# Project Training I SQL

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# Course description

**Language**: English

**Total hours**: 64h (16 * 4h)

**Training content**:

- 7 exercises
- 1 final project

# Prerequisites

All the following items are **not** required to understand the content of this project training, but they will be used as examples during classes.

- Python
- Web
  - HTTP
  - HTML
  - CSS
  - JavaScript
- SQL
- Linux

# Goal

The goal of this project training will be to build a clone of the famous microblogging platform **weibo**. Students will be able to have deep principles about SQL technologie using PostgreSQL through small exercises, then, have a fully working project running on a linux environment.

# Goal - Features

Feature required into the final project:

- Login/Registration
- Post
- Repost
- Comment
- User management
- Follower management

# Goal - Project environment

Each group will run their final project on the following environment:

- Linux (either Ubuntu, Debian, Fedora, etc...)
- Python 3.5+
- Flask or any low level python web frameworks
- PostgreSQL 9.5+

*Notice: A working project is more important than a beautiful one*

This project training is not intended to teach you how to build a website but really focuses on data management with a database through a website.

Web development is another topic that cannot be fully covered, however some useful tips will be provided during each session.

# Course topic

- Project management using SCRUM
- Database design
- Database softwares
- Database management
- Documentation generation
- Code versioning with **git**
- Unit testing
- Server management

During the first class, student will have to form groups to work on each excercises and the final project.

A schedule will have to be prepared by each group for the final project, helping them to keep track of the amount of work that has been done and the current progress.

# Score

The final score will be based on your assignments+final project scores.

The final project will count as 50% of the final grade while 40% will be given by your assignments, and 10% for the attendance.

Any extra work accomplished by students will be rewarded.

# Course Schedule

# Week 1

- Presentation of the project.
- Creation of working groups with 3 to 5 students.
- Working environment setup

# Week 2

- Presentation of SQL
  - History
  - Usage
- Presentation of Mysql, Postgres and SQLite
  - Core mechanism
  - Usage
- Database modelisation
  - How to modelize a database

# Week 3

- Database relationships
  - ManyToMany
  - ManyToOne
  - OneToMany
  - OneToOne
- Project I
  - Modelisation of the final project database regarding user, posts, comments relationships between all the items.

# Week 4

- Assignment 1 presentation
- Introduction to linux environment
- Assignment 2: Testing and production environment setup
  - Create a github account
  - Setup an Ubuntu server
  - Setup PostgreSQL 9.5+
  - Setup ssh

# Week 5

- Assignment 2 presentation
- Introduction to web development
  - HTTP
  - HTML
  - CSS

# Week 6

- Introduction to JavaScript
- Introduction to Flask web framework
- Assignment 3:
  - Create Registration page
  - Create Login page
  - Create Account page

All the user informations will be saved into postgres.

# Week 7

- Assignment 3 presentation
- Introduction to database security and how to avoid SQL injections
- Introduction to ORM technologies
- Assignment 4:
  - Create a stream page where a user can Create/Update/Delete his own posts
  - Display posts in a feed page from the current user only

# Week 8

- Final project follow-up

During this session, each group will have to show the progress of the final project and make sure that all the required feature can be implemented on time.

# Week 9

- Assignment 4 presentation
- Introduction to Indexes
  - How to optimise querying
  - UNIQUE INDEXES
  - PRIMARY KEYS
  - COMPOSED INDEXES

# Week 10

- Introduction Replication, Sharding and Failover
  - Datacenter replication
  - Geo replication
  - Disaster recovery
- Introduction Transactions and Atomicity.
  - Ensure data consistency
- Assignment 5
  - Add **followers** logic
  - Add post and comment “like”
  - Add nested comment reply

# Week 11

- Assignment 5 presentation
- Introduction to Stored Procedures and Triggers
  - How to delegate action based on certain events
  - Write sql queries as “functions”

# Week 12

- Introduction to unit-tests
  - How to make sure the program is always working after updates
  - Testing tools
  - Testing online services
- Assignment 6
  - Add unit-tests for every implemented functionalities
  - Add input validation for any inserted data and make sure the final dataset is consistent based on the user inputs generated by the test cases.

# Week 13

- Assignment 6 presentation
- Introduction to NoSQL
  - Principles
  - Differences with RDMS
  - Existing technologies
- Assignment 7
  - Add picture upload
  - Implement client-side DOM manipulation with JavaScript

# Week 14

- Assignment 7 presentation
- Advance usage of GIT
  - GPG commit signatures
  - Hooks
  - Hosting

# Week 15

Last step before the final presentation, each group will show their progress about documentation, code and test coverage.

# Week 16

- Final presentation

Each group will have to run their final project into a virtual machine then run the testing script before being manually tested with all the team members.

Usability, speed, database querying logic will be taken in consideration.