Technical Installation Manual V.2

COS 301 Capstone Project: Demo 4

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LightBot Adaptive Traffic Control System

Contents

1. Introduction

This document will discuss all the information in detail needed to clone the master branch from the Git repository to configure the system to be installed and run. This will also discuss all the additional software needed to run the system.

The LightBot System consists of 3 different components to cater for which will be discussed in detail. The system has a dashboard that is a web application, which runs on a web browser, linked to a web server. The web server in turn is linked to a remote api server on which the web application and web server is deployed. The simulator is a desktop application which the user can download and runs on the users local machine.

The web application needs to be installed and run, thereafter the server should be started and then the simulator can be downloaded.

2. Prerequisites

The LightBot Web application will need the following software and packages to be installed:

1. Visual Studio Code is the recommended IDE to execute and deploy the application. Please download **Version 1.48.0**. This is the newest Visual Studio Code version.
2. React and React-DOM packages need to be installed to be able to run the web application.
3. Node.JS needs to be installed to be able to use React packages. The NPM package manager will then be installed automatically. All other relevant packages are added to one installation command which will be installed through NPM.
4. Visual Studio Code can be downloaded from the following link:
   https://code.visualstudio.com/download
   This link will direct the user to the Visual Studio website where there are 3 download options available for Windows, Linux and macOS respectively, see Figure 1.

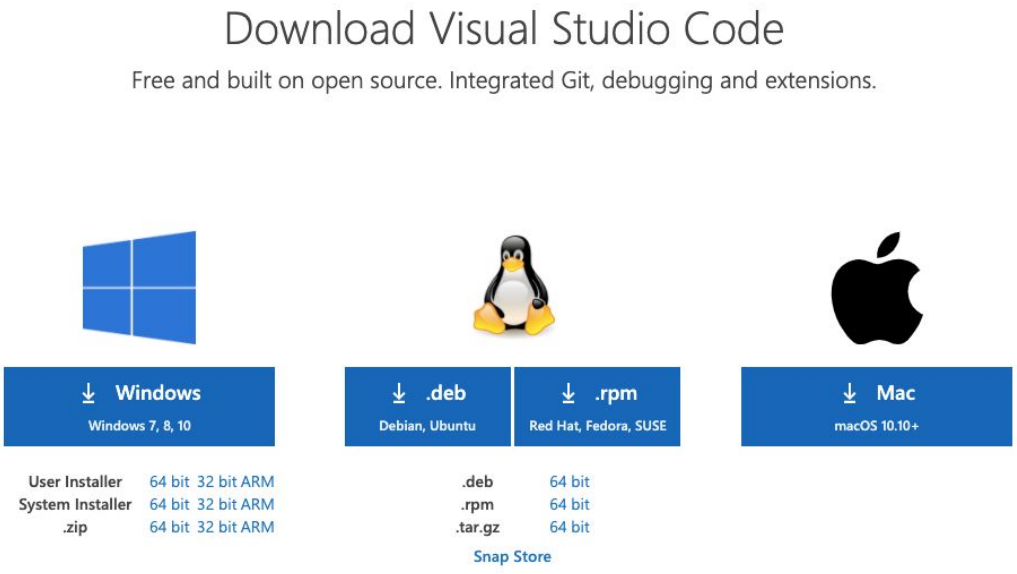

Figure 1: Visual Studios download web page

The user can follow the installation steps provided by the downloaded software installation guide.

5. NodeJS can be downloaded from the following link:
   https://nodejs.org/en/
   This link will direct the user to the NodeJS website where the website will direct them to the relevant download page as it automatically distinguishes the OS your local machine runs on, see Figure 2.
   Please download **Version 12.18.3**. This is the recommended NodeJS version.

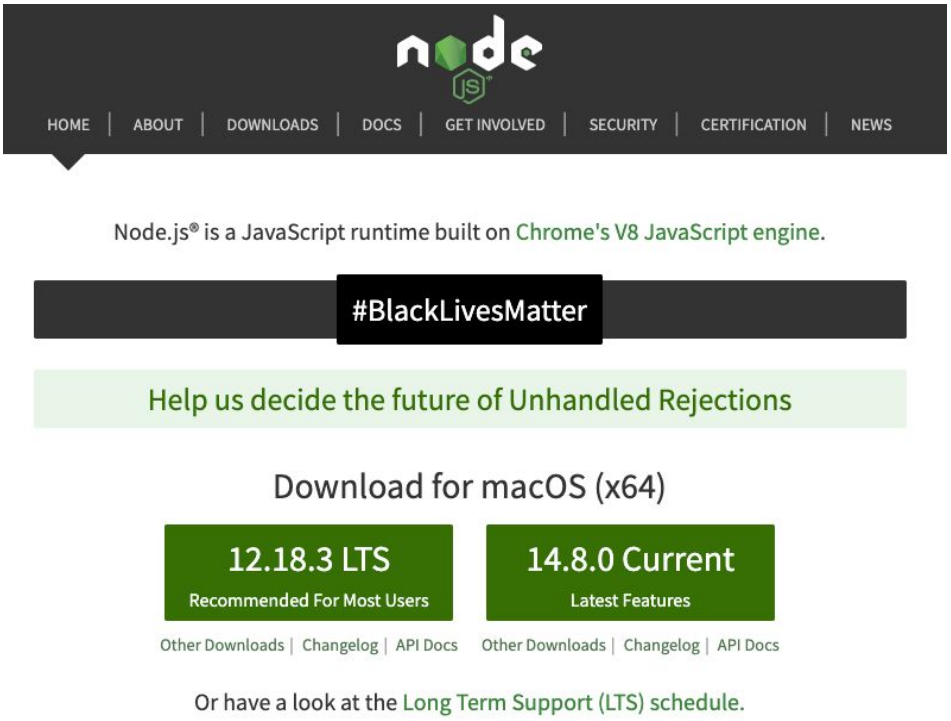

Figure 2: NodeJS download web page

The LightBot Web Server will need the following software and packages to be installed:

1. Visual Studio Code is the recommended IDE to execute and deploy the application, as discussed above.
2. All relevant packages needed for the web server are installed through the Node.JS and NPM packages as discussed above.

The LightBot Simulator will need the following software to be installed:

1. Java 8 needs to be installed on the users local machine to be able to execute the java application. Please download **Version 8 Update 261**. This is the newest Java version.
2. No additional packages are required.
3. Java 8 can be downloaded from the following link:
   https://java.com/en/download/
   This link will direct the user to the Java 8 website where once the user clicks on the "Java Download button", see Figure 3, the website will direct them to the relevant download page as it automatically distinguishes the OS your local machine runs on.

Figure 3: Java 8 download web page

3. Installation

Please follow the instructions below for the relevant components to install the software and system correctly. This will ensure optimal execution of the system.

3.1 LightBot System Code

1. Navigate to the COS301-SE-2020/MPL-Lightbot repository on Github.
2. The repository can be found here: https://github.com/COS301-SE-2020/MPL-Lightbot
3. Once the web page has loaded, the following screen will appear, see Figure 4. Here the user can access all the relevant code needed to run the LightBot system.
4. The user must click on the "Code" button, and a dropdown list will appear where the user must download a ZIP folder of the code, see Figure 5.

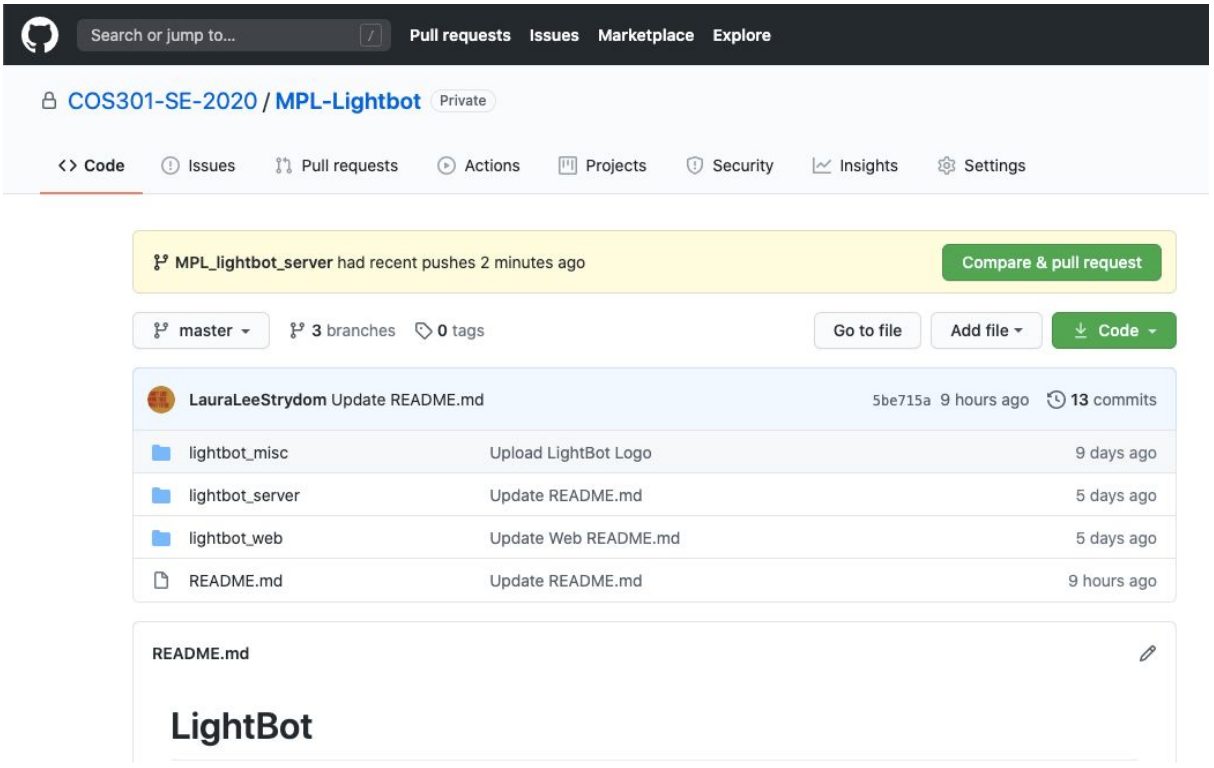

Figure 4: COS301-SE-2020/MPL-Lightbot repository on Github

5. Once the ZIP folder has been downloaded, please extract the contents and save the folder where desired. It is recommended to save it where the user has easy access to.

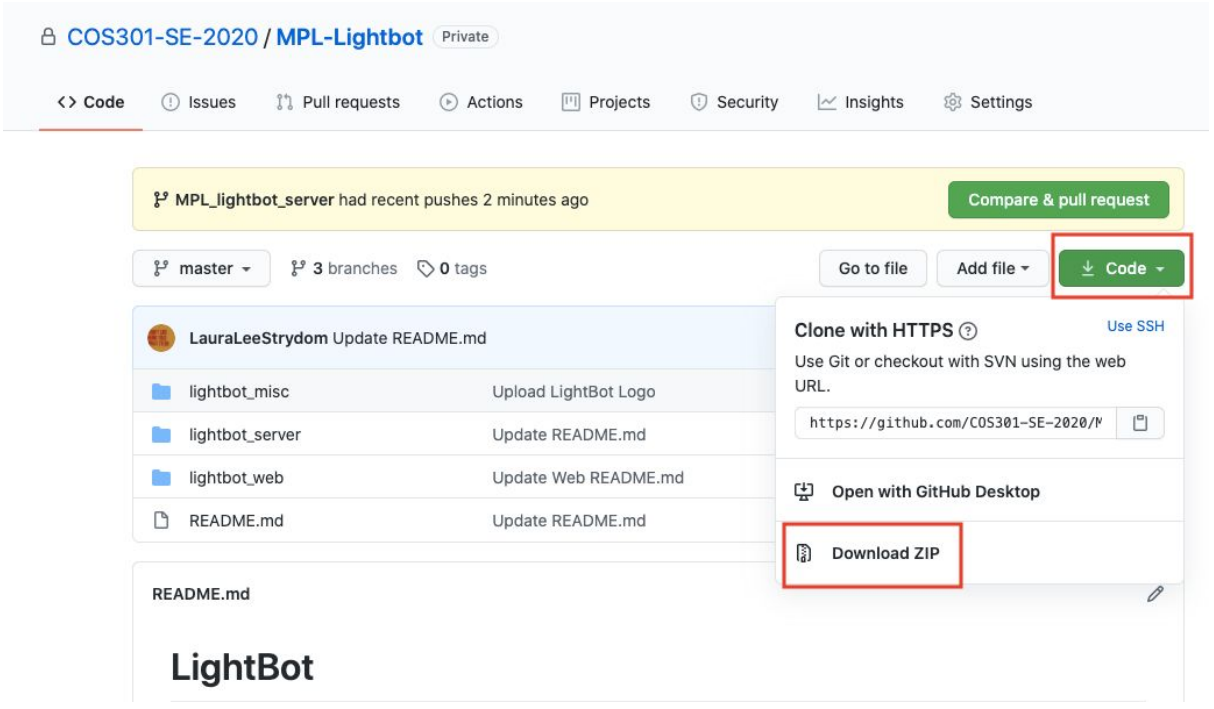

Figure 5: Download code from repository

3.2 LightBot Web Application & Server

1. Navigate to where Visual Studio Code has been installed on the local machine, and open/run the application. See Figure 6 for how the IDE will be displayed.

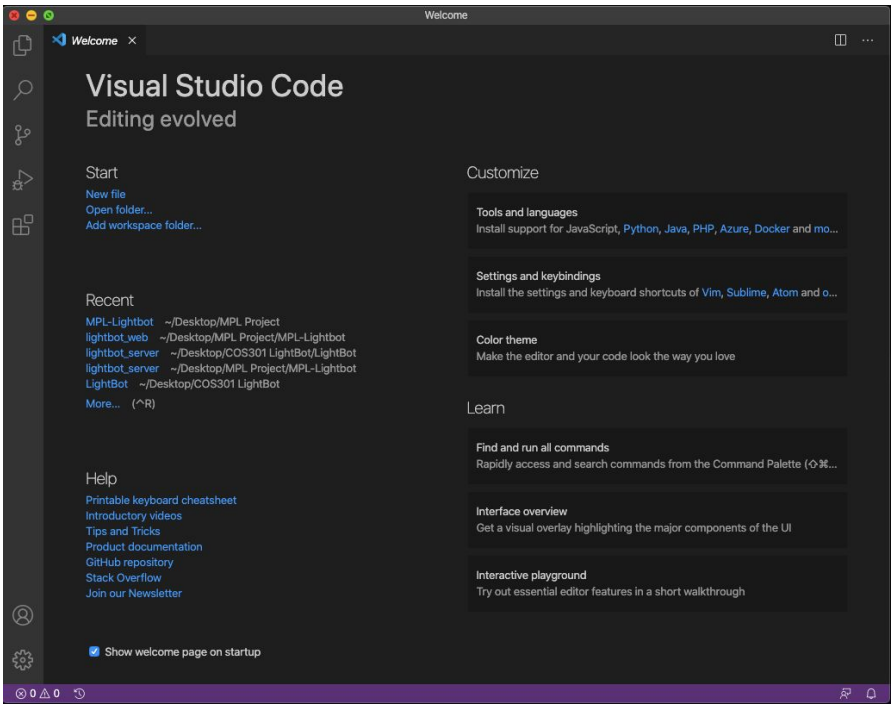

Figure 6: Visual Studio Code home page

2. Before starting with the LightBot installation, we need to install a few packages first. They need to be installed through a VS Code terminal, which can be opened by clicking on the "Terminal" option on the top window toolbar and navigating down to the "New Terminal" option, see Figure 7.

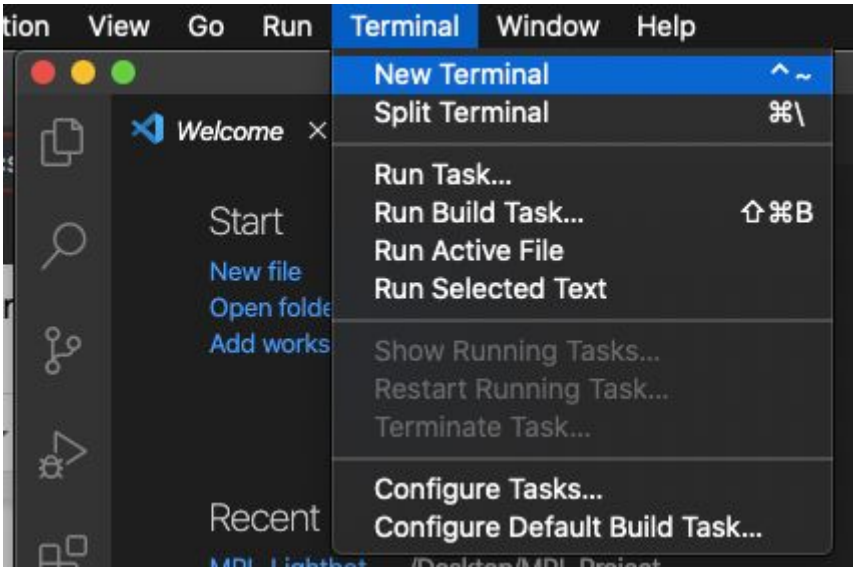

Figure 7: New Terminal option

3. In this terminal, you will type the following commands, and execute each separately, see Figure 8:
    a. npm install --save react
    b. npm install --save react-dom

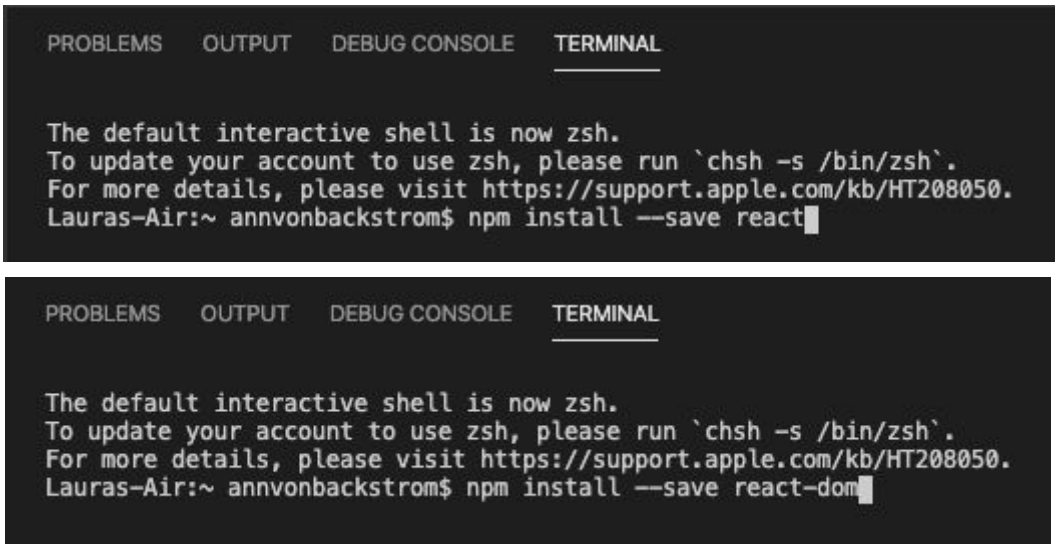

Figure 8: Install React and React-DOM

When you installed NodeJS on your local machine, it automatically installed NPM, which is a package manager used to install additional packages used in React. This allows you to use the preset npm before installing a package. All the relevant packages will be saved in the package.json file.

4. Next, you want to open up the extracted LightBot code that was downloaded previously. To do this, click on the "File" option on the top window toolbar and navigate down to the "Open..." option, see Figure 9. A window will open where the user needs to navigate to the location where the extracted code is saved. Click on the folder, and then click on the "Open" button.

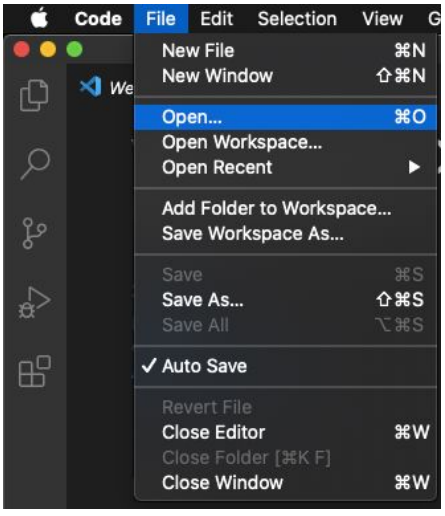

Figure 9: Open option

5. Visual Studio Code will open up the folder and you will see the following folder structure, see Figure 10. The code is separated into different folders relevant to the specific component:
    a. First, the lightbot_misc folder, where miscellaneous files are stored that are used for the Git repos' README.
    b. The lightbot_server folder, where the code for the web server can be found.
    c. The lightbot_simulator, where the code and executable jar file can be found for the Simulator desktop application.
    d. And lastly the lightbot_web, where the code for the web application can be found.

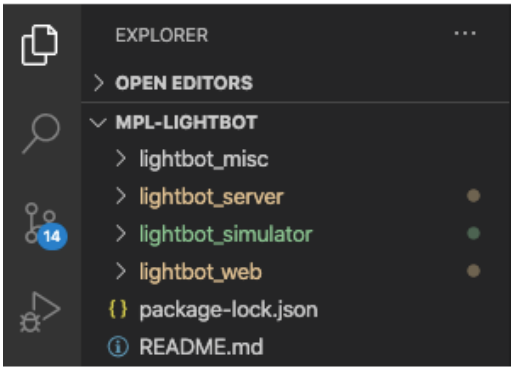

Figure 10: Folder structure

6. To install the relevant packages for the web application, please follow the following steps:
    a. Right click on the lightbot_web folder, and click on "Open Integrated Terminal", see Figure 11.

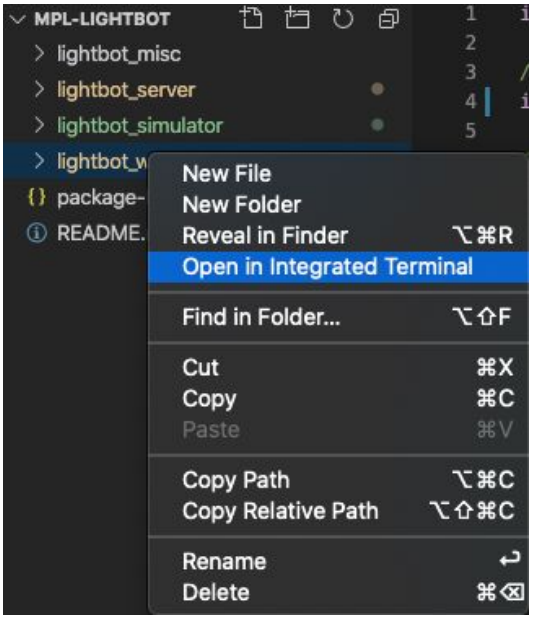

Figure 11: Open Integrated Terminal

b. A terminal will open at the bottom of the IDE, see Figure 12. This is where the installation script, which is one line of code, will be executed. Please ensure that the integrated terminal is specified for lightbot_web.

Figure 12: Integrated Terminal

c. In this terminal, you will type the following command and execute:
   i. npm install

7. To install the relevant packages for the web server, please follow the following steps:
   a. Right click on the lightbot_server folder, and click on "Open Integrated Terminal", see Figure 13.

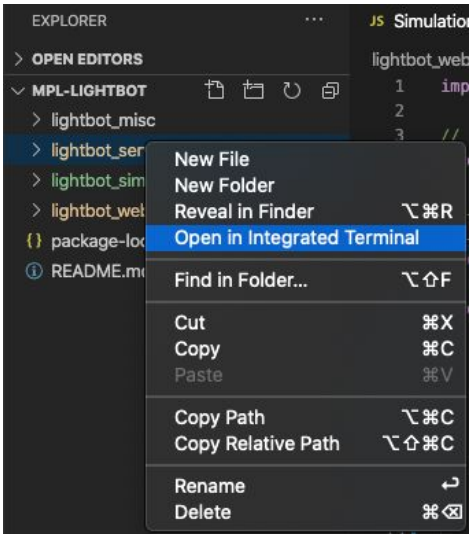

Figure 13: Open Integrated Terminal

b. A new terminal will open at the bottom of the IDE, see Figure 14. This is where the installation script, which is one line of code, will be executed. Please ensure that the integrated terminal is specified for lightbot_server.

Figure 14: Integrated Terminal

c. In this terminal, you will type the following command and execute:
    i. npm install

By executing "npm install" in separate terminals, all needed packages will be installed to run the component, and the system overall. These packages and their versions can all be found in the package.json file in each components folder.

To stop the lightbot_web and lightbot_server components from running, you can press CTRL + C in each integrated terminal. You will be notified that the component has stopped and shut down.

3.3 LightBot Simulator Desktop Application

No installation is needed for the desktop application to run. Once Java 8 is installed, the application will be able to execute smoothly upon opening.

4. Deployment/Running

To execute the LightBot system, the following steps need to be followed:

1. Open up the integrated terminal for the ligtbot_web, and type in the following command:
    a. npm start
2. You will see the terminal displaying this message, see Figure 15, followed by a message that says "Starting deployment server", which means that the application is launched successfully.
3. Your default browser will open up, and the LightBot Web Application will be launched in the browser.

```
> lightbot-dash@1.1.0 start /Users/annvonbackstrom/Desktop/MPL Project/MPL-Lightbot/lightbot_web
> react-scripts start
```

Figure 15: Executing lightbot_web

4. Go back to VS Code, and open up the integrated terminal for the ligtbot_server, and type in the following command:
    a. npm start
5. You will see the terminal displaying this message, see Figure 16, which means that the server is running successfully on the remote api server and is connected to the MongoDB database.

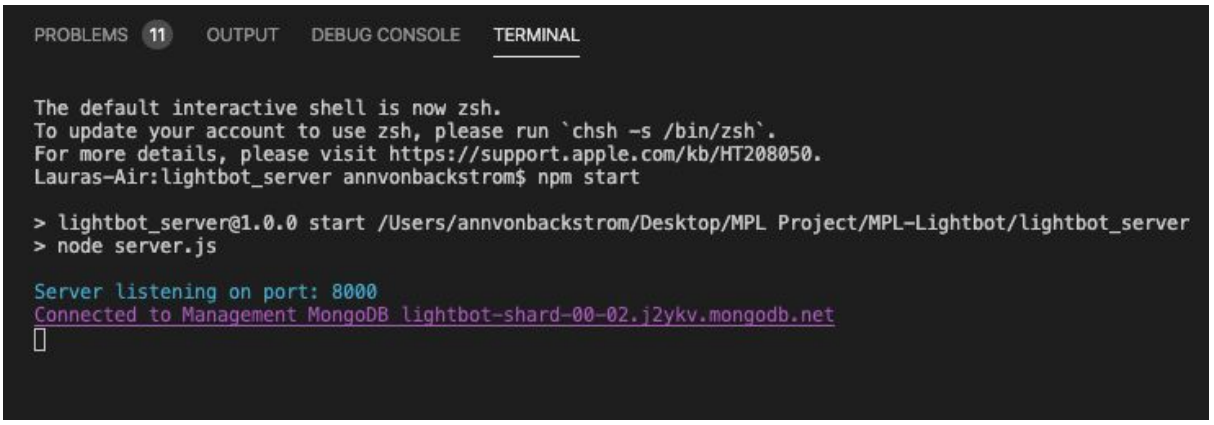

Figure 16: Executing lightbot_server

6. This is only necessary if you decide to run the local node.js server. Otherwise, the web application will run on the remote AWS server.
7. Revert back to your default browser where the web application has launched, and now you can start using the LightBot System. See Figure 17 on how the LightBot web GUI would look like upon successful execution.

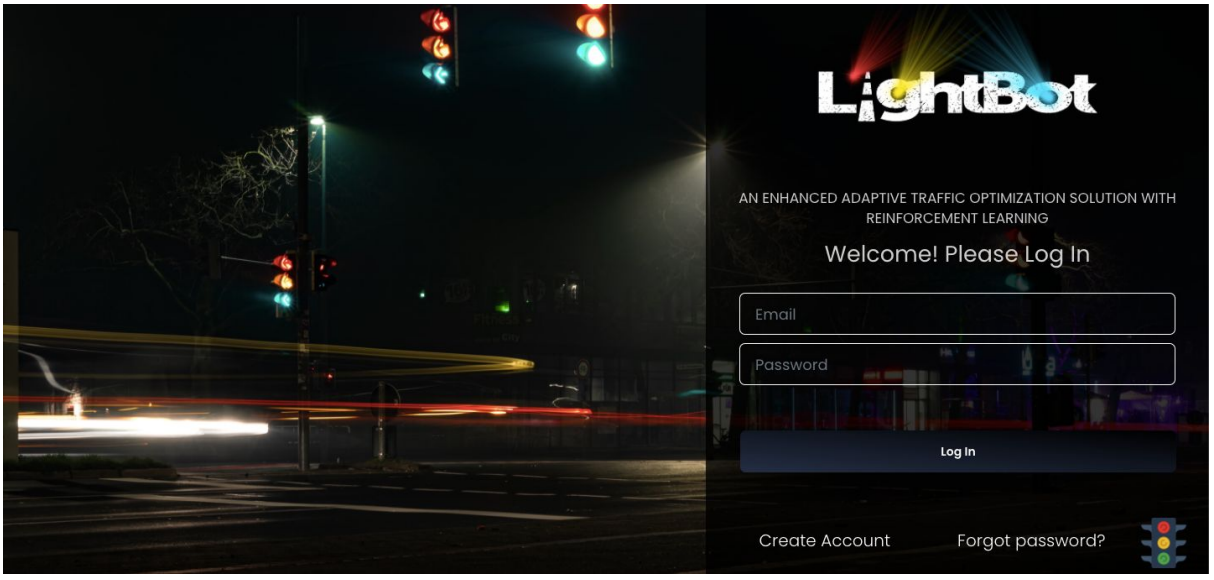

Figure 17: LightBot Web GUI

8. To execute the Lightbot Simulator, you can double-click or right-click on the Sim.jar file that you downloaded on the Simulation page, choose the “Open” option and open with Jar Launcher, see Figure 18.
9. The following interface will open up, which is the Simulator GUI, see Figure 19.

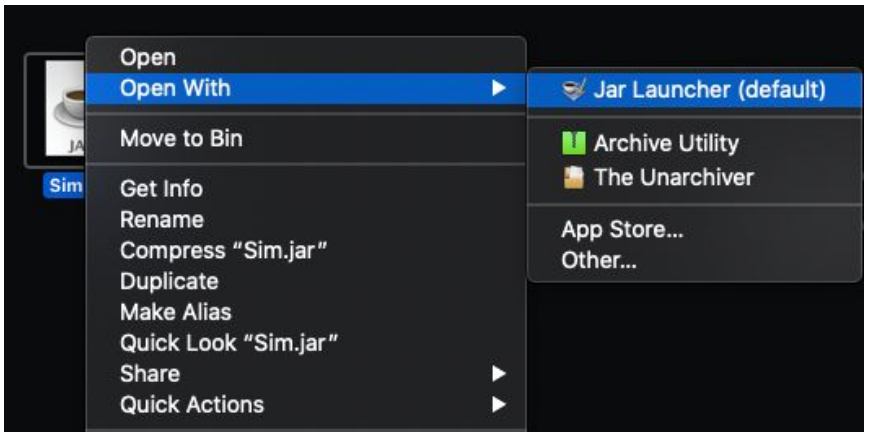

Figure 18: Open Desktop Application

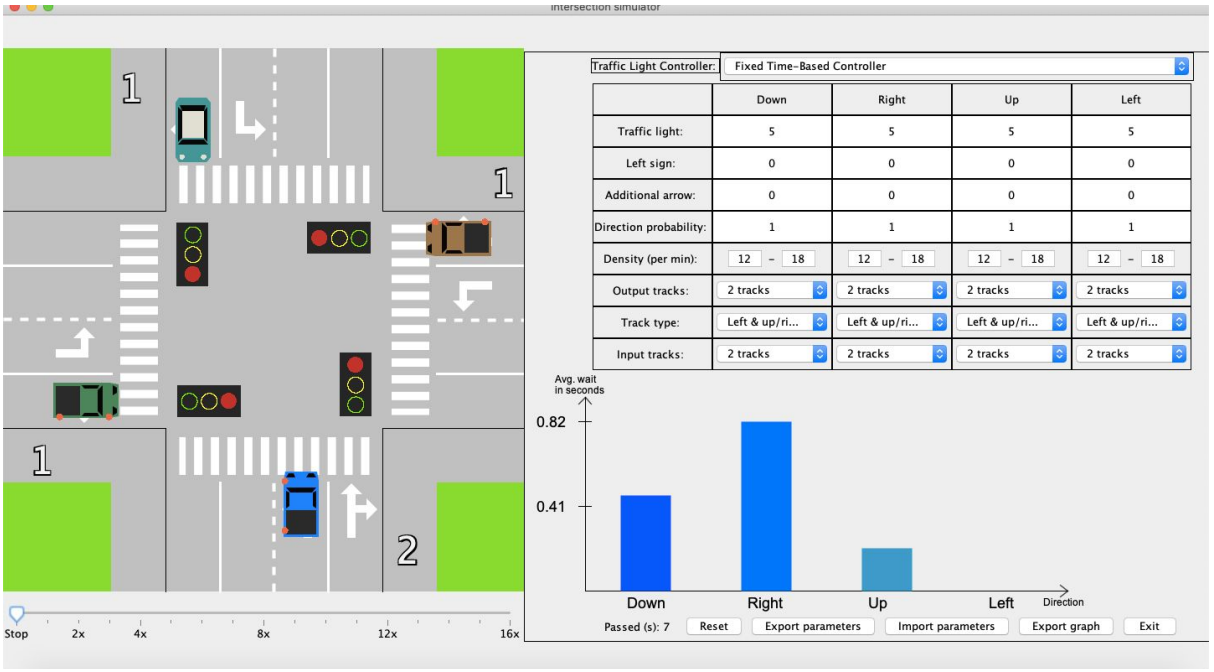

Figure 19: LightBot Simulator GUI

For more information on how the system works, please read the User Manual, which can be found here: https://drive.google.com/file/d/1QjjUKQgILMPNIRjhENtw_VxXSQxo3FFG/view?usp=sharing