

## **Team 2:**

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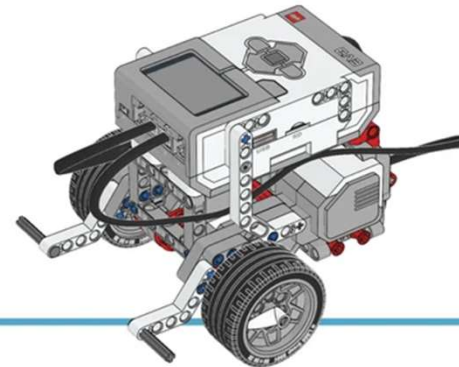
**Hanze Liu**



# **Autonomous Driving Cars**

# Functionality

This will be a core system useable by other systems in BrickMMO. This system lets a user point a location to the vehicle, then the vehicle will drive to that location automatically.



# Dependency

This system will be dependant on :

GPS System  
Charging system  
Speed-Control system



The LEGO Group. (n.d.). Boutique Hotel. Retrieved 2022, from <https://www.lego.com/en-ca/product/boutique-hotel-10297>.

## **3. Settings and Info**

# Settings & State

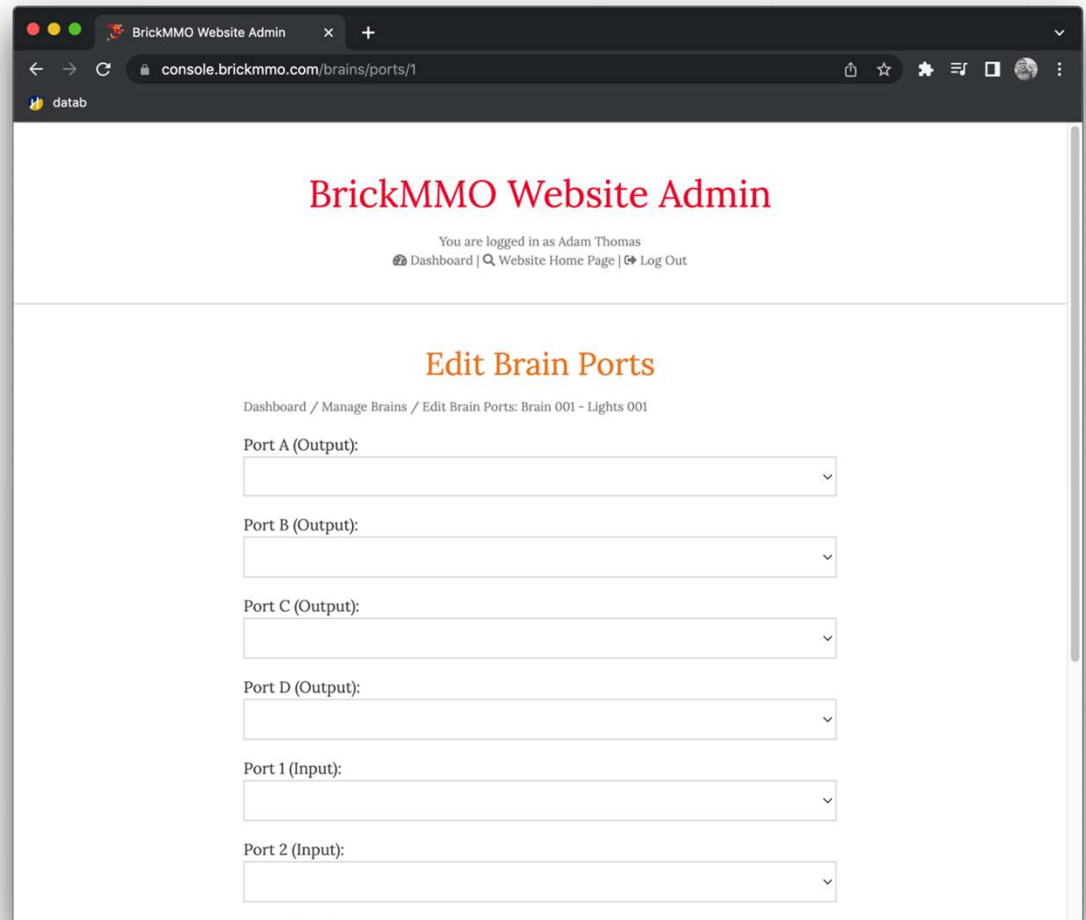
**Vehicle ID** : Unique ID for API calls

**Vehicle state** : On / Off

**Destination** : GPS Location

**Route Traffic** : Retrieve from GPS

**Battery Level** : 0 - 100%



The screenshot shows a web browser window with the title 'BrickMMO Website Admin'. The address bar shows the URL 'console.brickmmo.com/brains/ports/1'. The page content includes the title 'BrickMMO Website Admin' in red, followed by a login status 'You are logged in as Adam Thomas' and a navigation bar with links 'Dashboard', 'Website Home Page', and 'Log Out'. The main heading is 'Edit Brain Ports' in orange. Below it is a breadcrumb trail 'Dashboard / Manage Brains / Edit Brain Ports: Brain 001 - Lights 001'. The form contains six dropdown menus: 'Port A (Output):', 'Port B (Output):', 'Port C (Output):', 'Port D (Output):', 'Port 1 (Input):', and 'Port 2 (Input):'. Each dropdown menu is currently empty and has a downward arrow icon on the right side.

# Module Input / Output

## Inputs

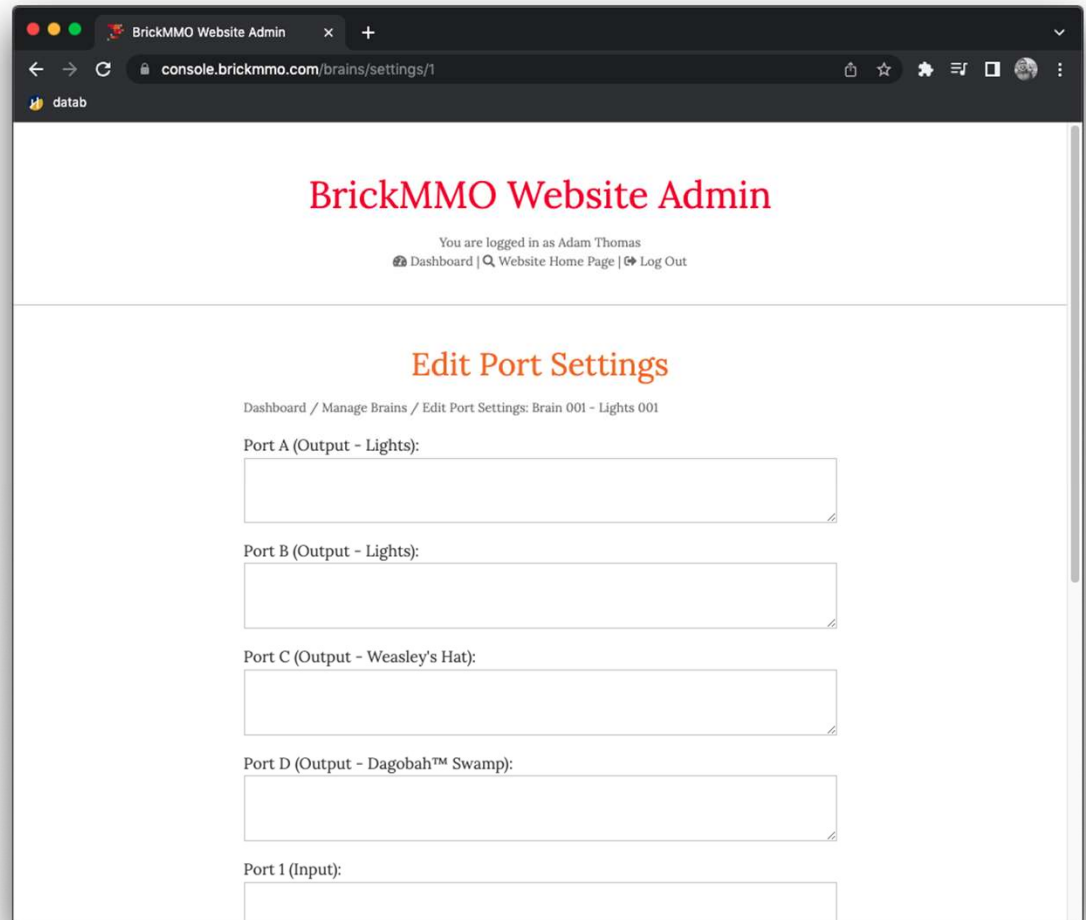
**Destination : GPS Location**

## Outputs

**Shortest Path to Destination : Route**

**Estimated time to Destination : Integer**

**Has enough charge to reach Destination  
: Boolean**



The screenshot shows a web browser window with the title 'BrickMMO Website Admin'. The address bar displays 'console.brickmmo.com/brains/settings/1'. The page header includes the title 'BrickMMO Website Admin' and a login status 'You are logged in as Adam Thomas' with links for 'Dashboard', 'Website Home Page', and 'Log Out'. The main content area is titled 'Edit Port Settings' and shows a breadcrumb trail 'Dashboard / Manage Brains / Edit Port Settings: Brain 001 - Lights 001'. Below this, there are five input fields for port settings: 'Port A (Output - Lights):', 'Port B (Output - Lights):', 'Port C (Output - Weasley's Hat):', 'Port D (Output - Dagobah™ Swamp):', and 'Port 1 (Input):'. Each field is represented by a text input box with a small icon in the bottom right corner.

# Possible Integrations

This core system can possibly be integrated into a future public transit system, or ride share like Uber.

The screenshot shows a web browser window with the title 'BrickMMO Website Admin'. The address bar shows the URL 'console.brickmmo.com/brains/json/1'. The page header includes the title 'BrickMMO Website Admin' and a login status 'You are logged in as Adam Thomas'. Below the header, there are navigation links: 'Dashboard', 'Website Home Page', and 'Log Out'. The main content area is titled 'Edit Port JSON' and shows a breadcrumb trail: 'Dashboard / Manage Brains / Edit Port JSON: Brain 001 - Lights 001'. The page contains five text input fields for editing JSON data:

- Port A (Output - Lights): `{"buildings" : [1]}`
- Port B (Output - Lights):
- Port C (Output - Weasley's Hat):
- Port D (Output - Dagobah™ Swamp):
- Port 1 (Input):



## **4. Ports, Motors, and Settings**

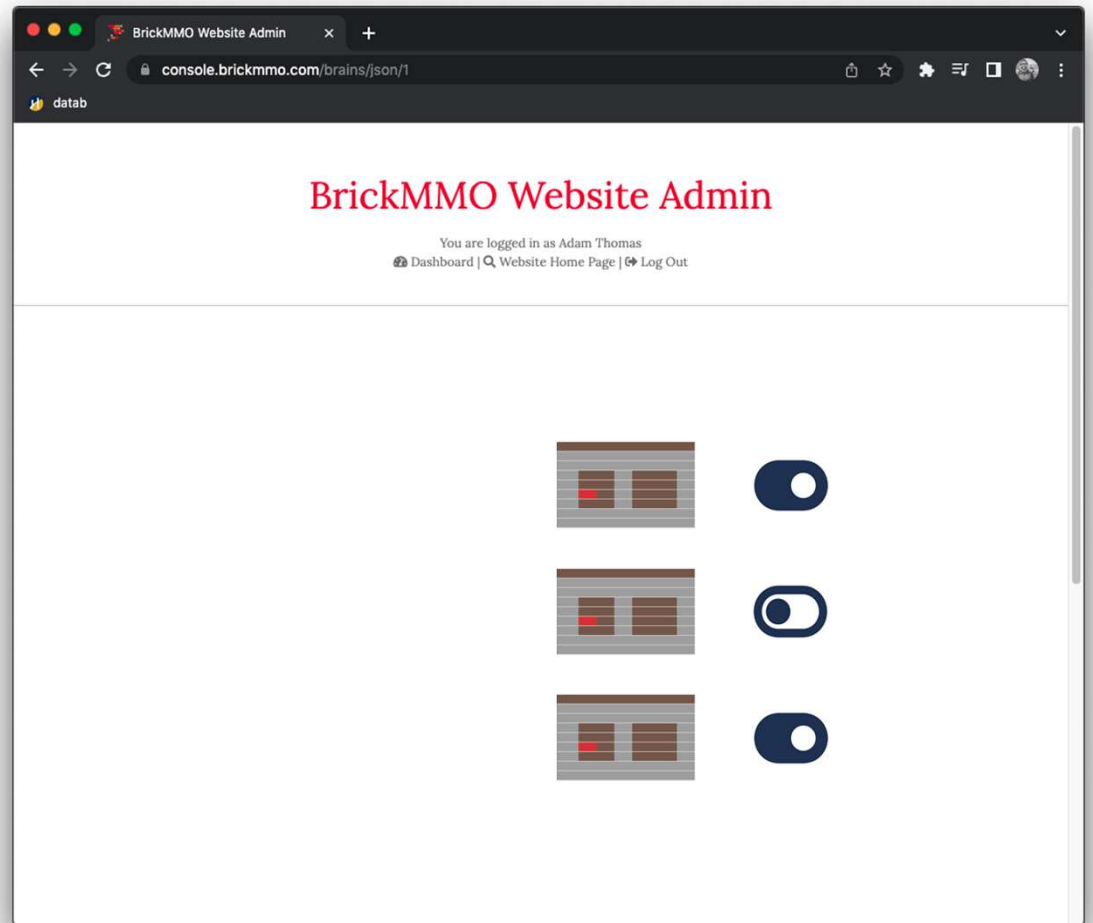
# Sensors and Motors

- EV3 Hub (Brain, receives inputs)
- EV3 Medium Motor to turn infrared sensor
- EV3 Large Motor for accelerating / stopping / turning
- Infrared Sensors / Radar (Measure distance to nearby objects, aid in maneuvering)



# Admin Control Panel

1. Managing vehicle condition
  - Checking battery
  - Checking sensor
1. Parking spot



## **5. Pseudocode**

# IOT Loop

```
if carCharged:  
    set coordinates;  
        while reachedToCoordinates:  
            if obstacle || traffic  
                signal  
                slowDown or stop;  
            else if emptyRoad  
                maintainSpeed;  
else:  
    Use chargingStation;
```



The LEGO Group. (n.d.). Diagon Alley™. Retrieved 2022, from <https://www.lego.com/en-ca/product/diagon-alley-75978>.

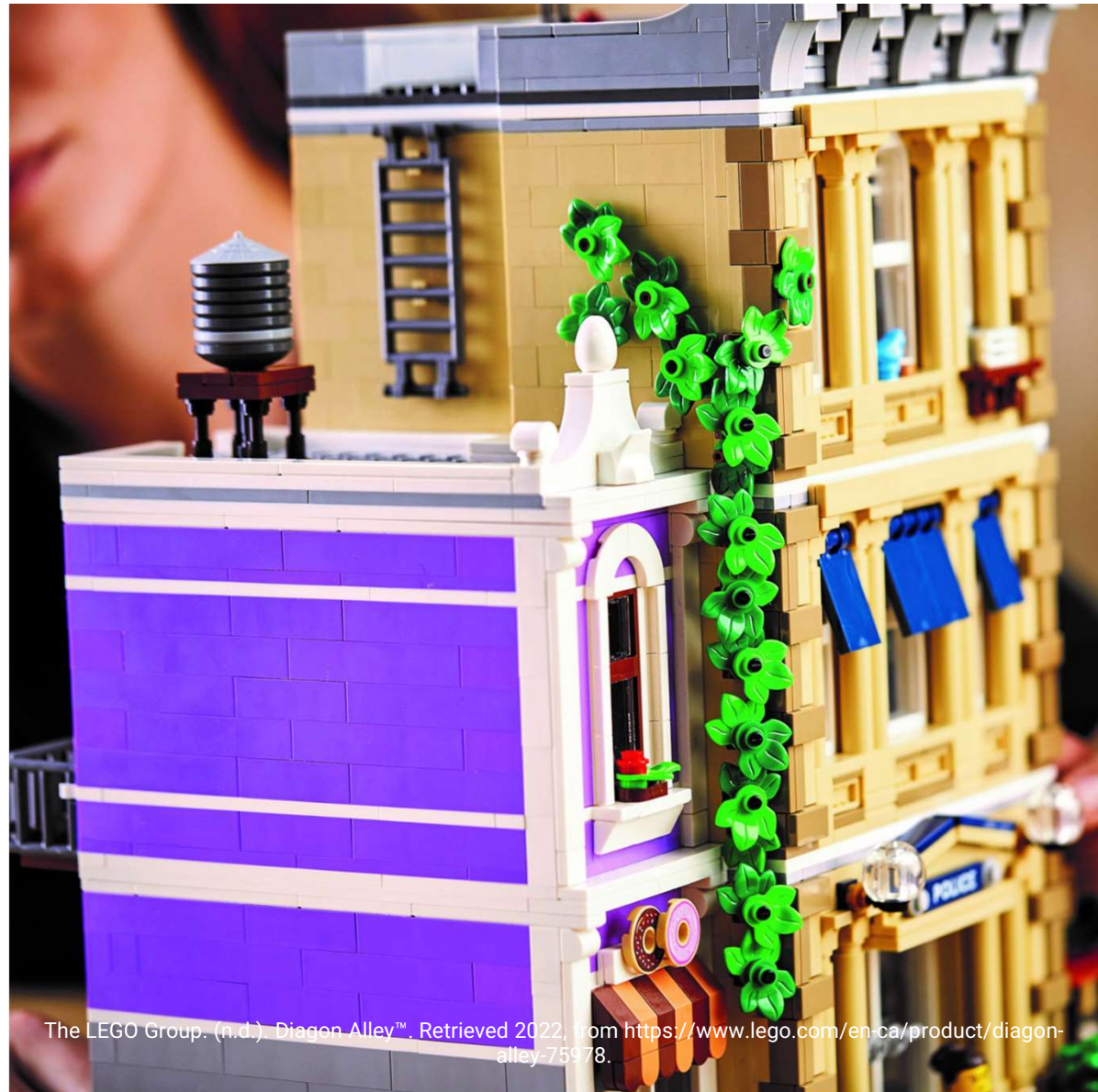
# API Endpoints

/api/vehicle/info/{vehicle-id}

**Returns the vehicle information of the specified vehicle. E.g Battery Percentage, Estimated time to location, etc.**

/api/vehicle/destination/{vehicle-id}/{gps-location}/

**Tells the specified vehicle id to goto the specified location.**



The LEGO Group. (n.d.). Diagon Alley™. Retrieved 2022, from <https://www.lego.com/en-ca/product/diagon-alley-75978>.