

# **Practices for Lesson 11: Normalizing Your Data Model**

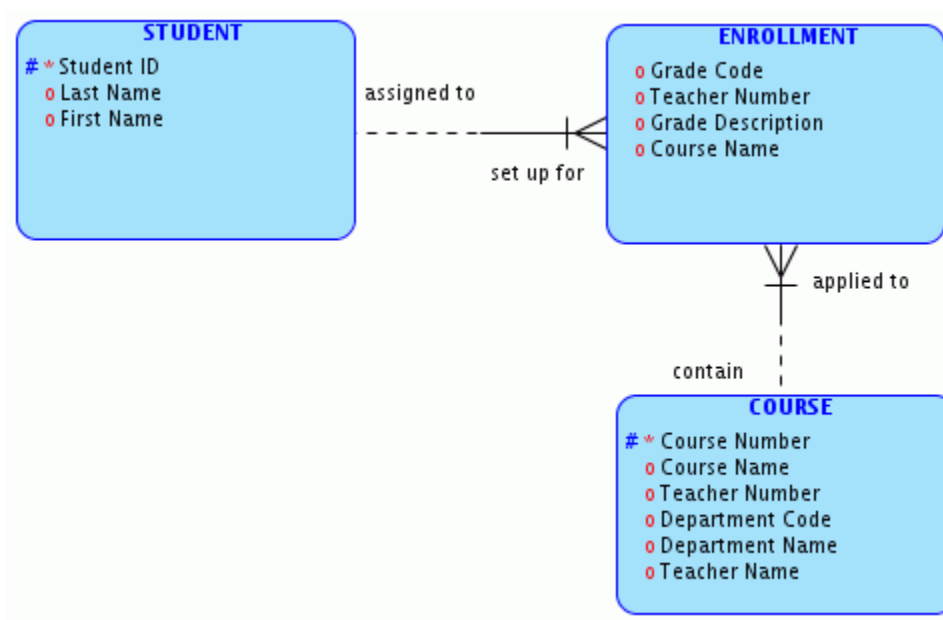
## **Chapter 11**

## Practice 11-1: Normalize an ERD

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### Task

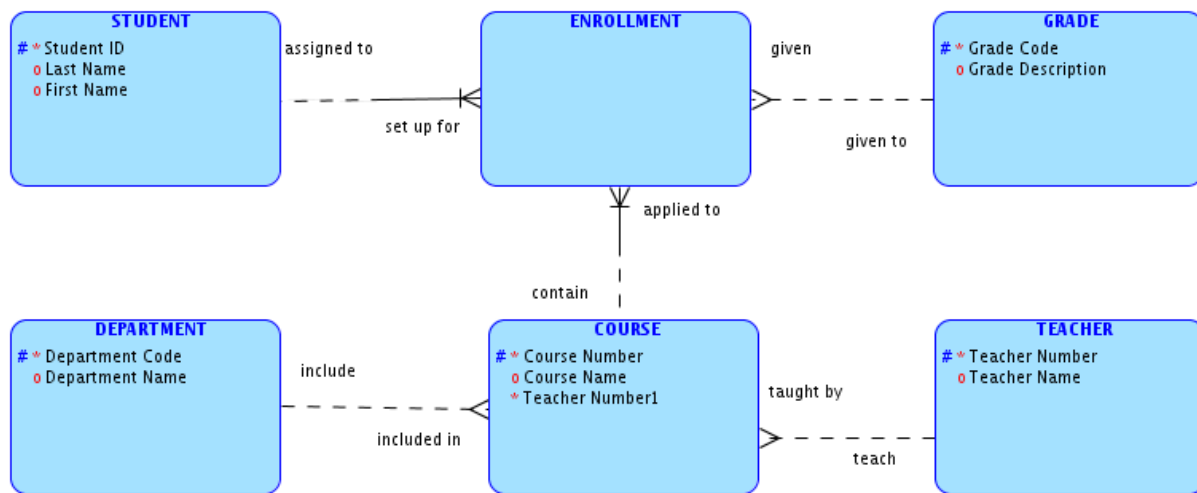
For the following ERD, evaluate each entity against the rules of normalization, identify the misplaced attributes, and explain which rule of normalization each misplaced attribute violates. Then redraw the diagram in Oracle SQL Developer Data Modeler.



## Solution 11-1: Normalize an ERD

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One possible solution to this practice is:



1. The grade information is a repeating group in **ENROLLMENT**; therefore, you create its own entity, **GRADE**, and put the grade code and description in that new entity.
2. The teacher information is also a repeating group in **COURSE**; therefore, you create its own entity, **TEACHER**, and put the teacher number and name in that new entity.
3. The teacher number in enrollment can be eliminated because it is already in the new **TEACHER** entity.
4. The Department Name depends on the Department Code; therefore, you can create its own entity, **DEPARTMENTS**, and move the department code and name to that new entity.
5. In the new entities, define the unique identifiers accordingly.

## Practice 11-2: Validate an ERD for Normalization

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### Tasks

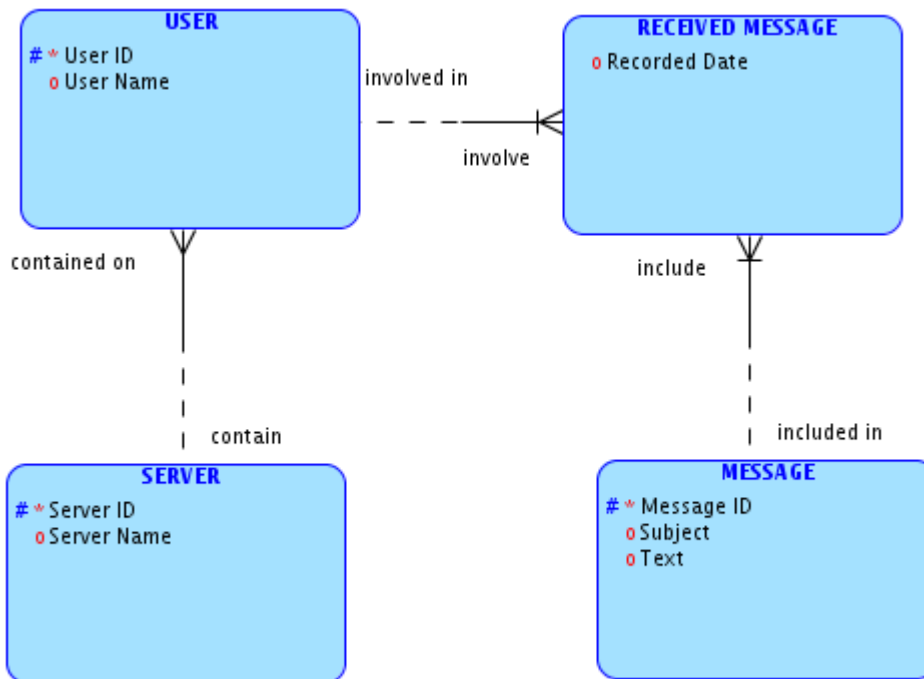
For the following ERD, evaluate the following unnormalized data and develop an entity relationship diagram in SQL Developer Data Modeler that is normalized to third normal form.

User ID	User Name	Message ID	Recorded Date	Subject	Text	Server ID	Server Name
2301	Smith	54101	05/07	Meeting Today	There is...	3786	IMAP05
2301	Smith	54098	07/12	Promotions	I like to...	3786	IMAP05
2301	Smith	54445	10/06	Next Assignment	Your next...	3786	IMAP05
5607	Jones	54512	06/07	Lunch?	Can You...	6001	IMAP08
5607	Jones	54101	05/07	Meeting Today	There is...	6001	IMAP08
5607	Jones	54660	12/01	Jogging Today?	Can you...	6001	IMAP08
7773	Walsh	54101	05/07	Meeting Today	There is...	9988	EMEA01
7773	Walsh	54554	03/17	Stock Quote	The latest...	9988	EMEA01
0022	Patel	54101	05/07	Meeting Today	There is...	9988	EMEA01
0022	Patel	54512	06/07	Lunch?	Can you...	9988	EMEA01

## Solution 11-2: Validate an ERD for Normalization

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One possible solution to this practice is:



1. For first normal form, you needed to identify that there were multiple messages received for a given user. So **USER** and **MESSAGE** were created. There was an M:M between those two entities.
2. For second normal form, you needed to identify that not all the attributes in **MESSAGE** were dependent on the key; therefore, you must resolve the M:M to create the **RECEIVED MESSAGE** entity.
3. For third normal form, you needed to identify that a **Server Name** only depended on the **Server ID**; therefore, you could create a new entity and establish a relationship with the **User** entity.