CSE183 Summer 2021 - Assignment 8

In this assignment you create Diligent, a Slack style messaging system, as a Single Page Full Stack Web App using the NERP Stack: Node.js, Express, React, and PostgreSQL, plus Material-UI.

This assignment is worth 20% of your final grade.

Submissions are due NO LATER than 23:59, Thursday July 22, 2021

Late submissions will not be graded.

Installation

See instructions in Assignment 2 and ensure you are running the current LTS version of Node.js. You will also need to have downloaded and installed Docker Desktop: https://www.docker.com/products/docker-desktop.

Setup

Download the starter code archive from Canvas and expand into an empty folder. I recommend, if you have not already done so, creating a folder for the class and individual folders beneath that for each assignment.

The starter code archive contains some files that you will modify:

```
backend/api/openapi.yaml
backend/src/app.js
backend/sql/data.sql
backend/sql/schema.sql
backend/sql/indexes.sql

frontend/public/src/App.js
```

And some that you should ***not*** modify:

```
package.json

backend/.env
backend/.eslintrc.js
backend/docker-compose.yml
backend/package.json
backend/src/server.js
backend/src/dummy.js
backend/sql/database.sql

frontend/.eslintrc.js
frontend/package.json
frontend/public/index.html
frontend/public/favicon.ico
frontend/src/index.js
```

To setup the development environment, ***navigate to the folder where you extracted the starter code*** and run the following command in this folder and the `frontend` and `backend` sub-folders:

```
$ npm install
```

This will take some time to execute as `npm` downloads and installs all the packages required to build the assignment.

To start database Docker container, in the `backend` folder run:

```
$ docker-compose up -d
```

The first time this runs it will take a while to download and install the backend Docker PostgreSQL image and start the database service for your server to run against.

To start the frontend and backend dev servers, run the following command:

```
$ npm start
```

The frontend and backend servers can be run individually from their respective folders by running `npm start` in separate console / terminal windows.

To run the linter against your backend code, run the following command in the `backend` folder:

```
$ npm run lint
```

To stop the database, in the `backend` folder run:

```
$ docker-compose down
```

Web App Specification

This system must be a Single Page Web Application using the following technologies.

Browser:	React & Material-UI
Server:	Node.js & Express
Storage Tier:	PostgreSQL

The server must present an OpenAPI constrained API to the SPA running in the browser and the server must store its information in a PostgreSQL database.

Do NOT have the user interface simply download the contents of the database at startup and run all subsequent operations from an in-browser-memory cache. Submissions taking this approach will be severely marked down.

A “mobile first” approach should be taken; the principal operations being:

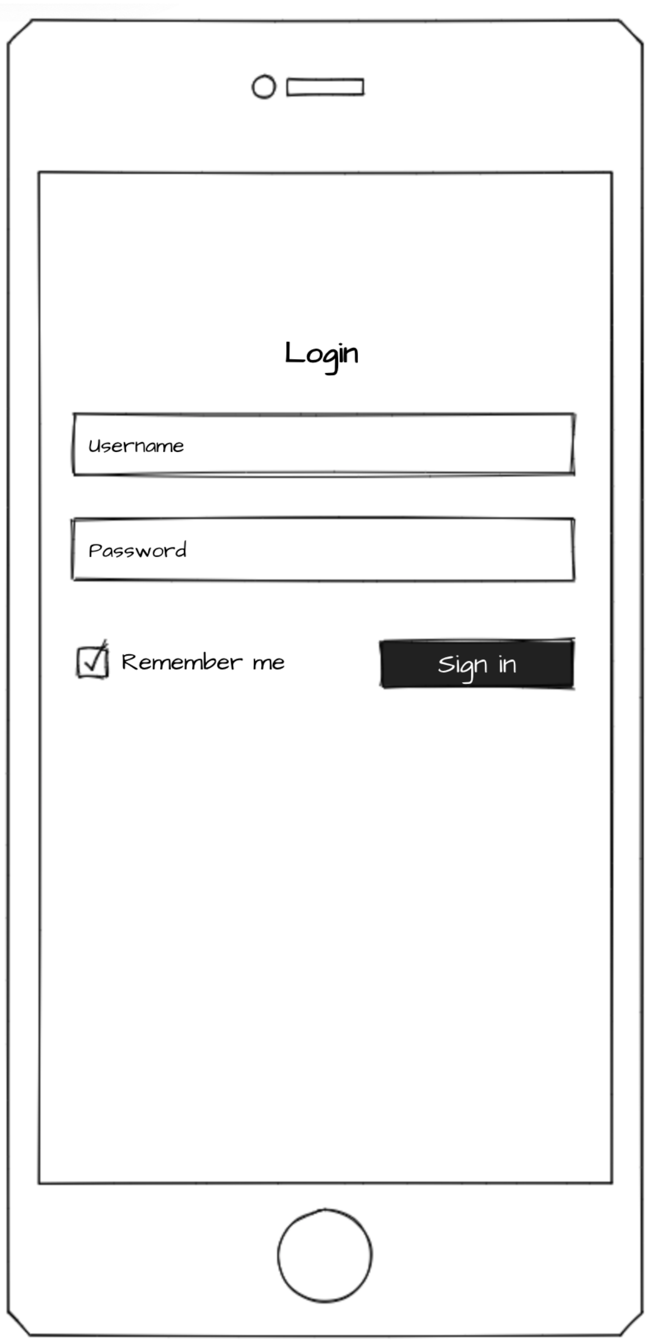
- Login Screen
- Workspace Selection
- Message List
- Channel Selection
- Direct Message Selection
- New Messages
- Threaded Replies
- Reactions
- Search
- User Properties

For the desktop version, the principal operations are as for mobile, but settings should be a drop down dialog rather than full screen.

Each is examined in detail on the following pages but if you’re unsure how something should work, use the Slack Web App and see how it does it.

Login Screen

The concept of a user is important when designing your Web Application. The logged in user should only be able to see their own direct messages. Use The Authenticated Books Example as a guide.



Mobile: Channel & Direct Message Selections (The ‘Home” Page)

Most Recently Selected Workspace

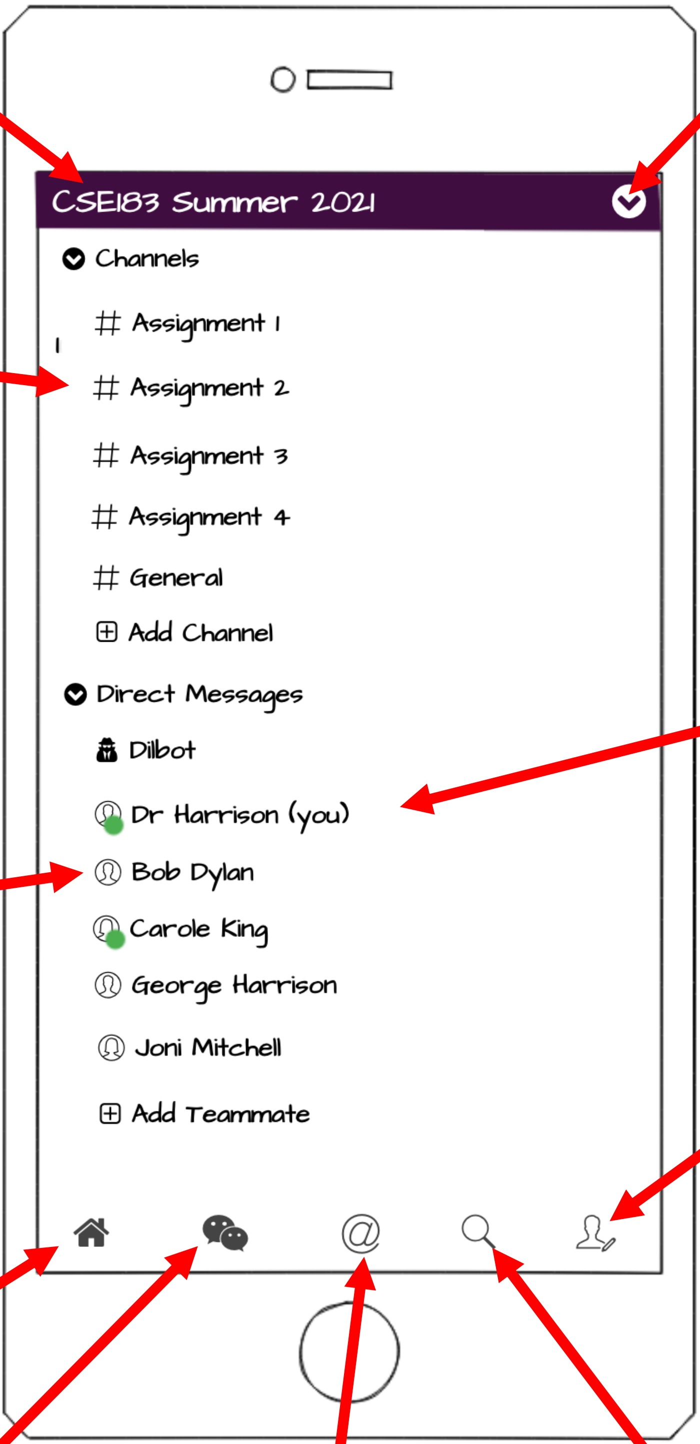
Shows Drop-down-list of workspaces

Selecting a channel shows the message viewer for that channel

A ‘green dot’ on a user shows that user is logged in — unless they set their status to “away”

Selecting user shows the message viewer for direct message front that user to the current user

Shows the user profile screen



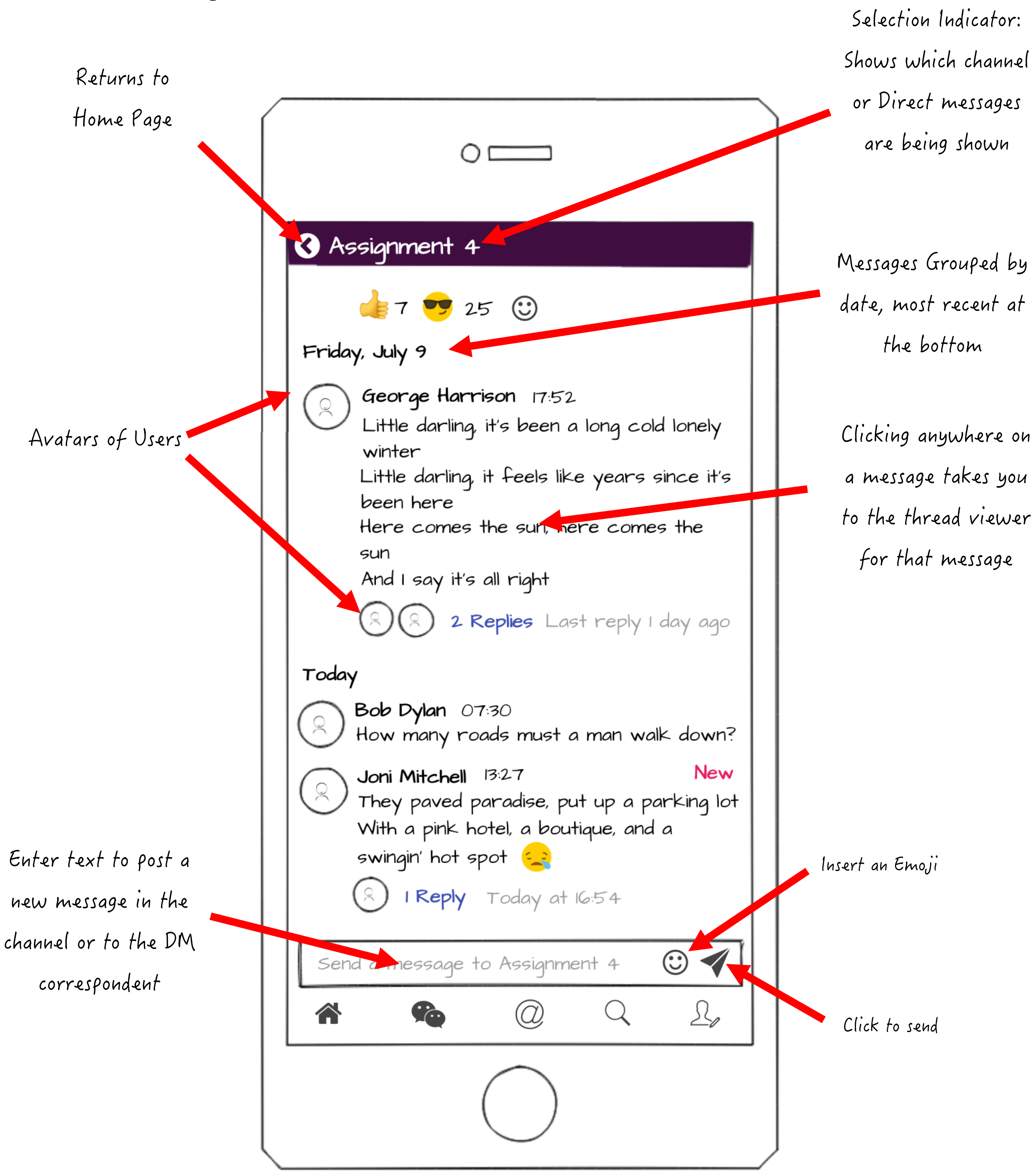
Brings user back to this screen

Shows all direct messages for this user

Shows all messages where the current suer was mentioned with @user-name

Pops up an entry field to enter a search term to filter the message list

Mobile: Message Viewer


Returns to Home Page
Selection Indicator: Shows which channel or Direct messages are being shown
Messages Grouped by date, most recent at the bottom
Avatars of Users
Clicking anywhere on a message takes you to the thread viewer for that message
Enter text to post a new message in the channel or to the DM correspondent
Insert an Emoji
Click to send
Assignment 4
7
25
Friday, July 9
George Harrison 17:52
2 Replies Last reply 1 day ago
Today
Bob Dylan 07:30
Joni Mitchell 13:27
New
1 Reply Today at 16:54
Send a message to Assignment 4

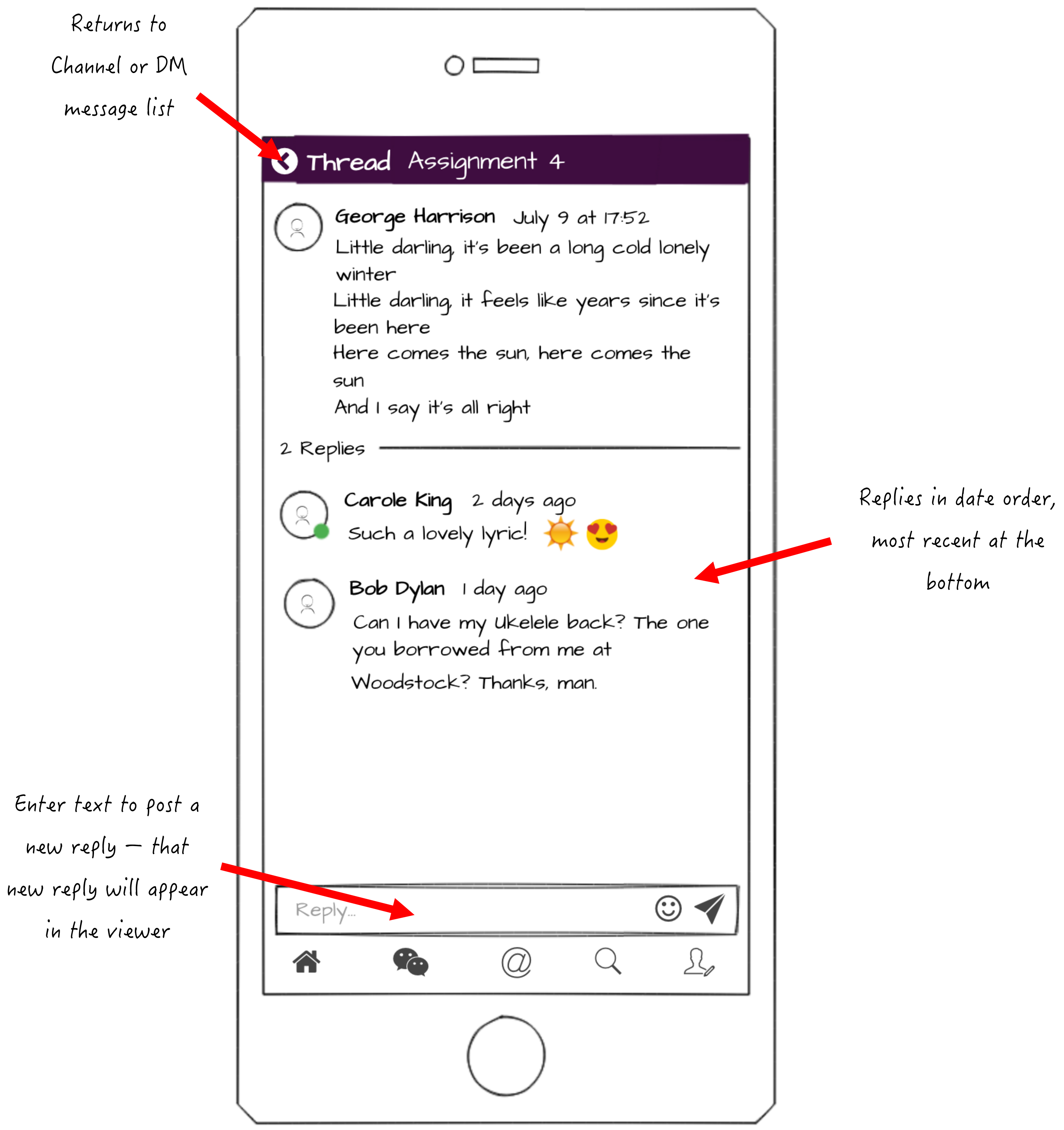
Little darling, it's been a long cold lonely winter
Little darling, it feels like years since it's been here
Here comes the sun, here comes the sun
And I say it's all right

How many roads must a man walk down?

They paved paradise, put up a parking lot
With a pink hotel, a boutique, and a swingin' hot spot 😢

Bottom buttons work the same way everywhere!

Mobile: Thread Viewer



Returns to Channel or DM message list

Replies in date order, most recent at the bottom

Enter text to post a new reply — that new reply will appear in the viewer

Thread Assignment 4

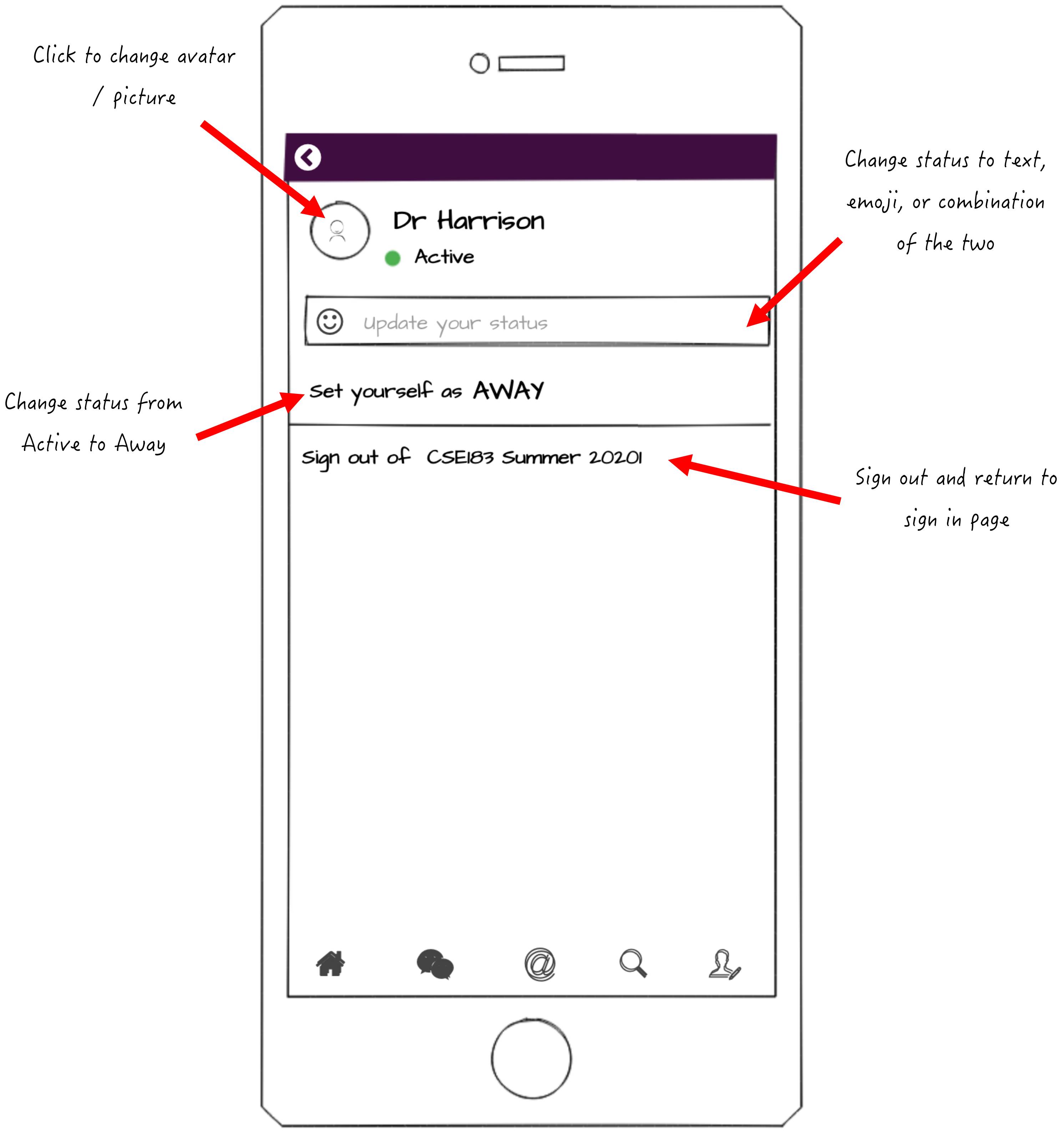
George Harrison July 9 at 17:52
Little darling, it's been a long cold lonely winter
Little darling, it feels like years since it's been here
Here comes the sun, here comes the sun
And I say it's all right

2 Replies

Carole King 2 days ago
Such a lovely lyric! ☀️ 😍

Bob Dylan 1 day ago
Can I have my ukelele back? The one you borrowed from me at Woodstock? Thanks, man.

Mobile: Settings


Click to change avatar / picture
Change status to text, emoji, or combination of the two
Dr Harrison
Active
Update your status
Set yourself as AWAY
Change status from Active to Away
Sign out of CSE183 Summer 20201
Sign out and return to sign in page

Desktop: Wide View

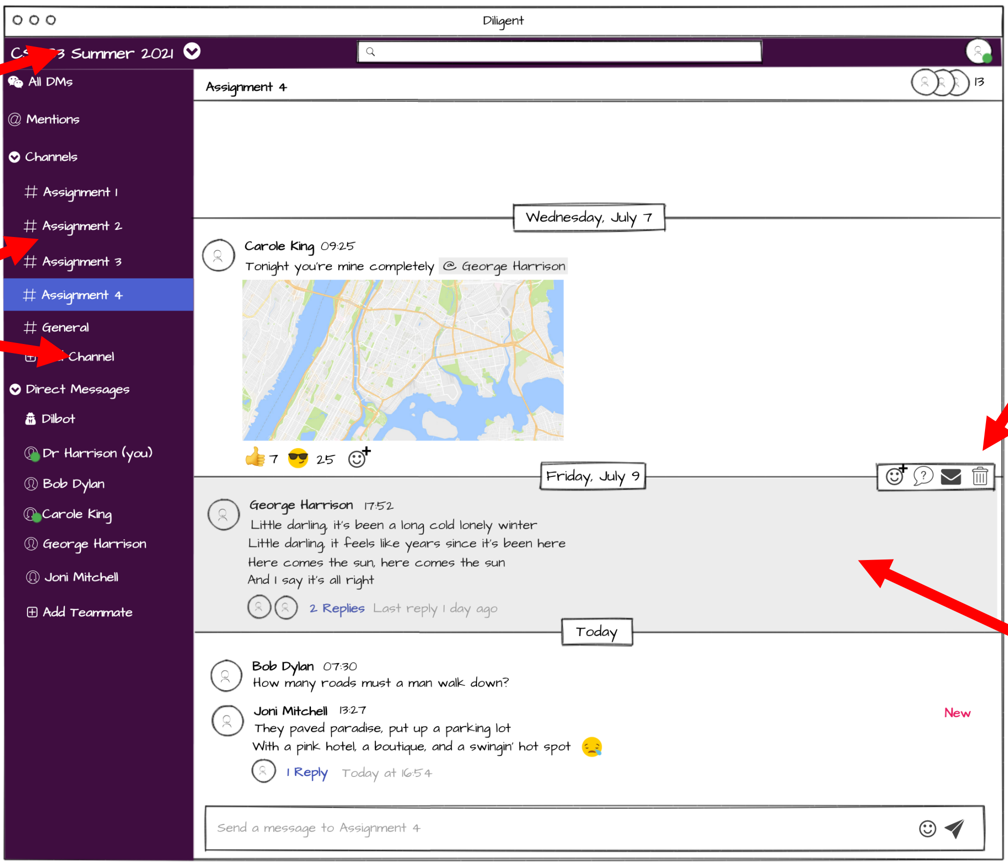
Select Workspace

Select:

* All DMS

* Mentions

* User for DMs



Diligent

CSE183 Summer 2021

All DMs

Mentions

Channels

# Assignment 1

# Assignment 2

# Assignment 3

# Assignment 4

# General

Add Channel

Direct Messages

Dilbot

Dr Harrison (you)

Bob Dylan

Carole King

George Harrison

Joni Mitchell

Add Teammate

Assignment 4 13

Wednesday, July 7

Carole King 09:25
Tonight you're mine completely @ George Harrison

👍 7 😎 25

Friday, July 9

George Harrison 17:52
Little darling, it's been a long cold lonely winter
Little darling, it feels like years since it's been here
Here comes the sun, here comes the sun
And I say it's all right

2 Replies Last reply 1 day ago

Today

Bob Dylan 07:30
How many roads must a man walk down?

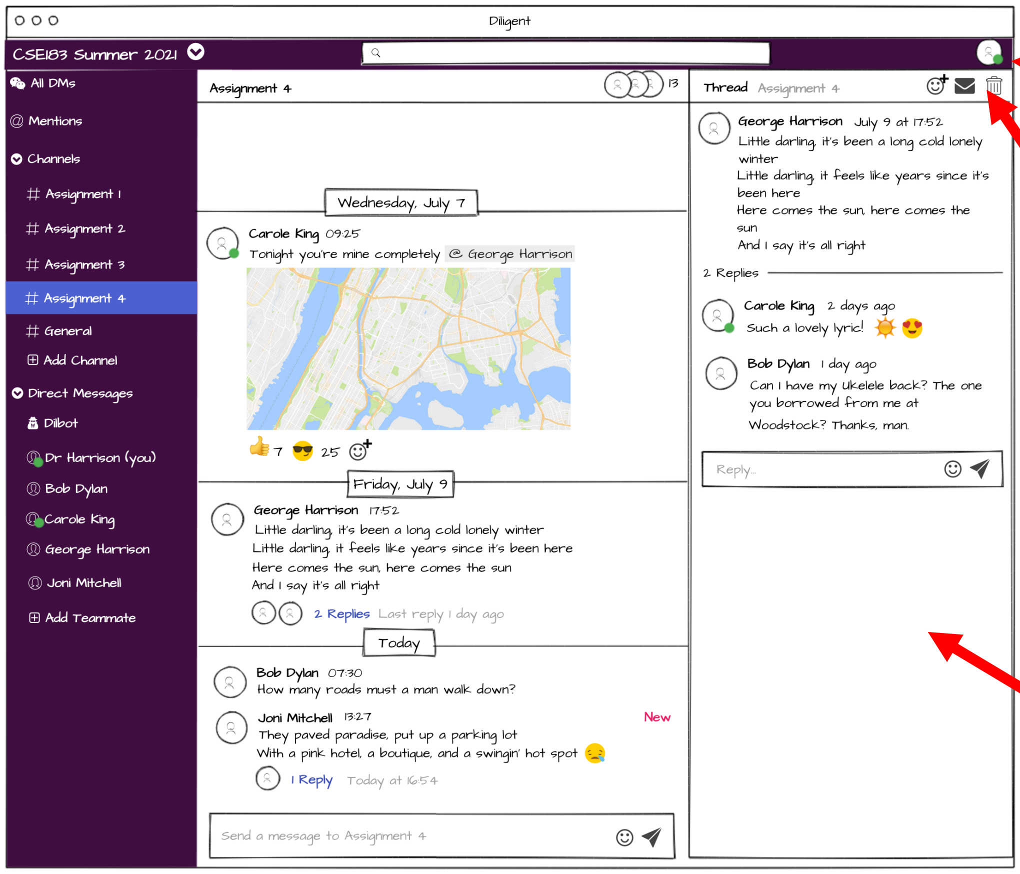
Joni Mitchell 13:27 New
They paved paradise, put up a parking lot
With a pink hotel, a boutique, and a swingin' hot spot 😓

1 Reply Today at 16:54

Send a message to Assignment 4

Show "response / reply / mark unread / delete" meu when mouse hovers over message

Highlight message when mouse hovers over it



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CSE183 Summer 2021

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Thread Assignment 4

George Harrison July 9 at 17:52
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Reply...

Show settings as a drop down

"response / mark unread / delete" menu

Show reply pane when message clicked

Desktop: Narrow View & Navigation Popup

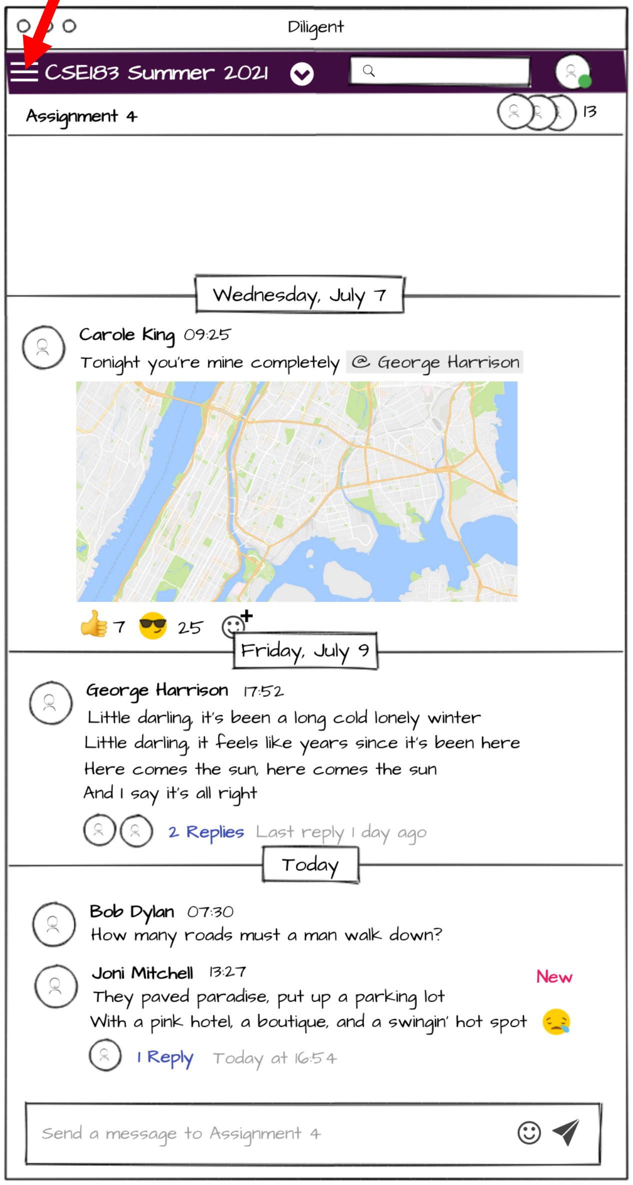
When very narrow, starts to work like mobile version

When a little narrow...

Selection pane is hidden and menu appears

Clicking menu shows selection pane

Clicking on message list or selecting a channel/user hides selection poane



Diligent

CSE183 Summer 2021

Assignment 4 13

Wednesday, July 7

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👍 7 😎 25

Friday, July 9

George Harrison 17:52
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2 Replies Last reply 1 day ago

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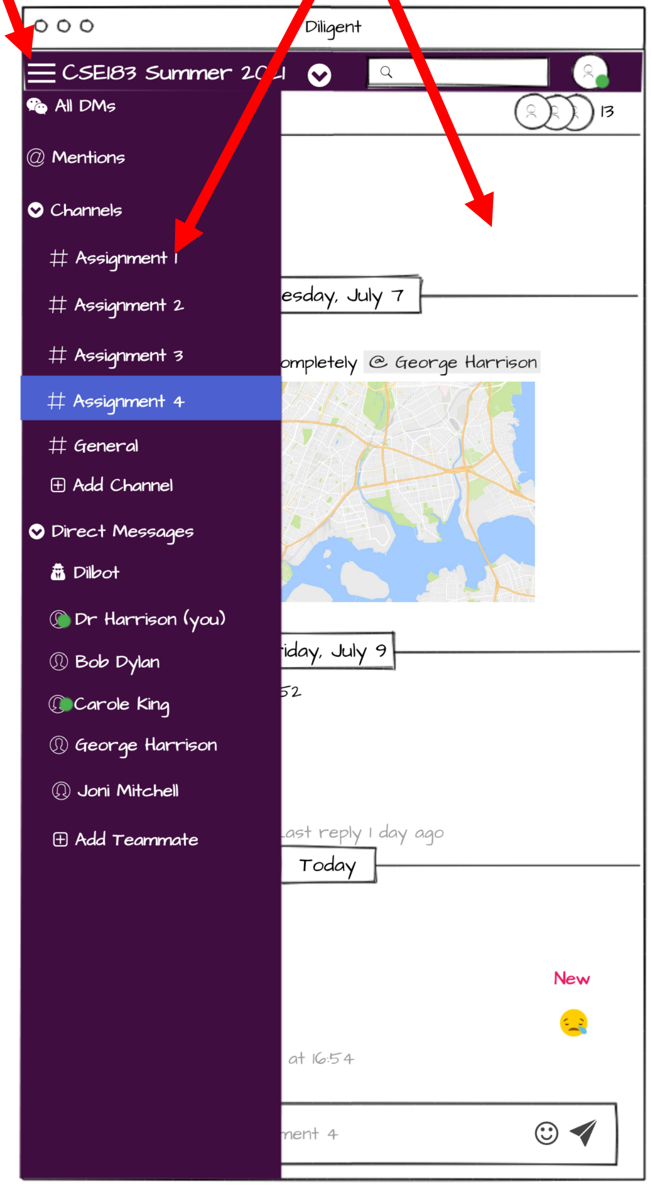
1 Reply Today at 16:54

Send a message to Assignment 4



Diligent

CSE183 Summer 2021

All DMs
Mentions
Channels
# Assignment 1
# Assignment 2
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# General
Add Channel
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Dilbot
Dr Harrison (you)
Bob Dylan
Carole King
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Add Teammate

Development Guidelines

Whilst you can construct the user interface any way you like, this finished front end must be a Single Page Application; React Routes may prove useful for the mail reading and composition pages.

Background

Messages in this system can have any properties you deem necessary to complete the assignment.

Note that your API must be constrained by an OpenAPI version 3.0.3 schema. You should endeavor to make this schema as restrictive as possible.

For example, your schema should specify the acceptable format of the e-mail id property. If an id in any other form is presented, your system should reject it simply by performing the validation provided in the starter code.

When you start the backend, use a browser to visit http://localhost:3010/v0/api-docs/ where you can manually test the API as demonstrated in class.

Initially, the only operation available will be:

Which if executed will return the current data and time and the date and time the backend database was initialised.

Database Schema

The supplied database schema can be found in `backend/sql/schema.sql`. It defines a single table '`dummy`'. You will want to define the tables you need in this file.

Optionally, you can also define indexes to be built against your tables in: `backend/sql/indexes.sql`

Resetting Docker

If you run into problems with your dev database, or simply want to re-set it to its initial state, issue the following commands (you will need to be in PowerShell on Windows):

```
$ docker stop $(docker ps -aq)
$ docker rm $(docker ps -aq)
```

What steps should I take to tackle this?

You should base your implementation on your solutions for Assignments 5 and 7 plus the Books Database Example and the Authenticate Books Example.

There is a huge amount of information available on OpenAPI 3.0.3 at https://swagger.io/specification/ and http://spec.openapis.org/oas/v3.0.3. Also consult the Petstore example at https://petstore3.swagger.io/ and make good use of the on-line schema validator at https://editor.swagger.io/.

A good resource for querying JSON stored in PostgreSQL: https://www.postgresqltutorial.com/postgresql-json/

Many Material-UI Examples and sandboxes for experimentation are available: https://material-ui.com/

A plausible development schedule

There are any number of ways of approaching this task, but items that need consideration in approximately the order they need considering are:

- Decide on your data entities
  - For example (not an exhaustive list)
    - User
      - Name
      - Password hash
      - Current workspace
      - Status
    - Workspace
      - Name
      - Users with access
    - Channel
      - Name
      - Users with access
    - Message
      - User who created it
      - Creation date & time
      - Content
      - Replies
      - Reactions

- Decide on the end points for you API
  - Start with login so user interface work can start
  - Then provide a list of Workspaces
  - Then a list of users
  - Then a list of messages in a Workspace
  - Then a list of direct messages from a user
  - Etc.

- Create UI Components
  - Login
  - Selection bar (where you choose channels / DMs)
  - Message list
  - Replies panel
  - Etc.

Remember, this is only a guideline. You can develop in any sequence you like but do work together as a team. Keep in touch with each other and have a Zoom call at least once a day, preferably two or three times.

How much code will we need to write?

This is a difficult question to answer, but not including your OpenAPI Schema, something in the order of 1000 to 2000 lines of JavaScript might be a reasonable estimate.

Source code repository

You must create a private GitLab repository for this assignment. Make both members of the team contributors and invite dcharris@ucsc to join the project.

Your repository will be checked for relative contributions so both members of the team must commit changes frequently with a roughly even distribution of work.

Grading scheme

The following aspects will be assessed:

1. (40%) **Basic Requirements**

    a. All data is stored in PostgreSQL
    b. Server exposes an authenticated OpenAPI restricted RESTful interface
    c. Users can not see any messages without logging in
    d. Users only see channels they are subscribe to
    e. Users only see messages in channels they are subscribed to
    f. Users only see direct messages sent to them
    g. Users can create new messages
    h. Users can respond to direct messages
    i. Users can reply to messages in channels they are subscribed to
    j. Users can give feedback on messages in channels they are subscribed to

2. (30%) **Advanced Requirement**

    a. User Interface is a close approximation to the Slack look and feel with specific requirements as listed above.
    b. Users can search for messages by content.

3. (20%) **Stretch Requirement**

    a. Emojis can be inserted in messages and used as responses to messages
    b. Messages can contain images
    c. Users have avatars they can choose themselves
    d. Users can set their status manually and other users can see it

4. (10%) **Extreme Requirement**

    a. A message entered on one device / browser will show up on another without the user having to refresh the page.

5. (-100%) **Did you give credit where credit is due?**

    a. Your submission is found to contain code segments copied from on-line resources and you failed to give clear and unambiguous credit to the original author(s) in your source code (-100%). You will also be subject to the university academic misconduct procedure as stated in the class academic integrity policy.

    b. Your submission is determined to be a copy of a past or present student's submission (-100%)

    c. Your submission is found to contain code segments copied from on-line resources that you did give a clear an unambiguous credit to in your source code, but the copied code constitutes too significant a percentage of your submission:

○ < 35% copied code	No deduction
○ 35% to 50% copied code	(-50%)
○ > 50% copied code	(-100%)

Note that code distributed in class does not count against the copied total but must be cited.

Additional Requirement

You are also required to make a short YouTube video of your Web App demonstrating the features you have successfully implemented.

- Create it under your UCSC CruzID Account - all members of your team should upload it
- Make it “unlisted” - only those with the link can see it
- No more than five minutes
- Demonstrate all the features you successfully implemented
- Screen capture from your laptop is fine
- Keep it simple - no marks for fancy effects and/or editing

What to submit

Run the following command to create the submission archive:

```
$ npm run zip
```

You must also paste a link to your YouTube video into the canvas submission – more details to follow.

****** UPLOAD** `Assignment8.Submission.zip` **TO THE CANVAS ASSIGNMENT AND SUBMIT ******