

Homework Due 2018-03-18 by 11:55 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 Guang Yang, <mailto:gy552@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 we are required to report all possible violations.

2 Assignments

1. Instructions:

The procedure for accessing and using the Oracle system on CIMS servers has been previously uploaded.

Then look at the database described in `Homework04Relation.architect`. Loosely speaking, it describes a company system, which contains the relations between people and projects. In addition, you are provided information (some perhaps not necessary) and constraints below. Of course, at this stage you only have tables and mappings between them, but they were derived from an ER diagram, which you are not given. But it will be convenient to use the language of ER diagrams in some of the text below.

- (a) There is an entity set implemented as table **Person**.
- (b) There is an entity set implemented as table **Engineer**, which is a set consisting of some of the entities in **Person**.
- (c) There is a binary relationship **Mentor** from **Engineer** to **Engineer**. There is no table for it and it is specified using a foreign key.
- (d) There is an entity set implemented as table **Manager**, which is a set consisting of some of the entities in **Person**.
- (e) An entity in **Person** is in at least one of the **Engineer** and **Manager**.
- (f) There is an entity set implemented as table **Team**.
- (g) There is a relationship implemented as table **Participates** between **Engineer** and **Team**.
- (h) There is a binary relationship **Directs** from **Participates** to **Manager**. There is no table for it and it is specified using a foreign key.
- (i) There is an entity set implemented as table **Project**.
- (j) There is a table **Funding**. Originally, it was a multi-valued attribute of the entity set **Project**, which is now a table.
- (k) There is a binary relationship **Manages** from **Project** to **Manager**. There is no table for it and it is specified using a foreign key.

Please also read the script `N12345678_Homework04Script.sql` carefully. It defines and creates the sample database and has placeholders for putting in your solutions. You need to produce the queries listed in **item 3** below; put your solutions in `N12345678_Homework04Script.sql` and rename the file as `yourNnumber_Homework04Script.sql`. You also need to change the name of

the spool file from `N12345678_Homework04Spool.txt` to `yourNnumber_Homework04Spool.txt`, towards the end of the script file.

For each query listed in **item 3** below, *unless stated otherwise*,

- (a) *Explicitly* sort the results in ascending order
- (b) *Explicitly* remove duplicates from the answer

Do not rely on the system to do it for you, even if it does so.

So assuming you are going to select a and b, you should actually use:

```
SELECT DISTINCT a, b
...
ORDER BY a ASC, b ASC;
```

Please use only those SQL operations that were covered in the class presentations.

You may use intermediate tables while producing your answers. In order to run your queries without getting errors, please use TEMP1, TEMP2, ..., TEMP20 as your intermediate table names. There is no assumption that you will need that many intermediate tables or even one. If you do use such tables, start use them in order, that is first TEMP1, then TEMP2, etc. The temporary tables will be explicitly DROPped them before your queries so that their old values, if any, will not create problems.

After filling your solutions in `yourNnumber_Homework04Script.sql`, you need then run your script on Oracle and it will automatically save the spool records in a file called `yourNnumber_Homework04Spool.txt`. You need to hand in both `yourNnumber_Homework04Script.sql` and `yourNnumber_Homework04Spool.txt`, in a way stated in **item 4** below.

2. Files in this zip archive:

- (a) The file you are reading.
- (b) `Homework04Relation.architect`, an SQL Power Architect implementation of the database as described before.
- (c) `N12345678_Homework04Script.sql`, a script that will produce the database in Oracle and also contains placeholder to put your solutions to **item 3** below.

3. Queries: Produce queries for the following questions and put your answer into `Homework04Script.sql`.

- (a) Produce table Answer01 (Person_IDnumber, Person_Name) which contains all the people who are both a manager and a engineer. (Basic where clause)
- (b) Produce table Answer02 (Person_Name) which contains all the engineers who don't have a mentor.
- (c) Produce table Answer03 (Person_Name) which contains all the engineers who don't participate in a team.

- 105 (d) Produce table Answer04 (Person_Name, Team_number) which contains all the engineers
106 who participate in at least one team and the number of teams they participated in.
- 107 (e) Produce table Answer05 (Person_Name, Project_Name) which contains all the managers
108 with degree '2' and the projects they managed.
- 109 (f) Produce table Answer06 (Project_Name, Team_number) which contains all the projects
110 and the number of teams they contain.
- 111 (g) Produce table Answer07 (Team_Name, Highest_Level) which contains all the team names
112 and their highest engineer level.
- 113 4. **What to Submit:** Please submit a single zip file as described in **item 7** of **section 1**.
- 114 The archive should contain two files
- 115 (a) `yourNnumber_Homework04Script.sql`
- 116 (b) `yourNnumber_Homework04Spool.txt`