Run two queries on your data. Include screenshots for the results of the two queries (take the screenshots while running the queries in the cloud shell).
Please remember to terminate your MySQL instance after you finish. Also,

if you use cloud storage to upload a data set, delete your data set file after you finish. If you choose to upload a data set, make sure the file size is not too large. Remove the headers from the csv file before loading the data. For details about cloud computing and using the GCP, please refer to the lectures in Week 5. Make sure you redeem the GCP credits posted on Campuswire (post #307).