Homework Due 2022-03-03 by 23:59 New York Time

Contents

1 General Instructions

1. You need to follow carefully the instructions for the assignment as written below.

   It is advisable to print out this document and check off various points as they are addressed. It is easy to miss something when switching between the assignment and the solution on a single screen, especially on a laptop with a relatively small screen.

   If you do not have access to a printer, at least review your solution before the submission to make sure that you followed the instructions and that you did all that you were requested to do and only what you were requested to do.

2. If you want to refer to a specific line in this document, refer to the small numbers in the left margin.

3. If you have questions concerning this homework email Akshay Rita, mailto:ar6618@nyu.edu, *in the way specified in the course description.* Note, however, that you should not ask for help in producing your submission. If you need help in understanding the material required, contact Zvi Kedem, mailto:zk1@nyu.edu *in the way specified in the course description.*

   To be sure that you get an answer to your question before the submission deadline, *do not delay your question to the date on which the assignment is due.*

   If you still have unresolved questions, email Zvi Kedem, mailto:zk1@nyu.edu, including all relevant correspondence with the assistant(s) listed above, *in the way specified in the course description.*

4. Submit your homework in an electronic form by uploading it to Brightspace by the due date and time. Use only permitted software and format. E.g., if you are asked for a relational database specification using SQL Power Architect than that's what you must submit.

   Do not package the files you need to submit in an archive unless specifically asked to do that.

5. If you submit a scanned, handwritten assignment when permitted, it has to be written neatly, that is, it should be neatly divided into lines just as a typeset document, etc. You may submit a handwritten assignment only when that is explicitly allowed. And, unless stated otherwise, you must submit such a handwritten assignment as a file in PDF format only.

6. It is important that you follow the directions precisely. Also, please *check* that you submitted what you intended to submit, as you are responsible for making sure of that. The best way to do is to download what you submitted to check that.

   And the best way to manage your work is to dedicate a folder/directory to each assignment.

7. Until the deadline you may resubmit your homework as many times as you like and you may want to submit it relatively frequently in case something happens to your partial work on your machine. If you submit your homework after the deadline, it may not be noticed or evaluated.

8. Do not email your submission to any of the assistants. If you did not submit your solution on time, please email Zvi Kedem, mailto:zk1@nyu.edu, *in the way specified in the course description* with an explanation of what has happened, and if you have a solution (possibly partial), email the solution also.

   If you do need to submit the solution by email, and *only* if you need to submit by email because you are late or for other reasons, please follow the format as described next. Assuming that you are submitting your solution to Homework due 2034-02-15 and your Net ID is abc123, all the files of your homework should be emailed as a zip file named `20340215abc123.zip`. Of course you need to specify the correct date and the correct Net ID.

   Do not communicate with any of the graders concerning a late submission.

9. Be sure to follow the academic integrity rules listed in the posted syllabus. The department, the GSAS, and NYU treat academic integrity very seriously and we are required to report all possible violations.

10. Under some circumstance, we may be able to extend a deadline on request, but generally only on a one-by-one case. All such requests need to be addressed to Zvi Kedem, mailto:zk1@nyu.edu *in the way specified in the course description*, as soon as possible and preferably before the deadline, and with a reason for such a request.

2 Homework

Reminder: If you are not officially registered in the class and the class does not show on Albert for you, do not submit any assignments.

Please read and follow carefully the instructions in Section 1.

2.1 Description

There are two assignments: (1) To exercise logging into Oracle and running a simple, prepared query: (2) To create a relational implementation of an ER diagram.

2.2 Assignments

1. Start with this part. It is simple but if you run into difficulties they need to be resolved quickly.

   Make sure that you know how to run SQL queries/commands on the Oracle systems at CIMS.

   To do that, follow the instructions in `How_To_Use_Oracle_At_CIMS.pdf`.

   You do not need to understand the queries/commands, just to make sure that you can do what's requested.

   if you run into difficulties doing that part of the assignment, please send email to Akshay Rita, mailto:ar6618@nyu.edu, explaining what the difficulties were. You will be helped. However, note Section 3.1 of `2433.pdf`.

2. You will need to create a relational implementation modifying `Relational04.architect` of the ER diagram `Assignment04.drawio` satisfying the annotations in `AssignmentText04.txt`, using `SQL Power Architect` with Crow's feet notation and including the needed (but only the needed) annotations. Replace `zk1` with your Net ID and note what's specified in Item 2a.

   You should follow *exactly* the ER diagram given and the example of the University database we covered in class; please pay attention how we treated various types of entities/relationships to the extent that they are relevant for the assignment. However, do not further improve your relational implementations, even if such improvements are possible.

   (a) Specify the following using `SQL Power Architect` and everything else that needs to be specified (if anything) put in annotations by modifying `SolutionText04.txt`

   - tables
   - attributes, including for each that
     - it must not be NULL (if applicable)
     - it is a part of the primary key (if applicable)
     - it is a part of a foreign key (if applicable)

It is not important for us what the domains of the attributes are, so use VARCHAR as the domain for all attributes

- many-to-one mappings between tables (or one-to-one as applicable)

Please,

- Do *not* make any assumptions about the application beyond the specifications listed.
- Do not optimize your design, just follow the specification given.
- Do not use any other capabilities that `SQL Power Architect` provides; for example do not use Index Properties or Remarks for Column Properties.
- Anything that cannot be specified in your SQL Power Architect diagram, put as annotations in `Solution04.txt` file, as described below.
- Do *not* put anything in the annotations that can be reflected in the SQL Power Architect implementation; make sure that the implementation reflects that.

  For constraints that are reducible to a specification of a table, address the specification in the context of tables and not of an ER diagram, as appropriate. Recall, that a person who gets your specification here, does not understand anything that's not phrases in the context of a relational database.

  Some hypothetical examples

  i. Assume that we have a relationship Birth(Parent, Child) and an annotation of that relationship for the ER diagram states "A person cannot be its own child." Assume that this relationship is implemented as a table Birth(Parent, Child). Translate the given annotation into a statement similar to "In a tuple of table Birth, Parent != Child."

  ii. Assume that we have a relationship Person(SSN, LN, FN) with primary key SSN, and no two persons can have both the same LN and the same FN. Assume that this relationship is implemented as a table Person(SSN, FN, LN) with primary key SSN. Translate the given annotation into a statement similar to "(FN, LN) is UNIQUE in table Person."

(b) Modify the file `Solution04.txt` as specified in Item 1 of Section 3.

3 What to submit

Please upload 3 files, named *exactly* as specified and in the format *exactly* as specified.

1. `Solution04.txt` in the text format, by modifying the file in this assignment.

   In that file

   - Replace the Metadata with your information.
   - State the required (and only the required) Annotations.
   - State your responses by placing appropriate text after the item label as listed below (so your first item will labeled "(a)"):

     (a) State whether you have done what is requested in Item 1 of Section 2.2. If your answer is "Yes", just state that.

     If not, explain why.

2. A file with a diagram in the native format as produced by SQL Power Architect. The file should be called `Relational04.architect`.
3. A file with a PDF version of the diagram you have produced. The file should be called `Relational04.pdf`.

A An SQL Power Architect bug: Please read

SQL Power Architect sometimes produces inconsistent diagrams such as our R-S diagram in Figure 1. In R-S, attribute A in S can be NULL but the left side of the line between R and S has a stroke | indicating that the binary many-to-one mapping from S to R is total. Only R1-S1 and R2-S2 are correct. So make sure that your diagram is correct, fixing what SQL Power Architect produces, if necessary. This is easy to do by modifying Relationship Properties.

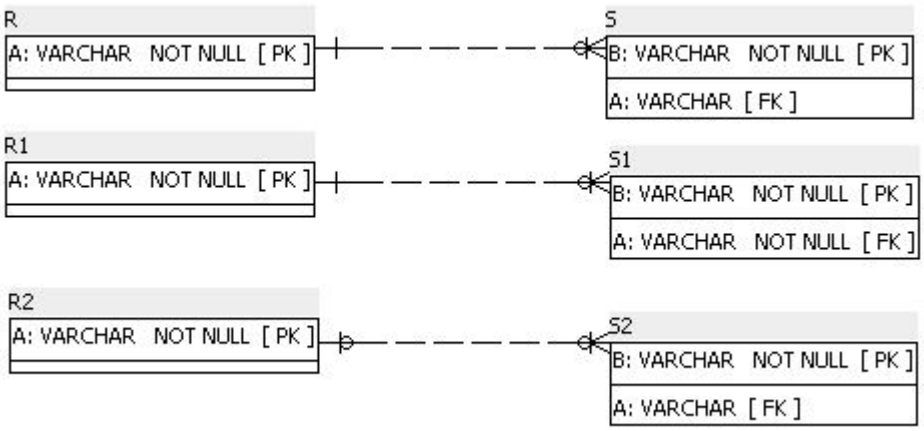

Figure 1: Read the text of Appendix A