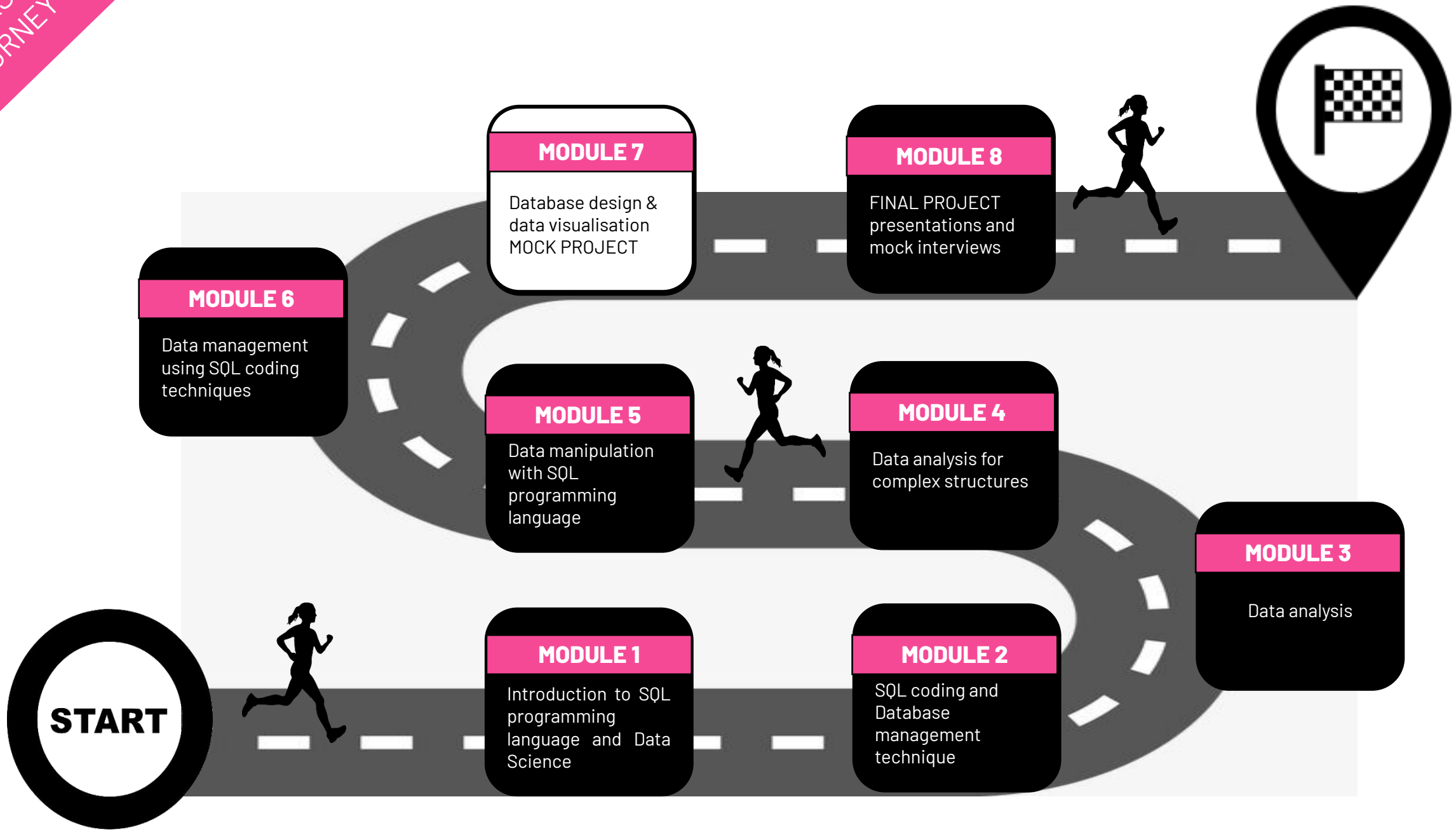
WELCOME TO CFG

YOUR INTRODUCTION TO DATABASES & SQL PROGRAMMING LANGUAGE

CODE FIRST GIRLS

TECH OPENS UP LIMITLESS OPPORTUNITIES FOR GIRLS

COURSE JOURNEY



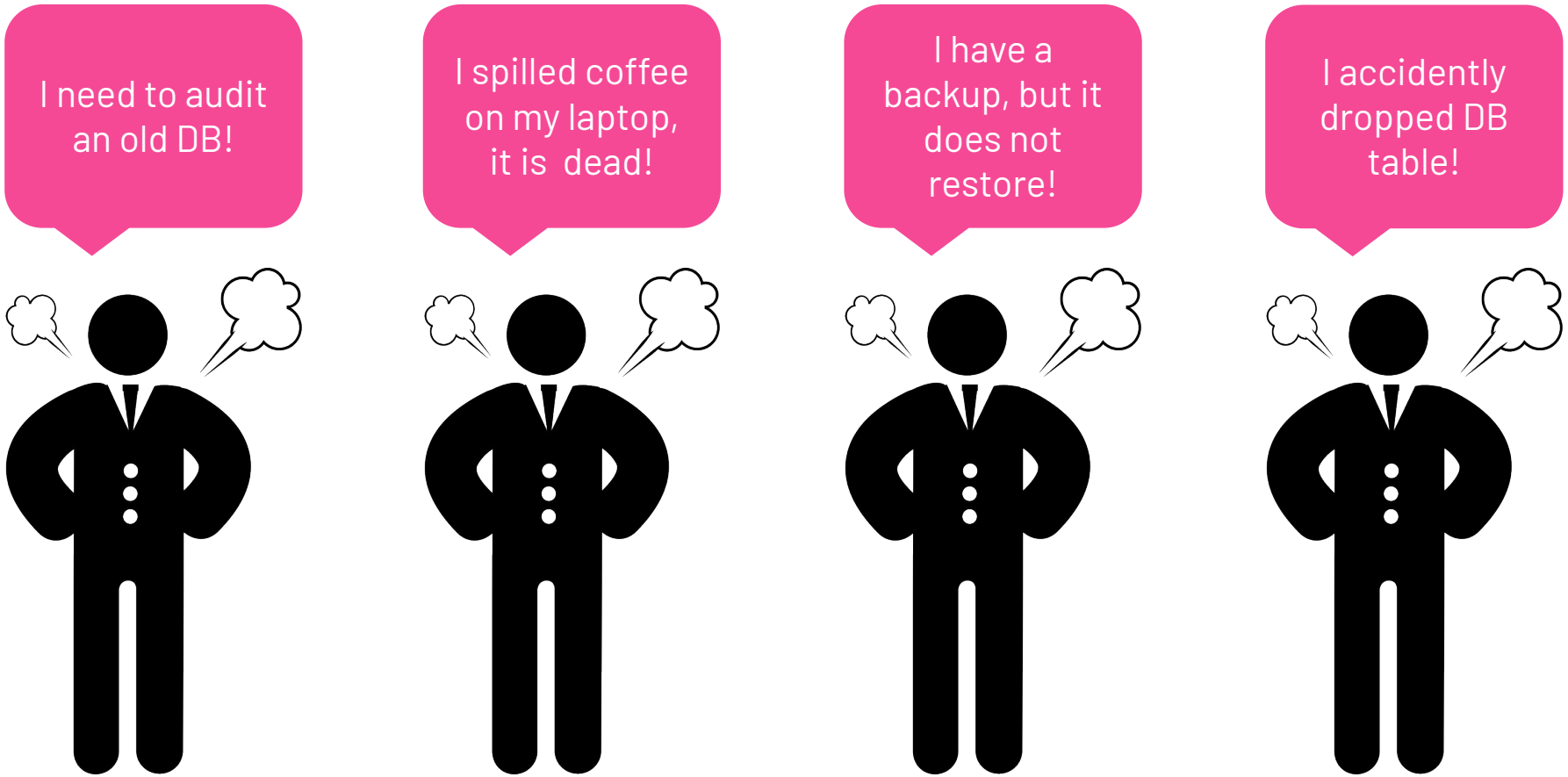
07 DB DESIGN AND DATA VISUALISATION

1. DB backup and restore
2. DD data import and export
3. MOCK PROJECT: DB design and data visualisation

PERFECT WORLD

DISASTER STRIKES

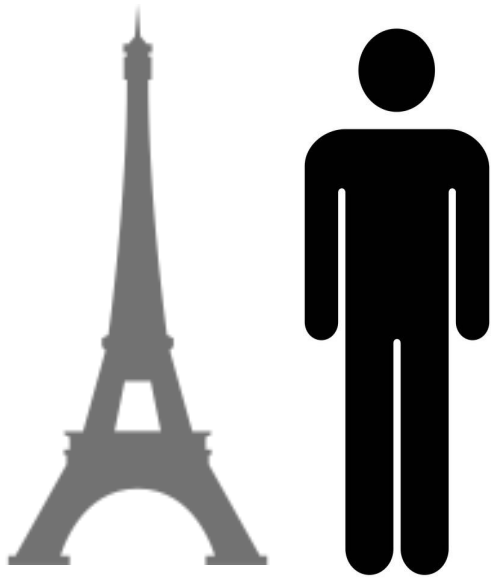
REAL LIFE SCENARIOS



MYSQLDUMP

- We can backup one database or multiple ones at the same time.
- We can also back-up a single table from a database
- We can back up not just the database with its tables, but also the logic encapsulated in Triggers, Stored Procedures etc.
- We are going to use CMD (Linux command line widow) in order to perform the backup.

SCENARIO SET UP



INSTRUCTOR DEMO

Every month both London and Paris bakeries have to analyse end of month sales and pay the franchise royalties to the Bakery brand in France.

Pierre gets in touch with Margaret and asks her to take a backup of the London bakery database that captures all activates including sales figures and send it over to him.

Task

- Take a backup of a single database
- Store it in a new folder

WINDOWS

MAC

STUDY VIDEOS ABOUT DB BACKUP

Practice case study scenarios on DB backup, review additional materials On internet if necessary.

SELF-STUDY TASK

- Watch the videos for MAC and WINDOWS on how to backup a database.
- There are multiple scenarios in the reference material section – they offer you a challenge to try to backup multiple tables within one DB or even multiple DBs
- Review and complete those study cases on DB backup.

DATABASE RESTORE

- A successful restore is equally valuable as a successful backup
- A disaster recovery strategy is never complete without a test of a database restore.
- Always test your backup by restoring it on a test server or another machine

SYNTAX

mysqldump options > backup_filename.sql

Mysql options < backup_filename.sql

EXAMPLE

 CREATING BACKUP

 RESTORING BACKUP

INSTRUCTOR DEMO

Every month both London and Paris bakeries have to analyse end of month sales and pay the franchise royalties to the Bakery brand in France.

Pierre gets in touch with Margaret and asks her to take a backup of the London bakery database that captures all activates including sales figures and send it over to him.

Upon receiving the backup Pierre needs to restore the database on a server.

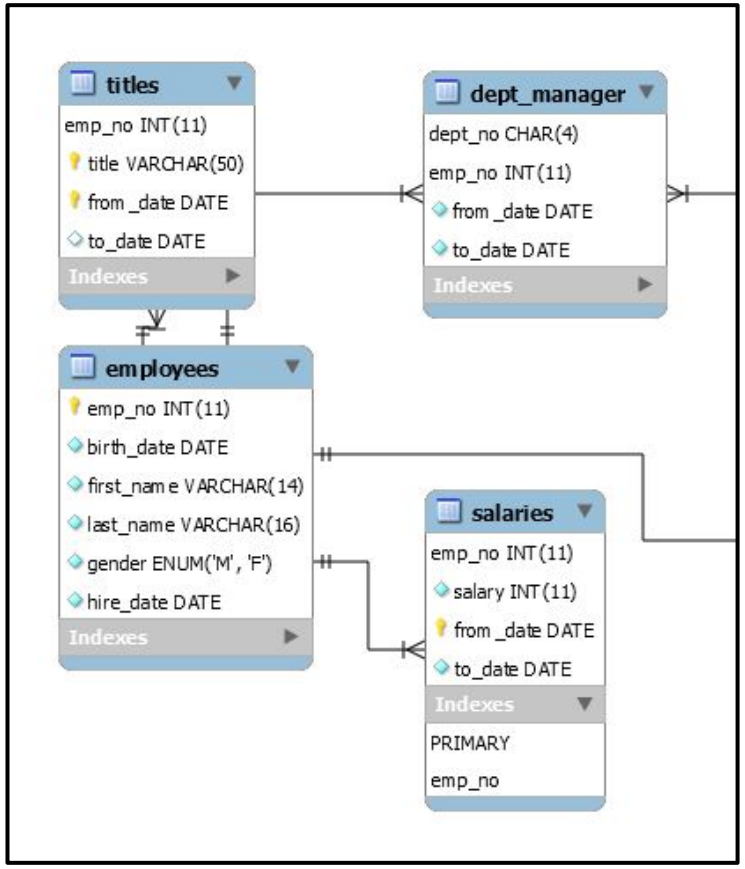
Task

- Restore a single database
- Store it in a new folder

QUICK SUMMARY

- **mysqldump** is a client utility that performs a logical backup
- user can take backup of a database, a table, a schema, any stored routines and various other objects with the help of **mysqldump**
- **mysql** is a client utility that restored a logical backup
- **mysqldump** is useful for taking a backup, whilst **mysql** command is useful to restore the backup

ER DIAGRAM



- We can create a diagram for existing MySQL DB with the help of MySQL Workbench
- It can be achieved by using the **reverse engineering** functionality to create a model.

BUSINESS INTELLIGENCE TOOLS

INTRODUCTION

- Tableau is a powerful and fastest-growing data visualization tool used in the business intelligence industry. It allows to simplify raw data into a very easily understandable format.
- Data analysis is very fast with Tableau, and the visualizations created are in the form of dashboards and worksheets.
- Such data visuals help professionals to understand the data that is created using Tableau at any level in an organization.

- Power BI is a Business Intelligence and Data Visualization tool which helps to convert data from the various data source into interactive dashboards and BI reports. It also provides multiple software connectors and services.
- Microsoft Power BI is a tool that helps to handle data from different sources and provides visualization after the cleaning and integration process.
- It also offers a feature of Ad Hoc report generation, which helps in the analysis of the data.

TABLEAU

FEATURES

- Data blending
- No need of technical knowledge
- Real-time analysis
- Data collaboration and data notifications
- DAX analysis function
- Patented technology from Stanford university
- Toggle view and drag-and-drop
- List of native data connectors
- Highlight and filter data
- Share dashboards
- Embed dashboards within
- Mobile-ready dashboards
- Tableau reader for data viewing
- Dashboard commenting
- Create “no-code” data queries
- Translate queries to visualizations
- Import all ranges and sizes of data

INTERESTING FACTS

- Tableau has the feature of drag-n-drop, which allows its users to create interactive visuals quickly. It can also build interactive dashboards with just a few clicks.

- Tableau products include Tableau Desktop, Tableau Server, Tableau Online, Tableau Vizable, Tableau Public, and Tableau Reader.

- Tableau Software was founded in 2003 and Tableau Desktop 1.0 was released in 2004.

- Tableau software is more expensive than Power BI

POWER BI

FEATURES

- Customizable dashboards
- Datasets
- Reports
- Navigation pane
- Q&A question box
- Help & feedback buttons
- Ad Hoc reporting and analysis
- Online Analytical Processing (OLAP)
- Trend indicators
- Interactive reports authoring
- Complete reporting & data visualization tools
- Real-time dashboards that help business owners solve problems as they occur
- Offers Power BI embedded, azure service that allows applications to interact with Power BI
- Q&A feature of Power BI allows users to ask questions using natural language to get answers in a specific graphical form.
- Content Packs: for sharing dashboards with team

INTERESTING FACTS

- Power BI has an easy drag and drops functionality, with features that allow you to copy all formatting across similar visualizations

- The key components of Power BI are Power BI Desktop, Power Bi Service, Power BI Mobile Apps, Power BI Gateway, Power BI Report Server.

- Power BI was designed in 2010, and the initial release was available for public in July 2011.

- Power BI is cheaper than Tableau software. (e.g. Power BI professional version costs less than $10 per month per user.)

POWER BI

IMPORTANT NOTE

- Power BI is a member of the **Microsoft 365** products and services family. (*Note that it is very tricky to use it on a Mac device)*

- Power BI **requires that you use a work or school email address.**

- You **CANNOT sign up or purchase it using email addresses provided by consumer email services** (e.g. hotmail.co.uk, gmail.com etc.) or telecommunication providers.

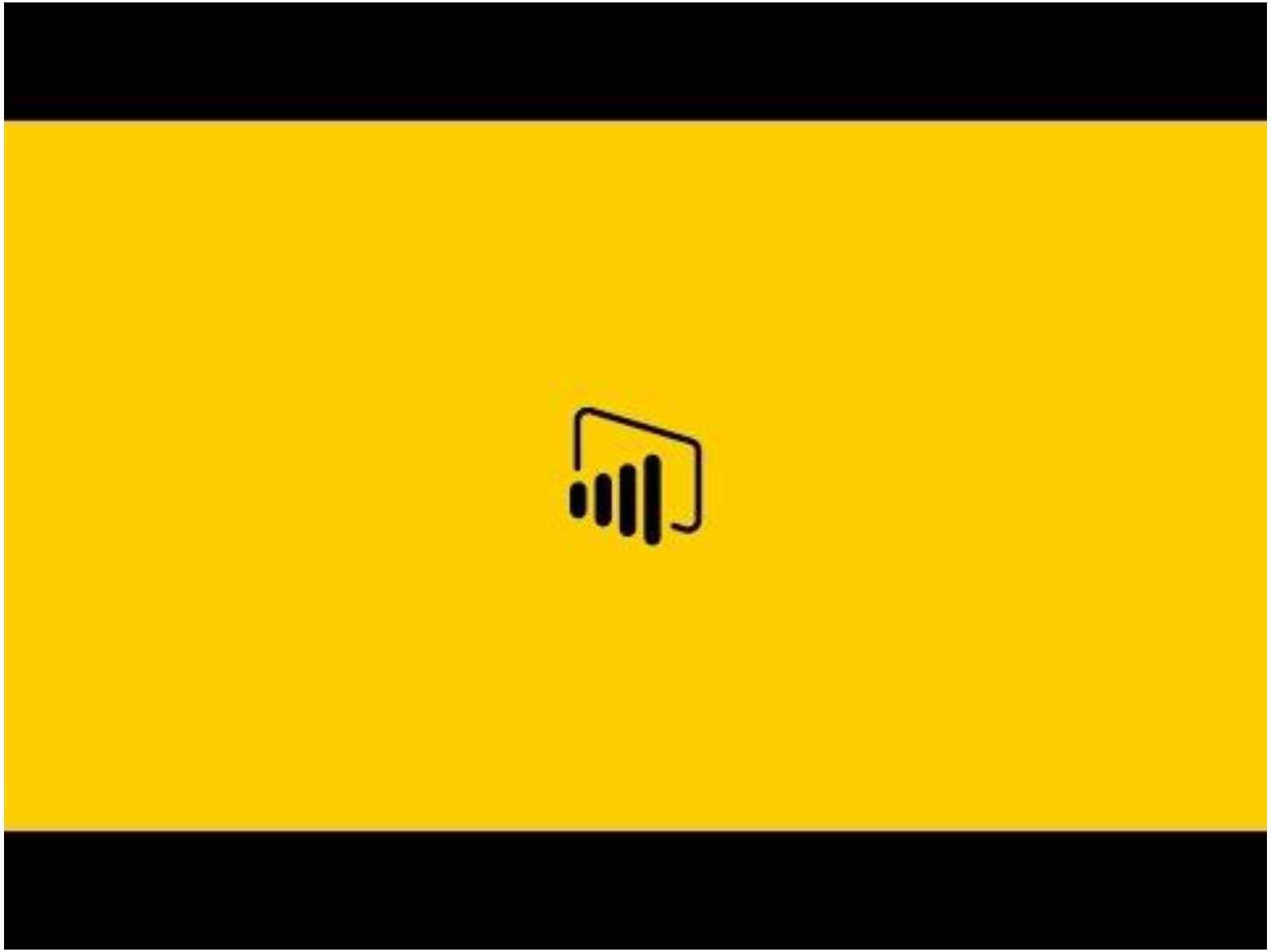
- **If your work or school authorizes you** to use their email domain for practicing with Power Bi, then you can sign up for it for free here: powerbi.microsoft.com

Let's watch
"Introduction to Power BI"
video to get a better idea about this tool (as we cannot easily sign up for it)

NB: we will do a practical exercise using Tableau

POWER BI

VIDEO



MOCK PROJECT

- Create and design a brand new DB
- Upload data from a csv file into a new DB
- Build an ER DIAGRAM for the new DB
- Write queries to select required sample data
- Export data into a new csv file
- **Visualise resulting data set with Tableau**

PROJECT

The project is an essential part of his course. In order to ‘graduate’ and get a certificate of completion you need to create, deliver and present your own database project. Your project should reflect all major learning outcomes from the course modules. There are ‘must have’ core requirements, that need to be achieved as a minimum deliverable.

CORE REQUIREMENTS

- ✔ Create relational DB of your choice with minimum 5 tables
- ✔ Set Primary and Foreign Key constraints to create relations between the tables
- ✔ Using any type of the joins create a view that combines multiple tables in a logical way
- ✔ In your database, create a stored function that can be applied to a query in your DB
- ✔ Prepare an example query with a subquery to demonstrate how to extract data from your DB for analysis
- ✔ Create DB diagram where all table relations are shown

PROJECT

In addition to the core requirements you need to include *any 2-3 requirements from the advanced options* list. (Optionally, you can include more or all of the advanced options, the 'extras' are entirely up to you. Although they do provide a very good learning ground). Everything outlined in the core and advanced lists have been covered in this course. You can vary your level of the project complexity by tuning the amount of stored objects, analytical filters and function, as well as amount of tables and their relations in the database.

ADVANCED OPTIONS
✔ In your database, create a stored procedure and demonstrate how it runs
✔ In your database, create a trigger and demonstrate how it runs
✔ In your database, create an event and demonstrate how it runs
✔ Create a view that uses at least 3-4 base tables; prepare and demonstrate a query that uses the view to produce a logically arranged result set for analysis.
✔ Prepare an example query with group by and having to demonstrate how to extract data from your DB for analysis

PROJECT

PROJECT SUBMISSION AND ASSESSMENT

- Take a backup copy of your diagram, save it as *projectname.sql* file and submit via Slack channel before the deadline.
- Your instructor(s) would restore the file on their MySQL server and examine the code.
- Your instructors would mark it accordingly, then provide comments and feedback on your project.
- A copy of your project file along with the assessment and comments would be forwarded to CFG to keep a record of and to issue you a certificate, upon successful completion of the project.
- Every student will be presenting and demonstrating their projects in class during week 8. To summarise, you need to do both: present the project in class and submit it online.

PROJECT

PROJECT PRESENTATIONS

- Please note that it is possible to be working on a project in groups of two. In this case you can join forces with your classmate and work on the same DB. In this case you would need to take a number of backups and send the updates to each other or store a master copy of the DB on the cloud location e.g. Google Drive.

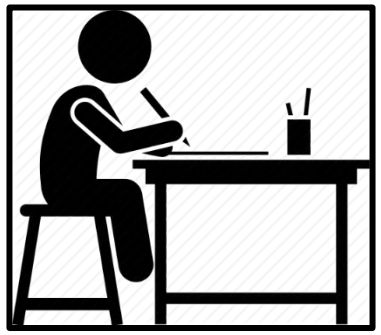
- NB: if you do a group work , you are expected to do all advanced points and produce at least 8 tables in the DB.

- You will have approximately 3 min to do a presentation in class. Start with the DB diagram and explain the idea behind your project, what it is for and how it is expected to be used.

- The run your sample queries to demonstrate how functions, store procedures etc. work. Also show the class few snippets of sample data stored in tables.

- A quick Q&A about the project at the end of each presentation from your instructors and the group.

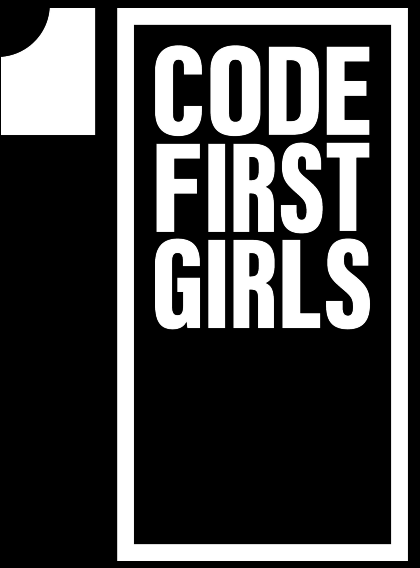
HOMEWORK



- Please work on your course projects to be ready to be presented during our class in week 8.
- Please submit your projects online before the deadline.

GOOD LUCK!

THANK YOU
HAVE A GREAT WEEK!



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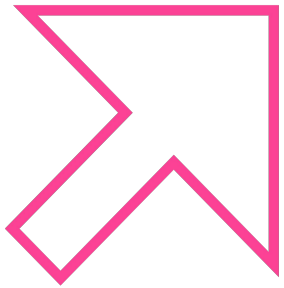


REFERENCE MATERIALS

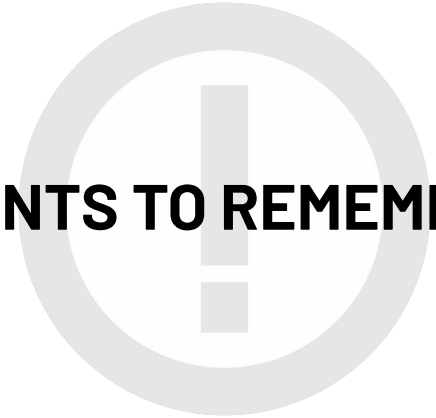
REVISION

BACKUP =
DATA SAFETY

FREQUENT BACKUP AT
REGULAR INTERVAL

STORE A BACKUP
LOCALLY, CLOUD,
REMOTE SERVERS!

SCHEDULE NIGHTLY
MAINTENANCE PROCESS
(BACKUP)



POINTS TO REMEMBER

USE GOOGLE DRIVE,
DROPBOX, REMOTE
COMPUTERS (FTP)

UTILISE EXPORT &
IMPORT FEATURES OF
WORKBENCH

RESTORE DB WITH
MYSQL

BACKUP DB WITH
MYSQLDUMP

PRACTICE
(optional)

Task No2

Every month both London and Paris bakeries have to analyse end of month sales and pay the franchise royalties to the Bakery brand in France.

In addition to that, the management team in HQ in France wants to review employees records in London in order to analyse their performance, potentially promote few members of stuff and calculate end-of-year inflation based salary increases.

Pierre gets in touch with Margaret and asks her to take a backup of the London bakery database and London company (employee) database

- Take a backup of multiple databases (two different independent DBs)
- Store everything in your backup folder

PRACTICE
(optional)

Task No3

Once every quarter a full backup of all databases across all shops needs to be done, so it can be stored and archived in one single location. This is needed for the data security and audit purposes.

A full backup of EVERYTHING , i.e. all databases across all sights needs to be performed.

- Take a backup of EVERYTHING – all databases from all location.
- Store everything in your backup folder

PRACTICE
(optional)

Task No4

At the end of every day the HQ Business Analyst needs to produce an end of day report for the top management in France. The sales figures are based on daily sales across both bakeries.

Pierre requests Margaret to take a backup of a single sales table in the bakery database and send it over to him, so the data can be combined with the French figures and be available for Business Analysts.

- Take a backup of one single table in the bakery database
- Store everything in your backup folder
- Do it together with your instructor

PRACTICE
(optional)

Task No5

Our cakes are delicious and our sales are booming! The bakery unit in London has a different tax model compared to the Paris based shop. So the logic to calculate taxes and other payment contributions are different for both countries.

The tax calculation logic is written into some stored procedures and functions. Our HQ would like to have a copy of the calculation logic as a backup for Business Analysts.

Pierre contacts Margaret and asks her to take backups of all the database objects like Stored Procedures, Triggers, Events and Stored functions.

- Take a backup of the bakery database stored procedure, triggers and events.
- Store everything in your backup folder
- Do it together with your instructor

PRACTICE
(optional)

Task No6

Every month both London and Paris bakeries have to analyse end of month sales and pay the franchise royalties to the Bakery brand in France.

In addition to that, the management team in HQ in France wants to review employees records in London in order to analyse their performance, potentially promote few members of stuff and calculate end-of-year inflation based salary increases.

Pierre gets in touch with Margaret and asks her to take a backup of the London bakery database and London company (employee) database

Upon receiving the backup Pierre needs to restore the database on a server

- Restore multiple (two different independent) DBs
- Store everything in your backup folder
- Do it together with your instructor