

# CCT College Dublin

## Assessment Cover Page

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<b>Module Title:</b>	Databases, Web development
<b>Assessment Title:</b>	CA1 – ERD, HTML Tables & CSS
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<b>Assessment Due Date:</b>	28/10/2022 at 23:59 hs
<b>Date of Submission:</b>	28/10/2022

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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.

# Cross module CA

## Database component report

Github link: [https://github.com/SilverDaml/webdev\\_ca1](https://github.com/SilverDaml/webdev_ca1)

This report, details the design process for an ERD for a company HR department. It has been done in 3 sections: the *conceptual model*<sup>1</sup>, the *logical model*<sup>2</sup> and the *normalization process*<sup>3</sup>.

**-Conceptual model(see page 3):** Using *Chen notation*<sup>4</sup>, I separated each entity, their attributes, and the relationship between them. I took **Employee**, **department** and **role**, as the main entities, while *department manager*, *salary change* and *employee belonging date* stayed as the weak ones, given that, at some point, these last ones are dependent of the former ones to exist. I defined attribute types, such as primary, multivalued, etc.

**-Logical model(see page 4):** once the conceptual model was finished, I focused on each entity's primary and foreign keys, along with how they were connected with each other, and their cardinality level. Most of them were a 1: N relationship such as:

- \* "One employee can have one or many roles over time, and each role can be held by 1 or many employees over time"
- \* "One department can have one or many managers at the same time, and each manager can belong to one or more departments over time"

Lastly, I assigned a data type for each attribute. This logical model was created using *Crow's foot notation*<sup>5</sup>.

**-Normalization process(see page 5):** Finally, once the logical model was created, I began with the normalization process. Following Boyce-Codd's first 3 *normal forms*<sup>6</sup>, I tried to avoid as much data redundancy, null values and space storage as possible. For this, I had to create some extra tables (when needed), such as *role change* (apart from the role main table) so I could store previous roles held by employees and keep it separated from the main **Role** entity. Then, I tried there no to be partial dependencies between key and non-key attributes as well as no transitive dependencies either

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<sup>1</sup> David taylor(2022), "What is data modeling? Types (conceptual, Logical, Physical)", Guru99, October 22<sup>nd</sup>. Available at : <https://www.guru99.com/data-modelling-conceptual-logical.html>

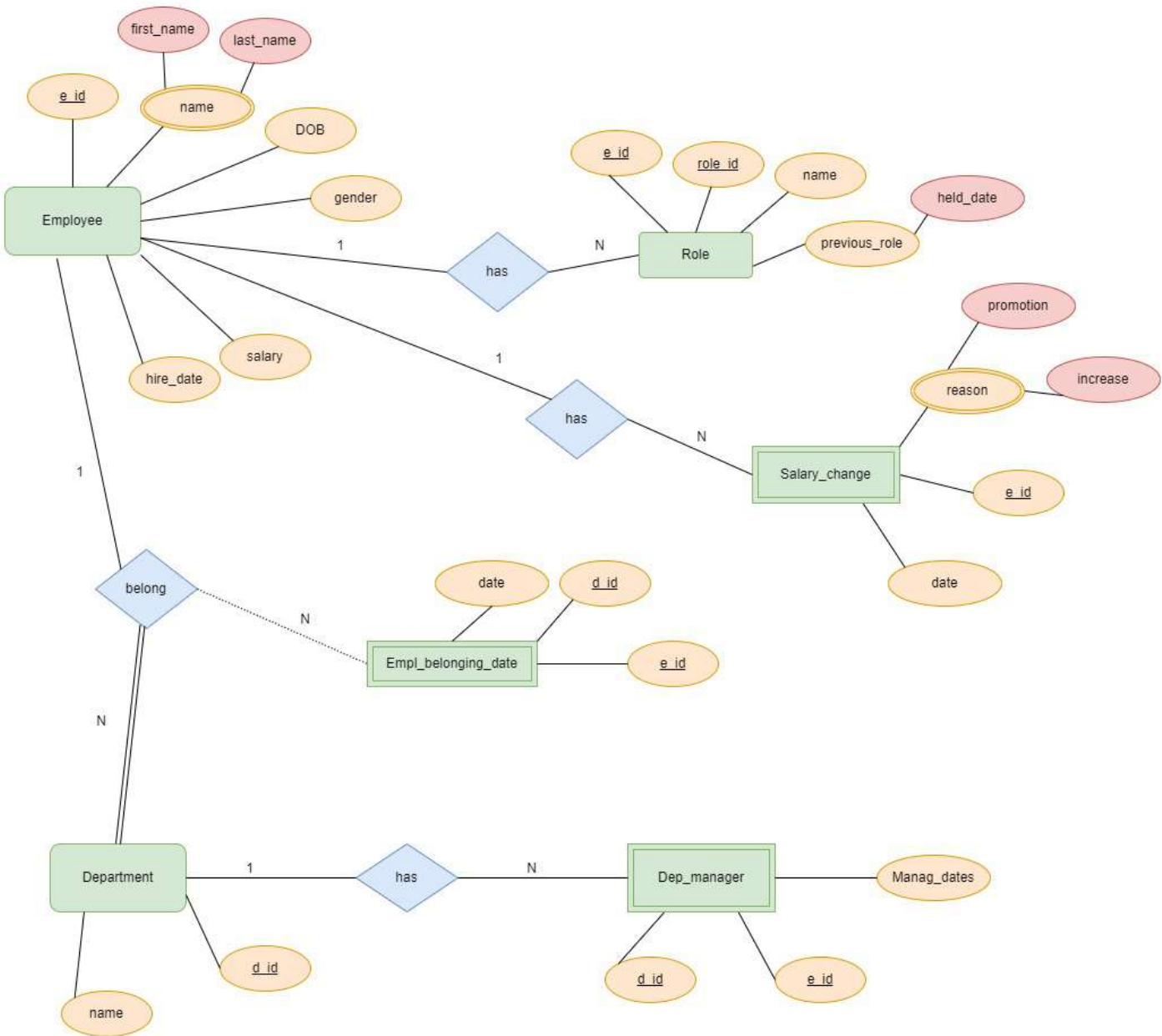
<sup>2</sup> Ibid.

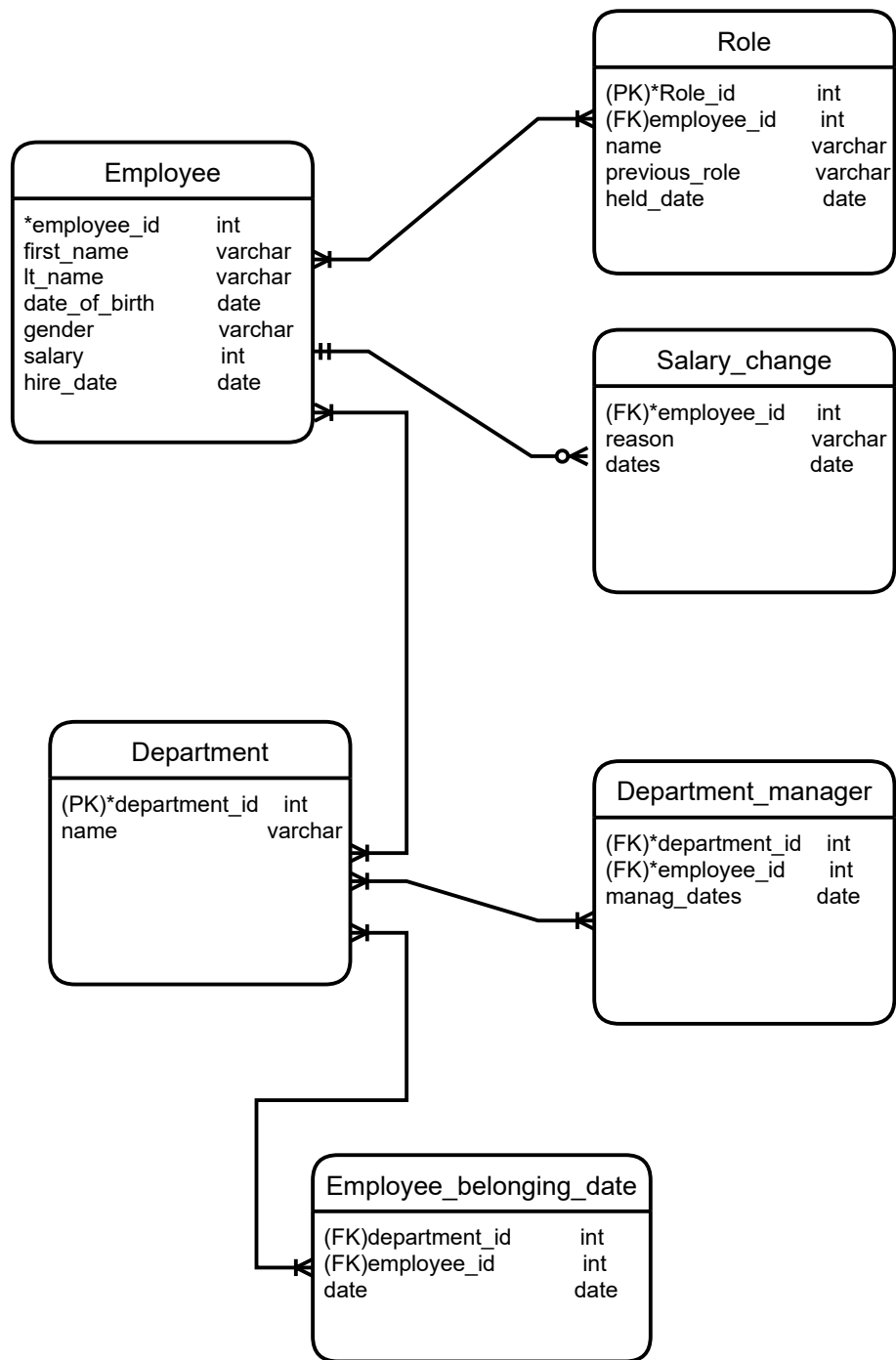
<sup>3</sup> Sathish Routu(2022), "Database normalization. A step-by-step guide with examples", Analytics Vidhya, August 16<sup>th</sup>. Available at: <https://www.analyticsvidhya.com/blog/2022/08/database-normalization-a-step-by-step-guide-with-examples/>

<sup>4</sup> Patrycja Dybka(2014), "Chen notation", Vertabelo, August 2<sup>nd</sup>. Available at: <https://vertabelo.com/blog/chen-erd-notation/>

<sup>5</sup> Patrycja Dybka(2016), "Crow's foot notation", Vertabelo, March 31<sup>st</sup>. Available at: <https://vertabelo.com/blog/crow-s-foot-notation/>

<sup>6</sup> Mithlesh Upadhyay(2020), "Boyce-Codd normal form(BCNF)", GeeksForGeeks, January 27<sup>th</sup>. Available at: [https://www.geeksforgeeks.org/boyce-codd-normal-form-bcnf/#:~:text=Boyce%E2%80%93Codd%20Normal%20Form%20\(BCNF,Y%20in%20given%20relation.](https://www.geeksforgeeks.org/boyce-codd-normal-form-bcnf/#:~:text=Boyce%E2%80%93Codd%20Normal%20Form%20(BCNF,Y%20in%20given%20relation.)





Employee						
Employee_id(PK)	first_name	last_name	date_of_birth	gender	hire_date	salary
1	John	Edwards	15.11.1999	male	21.11.2021	\$500
2	Michael	Foster	02.07.1995	male	13.02.2016	\$800
3	Anna	Downs	30.12.1991	female	14.05.2015	\$900
4	Nick	Prince	12.04.2000	male	30.08.2020	\$400
5	Susan	Donovan	11.01.1981	female	02.03.2010	\$1,600
6	Paul	Peterson	12.11.1997	male	03.10.2017	\$700
7	Claire	Green	02.02.1988	female	22.09.2012	\$1,400
8	Christine	Bell	22.12.1986	female	06.07.2012	\$1,500
9	Megan	Binder	02.04.1994	female	05.04.2020	\$450
10	Adam	West	21.01.1979	male	19.01.2009	\$2,000
11	Rachel	Thompson	13.10.1985	female	15.12.2013	\$1,500
12	Willian	Scott	15.07.1990	male	16.09.2014	\$1,450

Salary_change		
Employee_id(FK)	reason	date
1	increase	01.05.2022
2	promotion	13.02.2018
3	increase	14.05.2016
4	increase	30.06.2021
5	promotion	02.03.2012
6	increase	10.11.2018
7	increase	22.10.2013
8	promotion	06.07.2014
9	promotion	05.04.2022
10	promotion	19.01.2011

Department	
Department_id(PK)	name
1	human_resources
2	sales
3	research
4	technology
5	customer_service
6	finance
7	administration
8	legal
9	marketing
10	quality_asurance

Department_manager		
Employee_id(FK)	Department_id(FK)	management_dates
1	9	01.01.2022
2	4	13.01.2018
3	5	14.03.2016
4	2	30.06.2020
5	10	02.01.2011
6	8	10.05.2018
7	6	11.12.2013
8	7	26.06.2014
9	1	25.03.2022
10	3	19.12.2010

Employee_belonging_date		
Employee_id(FK)	Department_id(FK)	date
1	4	01.03.2022
2	6	12.03.2018
3	1	11.03.2016
4	8	10.06.2020
5	2	22.01.2011
6	10	15.05.2018
7	4	11.05.2013
8	6	11.07.2014
9	3	15.12.2022
10	2	19.12.2013

Role	
Role_id(PK)	name
1	CEO
2	manager
3	supervisor
4	executive
5	operations_productions
6	chief_marketing
7	sales_representative
8	buisness_analyst
9	HR_personel
10	accountant

Role_change			
Employee_id(FK)	Role_id(FK)	previous_role	held_date
1	2	manager	01.01.2022
2	1	CEO	13.01.2018
3	4	supervisor	14.03.2016
4	3	executive	30.06.2020
5	2	buisness_analyst	02.01.2011
6	10	chief_marketing	10.05.2018
7	7	sales_representative	11.12.2013
8	9	operations_productions	26.06.2014
9	6	HR_personel	25.03.2022
10	5	accountant	19.12.2010