Project Overview

Final Project

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Goals

- Gain practical experience with designing and building real data-driven web/mobile applications
- Learn how to collaborate in teams and meet deadlines
- Exercise your creativity
- Get comfortable with undertaking ambitious projects from start to finish
- Build your portfolio for getting a job / internship

5 Stages

- Stage 0: Group formation (no hard deadline)
- Stage 1: Functional Description + ER Design (2/11/18)
- Stage 2: Development Plan (2/25/18)
- Stage 3: Setup Dev Environment (3/4/18)
- Stage 4: Initial Demo (4/8/18)
- Stage 5: Final Demo and Report (5/6/18)

Stage 0: Group formation

- Groups must have 3-4 people (no more, no less)
- No restrictions on who you can team up with
- Suggestions
  - Have team members with different backgrounds (engineering / design, front end / back end)
  - Designate a ‘captain’ to manage the team

Stage 1: Functional Description and Entity-Relationship Design

- Requirements
- Discuss what makes your application useful + unique
- Describe the source that you will get your data from
- Features
  - Basic functionality (CRUD)
  - Advanced functionality (2 or more)
- Advanced techniques (5 or more)
- ER diagram – include necessary assumptions

Advanced features

- Should be relevant and useful for your application
- Should be technically challenging
  - At least 3-4 days of work for the whole team per advanced function to implement excluding learning how to code
  - May build upon external libraries but not use as-is
- You should be able to clearly explain the technical challenge in each advanced function

Advanced features examples

- Good examples
- Machine learning
- Data visualization
- Real time query
- Chat system / bot

- Bad examples
- Port to iOS / Android
- Simple use of Maps API
- Scrape data from website
- Push notifications

List of advanced techniques

- Indexing
- Parallel query execution
- Transaction
- Approximate query processing
- Triggers
- Partitioning / Sharding
- Stored procedure
- Prepared statements
- Compound Statements
- Constraint
- View

Stage 2: Development Plan

- The relational **schema** of your database
- Final choices of DBMS and software platforms / languages that you will be using
- How will you get data for your application (crawling the Web / API / synthetic)
- **Division of responsibilities** of team members
- The project timeline with **milestones**

Design decisions

- Web App (browser-based)
- Mobile App (tablet / phone)

Dataset

- Requirements
  - Use real-world data to back your application
  - At least 50,000 records / rows total in the database
  - Must be obtained legally and free to use for academic purposes
- Sources
  - Precompiled (Ex: https://www.kaggle.com/datasets)
  - Scraped from internet (Ex: using PyQuery)

Stage 3: Setup Development Environment

- Play with VM, MySQL, HTML
- Initiate a site and post your project URL to Coursera
  - The site can be empty but the URL must be working (no 404 or other HTTP errors)
  - If you are building a mobile app, assemble a project package and share it via quick release (link to the app download and early access)

Stage 4: Midterm Demo (10 min)

- Enough data to showcase functionality
- Basic functionality
  - Create / Insert records to the DB
  - Read / Search records
  - Update records
  - Delete records
- **Remember**: This shouldn’t be your login functionality
- **Describe** plans for your advanced functions

Stage 5: Final Demo (15-20 min)

- Real data in the system (>50k records)
- Record a project demo video
  - Repeat CRUD / basic functionality
  - Show a few interesting queries
  - Present your advanced functions and clearly articulate why they are advanced
  - Show relevant code for 5 advanced techniques
- Edit template and submit final report on Coursera

Project grading [25% total]

- [1%] Stage 1: Functional Description
- [1%] Stage 2: Development Plan
- [1%] Stage 3: Setup Dev Environment
- [7%] Stage 4: Initial Demo
- [15%] Stage 5: Final Demo
  - [10%] 2+ Advanced features
  - [3%] 5+ Advanced techniques
  - [1%] 50k records
  - [1%] User experience

How to pick a good project idea

- Are you solving a real-world problem?
- How often do people face this problem?
- What is the use-case for the application?
- Are there any similar projects / websites? Can your solution improve on existing ones?
- Is it realistic to implement in a one semester time frame?

Popular student project ideas in the past

- Academic:
  - Course material search, scheduling, ...
- Entertainment:
  - Book recommendation, music / playlist sharing, fantasy football analysis, dating, cooking, ...
- Productivity:
  - Task management, human resource management, ...
- Healthcare
  - Physician recommendation, ...

CS 411: Hall of Fame

- https://www.youtube.com/watch?v=JxXxK9OaQa8
- https://www.youtube.com/watch?v=-hWT51ysbqw
- https://www.youtube.com/watch?v=8dIxePWBIrs