Changes Made

Suggested changes 1: sizing of map
Change 1: We realigned our map with the navbar of the page with the same padding on the left. We also resized the map according to screen size and less rectangular. We purposefully leave the right-side margin blank. Taking a look at our designed wireframes, we planned to save the right-side margin for later implementation of the Filter functionality given it has a direct effect on the map. This way everything is visible to the users when they open up the webpage.

Suggested changes 2: all pins should be visible for search
Change 2: We researched on possible implementation (i.e. "fitBound" feature of leaflet) and made an initial attempt to accomplish the desired effect. Unfortunately, we have not yet accomplished the desired effect, after implementing the fitBound function, the map will not zoom and stay static since the fitBound function override the zoom effect and left the map static. For this submission, we left out the fitBound function, since it did not give us the desired effect.
However, as we focused on implementing most of the general concepts and their functionality this time, we haven't come up with a refined solution to this feature yet. We will make sure to include it in our full project.

Suggested changes 3: not able to search for businesses that do not match exactly
Change 3: we added partial search to the search function, so it now searches for businesses that contain the input of the search bar as a substring. To avoid too many matches and run out of resources, we would only show a max of 10 matches. We also added ignoring cases.

Suggested changes 4: unable to test registration
Change 4: we added full authorization of user and business registration and disabled empty username and password. Now, users and businesses can test registration by signing into the account they just created. The status of the website is also shown at the top right corner for people to check whether the login is successful.

Suggested changes 5: no meaningful message for when search fails
Change 5: we added error messages to search, such as for searching empty input.

Suggested changes 6: no meaningful message for any signup error
Change 6: we added error messages to account creation, such as empty input and information of business does not match the government database. There might be more places where messages are needed but for the time given, we haven't got to every detail yet. We will make sure to polish these for the full design.

Suggested changes 7: API design using wrong CRUD
Change 7: we reviewed all API calls and fixed them, and also designed new API calls that we implemented for MVP more carefully. One issue that we failed to fix, is for some of the get requests, they return a 304 error which we have not yet figured out what caused the error. For now, we changed the get request to post just so that the deploy app work for this submission.

Nielsen's Usability Heuristics

1. Visibility of system status

- Users can alway tell the current system status looking at the top right hand corner
- If not sign in, there will be (Business SignIn/ Customer Signin) Options
- If sign in, the sign in options will change to their current signin username

2. Match between system and the real world

- All buttons are label with familiar terminology, guiding the users to navigate through the apps, no internal jargons

3. User control and freedom

- For example, on the business homepage
  - Business owners have the freedom to modify the information on the page.
  - They can edit, save what they write or undo their action by cancelling
  - A clear signout button on the top right for sign in users
- For Map
  - Clear button for the search function

4. Consistency and standards

- Sign in page for business and customer looks near identical except business has an extra input of business name and address
- Consistency on button names throughout
  - Edit
  - Save
  - Cancel
- Top left always navigate to the map
- Top right always map to person info
  - Busi-> Business Homepage
  - Customer-> customer profile page

5. Error prevention

- Signin/Signup page
  - Prevent empty inputs
- Map Search
  - Prevent empty inputs
- User
  - Rating and Review- require both
  - Business reply - prevent empty input

- Changes not visible, message in green will indicate a success action
- Error message in red to indicate failure

6. Recognition rather than recall

- Customer Profile page
  - Menu is provided to shift from different view
  - Text on tab indicate which is which
    - View reviews/rating
    - Check if business replied
- Everything is labeled, users will know what page they're on
  - Business homepage
    - Name
    - Address
    - All edits are reactive, instant update on the page
      - Description/Category
      - Hour of operation/Covid Info
      - Rating/Review
      - Replies
  - User username on top right, know who's signin

7. Flexibility and efficiency of use

- Currently, our app does not have any shortcuts for expert users, because we want to make the app fair to everyone. To add shortcuts for expert users, maybe we can allow users to follow businesses, so then when we want to look up this business later, they can directly go into their user homepage and find this business, and would not need to search for this business on the map again.

8. Aesthetic and minimalist design

- Minimalist design, every function is displayed within the page, no need to navigate to multiple pages. The following is the three main navigation page.
  - Map->Homepage
  - BusinessHomepage/Customer Profile Page
  - Signin/Signout Page

9. Help users recognize, diagnose, and recover from errors

- Error message in red and clearly indicate what caused the error which allows the user to recover from it.

10. Help and documentation

- There are placeholders on empty input box giving user instruction on format or what input is it for

Additional Significant Design Decisions

Partial Search

We decided to add a partial search in the search function which allowed users to search for businesses that contain the input. This allows the user to search for more businesses other than the ones with the exact name. However, there are still some limitations. Our current design fails to consider cases such as potential spelling mistakes. With the limit that we placed on the pin number, a user might not find the desired businesses on the map.

Alternative Design: Previously, we have considered only display pins on businesses that have the exact same name as the input. We came to realize that it's not ideal, especially because our original design was also case sensitive. It's unlikely that the user will know the spelling and capital cases of the name of a business, therefore we rejected the design and changed it to the current partial search.

Username SignIn for Business

We decided to add a username feature to the business account. This way, business owners can now sign in by a unique username that they choose in the sign up process. Doing so, we maintain the consistency between customer and business owners, so both can be signed in with simple username and password. Also, in the case if a business owner signs up a customer account, he/she can maintain the consistency of using the same username and password(if not already taken).

Alternative Design: An alternative design we have considered previously was instead of username, business account will sign in using their business name and address along with a unique password. We later rejected this design because the name and the address can be really long and easy to make mistakes in the spelling which can cause many confusion. Plus, the name and the address are all public information which increases risk on account safety.

View All Reviews vs. View All Replies -- Both Chronically

We decided to add a view review and all replies for the customer in their profile page. This way, the customers can view a list of their reviews on restaurants and can check if any restaurants have replied to their reviews. Doing so, the customers can have an update or refresh their memory on business they have visited to see how their experience was. Viewing the replies also allows the customers to see if the business has acted upon their review if the review indicates a suggestion or if businesses answer their questions. A limitation on

this is that a customer might have a hard time differentiating between the business if the business shares the same name.

Alternative Design: We previously did not implement a view rating/review and view reply function for the customer side. The rating/reviews and replies are displayed on the business homepage. We thought it would be inconvenient and hard to remember for the users to return to a specific business page and check for their past rating/review and business reply. Therefore, we rejected this design and implemented it in the customer profile page for quick access.

Allow customized COVID-related features

We decided to give business owners the highest level of flexibility in changing any information on their business home page and adding any additional information they would like to add. The situation of COVID-19 is still fast changing, and people are learning more about it as time goes on, which means that businesses are likely to be changing how they are operating. Therefore, we decided to make the business homepage as flexible as possible, so that business owners can accurately change the information on the page to reflect on the way they are operating.

Alternate considered: Not allow personal input on the business homepage, and only allow some basic information to be changed. No matter how many categories we predesign on the business homepage, it would never be possible to cover all the different ways of operation and all the information that all the business owners would like to include on the homepage, which is the reason why we decided to allow personal input.

One Additional Design Decision - Ethics

Design question 4: whether to allow business accounts to review other businesses?

Possible Choice	Value Promoted?	Values Demoted?
Allow business accounts to review other businesses	Outcome lens: this can be better for businesses that are willing to give feedback or help to other businesses, because they can leave it as reviews.	Process lens: this would make the process of businesses viewing other businesses' homepages harder, because there would be more buttons available on the homepage Structure lens: This put chain businesses at an advantage, because they can give really positive reviews to each other and make them look better.
Not allow business accounts to review other businesses	Process lens: this keeps the business homepage cleaner, because there would be no review buttons that are distracting	Outcome lens: this may make it worse off for businesses that do not have many reviews, since we disabled some potential reviewers from

	Structure lens: this makes it fair for all businesses, because all the reviews they got would be from their customers and depends on how well they operate, and would not be affected by how many chain businesses they have	posting reviews.

4. whether to allow business accounts to review other businesses?
Choice: not allow business accounts to review other businesses
- this makes it fair for all businesses, because all the reviews they got would be from their customers and depends on how well they operate, and would not be affected by how many chain businesses they have
- this keeps the business homepage cleaner, because there would be no review buttons that are distracting
- Even though this may make it worse off for businesses that do not have many reviews, since we disabled some potential reviewers from posting reviews, we think that these businesses would eventually have more reviews, after more customers visit them, and this is not important enough to offset the fairness problem this decision has

Changes made to the original protocol: None
- Design question 1: show filter results as dots on the interactive map
    - We have not implemented this yet, since this is planned for the Finished Product. We do not plan to change it at this point though.
- Design question 2: Ask business account creator to enter the name and location of the business, and allow creation if the information entered match our record in the database
    - This is how business account creation is implemented
- Design question 3: do not allow users to edit ratings and comments
    - This is how it is implemented now