CCT College Dublin

Assessment Cover Page

Module Title:	Databases
Assessment Title:	ERD
Lecturer Name:	Aldana Louzan
Student Full Name:	Halil UGUR
Student Number:	2022389
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Declaration

By submitting this assessment, I confirm that I have read the CCT policy on Academic Misconduct and understand the implications of submitting work that is not my own or does not appropriately reference material taken from a third party or other source. I declare it to be my own work and that all material from third parties has been appropriately referenced. I further confirm that this work has not previously been submitted for assessment by myself or someone else in CCT College Dublin or any other higher education institution.

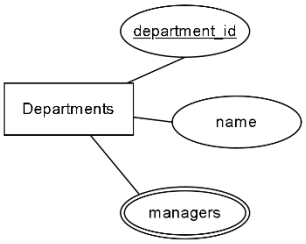
Contents

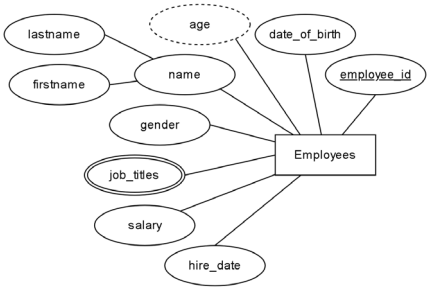
Abstract

This project has aim that create database for Human Resources. Project generally has three sections. These are conceptual design, logical design, and normalization process. The conceptual design contains generally structure of the HR database. The logical design gives us more detail about the HR database. The normalization process is trying to block of data repeating or null values.

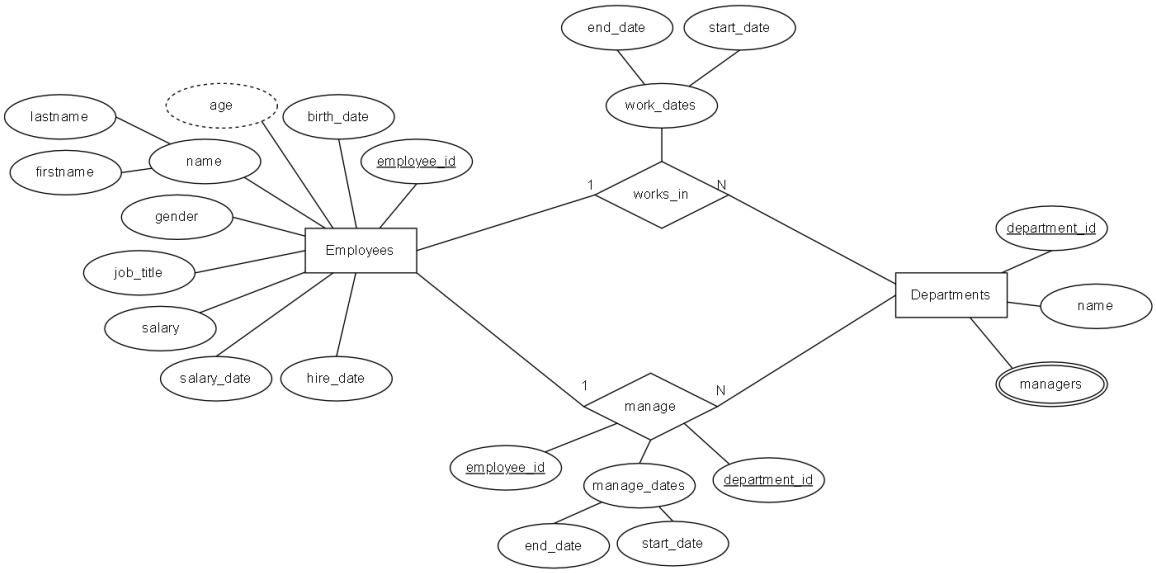
Conceptual Design (CHEN Notation)

There is have two main entities for conceptual design as Employee and Department. Employee entity include that personal information. Department entity is any field work on. Each entity has relationship that as shown below.



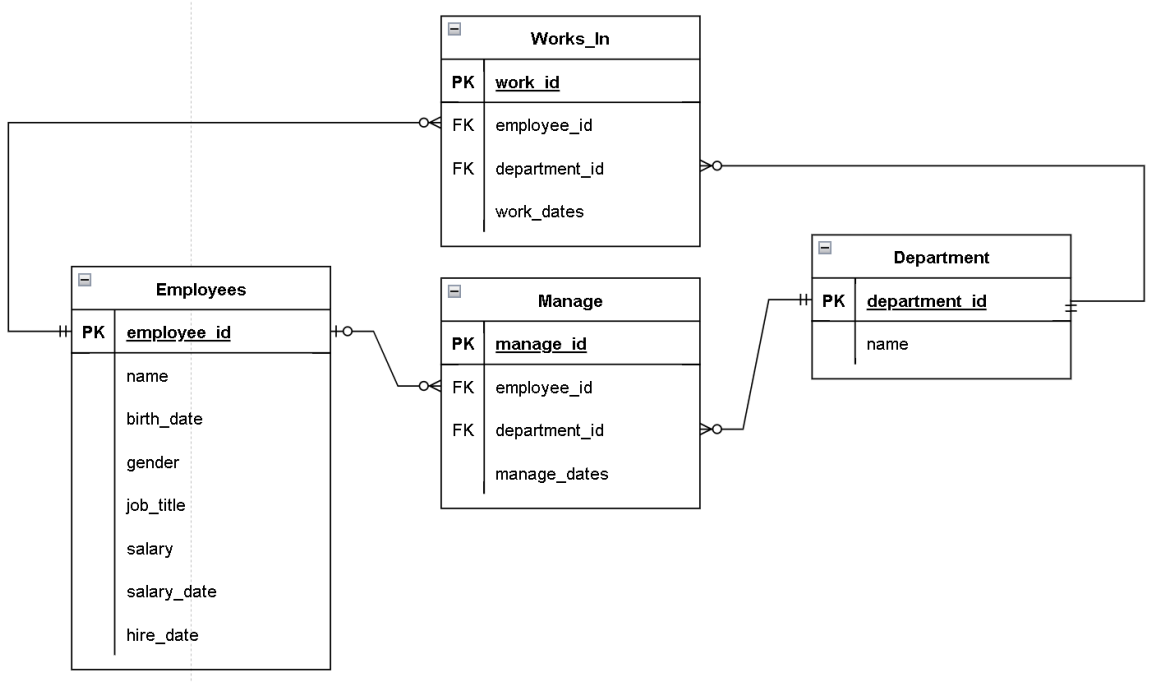


FINAL RESULT



Logical Design (Crow's Foot Notation)

At the logical design section created relational data model from conceptual design. On RDM added relations to between entities.



The above image have simple relation between employees and departments. There are several reasons why I draw like this:

1. Each employee can work different time at the different departments. We need to create a relationship table for periods.
2. Employee can be manager at the same time. So, we created the manage relation between employee and department
3. Employee should have old salary data on theirself. For that reason I added salary and salary_date on employee table.

MAIN TABLES

Employees

employee_id	name	birth_date	gender	job_title	salary	salary_date	hire_date
1	Halil UGUR	10.10.1994	1	Java Developer	2000	10.10.2020	10.10.2020
2	Sezer DENEY	10.10.1995	1	Analyst	1500	1.1.2019	1.1.2019
3	Zeynep DALGA	10.10.1996	0	CEO	5000	12.12.2010	12.12.2010
4	Derya GUNES	10.10.1997	0	Team Lead	4000	1.1.2013	1.1.2013
5	Halil UGUR	10.10.1994	1	Python Developer	5000	10.10.2021	10.10.2020

Departments

department_id	name
1	R & D
2	IT
3	HR
4	SALES

RELATION TABLES

Manage

manage_id	employee_id	department_id	manage_date	
23	3	1	9.9.2010	11.11.2023
11	4	3	1.1.2013	1.1.2023
34	3	2	9.9.2010	11.11.2023

Works_in

work_id	employee_	departmer	work_dates	
66	1	2	10.10.2020	10.10.2023
21	1	1	10.10.2020	10.10.2023
53	2	1	11.11.2019	11.11.2023
29	4	3	1.1.2013	1.1.2023

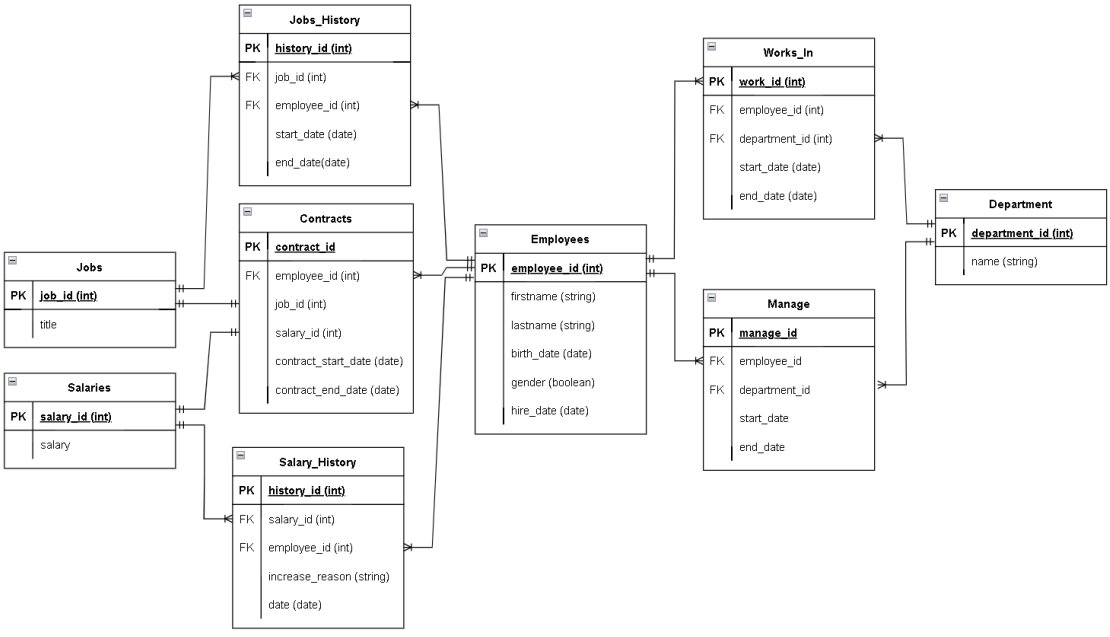
Figure 1 Before Normalization process table visuals

Normalization process

After I filled data, I saw that we have repeat data on employee table. At the same time, we needed to split composite fields to subs fields. For this I added new tables on current schema.

Steps of Normalization process:

- Employee table was had duplicate data. Therefore, we marked the repeat values on table.
- We created Salaries and Jobs table because same data always repeated.
- Salary history should have different table without contract table. Because salary can a few times increment in contract periods. So, it needs to independent from contracts table. Job history table too.
- We need divide each field that require to sub fields. Composite fields always contain minimum two values. Therefore, this makes difficult understanding of the data and query.



MAIN TABLES

Employees

employee_id	firstname	lastname	birth_date	gender	hire_date
101	Alvy	Tatton	05.07.1993	1	06.01.2016
102	Muffin	Coath	29.07.2000	0	30.08.2019
103	Lonnie	McKibben	18.02.2000	1	21.02.2016
104	Abbe	McLernon	05.02.1996	0	06.03.2019
105	Olly	Collcott	02.07.1992	1	21.09.2022
106	Ashlie	Garretts	25.09.1995	0	26.10.2015

Departments

department_id	name
1	Human Resources
2	Sales
3	Support
4	Accounting
5	Research and Development
6	Product Management

Contracts

contract_id	employee_id	job_id	salary_id	contract_start_date	contract_end_date
1	101	1	1	06.01.2020	06.01.2023
2	102	2	2	30.08.2019	30.08.2023
3	105	3	3	21.09.2022	21.09.2023
4	101	4	4	06.01.2016	06.01.2020

Jobs

job_id	title
1	Human Resources Manager
2	Web Designer IV
3	Software Engineer II
4	Help Desk Technician

Salary_History

history_id	salary_id	employee_id	increase_reason	date
1	12	101	increase	06.01.2020
2	5	101	promotion	06.01.2021
3	3	105	promotion	25.12.2022
4	102	102	increase	24.11.2022

Salaries

salary_id	salary
1	5000
2	7000
3	10000
4	2500
5	5000
6	4550
7	4100
8	3650
9	3200
10	2750
11	2300
12	1850

Job_History

history_id	job_id	employee_id	start_date	end_date
1	4	101	06.01.2016	06.01.2020
2	1	103	21.02.2016	06.01.2018
3	4	106	26.10.2015	22.10.2017
4	3	104	06.03.2019	07.08.2021

RELATION TABLES

Manage

manage_id	employee_id	department_id	start_date	end_date
1	101	1	01.01.2017	01.01.2023
2	102	3	01.01.2019	01.01.2023
3	101	2	01.01.2018	01.01.2023

Works_in

work_id	employee_id	department_id	start_date	end_date
1	104	5	01.01.2019	01.01.2023
2	105	4	01.01.2022	01.01.2023
3	106	6	01.01.2015	01.01.2023

Figure 2 After Normalization process Table visuals

GitHub Repository

All the materials we use can be accessed from this repo: [GitHub Repo]

References

1) MySQL (2022a). MySQL :: MySQL Workbench Manual :: 9 Database Design and Modeling. [online] dev.mysql.com. Available at: https://dev.mysql.com/doc/workbench/en/wb-data-modeling.html.
2) MySQL (2022b). MySQL :: MySQL Workbench Manual :: 9.4.2.2 Reverse Engineering a Live Database. [online] dev.mysql.com. Available at: https://dev.mysql.com/doc/workbench/en/wb-reverse-engineer-live.html [Accessed 23 Oct. 2022].
3) Wikipedia Contributors (2019a). Conceptual Schema. [online] Wikipedia. Available at: https://en.wikipedia.org/wiki/Conceptual_data_model [Accessed 5 Jan. 2020].
4) Wikipedia Contributors (2019b). Entity Relationship Model. [online] Wikipedia. Available at: https://en.wikipedia.org/wiki/Entity%E2%80%93relationship_model.
5) Wikipedia Contributors (2021). Logical Schema. [online] Wikipedia. Available at: https://en.wikipedia.org/wiki/Logical_data_model [Accessed 23 Oct. 2022].
6) Wikipedia Contributors (2022). Physical Schema. [online] Wikipedia. Available at: https://en.wikipedia.org/wiki/Physical_data_model [Accessed 23 Oct. 2022].