SIT103/SIT772: Database Fundamentals

4.1P: Normalisation

Overview

In this task, you will learn how to draw dependency diagram and normalize a given database.

Tasks to do

1. Using the **INVOICE** table structure shown in Table 1 (*note that in this table rows are attributes and columns are data records*), draw its dependency diagram and identify all dependencies (including all partial and transitive dependencies). You can see that an invoice has more than one product and a product is in more than one invoice. From the business rules, we know that a product is supplied by one vendor only, but a vendor can supply many products.

   Note that you first need to determine the Primary Key to identify partial and transitive dependencies. What do you think can be the Primary Key in this table? Note that it is a minimal candidate key that can uniquely identify every records.

   Table 1. Sample INVOICE Records

Attribute Name	Sample Value	Sample Value	Sample Value	Sample Value	Sample Value
INV_NUM	211347	211347	211347	211348	211349
PROD_NUM	AA-E3422QW	QD-300932X	RU-995748G	AA-E3422QW	GH-778345P
SALE_DATE	15-Jan-2004	15-Jan-2004	15-Jan-2004	15-Jan-2004	16-Jan-2004
PROD_DESCRIPTION	Rotary sander	0.25-in. drill bit	Band saw	Rotary sander	Power drill
VEND_CODE	211	211	309	211	157
VEND_NAME	NeverFail, Inc.	NeverFail, Inc.	BeGood, Inc.	NeverFail, Inc.	ToughGo, Inc.
QUANT_SOLD	1	8	1	2	1
PROD_PRICE	$49.95	$3.45	$39.99	$49.95	$87.75

   You can draw Dependency Diagram using any tool you such as Word or Powerpoint. See Class slides for examples. You can find how to draw Dependency Diagram using Lucid Chart and Powerpoint in the following video.

   https://video.deakin.edu.au/media/t/1_diuebsth

2. Using the initial dependency diagram drawn for Question 1**, remove all partial dependencies** and draw dependency diagrams of new table structures. Note that your actions may result in multiple tables.

3. Using the tables structures you created for Question 2, **remove transitive dependencies in all tables**

and draw dependency diagrams of all tables.

4. Your might have multiple tables by now. For each table, please check if they satisfy conditions for 1NF, 2NF, and 3NF and justify why they do or do not satisfy.

5. Using the table structures from Question 3, draw a complete Entity Relationship Diagram (ERD) of the database using Crow Foot notations in your choice of professional tool (Visio, Lucidchat or draw.io).

   NOTE: Because the dependency diagrams cannot show the nature (1:1, 1:M, M:N) of the relationships, the ERD remains crucial to the design effort. Complex design is impossible to produce successfully without some form of modelling such as ERD. Yet, as the preceding decompositions demonstrate, the dependency diagrams are a valuable addition to the designer's toolbox. Normalization is likely to add tables/entities that may not have been considered during the initial (conceptual) modelling process. Therefore, initial ERD may change after normalization.

Submission Requirements:

Submit one PDF/WORD file showing all step/process of normalization and answering all questions above.

Submission Due

The due for each task has been stated via its OnTrack task information dashboard.