THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY
ISDN 2602

Final Project

Firebase Control Panel & Structure

User Manual

Ver. 1.0

Jimmy Wu

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An Overview of the Firebase Data Structure

As part of the assigned task in Lab 5, we familiarized ourselves with Firebase Realtime Database (RTDB) and employed it for both reading and writing data in JSON format. For the final project, we will implement a Real-Time Database to comprehensively monitor the traffic conditions within the scene. This database will enable us to determine the appropriate time to cross the road based on real-time information on traffic light statuses.

The hierarchy of the Json Objects are as follows (For the Actual JSON, please refer to the file attached):

- car
  - position
    - The car's position is identified by a unique tag. [!! It won't be used for this project, so NO NEED to write the tag to the RTDB!]
- demo
  - start_point (1-14)
  - end_point (1-14)
  - state [started, paused, stopped] [!! Your car will need to listen to the change of the state to start moving!]
  - task [1,2,3,4]
  - time_left – A Global timer that count down each second
- intersections
  - intersection_1
    - traffic_lights
      - light_1
        - time_remain
        - current_state
      - light_2
        - time_remain
        - current_state

There are five intersections (labelled 1 to 5), each containing two traffic lights.

Traffic Lights:

Each intersection has two traffic lights labeled as "light_1" and "light_2".

For each light:

"current_state" indicates whether it's currently red, yellow, or green.

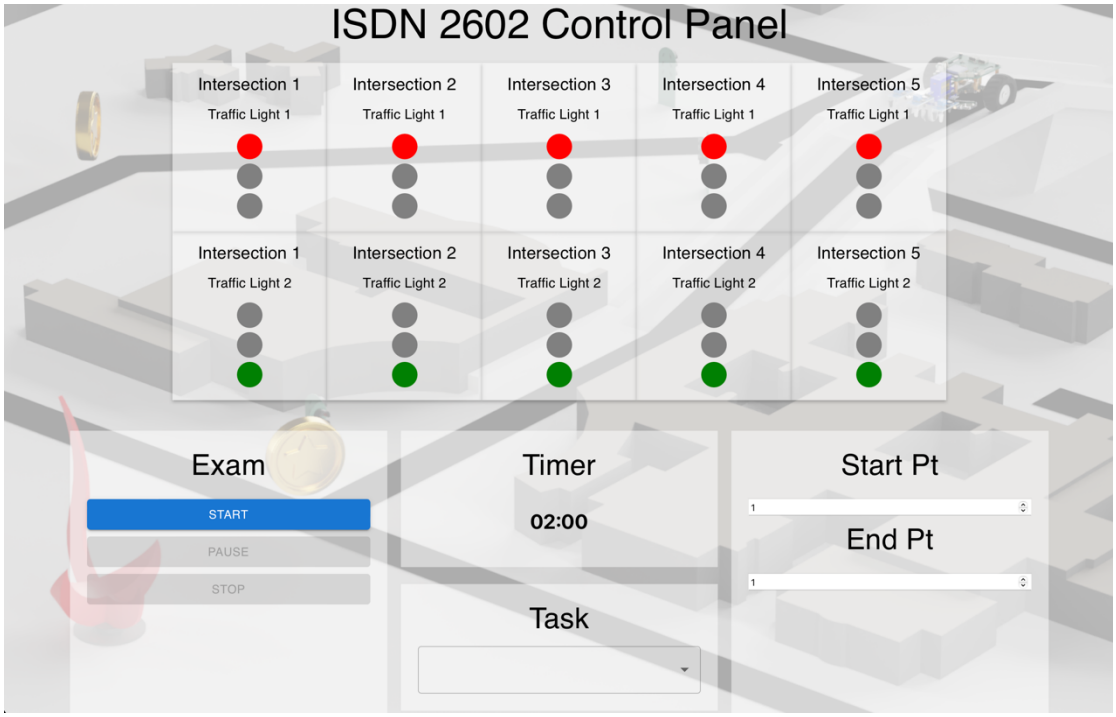
"time_remain" indicates the remaining time for the current state of the light.

Lighting Sequence:

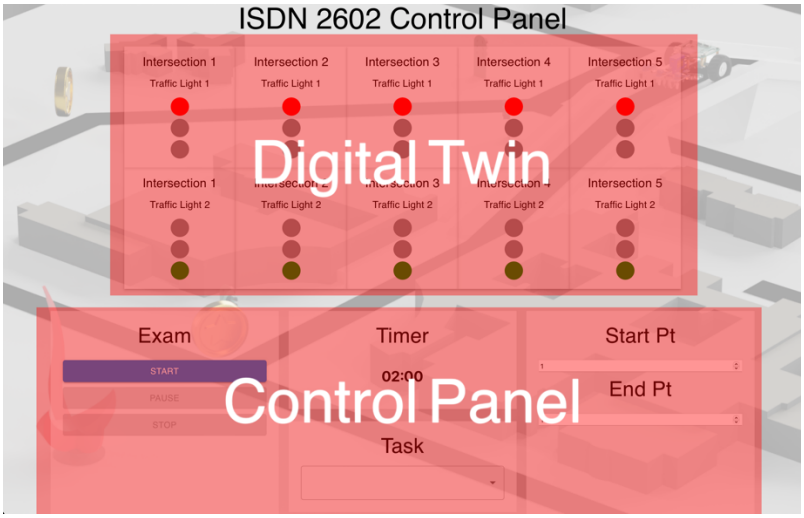
Green [15s] → Yellow [2s] → Red [17s]

<table>
<tr><td>Light 1</td><td>Green [15s]</td><td>Yellow [2s]</td><td colspan="2">Red [17s]</td></tr>
<tr><td>Light 2</td><td colspan="2">Red [17s]</td><td>Green [15s]</td><td>Yellow [2s]</td></tr>
</table>

The Traffic Control System



The Control panel is designed to allow you to visualize all traffic situation and simulate the whole exam experience.



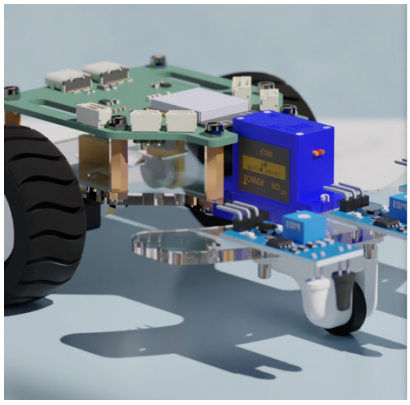
The Control Panel is split to two Areas

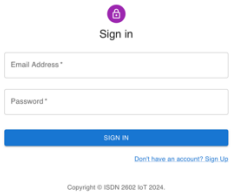
The Digital Twin is a Realtime visualization of all the traffic lights' status.

The Control Panel allows you to simulate the exam scenario and control the light's status.

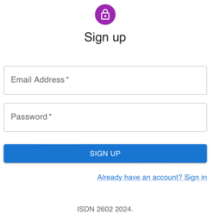
Sign up and Sign In to the Traffic Control System

You can access the traffic Control System at 2602dash.isdss.org





You can Sign in with your account. For the first time use, press sign up.



You will be creating a new account for the 2602 Project. You can pick whatever email and password you like.

It is important that you remember the email and password, as they will be used in your car for authentication, and we won't provide a password retrieval service!

Don't use your account to illegally write to the RTDB! Doing so can damage the database and cause trouble for other students. Write access is provided to your account for your convenience to test with your account, and it will be blocked if any illegal actions are taken!

Important Notes for the Realtime Database

1. Any write to the Realtime database other than other those allowed on the website is strictly prohibited.
2. Please only use the control software when you are physically present at Room 4223 or you will interfere with the testing at the field.
3. Please close the website when it is not in use to prevent accidental trigger.
4. Please remember your username and password for login.