Homework Due 2018-02-18 by 5:00 pm

1 General Instructions

Please read these instructions carefully for each assignment, though they generally do not vary much between the assignments.

1. You need to follow carefully the specific 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.

2. If you have questions concerning this homework email Jiaxuan Lu, `mailto:jl5006@nyu.edu` *in the way specified in the course description.*

3. Submit your homework in electronic form by uploading it to NYU Classes 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.

4. If you submit a scanned, handwritten assignment, it has to be written neatly, that is, it should be neatly divided into lines just as a typeset document, etc.

5. Show *all* your applicable work (other than for reading assignments, if any).

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

7. Your solution should be uploaded as a single `zip` file containing all the files that you need to produce. Assuming that your Net ID is abc123 and you are submitting your solution to Homework due 2034-02-15, your zip file should be named `20340215abc123.zip`, of course you need to specify the correct date and the correct Net ID.

8. Do not email your submission to any of the assistants. If you run into problems uploading your solution and the time for the submission has passed, please email Zvi Kedem *in the way specified in the course description* and if you have a solution, email the solution also.

9. Until the deadline that the system imposes you can 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.

10. In addition, there is a one-hour automatic extension, which you can use without any penalty. But do not count on it as it is only there in case you have communication problems and did not succeed in uploading the solution because of them.

11. **Be sure to follow the academic integrity rules listed in the course description posted on NYU Classes**. The department and the GSAS treat academic integrity very seriously and I am required to report all possible violations.

2 Assignments

2.1 Description

1. Read and make sure you understand the material in Unit 02 for which you are responsible.

   You will need to create an ER diagram using the software of your choice in Assignment 1.

2. Consider the following version of a Restaurant system, which focuses on a few aspects of the services offered by a restaurant, rather than on considering a real-world example.

   (a) There is an entity set **Person**. It has attributes **Employee-Id** which identifies a person entity, **Name** and **Start Date**. The value of **Name** is always known.

   (b) There is an entity set, **Server**, which is a set consisting of some of the entities in **Person**. It has a composite attribute **Working Shift**, which consists of attributes **Start Time** and **End Time**.

   (c) There is an entity set, **Manager**, which is a set consisting of some of the entities in **Person**. It has attributes **Department** and **Title**, which are both always known.

   (d) There is an entity set, **Chef**, which is a set consisting of some of the entities in **Person**. It has an attribute **Level** that is always known.

   (e) An entity in **Person** is in at least one of the entity sets **Server**, **Manager** and **Chef**.

   (f) There is a binary relationship **Mentors** between **Chef** and itself. The chef being mentor in the relationship must have level higher than the chef being mentee. Each chef can have at most one mentor.

   (g) There is an entity set **Customer**. It has attributes **Email** and **Order**. **Customer** is identified by **Email**. **Customer** can have at most 10 **Orders**.

   (h) There is a binary relationship **Serves** between **Server** and **Customer**.

   (i) There is a binary relationship **Evaluates** between **Manager** and **Serves**. Exactly one manager reviews the serving quality of each service. The relationship **Evaluates** has an attribute **Grade** which represents the quality of the service.

   (j) There is an entity set **Team**. It has attributes **Name** and **Size**.

   (k) There is a binary relationship **Leads** between **Manager** and **Team**.Each **Team** is led by exactly one **Manager**. **Team** can be identified by its **Name** and the **Manager** who leads it.

(l) There is an entity set **Dish**. It has attributes **Name**, **Type** and **Price**. **Name** and **Type** together identify **Dish**. **Price** is always known.

(m) There is an entity set **Table**. It has an attribute **Table Number**, which identifies **Table**.

(n) There is a ternary relationship **Cooks** among **Chef**, **Dish**, and **Table**. The relationship has an attribute **Number**, which lists how many "copies" of a particular **Dish** are **Cooked** for the corresponding **Table**. Each **Dish** is cooked by exactly one **Chef** (as only one **Chef** knows how to cook any specific **Dish**).

(o) The entity **Table** also has an attribute **Bill**, which is the sum of the product of the price of each dish ordered by the table times the number of the dish being ordered.

(p) There is a binary relationship **Sits** between **Customer** and **Table**.

Using the software of your choice from Assignment 1, produce an ER diagram for this application. If your software cannot conveniently produce underlined or double-underlined text, you can presumably place short line or lines under the text, as needed. *Please follow the instructions precisely.*

(a) Use the arrow notation (notation in Assignment 1) to indicate many-to-one relationships where needed and possible. Do not use cardinality notation.

(b) Do not make any assumptions about the application beyond the specifications listed.

(c) In your design do not create relationships that are not needed and if an attribute can be put in an entity and not in a relationship do that.

(d) Otherwise, do not optimize your design, just follow the specifications given.

(e) Not everything can be specified precisely using ER diagrams, so

i. Do as good a job as possible using your ER diagram; if a constraint can be partially expressed using ER diagram, do that and elaborate as needed in annotations.

ii. Anything that cannot be specified in your ER diagram, put as annotations in a dedicated file in `.txt` format.

iii. Do *not* put anything in the annotations that is already reflected in the ER drawing.

To produce your diagram, you will have to use the same software which you used in Assignment 1. On the diagram put

(a) Your name

(b) Your Net ID

(c) The software you used to produce your diagram

(d) Information about the computer on which you have prepared your ER diagram, one of the following

- Your own computer
- Somebody else's computer and specify whose
- A lab computer

2.2 What to submit

Please submit a single zip file as described in item 7 of section 1.

The archive should contain three files

1. The drawing in the original format as produced by your software
2. The PDF version of the drawing
3. The annotations in a text file (`txt` extension)

The solution to this homework will essentially be used to assign the next homework, so depending on when the next homwork is assigned, you may not be able to get any extensions, other than possibly very minimal.