

### Assignment 3

*A printed report showing [1] the problem, [2] solution methods, [3] codes developed, and [4] outputs produced for the queries indicated is due at or before 5:00 pm on Thursday, 22 April 2021. **The deadline is strictly observed.***

#### The Products Database

1. Consider the **Products** database schema and sample data in the course textbook<sup>1</sup> [pages 52-54]:

**Products**(*maker*, *model*, *type*)  
**PCs**(*model*, *speed*, *ram*, *hd*, *price*)  
**Laptops**(*model*, *speed*, *ram*, *hd*, *screen*, *price*)  
**Printers**(*model*, *color*, *type*, *price*)

where *type*  $\in$  {'PC', 'Laptop', 'Printer'}, and *model* is the key of the database relations.

- A. Implement the database using a RDBS of your choice.
- B. Provide SQL queries that produce the violations of the following constraints:
  - a. No manufacturer of PCs may also make laptops.
  - b. A manufacturer of a PC must also make a laptop with at least as great a processor.
  - c. If a laptop has a larger main memory than a PC, then the laptop must have a higher price than the PC.
  - d. If the relation Products mentions a model and its type, then the model must also appear in the relation appropriate to that type.

Show the outputs of your queries using the sample data provided in the textbook.

- C. Use CREATE FUNCTION and ALTER TABLE to implement the constraints into the database schema. Discuss the association of the functions created with the database relations and indicate the outcome for the sample data provided.
- D. Explain how the implementation C of the constraints in B may change if the following database schema is used:

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<sup>1</sup> Jeffrey D. Ullman and Jennifer Widom, *A First Course in Database Systems – Third Edition*, Pearson.

**PCs**(*maker, model, speed, ram, hd, price*)  
**Laptops**(*maker, model, speed, ram, hd, screen, price*)  
**Printers**(*maker, model, color, type, price*)

Best wishes

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