***Note1:*** *All labs are mandatory, and you will be marked on 4, randomly chosen out of 11 labs. These will account for 20% of your overall mark (5% each).*

***Note2:*** *If a marker requests for a specific lab (e.g. Lab 3) and you do not have Lab 3 available, you can ask for another lab to be marked (e.g. Lab 2) but the total marks for Lab 2 will be reduced by 50%.*

***Note3:*** *All the labs should be created on one single document following the* [*provided template,*](https://portdotacdotuk-my.sharepoint.com/:w:/g/personal/val_adamescu_port_ac_uk/EcxluvfBQCdFiOyaQsPbdzYB4OpU8WcLO52Gcvp4L21pVw) *saved in your drive (or computer) and accessible anytime. Labs are individual works, and they will be submitted into Moodle Dropbox - see deadline.*

***Note4:*** *If a LAB is not finished in the scheduled session, you should complete it at your most convenient time by the beginning of the next session.*

***Note5:*** *Use a code editor and do not type into VM directly*

*Online documentation:* [*https://devdocs.io/*](https://devdocs.io/)

# LAB 2 - Normalisation

**Q1. You have the following table (Fig.1) with data. Normalise the table in 1NF (show 1NF) and create the ERD for 3NF, with associated data type.**

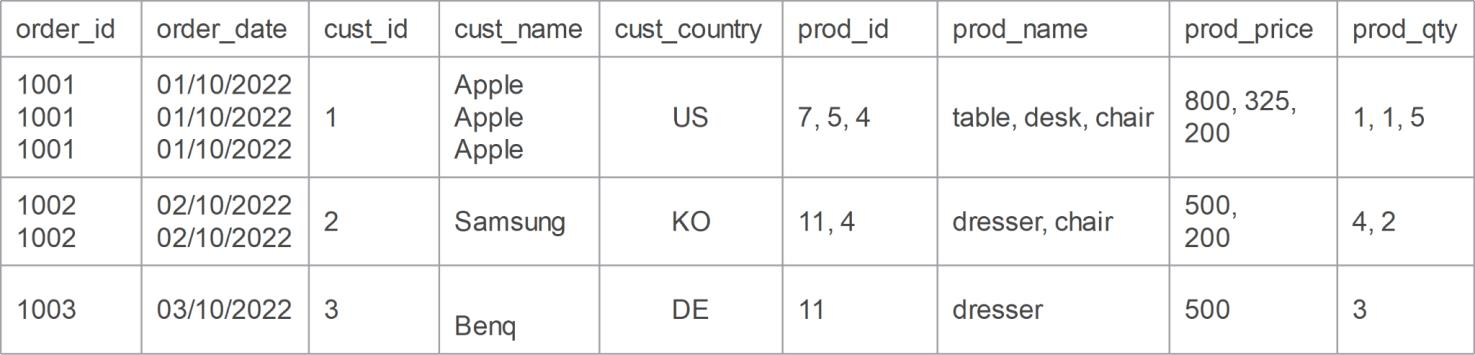


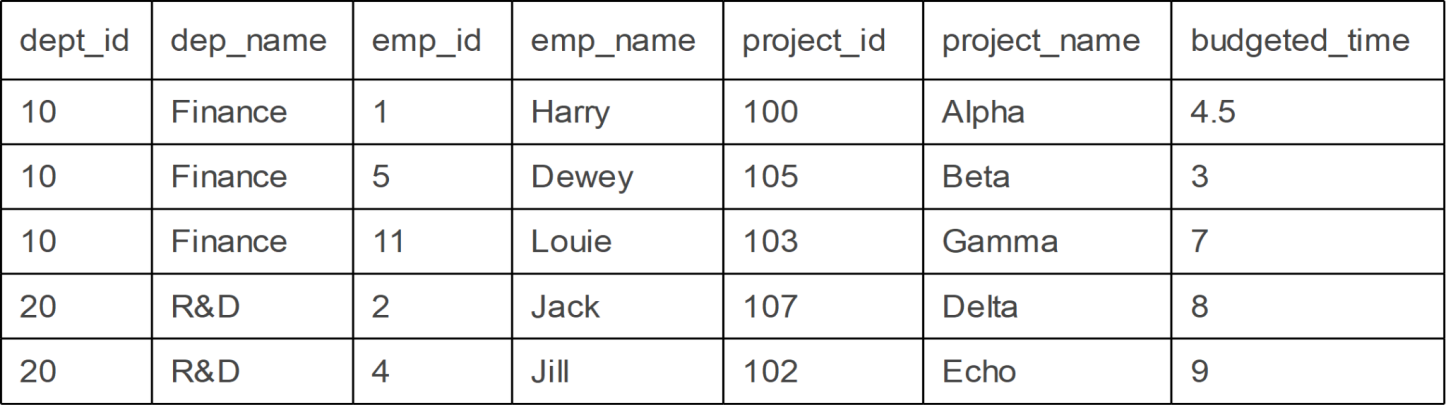
Fig. 1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Order\_id | Order\_date | Cust\_id | Cust\_name | Cust\_country | Prod\_id | Prod\_name | Prod\_price | Prod\_qty |
| 1001 | 01/10/2022 | 1 | Apple | US | 7 | Table | 800 | 1 |
| 1001 | 01/10/2022 | 1 | Apple | US | 5 | Desk | 325 | 1 |
| 1001 | 01/10/2022 | 1 | Apple | US | 4 | chair | 200 | 5 |
| 1002 | 02/10/2022 | 2 | Apple | KO | 11 | Dresser | 500 | 4 |
| 1002 | 02/10/2022 | 2 | Apple | KO | 4 | Chair | 200 | 2 |
| 1003 | 03/10/2022 | 3 | Apple | DE | 11 | dresser | 500 | 3 |

A diagram of a product

AI-generated content may be incorrect.

**Q2. You are given the following table in 1NF. Normalise data in 3NF and create the ERD with all data type and size.**



**A diagram of a project

AI-generated content may be incorrect.**

**Q3. University of Portsmouth keeps the following details about a student and the various modules the student studied (not accurate):**

up\_number (student registration number to university) stu\_name (student name)

stu\_addr (student address)

tut\_id (tutor id)

tut\_name (tutor name)

course\_id - (course code)

course\_name (course name)

module\_id (module code)

module\_name (module name)

module\_results (module exam result)

**in a relation:**

**Student**(up\_number, stu\_name, stu\_addr, tut\_id, tut\_name, course\_id, course\_name, (module\_code, module\_name, module\_results))

**The functional dependencies are:**

course\_code -> course\_name tut\_id -> tut\_name up\_number, module\_id -> module\_results module\_code -> module\_name

Which of the following is a first step of the normalisation of the relation (table) **Student to 2NF**?

*Hint: you can input a quick sample output in a spreadsheet (like Q1) and remove the repeating group.*

1. STUDENT(up\_number, stu\_name, stu\_addr, tutor\_id, tutor\_name, course\_id, course\_name)

MODULE(up\_number, module\_id, module\_name, module\_results)

1. **STUDENT**(**up\_number**, stu\_name, stu\_addr, tutor\_id, tutor\_name, course\_id, course\_name, (module\_code, module\_results))

**MODULE** (**module\_code**, module\_name)

1. **STUDENT**(**up\_number**, stu\_name, stu\_addr, tutor\_id, tutor\_name, course\_id, (module\_id, module\_name, module\_results))

**COURSE**(**course\_id**, course\_name)

1. **STUDENT**(**student\_id,** stu\_name, stu\_addr, tutor\_id, tutor\_name, course\_id)

**MODULE**(**student\_id**, **module\_id**, module\_name, module\_results)

**COURSE**(**course\_id**, course\_name)

**Q4. Based on the previous data sample, what would be a 3NF normalisation? Write just the table names and the attributes as above**

**A diagram with text and a box

AI-generated content may be incorrect.**

**Q5. You have a SUPPLY table that records details about suppliers, products, and cities where the products are supplied. Acknowledge that a supplier will supply in many cities and a city will have many suppliers.**

**SUPPLY**(supplier\_id, supplier\_name, product\_id, product\_name, city\_id, city\_name)

Normalize the table into 3NF. Assume that the table is already in 1NF, explain why certain attributes had to be separated.

A blue rectangular object with black text

AI-generated content may be incorrect.

Normalizing into 3nf made it so the city entity was developed on as the brief does not make it clear as to how wide of a supplier the solution is for and product and supplier had to be separated as one supplier can carry many types of products

**Q6. Consider the following ORDER table that records:**

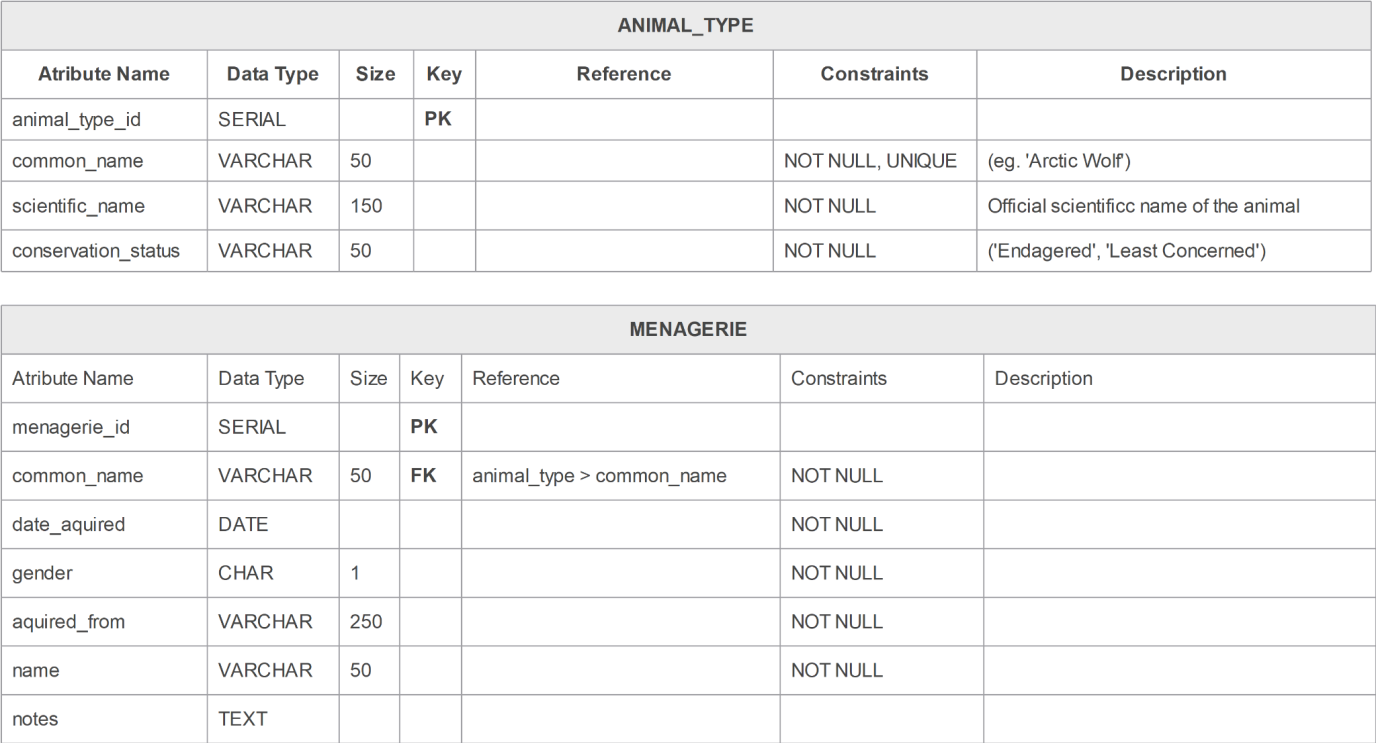
**ORDER**(order\_id, customer\_id, customer\_name, product\_id, product\_name, quantity, date)

**Normalize the ORDER table to 3NF.**

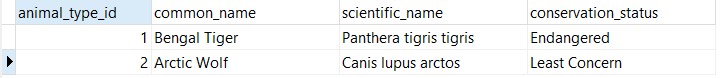
A diagram of a server

AI-generated content may be incorrect.

**Q7. Open your VM and create a new database (lab2). You are given the following data dictionary.**



**and the data sample output:**





* Write the CREATE statements for tables ANIMAL\_TYPE and MENAGERIE, including PKs, FKs, constraints, data type and size.
* Write 6 INSERT STATEMENTS for the following:

○ Common Name: ‘Bengal Tiger’, ‘Arctic Wolf’

○ Scientific Name: ‘Panthera tigris tigris’, ‘Canis lupus arctos’

○ Conservation Status: ‘Endangered’, ‘Least Concern’

○ Acquired Date: ‘14/07/2011’, ‘30/09/2008’, ‘01/06/2006’, ‘12/06/2007’ ○ Gender: ‘M’, ‘F’

○ Acquired From: ‘Dhaka Zoo’, ‘National Zoo’, ‘Scotland Zoo’, ‘Southampton National Park’ ○ Name: ‘Ariel’, ‘Freddy’, ‘Spark’, ‘Mia’

○ Notes: ‘Healthy coat at last exam’, ‘Strong appetite’, ‘Likes to play’, ‘Doesn't like sun’

The output of both tables should be exactly like in provided examples for ANIMAL\_TYPE and MENAGERIE .

**A screen shot of a computer

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A black screen with white text

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**Q8. Based on the previous database you have created, list all the animals that are endangered, along with common name, scientific name, animal name and date acquired.**

A screen shot of a computer

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A screen shot of a computer program

AI-generated content may be incorrect.