Beijing-Dublin International College
COMP2013J - Databases
Normalisation Worksheet

1 Worksheet Details

Submission Type: Individual assignment
Due date: 8^{th} of May 2020 @ 17:00 Beijing Time (No Late Submissions)
Worksheet Weight: The same as 1 Quiz
Submission Requirements: A PDF document containing the following:

1. Your UCD student number.
2. Your name.
3. The changes to logical schema produced during each step of the process
4. Explanations of the reasons for all of the changes.

This worksheet is based on the techniques learned in the Normalisation lecture. You will be given an image showing a piece of a price tracking spreadsheet used by a supermarket to track the prices of items that change over time. This information needs to be stored in a database. You should normalise the design, while showing the progress at each stage (1NF, 2NF and 3NF) as well as any functional dependencies.

2 Problem Diagram: Price Tracking Spreadsheet

	A	B	C	D	E	F	G	H
1	item_id	item_name	item_department	department_building	building_address	price_start	price_end	price
2	1	Toothbrush	Healthcare	1	123 SLT Lu	2020-04-26	2020-05-01	4
3						2020-02-01	2020-04-25	6
4	2	Television	Electronics	2	456 Songyu Lu	2020-03-01	2020-05-21	10000
5						2020-01-01	2020-02-29	8000
6	3	Umbrella	Homeware	1	123 SLT Lu	2020-01-01	2020-06-01	10
7	4	Purse	Homeware	1	123 SLT Lu	2020-01-01	2020-02-14	1200
8						2020-02-15	2020-05-01	1500
9						2020-05-02	2020-12-18	1300
10	5	Laptop	Electronics	2	456 Songyu Lu	2020-01-01	2020-02-01	21000
11						2020-02-02	2020-04-01	25000
12						2020-04-02	2020-12-31	24000
13								

Solution

Functional Dependencies

- $\{item\_id\} \rightarrow \{item\_name, item\_department, department\_building, building\_address\}$
- $\{item\_department\} \rightarrow \{department\_building, building\_address\}$
- $\{department\_building\} \rightarrow \{building\_address\}$
- $\{item\_id, price\_start\} \rightarrow \{price\_end, price\}$
- $\{item\_id, price\_end\} \rightarrow \{price\_start, price\}$

1NF - No Repeating Groups

`prices(item_id, item_name, item_department, department_building, building_address, price_start, price_end, price)`

2NF - No Partial Functional Dependencies

Dependencies

- **item_id, price_start**: price_end, price
- **item_id**: item_name, item_department, department_building, building_address
- **price_start**: None*

*Some students may choose to identify a functional dependency between `price_start` and `price_end`, because this value can be derived. This is also an acceptable answer and in the rewritten tables, the `price_end would be removed`

Rewritten Tables

`items(item_id, item_name, item_department, department_building, building_address)`
`prices(item_id, price_start, price_end, price)`

3NF - No Transitive Functional Dependencies

Transitive Functional Dependencies

- $\{item\_department\} \rightarrow \{department\_building, building\_address\}$
- $\{department\_building\} \rightarrow \{building\_address\}$

Rewritten Tables

`items(item_id, item_name, item_department)`
`departments( item_department, department_building)`
`addresses( department_building, building_address)`
`prices(item_id, price_start, price_end, price)`