6.170 Project 3.1 Design Document

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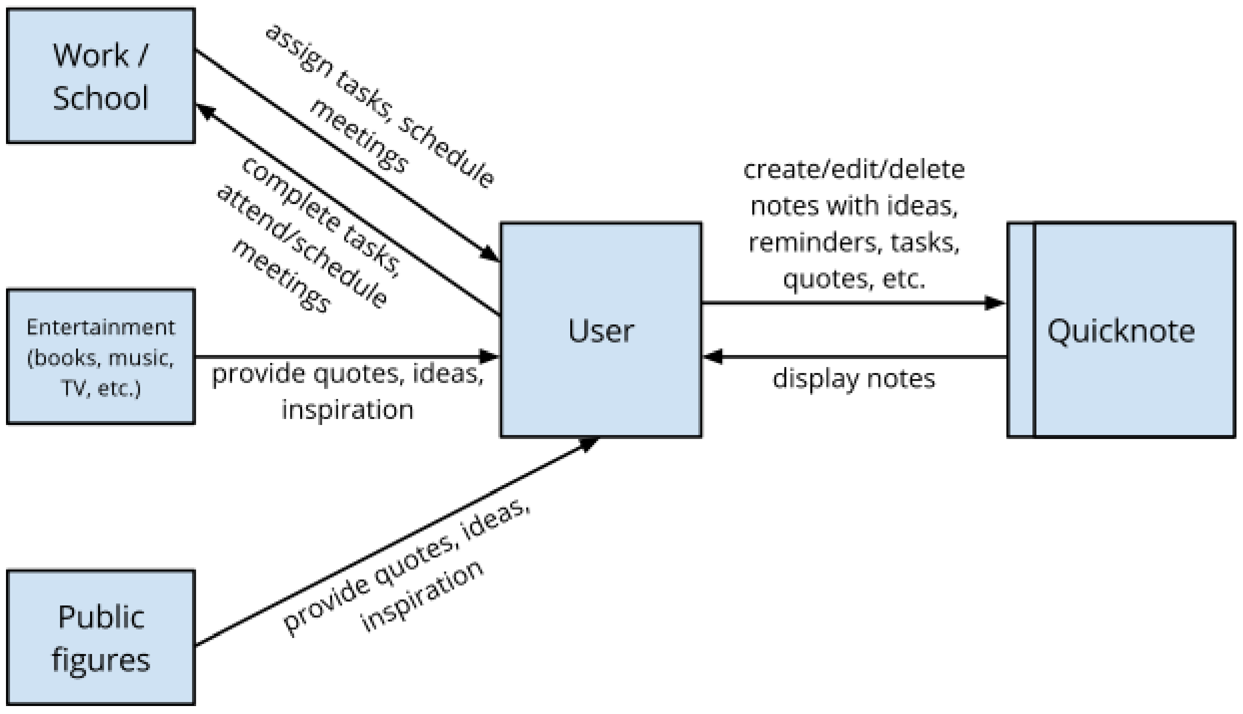
Overview

Purpose and goals

With this project, I would like to create a simple web-based interpretation of sticky notes, which I frequently use in my daily life. The appeal of physical sticky notes lies in their portability and modularity; as a result, they're the go-to solution for jotting down quick notes and reminders. Direct-to-digital translations of sticky notes, such as Mac OS X's Stickies app, are hindered by their efforts to replicate the physical product as much as possible. Moving notes around on a screen is cumbersome, and the implementations lack basic features people have come to expect from digital apps, such as search and tagging. This project, Quicknote, aims to provide a lightweight digital note-taking application that more closely resembles a basic text file (with notes that can be rearranged to some degree) than fuller-featured apps like Evernote, while maintaining the modular and rearrangeable qualities of sticky notes.

Context diagram

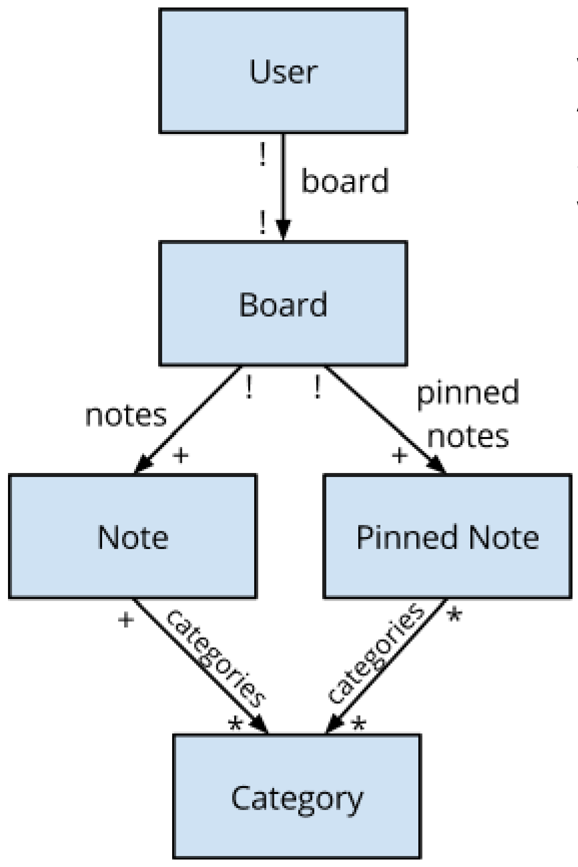

Work / School
assign tasks, schedule meetings
complete tasks, attend/schedule meetings
Entertainment (books, music, TV, etc.)
provide quotes, ideas, inspiration
User
create/edit/delete notes with ideas, reminders, tasks, quotes, etc.
display notes
Quicknote
Public figures
provide quotes, ideas, inspiration

Concepts

Key concepts

- **User**: anyone with a Quicknote account. Users can only view and modify their own notes.
- **Board**: the container for a user's collection of notes. In the minimum viable product, each user can only have one board, so all of the user's notes are aggregated in only one place.
- **Note**: a brief bit of text less than 1000 characters long. Users may hashtag any of the words inside a note's text to tag it with a category. For example: "pick up milk tomorrow #todo #groceries." This note will then be associated with the categories "todo" and "groceries," and the hashtags will be preserved in the note's text.
- **Pinned note**: a note that appears at the top of the list.
- **Category**: an object that associates notes with topics. Users can view notes associated with a certain category.

Object model



Note about object model:
When a user pins a note, that Note object is "deactivated" (not listed but still in the database) and a new Pinnednote object is created. This is why categories have 0+ pinned notes and 1+ notes.

Behavior

Feature descriptions

All of these actions can only be done when a user is logged in.

- **Create a new note**: Users can create a new note by entering text and hashtagged text into the text entry field at the top of the screen.
- **Edit notes**: Users can click on a note to edit its contents and categories. Users can add or delete categories simply by typing or deleting hashtags.
- **Delete notes**: Users can delete notes by clearing the contents of a note while editing, or by clicking the "X" that appears in the upper right-hand corner of the note on mouse hover.
- **View all notes**: Pinned notes appear at the top of the list, followed by all notes listed in order of creation date (newest to oldest).
- **View notes by category**: Users can click all hashtags in a note, as well as click all hashtags on the sidebar, to view all notes associated with that hashtag's category. If a user tries to create a new note while viewing a certain category of notes, the note field will visibly contain a "#[category]" at the beginning of the text field.
- **Pin notes**: Users can pin a note so that it persistently appears at the top of the list of notes. More-recently-pinned notes will appear closer to the top than less-recently-pinned notes.

Security concerns

Users must be able to view and edit only the notes associated with their own account. People are only able to access the main part of the website after logging in; anyone not logged in is redirected to the login splash page.

Password exposure

Password fields (rather than text fields) are used on login and signup forms to minimize the chance that users expose their password to others. On the databases, passwords are not stored in plaintext but rather in its hashed form, so that accidental database exposure does not put user passwords at risk.

Authorization & Fake HTTP Requests

The app will use the Cancan gem for authorization. Since any requests associated with viewing, creating, editing, and deleting notes will be asynchronous, the application will verify two things before fulfilling the request:

1. that the request was indeed asynchronous (`request.xhr?`)

2. that the user ID stored in the session's cookies matches the user ID in the request URL (through Cancan's `load_and_authorize_resource` call in controllers

This prevents users of malicious intent from attempting to tamper with other users' notes through methods like visiting the URL "http://myapp.com/deletenote?user=3&note=all". Rails' built-in cross-site request forgery protection will also prevent attackers from sending fake asynchronous requests from other websites.

SQL & Javascript Injection

Attackers may attempt to include SQL and Javascript code in any text field on the website. To prevent these injection attacks, the app will sanitize all inputs before processing them.

Packet sniffing

Attackers may attempt to collect users' login details or cookies via packet sniffing. To prevent this, the app will use SSL for requests (HTTPS).

User Interface

Please refer to the wireframes at the end of the document.

Challenges

Design challenges

1) How should the notes be visually represented?

Option 1: The notes look like traditional rectangular Post-it notes.

Using this metaphor would help users understand the intention of the app (i.e., "use this app as you would use sticky notes"). However, depending on the note size, this may not be the most efficient way for users to view their notes. Users typing in long paragraphs may also have difficulty reading over their words if the notes are too narrow.

> ***Option 1A: They are resizable to any size and dimension.***
>
> This would give users greater flexibility and control over the amount of content they want to put in each note, but it may be more difficult to display the notes in an easy-to-scan layout if the notes are all of different sizes.
>
> ***Option 1B: They are of fixed size.***
>
> This option can help ensure that notes can stay organized with less effort on the part of the user. A series of fixed-size post-its also introduces the possibility of a grid layout, which allows for efficient presentation and reading. However, users

may want to write notes longer than what the note dimensions allow.

Option 1C: Users have a few fixed-size options to choose from (e.g., 200x200 pixels, 400x200 pixels, and 400x400 pixels).
Giving users several options that work well together in a grid can be a solution to the content space vs. reading efficiency issue.

Option 2: The notes look more like strips of paper (i.e., lines of text in a text editor).
This option can be space-efficient and scannable, and works best when the user types long sentences and few line breaks. However, should a user attempt to type many short lines, this presentation may be less efficient than the Post-it rectangle solution.

Decision
Ultimately, I chose Option 2 because it has the best readability and space efficiency and is most likely to *guarantee* a good user experience because it is a more familiar pattern. Option 1C is also very attractive, but because it is not a commonly-used pattern, ironing out the kinks (e.g., dealing with resizing during editing notes) to create a satisfactory user experience may take longer than my time budget allows.

2) Should notes be rearrangeable in the default view? (They can still have the option of viewing by creation date and by other metrics.)

Option 1: Yes. The notes will have an associated rank that indicates what order to display the notes in. A note's rank will default value based on its creation date, and can be changed with drag-and-drop.
This would mirror the stick-anywhere quality of physical Post-its. However, if a user drags an old note *N* to the top (intending it to be permanently displayed at the top of the note list), new notes would still appear at the top of the list, pushing down note *N*. Additionally, moving a note from the bottom of the list to the top, or vice-versa, would be an unpleasant experience in long lists of, say, 300 notes.

Option 2: No. The default view for notes will be by creation date (newest to oldest).
Though this gives the user fewer options in customizing their note organization, we can compensate by encouraging users to use tag their notes extensively. However, the tagging approach may be incompatible with some users' workflows, and it will be difficult to keep important notes persistently visible.

Option 3: Yes and no. Certain notes can be pinned to the top of the list, but unpinned notes will be displayed by creation date (newest to oldest).
This allows users some degrees of freedom in customizing their note display and echoes

the “moveability” of real Post-its. When pinning or unpinning an old note in a long list, users may be confused by the “disappearance” of the note from the view. Power-user types may also be disappointed with the lack of options that pinning provides.

Decision
I chose Option 3 because it provides user-specified ordering features while still maintaining a simple and streamlined user experience. Adding “pinning tiers” or more user options would most likely create a confusing or cluttered experience that provides too many unused features.

3) Can users create a new note while viewing only the notes that belong to a certain category?

Option 1: Yes.
Users are very likely to want to create new notes while viewing a category’s notes. However, if those new notes do not belong to the category being viewed, they will not show up on the screen, which can be very confusing for the user.

> ***Option 1A: The new note will automatically be assigned to the category that the user is viewing.***
> This circumvents the problem of disappearing notes, but creates a new problem: if a user did not want the new note to be assigned to that category, it will appear in that category anyway!
>
> ***Option 1B: The new-note entry text box will not enforce any sort of default action. (It will act as it does in the all-notes view.)***
> Though this gives users the freedom to specify whether or not the note will belong in that category, it may be confusing when new notes don’t show up on the screen.
>
> ***Option 1C: The new-note entry text box will contain “#[category]” by default. Users can delete it if they don’t want the new note to appear in that category.***
> This reminds users that they are in a category-specific view, and it takes little extra effort on the part of the user to specify that they do *not* want notes to be assigned to that category. It lets the user be more conscious of and explicit in expressing that they do not want the default category assigning to occur. However, if a user accidentally deletes the “#[category]” while writing the note, they may be confused when the note doesn’t show up on the category view.

Option 2: No. Do not display the new-note entry text box when the user is viewing a category’s notes. (Users can only create new notes from the all-notes view.)

This is the easiest solution to the disappearing-note problem. However, it is very likely that users will want to create new notes from a category view. Not supporting this action is highly undesirable.

Decision

I chose Option 1C. By letting users opt out of a default, this is the best way to ensure that users are conscious of the category assignment, which minimizes surprise.