

FIT3162 Computer science & Data science project 2

User Guide

Environmental transportation optimization

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End User Guide

Initial set up

Open the terminal, and travel through to the folder contain server.js file, which use `ls` command to see the folder or file name in this folder and use `cd + folder Name` to go into the folder, and when reaching the server.js file, type `node add.js` and `ctrl + c` in terminal to initial the data (Figure 1). This file will initial the data which contain the information of the default admin, driver, vehicles to the database for this system.

```

Directory: C:\Users\lyc10\OneDrive\FIT3162\V4.2.4\V4.2.5\V4.2.5\V4.2.6

Mode                LastWriteTime         Length Name
----                -
da---l            05-Oct-21   10:39 AM             .idea
da---l            04-Oct-21   11:20 PM             css
da---l            24-Sep-21    9:05 PM          models
da---l            24-Sep-21    9:06 PM        node_modules
da---l            04-Oct-21   12:04 AM          public
da---l            24-Sep-21    9:55 PM          views
-a----            19-Sep-21    3:55 PM         6148 .DS_Store
-a---l            21-Sep-21    4:35 PM         4833 add.js
-a---l            16-Sep-21    4:40 AM        51367 package-lock.json
-a---l            16-Sep-21    2:52 PM         505 package.json
-a---l            04-Oct-21    7:19 PM        18123 server.js

PS C:\Users\lyc10\OneDrive\FIT3162\V4.2.4\V4.2.5\V4.2.5\V4.2.6> node .\add.js

```

Figure 1

Run the program

Open the terminal, and travel through to the folder contain server.js file, which use the command `ls` to list all the folders and files name in this folder and use `cd + folderName` command to go into the folder, and when reaching the server.js file, type `node server.js` to run the program (Figure 2).

```
PS C:\Users\lyc10\OneDrive\FIT3162\V4.2.4\V4.2.5\V4.2.5\V4.2.6> ls

Directory: C:\Users\lyc10\OneDrive\FIT3162\V4.2.4\V4.2.5\V4.2.5\V4.2.6

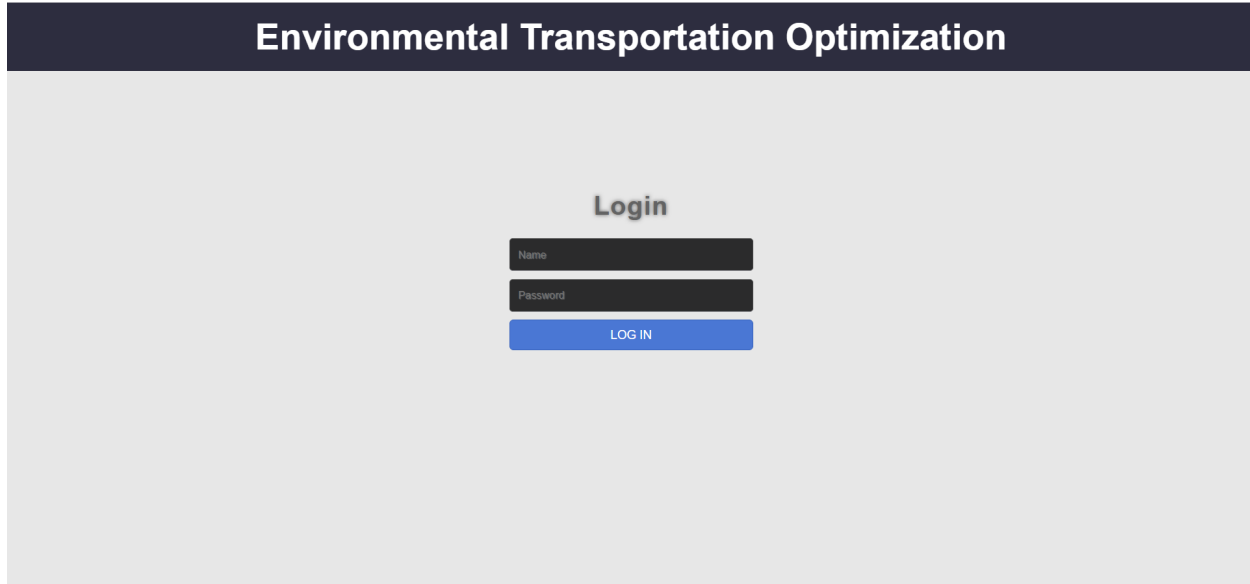

Mode                LastWriteTime         Length Name
----                -
da---l            05-Oct-21  10:39 AM             .idea
da---l            04-Oct-21  11:20 PM             css
da---l            24-Sep-21   9:05 PM             models
da---l            24-Sep-21   9:06 PM          node_modules
da---l            04-Oct-21  12:04 AM             public
da---l            24-Sep-21   9:55 PM             views
-a----            19-Sep-21   3:55 PM          6148 .DS_Store
-a---l            21-Sep-21   4:35 PM          4833 add.js
-a---l            16-Sep-21   4:40 AM        51367 package-lock.json
-a---l            16-Sep-21   2:52 PM          505 package.json
-a---l            04-Oct-21   7:19 PM        18123 server.js

PS C:\Users\lyc10\OneDrive\FIT3162\V4.2.4\V4.2.5\V4.2.5\V4.2.6> node .\server.js
```

Figure 2

Use the program

Enter the **IP address: 8080** in the browser, user will enter the login page. At the login page, insert the username and password according to this is user account or admin account, it will jump to either map page or admin page (Figure 3).



Environmental Transportation Optimization

Login

Name

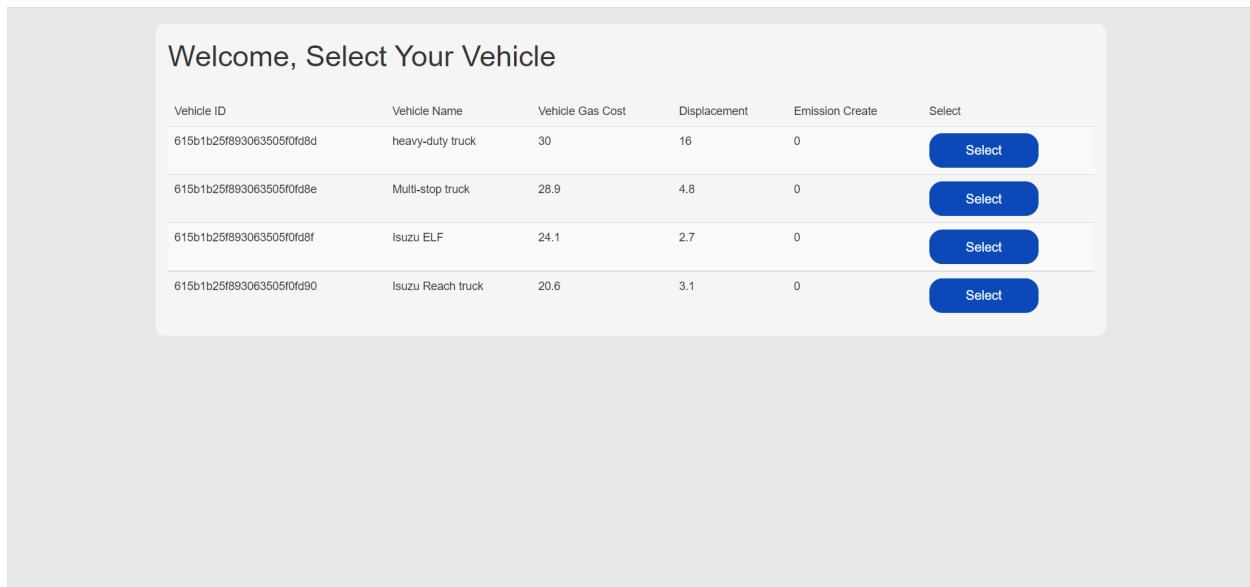
Password

LOG IN

Figure 3

In map page

When the user logs in with the driver's account and password, it will be redirected to the vehicle selection page. User need to click the Select button on the right side to select the vehicle which they will use (figure 4).



Welcome, Select Your Vehicle

Vehicle ID	Vehicle Name	Vehicle Gas Cost	Displacement	Emission Create	Select
615b1b25f893063505f0fd8d	heavy-duty truck	30	16	0	Select
615b1b25f893063505f0fd8e	Multi-stop truck	28.9	4.8	0	Select
615b1b25f893063505f0fd8f	Isuzu ELF	24.1	2.7	0	Select
615b1b25f893063505f0fd90	Isuzu Reach truck	20.6	3.1	0	Select

Figure 4

After clicking the select button, will jump to the map page, which have several different functionalities (Figure 5).

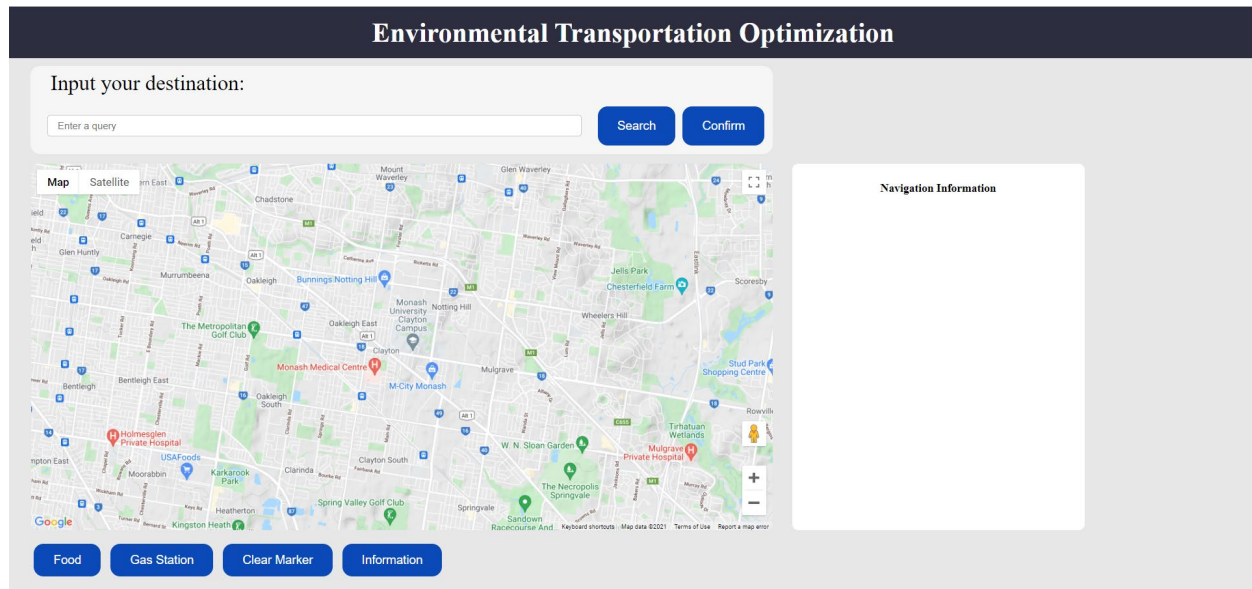


Figure 5

Path finding: By entering the destination location, and click search, the system will generate the path from the current location to the destination location. By clicking the confirm, the system will push this link to the server so that the admin will be able to know and store the data of this path in database. Then, navigation information bar will display the detail for the path and the path will show on the map (figure 6). The user must allow the browser to use the user location, otherwise the path will not be displayed

Food bottom: display the closest food store.

Gas bottom: display the closest gas station.

Clear Marker: clean up all the markers in the map

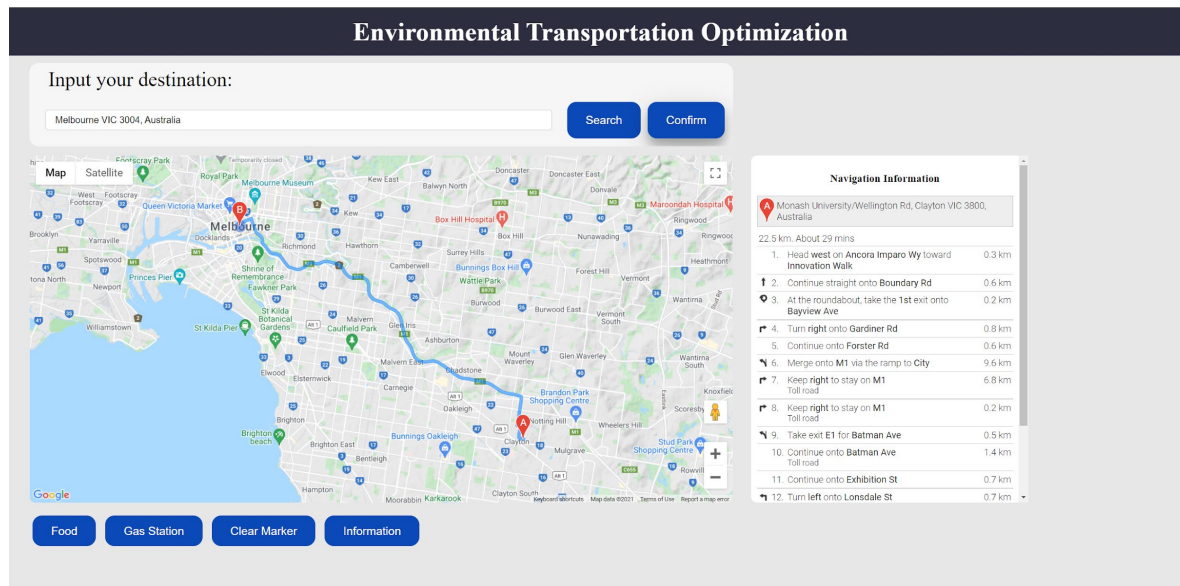


Figure 6

Administration Page: a management system

When a user logs in with an administrator account, the system will automatically jump to the administrator page. There is a menu bar contain the information for User, Admin, Vehicle, Warehouse, Show All Path and there is a submenu for User, Admin, Vehicle, Warehouse to either insert, list all, delete, update data (figure 7).

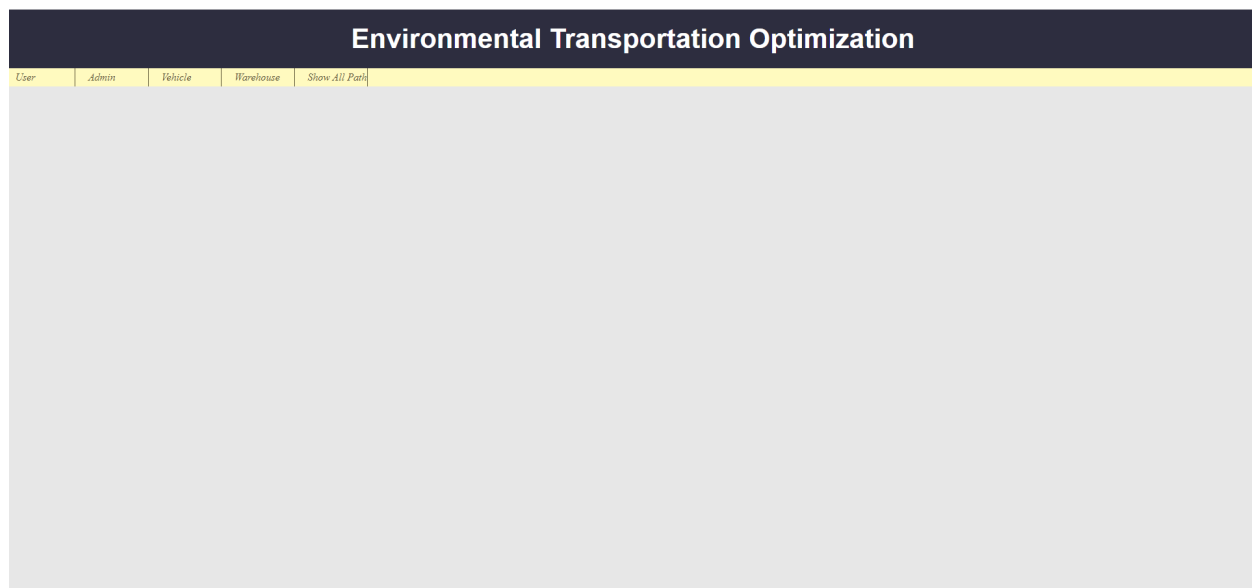


Figure 7

User page

In Insert user part, user need to fill in the data, and set up the password, and click submit to generate a new user (figure 8).

Environmental Transportation Optimization

User | Admit | Vehicle | Warehouse | Show All Path

Insert User

Name:

Birthday:

State:

Suburb:

Street:

Unit:

Phone:

Work Time:

Password:

Submit

Figure 8

In list user part, it will list all the information of the user (figure 9).

Environmental Transportation Optimization

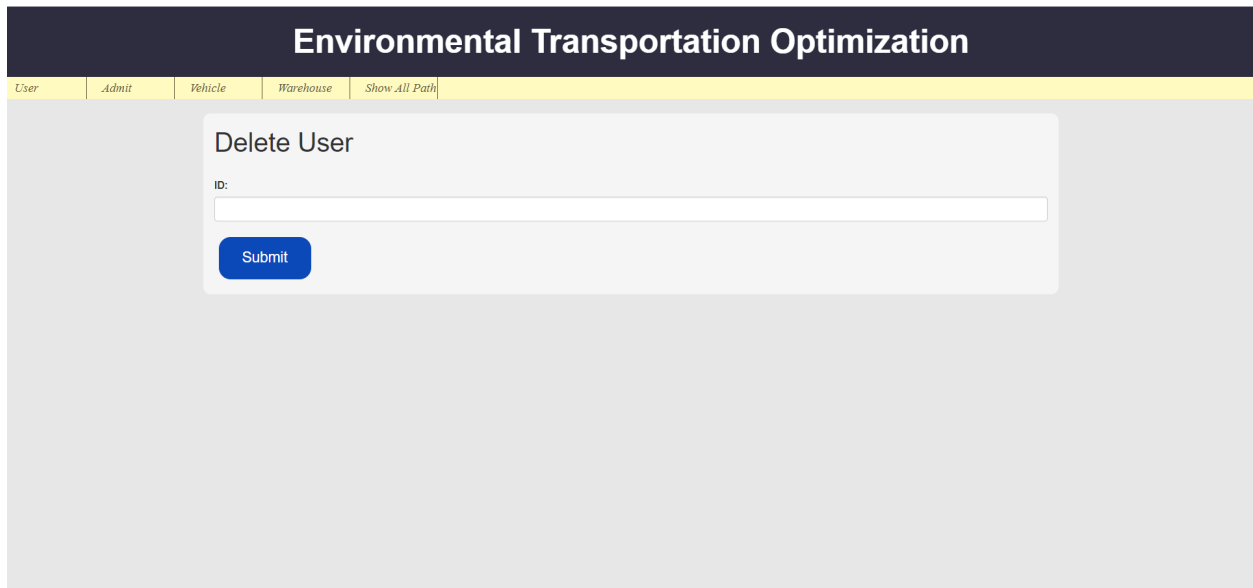
User | Admit | Vehicle | Warehouse | Show All Path

List Users

ID	Name	Birthday	State	Suburb	Street	Unit	Phone
615b1b25f893063505f0fd89	Haolin	Mon Oct 04 2021 23:17:57 GMT+0800 (China Standard Time)	TAS	Monash	Monash Street	3	1234567
615b1b25f893063505f0fd8a	Yuchen	Mon Oct 04 2021 23:17:57 GMT+0800 (China Standard Time)	VIC	Clayton	123 grand street	unit 4	778-960-8997
615b1b25f893063505f0fd8b	Jiahao	Mon Oct 04 2021 23:17:57 GMT+0800 (China Standard Time)	VIC	Clayton	123 grand street	unit 4	778-960-8998
615b1b25f893063505f0fd8c	Runzhe	Mon Oct 04 2021 23:17:57 GMT+0800 (China Standard Time)	VIC	Clayton	123 grand street	unit 3	778-960-8999

Figure 9

In delete user part, user need to input the user id and delete this user (figure 10).



The screenshot shows a web application titled "Environmental Transportation Optimization" with a dark blue header. Below the header is a yellow navigation bar with five tabs: "User", "Admin", "Vehicle", "Warehouse", and "Show All Path". The "User" tab is selected. The main content area is light gray and contains a "Delete User" form. The form has a title "Delete User", a label "ID:" followed by a text input field, and a blue "Submit" button.

Figure 10

In update user part, user will input the user id and update all the information of this user since the user id is unique (figure 11).

The screenshot shows a web application titled "Environmental Transportation Optimization". At the top, there is a dark blue header bar with the title in white. Below the header is a yellow navigation bar with five tabs: "User", "Admin", "Vehicle", "Warehouse", and "Show All Path". The "User" tab is currently selected. The main content area is light gray and contains a white rounded rectangle titled "Update User Form". Inside this form, there are several input fields: "User's ID:" (text), "State:" (dropdown menu with "VIC" selected), "Suburb:" (text), "Street:" (text), "Unit:" (text), "Phone:" (text), "Work Time:" (text), and "Password:" (text). A blue "Submit" button is located at the bottom left of the form.

Figure 11

Admin page

In insert admin page, user need to input the name and the password of the admin. Then click the submit to generate a new admin in the database (figure 12)

The screenshot shows the same web application as Figure 11. The "Admin" tab in the yellow navigation bar is now selected. The main content area is light gray and contains a white rounded rectangle titled "Insert Admin". Inside this form, there are two input fields: "Admin Name:" (text) and "Admin Password:" (text). A blue "Submit" button is located at the bottom left of the form.

Figure 12

In list all admin page, it lists all the admin account in this system (figure 13)

The screenshot shows a web application titled "Environmental Transportation Optimization". At the top, there is a dark blue header with the title in white. Below the header is a yellow navigation bar with five tabs: "User", "Admin", "Vehicle", "Warehouse", and "Show All Path". The "Admin" tab is currently selected. The main content area is light gray and contains a white box titled "List All Admin". Inside this box, there is a table with two columns: "ID" and "Admin Name". The table contains one row with the ID "615b1b25f893063505f0fd88" and the Admin Name "admin".

ID	Admin Name
615b1b25f893063505f0fd88	admin

Figure 13

In delete admin part, user need to input the admin id and delete this admin (figure 14).

The screenshot shows the same web application as Figure 13. The "Admin" tab is still selected in the yellow navigation bar. The main content area is light gray and contains a white box titled "Delete Admin". Inside this box, there is a form with a label "ID:" followed by a text input field. Below the input field is a blue button labeled "Submit".

Figure 14

In update admin part, user will input the admin id and update all the information of this admin since the user id is unique (figure 15).

The screenshot shows a web application titled "Environmental Transportation Optimization". At the top, there is a dark blue header bar with the title in white. Below the header is a yellow navigation bar with five tabs: "User", "Admin", "Vehicle", "Warehouse", and "Show All Path". The "Admin" tab is currently selected. The main content area is light gray and contains a white box titled "Update Admin Form". Inside this box, there are three input fields labeled "Admin's ID:", "Name:", and "Password:". Below these fields is a blue "Submit" button.

Figure 15

Vehicle page

In Insert vehicle part, user need to fill in the data, and click submit to generate a new vehicle(figure 16).

The screenshot shows the same web application as Figure 15. The "Vehicle" tab in the yellow navigation bar is now selected. The main content area is light gray and contains a white box titled "Insert Vehicle". Inside this box, there are four input fields labeled "Name:", "Type Gas Cost", "Displacement:", and "Emission create:". Below these fields is a blue "Submit" button.

Figure 16

In list vehicle part, it will list all the information of the vehicle (figure 17).

Environmental Transportation Optimization				
User	Admit	Vehicle	Warehouse	Show All Path
List All Vehicle				
Vehicle ID	Vehicle Name	Vehicle Gas Cost	Displacement	Emission Create
615b1b25f893063505f0fd8d	heavy-duty truck	30	16	0
615b1b25f893063505f0fd8e	Multi-stop truck	28.9	4.8	0
615b1b25f893063505f0fd8f	Isuzu ELF	24.1	2.7	0
615b1b25f893063505f0fd90	Isuzu Reach truck	20.6	3.1	0

Figure 17

In delete vehicle part, user need to input the vehicle id and delete this vehicle (figure 18).

Environmental Transportation Optimization				
User	Admit	Vehicle	Warehouse	Show All Path
Delete Vehicle				
Vehicle's ID:				
<input type="text"/>				
<input type="button" value="Submit"/>				

Figure 18

In update user part, user will input the vehicle id and update all the information of this vehicle since the vehicle id is unique (figure 19).

The screenshot shows a web application titled "Environmental Transportation Optimization". At the top, there is a dark blue header bar with the title in white. Below the header is a yellow navigation bar with five tabs: "User", "Admit", "Vehicle", "Warehouse", and "Show All Path". The "Vehicle" tab is currently selected. The main content area is a light gray rectangle containing a white rounded rectangle titled "Update Vehicle Form". Inside this form, there are five input fields, each with a label above it: "Vehicle's ID:", "Vehicle's Type:", "Gas Cost:", "Displacement:", and "Emission:". Each input field is a white rectangle with a thin gray border. At the bottom of the form is a blue rounded rectangle button with the word "Submit" in white text.

Figure 19

Warehouse page

In Insert warehouse part, user need to fill in the data, select the type of vehicle, and click submit to generate a new warehouse(figure 20).

The screenshot shows the same web application as Figure 19. The "Warehouse" tab is now selected in the yellow navigation bar. The main content area is a light gray rectangle containing a white rounded rectangle titled "Insert Warehouse". Inside this form, there are two input fields: "State:" and "Name:". The "State:" field is a white rectangle with a thin gray border and a small downward arrow on the right side, indicating it is a dropdown menu. The "Name:" field is a white rectangle with a thin gray border. At the bottom of the form is a blue rounded rectangle button with the word "Submit" in white text.

Figure 20

In list warehouse part, it will list all the information of the warehouse (figure 21).

The screenshot shows a web application interface with a dark blue header containing the title "Environmental Transportation Optimization". Below the header is a yellow navigation bar with five tabs: "User", "Admit", "Vehicle", "Warehouse", and "Show All Path". The "Warehouse" tab is currently selected. The main content area is light gray and contains a white rounded rectangle titled "List All Warehouse". Inside this rectangle, there are three columns labeled "ID", "type", and "name", which are intended for displaying a list of warehouse information.

Figure 21

In delete warehouse part, user need to input the warehouse id and delete this warehouse (figure 22).

The screenshot shows the same web application interface as Figure 21, but with the "Delete Warehouse" form displayed. The header and navigation bar are identical. The main content area contains a white rounded rectangle titled "Delete Warehouse". Inside this rectangle, there is a label "ID:" followed by a text input field. Below the input field is a blue button with the text "Submit".

Figure 22

In update warehouse part, user will input the warehouse id and update all the information of this warehouse since the warehouse id is unique (figure 23).

Figure 23

Show All Path Page

Since the admin side and the user side share the same database. After the driver confirms the route, the emissions, starting point, name of the car used, driver, and route length of that route on that day will be recorded in the path database. The show all path page will display all the information of these paths (figure 24).

Destination	Departure	Vehicle Name	User	Path Length	Emmsion
246 Clayton Rd, Clayton VIC 3168, Australia	Monash Uni	heavy-duty truck	Yuchen	2.773	83.19
Flinders Street Railway Station, Flinders St, Melbourne VIC 3000, Australia	Monash Uni	Isuzu Reach truck	Yuchen	21.394	440.716
Melbourne VIC 3004, Australia	Monash Uni	Isuzu Reach truck	Yuchen	22.509	463.685
Flinders Street Railway Station, Flinders St, Melbourne VIC 3000, Australia	Monash Uni	Isuzu Reach truck	Yuchen	22.509	463.685
Melbourne VIC 3004, Australia	Monash Uni	Multi-stop truck	Yuchen	22.509	650.51
Melbourne VIC 3004, Australia	Monash Uni	heavy-duty truck	Yuchen	22.509	675.27
1341 Dandenong Rd, Chadstone VIC 3148, Australia	Monash Uni	Multi-stop truck	Yuchen	22.509	650.51
1341 Dandenong Rd, Chadstone VIC 3148, Australia	Monash Uni	Multi-stop truck	Yuchen	2.773	80.14
1341 Dandenong Rd, Chadstone VIC 3148, Australia	Monash Uni	Multi-stop truck	Yuchen	7.087	204.814

Figure 24

Technical Guide

Push to Git:

When having the package, open the terminal, travel through to the file contain the server.js, which cd is to access the file, ls is to list the file in the folder (figure 25).

```
PS E:\Monash\2021S2> cd E:\Monash\2021S2\fit3162\V4.2.5\V4.1.1
PS E:\Monash\2021S2\fit3162\V4.2.5\V4.1.1> ls
```

目录: E:\Monash\2021S2\fit3162\V4.2.5\V4.1.1

Mode	LastWriteTime	Length	Name
d----	2021/10/4 0:06		.idea
da----	2021/9/24 21:52		css
da----	2021/9/24 21:05		models
da----	2021/9/24 21:06		node_modules
da----	2021/10/4 0:04		public
da----	2021/9/24 21:55		views
-a----	2021/9/19 15:55	6148	.DS_Store
-a----	2021/9/21 16:35	4833	add.js
-a----	2021/9/16 4:40	51367	package-lock.json
-a----	2021/9/16 14:52	505	package.json
-a----	2021/10/4 19:19	18123	server.js

```
PS E:\Monash\2021S2\fit3162\V4.2.5\V4.1.1> 
```

Figure 25

Create a git account, and create a new repository, copy the link, and in the terminal, type this following command:

- 1: **git init**
- 2: **git remote add origin <https://github.com/youraccount/yourrepo.git>**
- 3: **git pull origin master**
- 4: **git add .**
- 5: **git commit -m 'initial commit'**
- 6: **git push origin master**

paste your url in from the repository and enter the username and password in step 2

Go to the google platform and login by your google account, and build the platform:

<https://console.cloud.google.com/>

Create a project

From the top left drop menu, select 'New Project'. Provide a name (such as FIT3162Project) and click 'Create'.

Create a Virtual Machine Instance (figure 26)

Open the left panel→Compute Engine→VM instances→Create a new VM

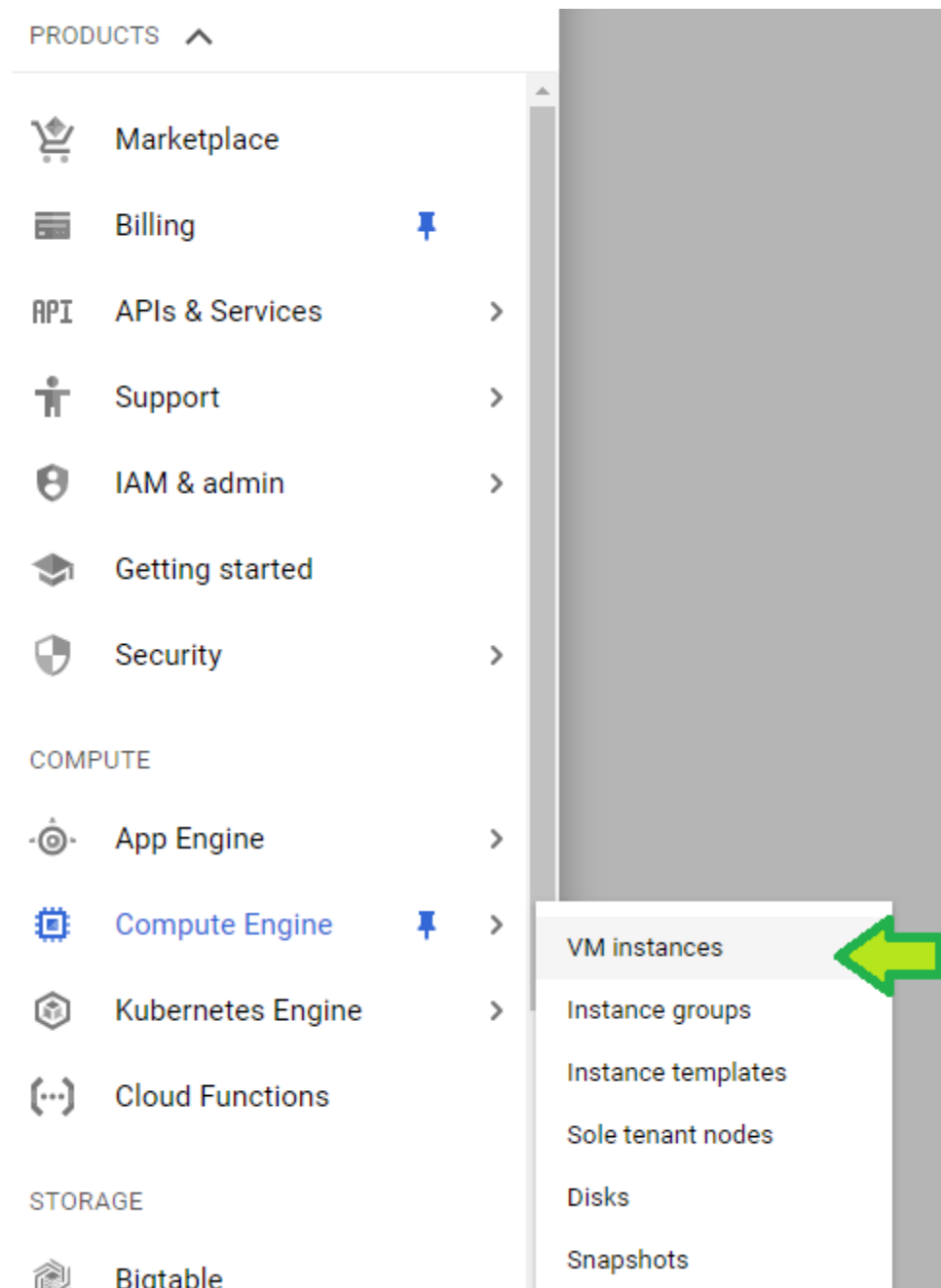


Figure 26

Provide the following details(figure 27)

Provide the following details:

#	ITEM	VALUE
1	Name	a name for the instance (fit2095 for instance)
2	Region	Melbourne
3	Zone	Default
4	Machine type-vCPU	micro
5	Machine type-Memory	1.0GB
6	Boot disk	Ubuntu 20.04 Minimal
7	Firewall	Set both protocols
		Allow HTTP traffic
		Allow HTTPS traffic
8	Create Button	Click

Figure 27

By default, very few ports are open for new instances. Therefore, we have to open 8080 and 4200 or all of them.

To do that, open the left panel→VPC network→Firewall rules→Create Firewall Rule and provide the following values (figure 28).

#	ITEM	VALUE
1	Name	a name for the instance (fit2095rule for instance)
2	Target	All Instances in the network
3	Source IP ranges	0.0.0.0/0
4	Protocols and Ports	Allow
5	Create	Click

Note: 0.0.0.0/0 implies all IP addresses.

Figure 28

Install the software stack

We have to install the following: Git and Node.js

Step 1: open your instance page and click on the SSH icon. A new window represents your VM's terminal will appear. To install your stack, execute the following commands sequentially.

Install Git

1: sudo apt update

2: sudo apt install -y git

Install Node.js & NPM

1: curl -fsSL https://deb.nodesource.com/setup_16.x | sudo -E bash -

2: sudo apt-get install -y nodejs

Install MongoDB

1: wget -qO - https://www.mongodb.org/static/pgp/server-5.0.asc | sudo apt-key add -

2: echo "deb [arch=amd64,arm64] https://repo.mongodb.org/apt/ubuntu focal/mongodb-org/5.0 multiverse" |

3: sudo tee /etc/apt/sources.list.d/mongodb-org-5.0.list

4: sudo apt-get update

5: sudo apt-get install -y mongodb-org

6: sudo systemctl enable mongod

7: sudo systemctl start mongod

Create a GitHub Repository

To sign up: <https://github.com/>

To create a new repo: <https://github.com/new>

Clone GitHub Repository to the VM instance

Open your VM terminal and execute this command:

1: `git clone https://github.com/youraccount/yourrepo.git`

Now it's time to install the project's dependencies, build components, and initial the data.

1: `cd project folder`

2: `npm install`

3: `node add.js`

keep the terminal alive and go to the GCP instance page and copy the external IP address (figure 29).

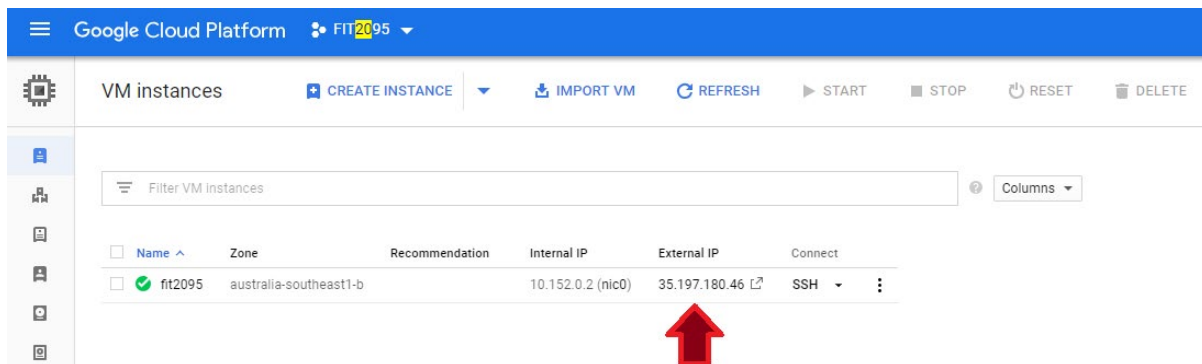


Figure 29

Open your browser and navigate to <http://externalIP:8080> (in my case: <http://35.197.180.46:8080>)

And go to the VM terminal again

1: `Ctrl + c`

2: `node server.js`

keep the terminal alive and go to the GCP instance page and copy the external IP address (figure 30):

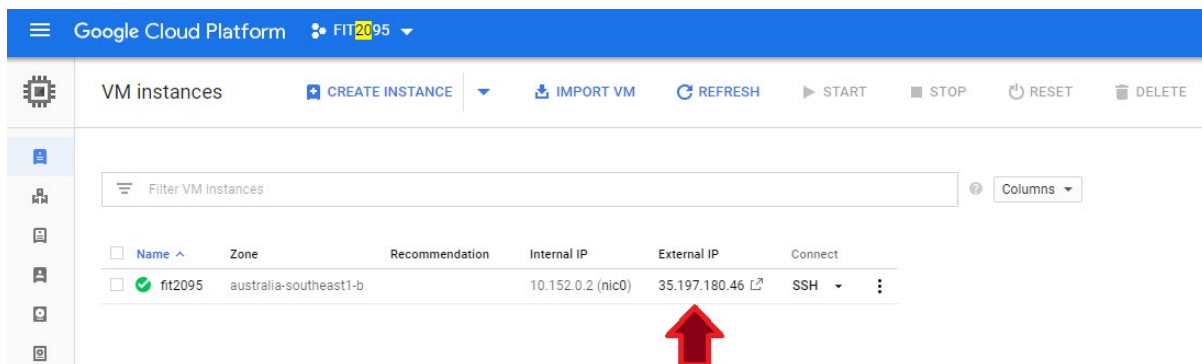


Figure 30

Open your browser and navigate to `http://externalIP:8080` (in my case: <http://35.197.180.46:8080>) and there is login page showing out (figure 31):

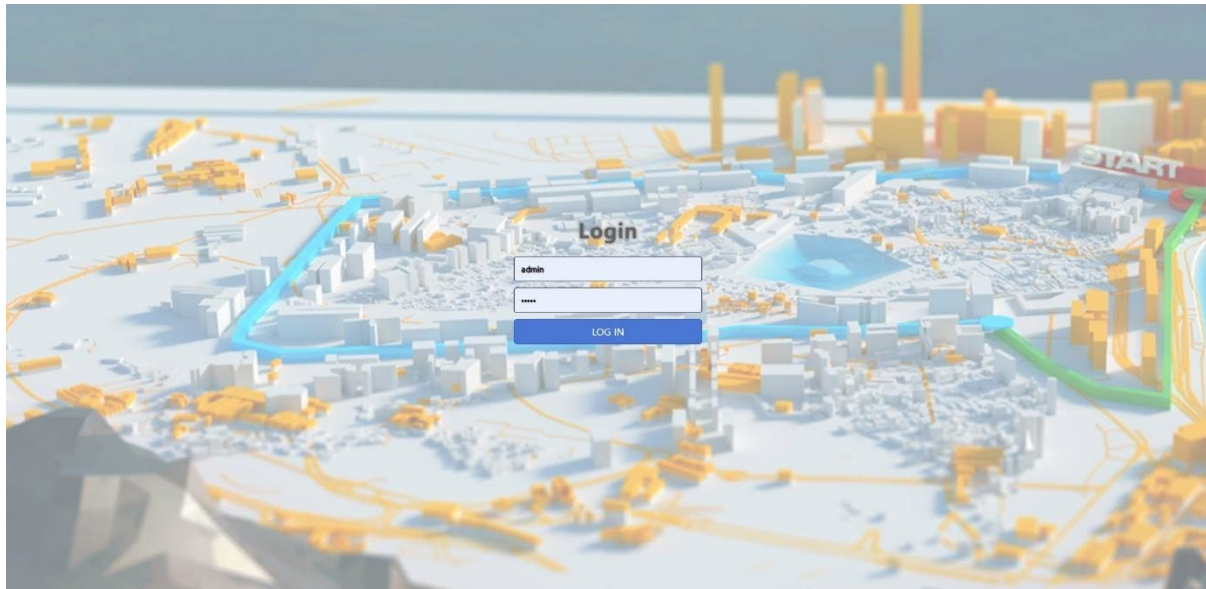


Figure 31

And this login page, every user that go to this URL with able to see and use.

Reference

Nawfal (2021, August 31). *Deploying a Node.js Application to Google Cloud Platform (GCP)*.

FIT2095. Retrieved September 31, 2021, from

<https://www.alexandriarepository.org/module/deploy-mean-application-on-google-cloud/>