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Due Date: February 12, 2019
Submission Method: Canvas
Score: 15%

Milestone 2: Sketching Frontend and Backend
ECS 165A - Winter 2019

In the first milestone assignment, you gained a broad understanding of the process of data-oriented app development starting from requirement gathering to evaluating and analyzing the required technologies. Hopefully, you now have a clear understanding of the functionalities and features of your app, the technology stack needed to implement them, and your conceptual data model (e.g. ER diagram). The main objectives of this milestone consist of three stages. **(S1) Frontend:** to identify and sketch all the screens in your Instagram App, paying attention to both UX and UI elements. **(S2) Backend:** To realize your complete ER model on your chosen database along with all the necessary application and data integrity constraints. **(S3) Demonstrate:** To present that you have a basic working app, you will be creating the very first version of your Instagram App consisting of two basic functionalities of your choice based on the frontend and backend outlined in the first two stages, such as ability to sign up and login, update user profile, or follow/unfollow other users.

Think Long-term, Plan Carefully.
Be curious, Be creative!

(S1) Designing Frontend:

The goal of this stage is to identify and sketch all the screens in your app. At the end of this stage, you would have the complete design (but not implemented yet) of your app that fulfills all the functionalities listed in your first milestone. Let's first dive into the steps of designing the UI for your application.

1. **Getting to Know Your App (App Personality & Persona)** You first need to form an understanding of your app personality, the app persona (e.g., Crafting a Character: Design an engaging Action, Redesigning With Personality, Personality in Design, Designing Personality, How to create Personas, a step by step guide).
2. **UX Design (User Experience Design)** Sketch a simple and intuitive interface using common UI elements on paper. Then improvise by creating the low-fidelity wireframes (e.g., visually sketch using sketch.app, Invision, or Adobe XD).
3. **UI Design (User Interface Design)** Add the visual elements to your low-fidelity wireframe by choosing attractive imagery, colors, use of the right fonts, buttons etc. that match your app personality.
4. **Reiterate/Finalize** Evaluate your design, brainstorm and discuss among your team members.

If you are wondering about the different elements of mobile design, refer to this Smashing Magazine article. It is a well-written guide consolidating various elements of mobile design. But again, it is important that you do not limit yourself to a single guide. You need to research and explore other resources and viewpoints. Also make sure that you attend our Invited Design Lecture, entitled "*What Else Speak Human*" by Aroosha Sarrafi on January 31, 2019.

For example, here is an interesting case study on pet diet application. This may help you understand the design cycle (briefly outlined above) when building your application. Also, here is a list of UI/UX case study examples of various applications. Here is yet another article summarizing the best practices used in UI/UX design. Here are a few emerging UX trends, The State of UX for 2019. You can use them to get some creative ideas for your UI/UX designs. If you are interested in UI/UX, there are many active blogs, here are a few examples:

1. UX Planet
2. UX Booth
3. Smashing Magazine

(S2) Designing Backend:

The second part of this milestone is to translate your complete ER model (defined in your first milestone) into a database schema (the logical design). Please refer to Chapter 3 before proceeding! The logical design is the mapping of entities, relationships, and attributes into a database schema. This step may differ depending on whether SQL or NoSQL database is chosen. When you sketched your ER diagram, you demonstrated that some forms of relationships exist between your entities, now to realize your design in practice, you need to translate these entities and relationships into objects offered by your chosen database platform. Furthermore, please ensure that you define all the necessary application and data integrity constraints such as primary key, foreign key, uniqueness, etc. as discussed in the lecture.

All the relationships identified in your ER diagram are going to be implemented in the database by either creating a new table, or just adding a new column to existing tables, or maybe there are other unique options tailored to our database platform. You can use online tools (e.g., draw.io) or MySQL Workbench to sketch your tables.

Once you materialized your schema design and loaded sample data, you need to identify and write a few queries needed to collect and aggregate the necessary data to

implement your defined application requirements. A simple example would be when designing the user profile, you may need to fetch user information related to a particular userID or emailID (see the basic example below). Note depending on your database design, user information may span across multiple tables for which you to have complex queries involving joins, subqueries, etc.

```
SELECT firstname, lastname, about
  FROM UserDetails
 WHERE emailID = 'alice@ucdavis.edu'
```

Here several informative guides to creating effective DB Design that you may utilize when building/updating your schema.

1. Tips for Better Database Design: This post offers tips to make informed database design choices.
2. Database Design Practices: This post offers twenty best general practices often used in practice.
3. DB Design: This is a basic article that offers a step-by-step outline of designing a relational database schema.
4. Eleven Rules for DB Design: An article outlining eleven rules often followed in practice.

(S3) Demonstrate Basic Features:

The final part of this milestone is to leverage your designed frontend (S1) and backend (S2) to develop at least two basic app features. A few examples of basic features (but not limited to) are as follows. Note each feature must be a well-defined functionality that was outlined in your first milestone. (1) Implementing user authentication wherein the user would be able to create a new account and sign-in if the user is already registered. (2) Displaying the user profile (perhaps after the user is logged into the system) that contains the editable basic personal information. The information could have been gathered during the user registration and the onboarding process. Perhaps the user could further be given the option to edit and delete the account at any point in time. (3) The user would be given the option to follow and unfollow other users.

Milestone Deliverables/Grading Scheme: What to submit?

At the end of this milestone, each team needs to prepare a presentation that concisely summarizes the entire progress including app personality/persona, UX/UI wireframes/screens, DB schema along with application/integrity constraints, sample

queries followed by a live demo of your Instagram App consisting of two basic app functionalities. In your submission, please also include the screen recording of your planned demo (for offline viewing). Also, you will need to submit **the presentation slides in .pptx, .key, or .pdf format, the screen recording of your live demo by the due date.** The submission is done through Canvas, and only one group member must submit the package on the behalf of the entire group.

S1: The justification and description of your design and all wireframes (frontend). Please include the sketches of both low- and high-fidelity wireframes (UX and UI).

S2: Include the diagram of your database schema and describe and justify the chosen constraints and design choices. You also need to include selected queries for populating data in your frontend.

S3: A live demo of two basic functionalities. An example of live flow would be registering a user → signing in → navigation to user profile screen → update profile → follow/unfollow other users. Please ensure that you have the screen recording of the planned demo for offline viewing.

If you had any major changes to your initial proposed approach, make sure you describe the changes and include the justification for the change.

The actual presentation and evaluation will be scheduled after the milestone due date. Each group will be assigned a dedicated 15-minute timeslot. The presentation must be completed strictly in 10 minutes (no extra time would be granted) followed by a 5-minute Q&A. In Q&A, each team member will be asked questions related to any part of the milestone to ensure every student's participation and understanding of the whole assignment. Groups with five members will receive an 18-minute time slot.

During the 10-minute presentation, each student must present their respective parts, e.g., each team member would take up one milestone and they would focus on the tier of the app they are leading (e.g., front-end, app logic, data model, or backend database).

Important Note: The presentation slides, the live demo, screen recording must be identical to the materials submitted by the milestone due date.

As noted in the course syllabus, for each milestone, a portion of the grade is devoted to the presented project as a whole on which all members receive the same grade (70% of the grade), but the remaining portion is individualized (30% of the grade), so for each milestone, not all group members may receive the same grade. In each milestone, **a bonus of up to 20% can be gained** to further encourage taking a risk, going the extra mile, and just to be curious & creative.

Late Policy

There will be a 10% penalty for each late day. After three late days, the homework will not be accepted.

Course Policy

In this class, we adopt the UC Davis Code of Academic Conduct available here.

Disclaimer

The external links and resources that are being provided on this handout serve merely as a convenience and for informational purposes only; they do not constitute an endorsement or an approval of their products, services, or opinions of the corporation or organization or individual. As a student, developer, or researcher, it is your sole responsibility to learn how to assess the accuracy and validity of any external site. This is a crucial skill in the age of the Internet, **where anyone can publish anything!**

Changelog:

Milestone Handout Version v1: January 31, 2019 (initial posted version)