CS3354 Software Engineering
Final Project Deliverable 2

Group 5
FunStop

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Wasif Siddiqui

1. [5 POINTS] Delegation of tasks:
Annie Paul: 4.1, 4.2/ Project Timeline in Presentation

Annie has been tasked with working on the estimation of our project schedule. This includes the start and end dates, as well as justifications for each estimate. She is also covering the project timeline in our presentation.

April James: Comparison/ Functional Requirements in Presentation

April has been tasked with comparisons to similar designs, something she will be working on with Kishan as well. She will also be covering the functional requirements in our presentation.

Ifrit Maruf: 2, Diagrams in Presentation

Ifrit has been tasked with including everything from our previous deliverable in our new deliverable as well as going over our diagrams within our presentation.

Joseph Ray: **1**, **5**, check 8, **A brief introduction to topic in Presentation**

Joseph has been tasked with writing a well-written description of the tasks we have been tasked with as well as running the test code and test cases for our password validation function. He is also verifying the quality and correctness of the references cited throughout the project. He will be introducing the project/app in our presentation as well.

Kishan Brahmbhatt: 6, Comparison, Conclusion, Future Work In Presentation

Kishan has been tasked with comparisons to similar designs, something he will be working on with April as well. He will also be working on the comparisons and conclusion and future work sections of our presentation.

Lan Nguyen: 8, 9, User Interface Design, same in Presentation, upload to GitHub

Lan has been tasked with reviewing the changes-made section of our deliverable as well as checking quality and correctness on the cited source. He will be working on uploading everything to GitHub as well as doing the user interface design on the presentation.

Wasif Siddiqui: 4.3, 4.4, 4.5, video editing, Cost Estimation in Presentation

Wasif has been tasked with estimating the costs of hardware, software, and personnel for our project. He will also be doing our video editing and covering the cost estimates within our presentation.

2. [5 POINTS] Project Deliverable 1 content
Deliverable 1 includes:

> GitHub IDs:
> - okitobi → joseph

- was170001 → wasif
- ifritmaruf -> ifrit
- LungTheMan -> Lan the MAN
- annie-paul -> annie
- kishanbrahmbhatt -> kishan
- aajames20 -> April

FunStop Navigation Software
1. Routes
    1.1. Search routes
    1.2. Create routes
    1.3. Review routes
    1.4. Save routes
2. Route Organization
    2.1. Sort by set filter (shortest distance, most funstops, best rated)
3. View
    3.1. Show navigation with compass north
    3.2. Show navigation with car view
    3.3. Day mode / Night mode
4. Other
    4.1. Zoom in/out on the route to show more or less of surrounding area

REPORT:

- **Repository URL:** https://github.com/okitobi2/3354-FunStop
- **Group number:** 5
- **The title of your project:** Fun Stop
- **The group members:** Kishan Brahmbhatt, April James, Ifrit Maruf, Lan Nguyen, Annie Paul, Joseph Ray, Wasif Siddiqui
- **Feedback Addressed:**

Similar existing applications

Roadtrippers - Trip Planner
This app [1] is made for travelers who want to explore new places and find stops along the way. The user can add up to 7 waypoints, and then they need to upgrade to add more. It is also an iOS application.

Roadside America
This app [2] focuses on finding the strange, uncommon places along highways during road trips. Users can set a range and get a description of each attraction.

iExit
This app [3] focuses on finding attractions, rest areas, restaurants, and other places at upcoming exits. The user can also plan trips by selecting highways with this app

Google Maps

This is a very familiar app that allows users to get directions and get to their desired destination. An interesting feature is creating offline maps in case if the user is offline or does not have signal [4]. Google Maps is generally used for navigation rather than trip finding and attraction seeking.

These relevant applications were found with Techlicious [5] and Travel and Leisure [6] articles from the web.

Our app, FunStop, is different from existing similar applications since we have a unique set of features that no other single app has. This app allows user to not only navigate their trip with a built in GPS, it has a day and night mode for convenience, and has the ability to search, create, review, and save routes. The user can also sort by filters such as shortest distance, most unstops and best rated. These routes can be downloaded locally into the user's device to minimize data usage if they are away from cellular signal. Unlike the Roadtrippers app, in FunStop, the user can add as many stops as they need without needing to upgrade the app [1]. Unlike iExit, our app focuses on attractions anywhere, not specifically along highways and close to exists [3]. Our app is different from RoadSide America since FunStop has built in navigation along with attractions. Last but not least, Google Map's focus is on navigation [4] while our app is based on finding interesting stops along a road trip. FunStop also allows users to search from premade and popular routes and the past user's routes that they have saved, which is a feature that not many of the pre-existing apps have. This feature along with the others mentioned above makes FunStop unique.

References

[1] "Roadtrippers - Trip Planner," *App Store*, 24-Nov-2014. [Online]. Available: https://apps.apple.com/us/app/roadtrippers-trip-planner/id944060491. [Accessed: 16-Oct-2020].

[2] "Roadside America," *App Store*, 30-Dec-2009. [Online]. Available: https://apps.apple.com/us/app/roadside-america/id347393479. [Accessed: 16-Oct-2020].

[3] "iExit," *iExit Interstate Exit Guide | Your Roadtrip Pitstop Finder*. [Online]. Available: https://iexitapp.com/. [Accessed: 16-Oct-2020].

[4] S. Kantra, "16 Surprising Things You Can Do with Google Maps," *Techlicious*, 06-Feb-2020. [Online]. Available: https://www.techlicious.com/tip/surprising-things-you-can-do-with-google-maps/. [Accessed: 16-Oct-2020].

[5] S. Kantra, "Get These Apps Before Your Next Road Trip," *Techlicious*, 17-May-2019. [Online]. Available: https://www.techlicious.com/tip/the-best-road-trip-apps/. [Accessed: 16-Oct-2020].

[6] E. Rhodes, "The Best Road Trip Apps That Help You Find Cheap Gas, Avoid Traffic, and More," *Travel and Leisure*, 29-Jul-2020. [Online]. Available: https://www.travelandleisure.com/travel-tips/mobile-apps/road-trip-apps#:~:text=Roadtrippers is one of the, attractions, hotels, and more. [Accessed: 16-Oct-2020].

- **Which software process model is employed in your project and why**:

Prototyping, as this allows for long term development and evolution based on both stakeholder and user-feedback. This is a commonly used method as most apps undergo drastic changes as technology and society advance.

- **List of software requirements**:

Functional:
1. Allow users to create accounts/login
2. Allow user to create routes
3. Allow user to search routes
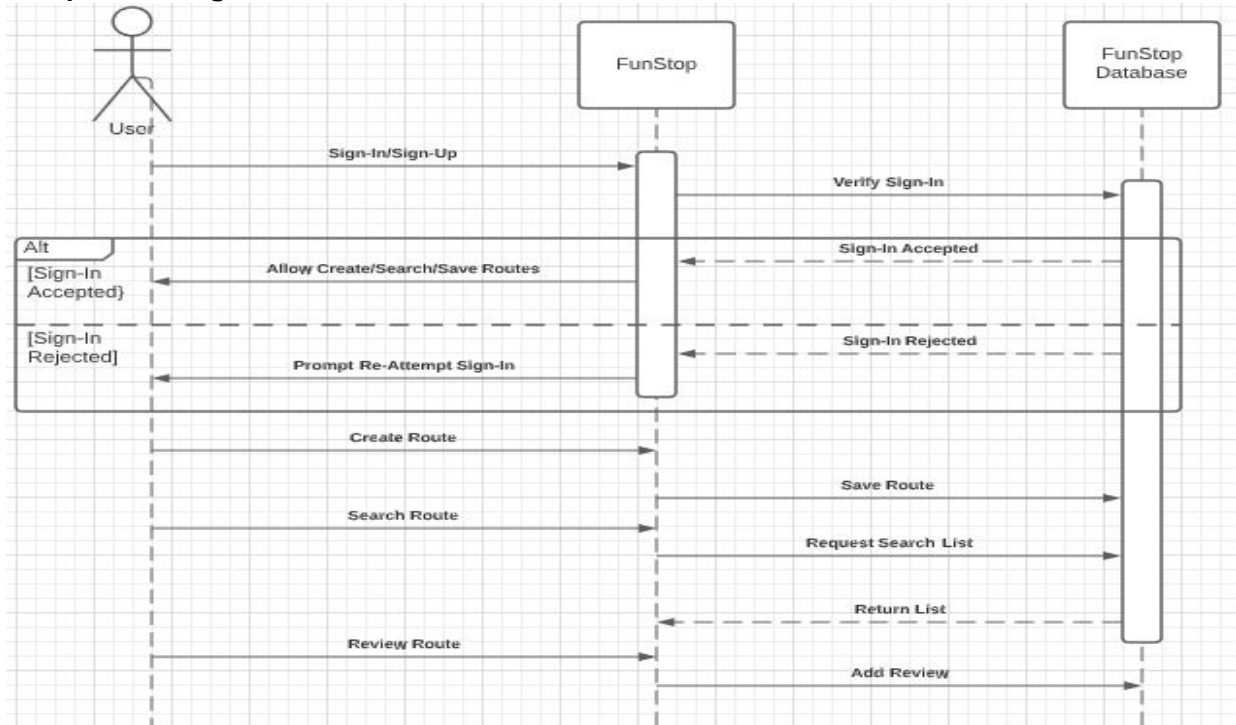4. Allow user to save routes
5. Allow user to review routes

Non-Functional:
1. Must work on iPhone 8 and newer
2. Must manage memory usage to allow for background usage on roadtrips
3. Must create downloadable routes to minimize data usage when away from cellular signal
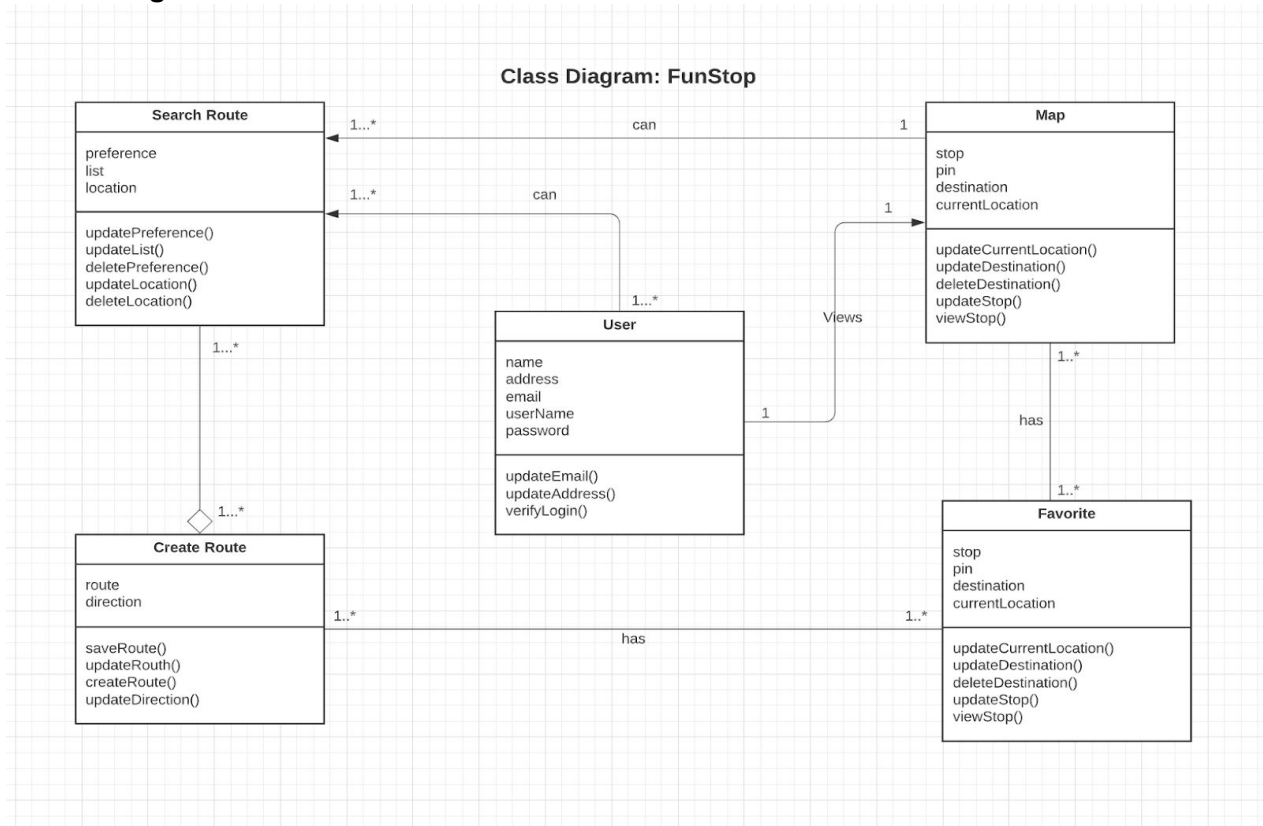4. Must preserve state incase of app closure or crash
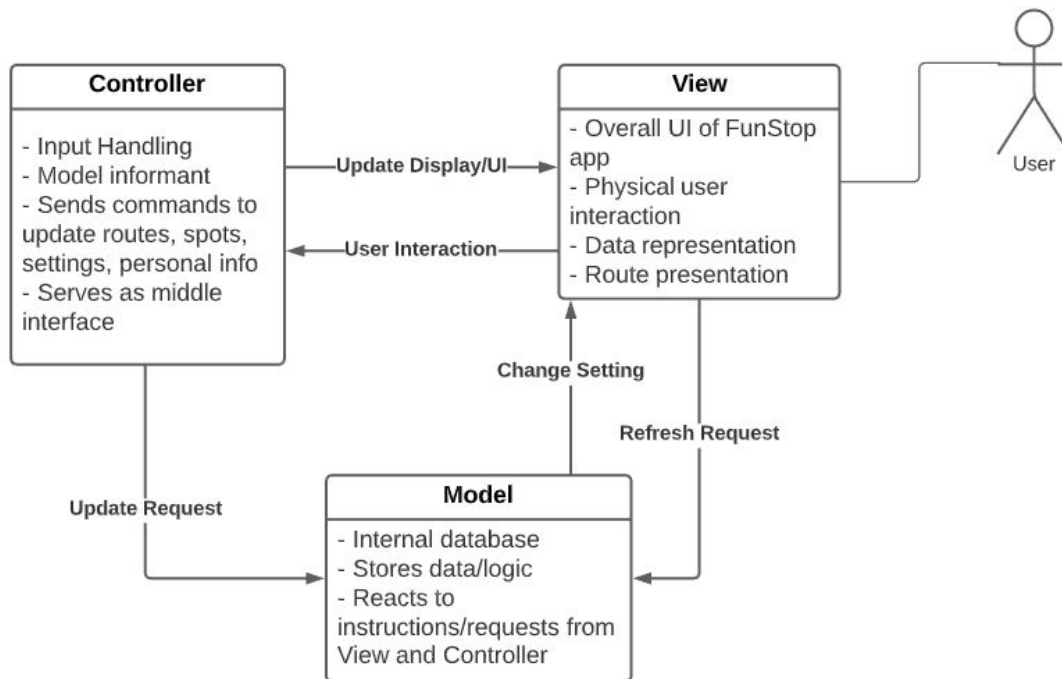
- **Use Case diagram:**
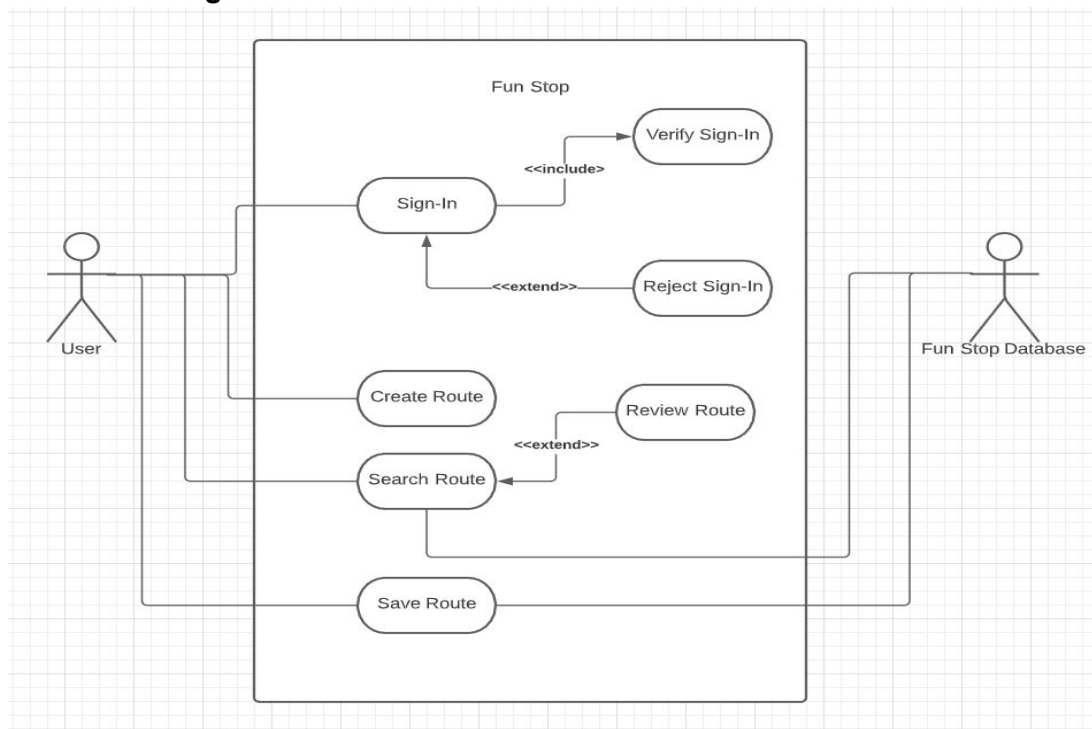
- Sequence diagram:

- Class diagram:

- **Architectural design (MVC):**

--end of deliverable 1--

3. [5 POINTS]
We chose option 2 and have pre recorded our presentation.
Video Presentation Link:
https://web.microsoftstream.com/video/d799759a-0caa-461b-bf08-6ffe5d5ec5bb
Slides Link:
https://docs.google.com/presentation/d/1ktpivNf1CZ5aQPWXgLVfz6mZozoUM55sIxKRMP7WGGY/edit#slide=id.ga6a2a6162f_0_185

4. [35 POINTS] Project Scheduling, Cost, Effort and Pricing Estimation, Project
duration and staffing

4.1. [5 POINTS] Project Scheduling
According to our calculations from applying Function Point, it would take the project team members approximately one week. We are planning on having a team size of 7 people and set our productivity to 25 points per person-week which comes to ideally 5 points per person-week. Since this development team may not be as experienced, we will allocate an additional week in case the unexpected occurs and as well as for debugging and extra testing to make sure the app is working as expected before deployment. If the team were to begin the project on January 4th 2021, it would end on January 18th 2021. Weekends will not be counted and each team member is expected to work approximately 8 hours a day in order to complete their assigned tasks.

4.2. [15 POINTS] Cost, Effort and Pricing Estimation:
Function Point (FP)

Compute Gross Function Point

	Function Category	Count	Complexity			Count x Complexity
			Simple	Average	Complex	
1	Number of user input	4	3	4	6	12
2	Number of user output	5	4	5	7	20
3	Number of user queries	2	3	4	6	8
4	Number of data files and relational tables	6	7	10	15	60
5	Number of external interfaces	3	5	7	10	15

GFP: 115

1.   2

2.   3

3.   2

4.   3

5.   3

6.   4

7.   3

8.   4

9.   2

10. 3

11. 5

12. 4

13. 2

14. 4

2 + 3 + 2 + 3 + 3 + 4 + 3 + 4 + 2 + 3 + 5 + 4 + 2 + 4 = 44

PCA: 0.65 + .01 x 44 = 1.09

FP = 115 x 1.09 = 125.35

E = 125.35/ 25 = 5.014

Team size = 7

D =   5.014 / 7 = .71 weeks = about 1 week

4.3. [5 POINTS] Estimated cost of hardware products (such as servers, etc.)
- We will be hosting our data on one of google's server's in their secure data center, this will cost $234.79/month
- To keep our data for a year would cost about $2800.00

4.4. [5 POINTS] Estimated cost of software products (such as licensed software, etc.)
- Xcode is free and the best option for developing iOS applications
- GitHub for version control is also free
- Cost of joining Apple's developer program and adding an app to the app store is $99.00

4.5. [5 POINTS] Estimated cost of personnel (number of people to code the end product, training cost after installation)
- Team of 7 programmers at $50/hour
- 11 days with 8 hour days equals 616 total hours
- 616 x 50 = $30,800 for personnel

5. [10 POINTS] Test plan for the software:
This test plan covers the password length validation method implemented in our server-side code. The function was tested and proved to be functional. It would test the length of the passwords used (during account creation) and ensure that they were within the allowed limit given to the user at creation. The function returned boolean values that could be used to decide what to print to the screen during the account creation process. Below are the software test images:

```java
passwordValidate.java    passwordValidateTest.java

 1
 2  public class passwordValidate
 3  {
 4
 5      public static boolean validatePassword(String password)
 6      {
 7
 8          if (password.length() > 36)
 9          {
10              return false;
11          }
12          else
13          {
14              return true;
15          }
16
17      }
18
19  }
20
```

```
Package Explorer  JUnit

Finished after 0.046 seconds

Runs: 1/1     Errors: 0     Failures: 0

passwordValidateTest [Runner: JUnit 5] (0.000 s)
```

```java
passwordValidate.java    passwordValidateTest.java

 1  import static org.junit.Assert.assertEquals;
 2
 3  import org.junit.Test;
 4
 5  public class passwordValidateTest
 6  {
 7      @Test
 8      public void isEqualTest()
 9      {
10          System.out.print("Test");
11          passwordValidate validator = new passwordValidate();
12          assertEquals("Here is the test for password length ->", true, validator.validatePassword("ThisPasswordIsTheRightLength"));
13      }
14  }
15
```

```
Package Explorer  JUnit

Finished after 0.05 seconds

Runs: 1/1     Errors: 0     Failures: 1

passwordValidateTest [Runner: JUnit 5] (0.000 s)
    isEqualTest (0.000 s)
```

```java
passwordValidate.java    passwordValidateTest.java

 1  import static org.junit.Assert.assertEquals;
 2
 3  import org.junit.Test;
 4
 5  public class passwordValidateTest
 6  {
 7      @Test
 8      public void isEqualTest()
 9      {
10          System.out.print("Test");
11          passwordValidate validator = new passwordValidate();
12          assertEquals("Here is the test for password length ->", true, validator.validatePassword("ThisPasswordIsToolongandcontainstoomanycharacterstobevalid"));
13      }
14  }
15
```

6. [10 POINTS] Comparison of FunStop with similar designs:

Roadtrippers - Trip Planner
This app [1] is designed for travelers and allows users to add up to 7 waypoints along a route with the free version of their app. Users can pay for an upgrade to allow for more waypoints. However, FunStop does not limit the number of stops the user can add to a route. Like FunStop, Roadtrippers is also an iOS application with built in navigation. Both applications will allow the user to create a custom route to the destination with stops along the way. Unlike Roadtrippers, FunStop allows users to view and use specific routes created and recommended by other users. With FunStop, users can leave reviews for routes they have taken before, including a review for each stop. Roadtrippers does not allow users to leave reviews for routes.

Roadside America
This app [2] focuses on finding the strange, uncommon places along highways during road trips. Both applications are iOS applications. With Roadside America, users are not able to create custom routes in the app, instead the app is used for finding the stops nearby [2]. Users would

then have to create a route to those stops in a separate app, such as Google Maps. This app would be useful for users who have not planned ahead for a road trip and would like to find stops near their current location or destination. FunStop is more convenient for users since the app allows for creation of specific routes with the selected stops. It also finds attractions regardless of their location, while Roadside America limits the attraction to those located along the highways [2]. FunStop allows for planning ahead all in one application because of the navigation feature. FunStop also has more features such as the ability to view other user's custom routes, leave reviews for routes, and save routes for future road trip ideas.

Google Maps/Apple Maps
The main purpose these apps are designed for are to serve as a GPS navigation tool to get users from Point A to Point B in the most efficient way possible. Based on user inputs and customizations, routes provided will account for factors like traffic, detours, construction, and tolls. Google Maps and Apple Maps both also allow the user to add stops along the way, adjusting navigation as needed. Similar to FunStop, Google Maps offers an optional feature called "For You", suggesting restaurants and stops to the user based on their search history and where they have been. However, based on user reviews, the suggestions often tend to be unsatisfactory or irrelevant to the user. FunStop specializes in the area of personalizing suggestions to the user's likes and dislikes, basing all recommendations off of the user's own inputs, providing maximum accuracy. More convenient than Google and Apple Maps, FunStop allows the user to create their own routes and find stops best suited for them. These routes can also be downloaded locally to the user's device to minimize data usage if they don't have access to a strong signal.

7. [10 POINTS] Conclusion

Conclusion
The mission behind our idea was to design a travel app that not only offered navigation, but could also suggest intriguing stops personalized to the user along the way. FunStop did exactly that. It offers its own unique features paired with navigation to provide a versatile, personalized user experience. During the early planning stages of our app, we considered building the design on a Layered Pattern but soon realized that an MVC pattern had far more advantages to our model. In terms of implementation, layered code can create issues with functionality whereas MVC was better suited for versatile interaction with data. After making that adjustment, working on the design of our model became smooth sailing.

Future Work
For the future, we hope to launch our app on the iOS App Store and make adjustments as necessary. To ensure minimal bugs and compatibility issues, we would send out regular software patches and firmware updates. Because our application will be public, users will be able to leave reviews, suggestions, and criticisms. As developers, the feedback will be taken into consideration and improvements will steadily be made to optimize the overall user experience. In later updates, the app will allow social media sharing to let users share their trips

and recommend FunStops to their friends/family. A premium we hope to expand on in the future will be to partner with rideshare brands like Uber or Lyft, where users can plan out their stops and destinations and have personal drivers to complete their trip.

8. [5 POINTS] References

[1] "Roadtrippers - Trip Planner," *App Store*, 24-Nov-2014. [Online]. Available: https://apps.apple.com/us/app/roadtrippers-trip-planner/id944060491. [Accessed: 2-Nov-2020].

[2] "Roadside America," *App Store*, 30-Dec-2009. [Online]. Available: https://apps.apple.com/us/app/roadside-america/id347393479. [Accessed: 2-Nov-2020].