*SQL and Relational Databases, Project Report, 2023*

Project Excelsior

**Florian Kenner - 22208397**

(Florian.Kenner@ucdconnect.ie)

Use a splash page image here [optional]

Use *LaTeX* if you wish but use the general spacing and font/style you find here (1.5 spacing, 12-point font for text, etc.).

Be sure to submit a PDF (not a .DOC file) as your report. Overall, it will be about **25-30 pages**, including diagrams and screenshots. A significant portion of the report should be textual. Do not rely on images to write your report for you.

**Remember**, your project this year concerns a database for a food laboratory. Your database is intended to support the workings of the innovation processes within the laboratory. As such, identify the place of the database in the overall laboratory, and tell us how you would support its operations at the SQL level.

**What to submit**: This report, as a PDF, *and* the necessary SQL files to allow us to examine your database constructs and test your queries.

# Table of Contents

|  |  |  |  |
| --- | --- | --- | --- |
| Section 1: | Section Heading | ……………………………………………………………….. | 1 |
| Section 2: | Section Heading | ……………………………………………………………….. | 2 |
| Section 3: | Section Heading | ……………………………………………………………….. | 3 |
| Section 4: | Section Heading | ……………………………………………………………….. | 4 |
| Section 5: | Section Heading | ……………………………………………………………….. | 5 |
| Section 6: | Section Heading | ……………………………………………………………….. | 6 |
| Section 7: | Section Heading | ……………………………………………………………….. | 7 |

# List of Figures

|  |  |  |  |
| --- | --- | --- | --- |
| Figure 1: | Figure Caption | ……………………………………………………………….. | 1 |
| Figure 2: | Figure Caption | ……………………………………………………………….. | 2 |
| Figure 3: | Figure Caption | ……………………………………………………………….. | 3 |
| Figure 4: | Figure Caption | ……………………………………………………………….. | 4 |
| Figure 5: | Figure Caption | ……………………………………………………………….. | 5 |
| Figure 6: | Figure Caption | ……………………………………………………………….. | 6 |

# Introduction

The following project embodies my vision for the database of the comic retailer excelsior. The comic book industry relies on physical items, which have so far mostly been displayed on physical storefronts and sold in stores. The tradition and history of this domain must be adapted modern demands, in example online retailing. The heart of each online retailer is its underlying database system, which determines how the sold goods are being viewed, which aspects are emphasized and how all parts of the business come together. The main technical part of my vision is being as close to reality as possible when making design and implementation choices. The project should be lean, yet complex enough to consider the peculiarities and subtleties of comic collecting and selling so that every comic enthusiast would be satisfied with this design. Furthermore, the database should meet all technical criteria to be performant, non-redundant and scalable.

Comic books have become far more than simple entertainment products, which get read once and forgotten afterwards. Comic books have turned into collectables which carry both emotional and financial value. There are single very valuable pieces which got produced only a few times many years ago and even fewer which survived until today. At the same time there are many editions produces and sold today in large quantities. The difficult job of a comic retailer is to satisfy all these different target groups with their different needs and demands. Numerous traits are shared by all comics. These can be differentiated on the abstract level of a comic book batch and the level of each physical copy. On the abstract level, each comic book has a title, publisher, release date and so on. Each physical copy has a condition, which is rated by a uniform evaluation system, a buying and selling price, etc.. The customer must be provided with all relevant information so that he can make an educated buying decision and is satisfied in the long term. The intended application of the project is therefore providing a database which stores all information of the comic books the retailer excelsior sells on which a website can be built.

From a technical perspective, the different abstractions of the data have to be considered when designing the database. It can be expected that the stress on the database will be low at the beginning but may grow over time, but it’s not to be expected to enter the domain of big data. The database stores so far only textual information, meaning no pictures or videos. There won’t be an ingoing stream of telemetry data for example which fills up our database. Still, the database must be able to handle increasing traffic through website visitors and deliver results in a short time to provide a satisfying user experience.

The scope of this project is providing a useful solution for dealing with all the data concerning the stock of excelsior. This means keeping track of the current inventory of comics and providing the additional information an enthusiast needs. This additional information to what series a single comic issue belongs, who published this series, which character appears in a comic book and who worked on a comic book. Also all above mentioned relevant information of a single copy must be stored, such as the buying price, the selling price, the condition and the format, meaning the cover size and material. On top of that, the database should keep track of all customer information such as the name, date of birth and address. These two parts must be brought together to keep track of inventory changes to document previous purchases. The basis for two more functions on possible the way of a customer to buying a comic book should be provided with database foundations, a wishlist and a shopping cart. Most customers are familiar with such functionalities from other online retailers and may therefore miss those in the online shop of excelsior if absent. Not part of the scope of this project is keeping track of logistic business information such as the physical storage of comics, the buying process of comics before they appear in our inventory and the shipping process. Also, no information regarding the payment except the prices should be stored.

# Database Plan: A Schematic View

In this section offer a high-level view of the database and its design. State what you think the principal entities are, as well as their main attributes and the key relations that connect them. Provide an E-R diagram (entities and tables) that illustrates your plan. Motivate your design – state why this way and not another.

# Database Structure: A Normalized View

Describe the main tables in your database and the role played by each. Show that your database meets the definitions of 1NF, 2NF and 3NF normal forms. Is your database also in BCNF normal form? If so, explain how and why.

# Database Views

What views do you provide onto your database? Justify each and define them here. Explain what each view is supposed to provide, and to whom it provides it. Is it wise or necessary to represent a certain relation as an SQL view? Be sure to specify your views (about 4 would be sufficient) and give examples of their use.

# Procedural Elements

Does your design employ procedural extras such as database triggers (in PL/SQL or the MySQL equivalent format)? If so, describe and motivate each. If your design does not contain procedural extras, explain why, and say how you were able to do without these additions. Most projects have some scope for procedural elements (about 4 would be sufficient here).

# Example Queries: Your Database In Action

Your database will provide a structure for the data in an application and a means of accessing and viewing that data. In this section show us the database in action, by providing sample queries and their outputs (please do not provide large data sets as outputs; summarize as appropriate). Provide specific queries to test on your database and tell us what those queries provide to the application. Use your existing database as the basis for your queries. If a query makes reference to any additional tables then provide example rows of this table in section 3.

You may use screenshots here but do not overfill your report with screenshots. Ensure that there is a cohesive argument expressed in the text of the report and that it is not simply a bag of diagrams and queries and screenshots. When you include images, make sure they are readable and actually add to the discussion.

# Conclusions

Provide any concluding thoughts here. How might you build on this work for the future? How might your database support future developments?

# Acknowledgements

Name check any person who helped you with this work. Acknowledge that the work is entirely your own, and that every sentence in this report was written by you and you alone. If you wish to quote another person or piece of work, place the quoted work in quotation marks and cite the author inline. Plagiarism is a very serious infraction that must be dealt with severely. Avoid any ambiguity on this point by citing things carefully!

# References

List any bibliographical citations here [for people and work that you quote/cite in the main text of your report; please do include meaningful citations]

2