IOT PHASE-5

Public Transportation Optimization- IOT

Aim :

Public transportation and optimization is the fundamental project in future there are many Sufficient factors that can retrieve the sufficient space of human need but public transportation is a basic need of all . in IOT public transportation optimization is done by coding implementation and web development.

OBJECTIVES OF THE PROJECT

- **Improved Efficiency:** Enhance the overall efficiency of the public transportation system by reducing travel times, minimizing congestion, and increasing the system's capacity to serve more passengers.
- **Reduced Congestion:** Alleviate traffic congestion by encouraging the use of public transportation over private vehicles, leading to smoother traffic flow and reduced environmental impact.
- **Increased Ridership:** Attract more passengers to use public transportation by making it more convenient, reliable, and affordable, leading to increased revenue and a reduced reliance on private vehicles.
- **Enhanced Accessibility:** Ensure that public transportation services are accessible to a broader segment of the population, including

individuals with disabilities and those from underserved communities.

- **Sustainability:** Reduce the environmental impact of public transportation by promoting the use of cleaner and more sustainable technologies, such as electric or hybrid vehicles, and by implementing green infrastructure.
- **Economic Viability:** Improve the economic sustainability of the public transportation system, ensuring that it remains affordable and competitive with other transportation options.
- **Safety and Security:** Enhance passenger safety and security through measures such as surveillance systems, emergency response capabilities, and well-lit transportation hubs.
- **Reliability:** Make public transportation services more reliable by optimizing schedules, reducing delays, and ensuring that passengers can depend on the system to get them to their destinations on time.
- **Integration with Other Modes of Transportation:** Promote seamless integration with other transportation modes, such as walking, cycling, and ride-sharing services, to offer passengers a complete and interconnected transportation network.
- **Cost Reduction:** Identify opportunities to reduce operational costs, which can lead to more affordable fares for passengers and greater financial sustainability for the system.
- **Customer Satisfaction:** Improve passenger satisfaction by providing a better overall experience, including convenient ticketing options, clean and well-maintained vehicles, and excellent customer service.

- ❖ **Equity and Inclusivity:** Ensure that public transportation services are equitable and inclusive, serving the diverse needs of all community members, including those with limited means of transportation.
- ❖ **Technological Advancements:** Embrace technology to improve services, such as mobile apps for tracking buses or trains, contactless payment methods, and data-driven decision-making.
- ❖ **Reduction in Energy Consumption:** Implement energy-efficient practices and technologies to reduce the overall energy consumption and carbon footprint of the transportation system.
- ❖ **Fiscal Responsibility:** Ensure responsible financial management, maintain transparency, and maximize the value of taxpayer or fare payer investments.

Public Transportation Optimization

Optimizing public transportation is a complex but highly valuable project that can improve the efficiency, accessibility, and sustainability of urban and regional transit systems. Here are some key steps and considerations for a public transportation optimization project:

- ❖ **Define Project Goals and Objectives:** Clearly outline what you aim to achieve with this project. Goals may include reducing congestion, improving accessibility, reducing environmental impact, or increasing ridership.

- ❖ **Data Collection and Analysis:** Gather data on existing public transportation systems, including routes, schedules, ridership, and operational costs. Analyze this data to identify areas of improvement.

- **Stakeholder Engagement:** Involve various stakeholders, including public transportation agencies, local governments, commuters, and environmental groups. Their input and support are crucial for project success.

IOT Device Setup

- **Choose the IoT Device:** Select the specific IoT device that suits your needs. It could be a sensor, a smart appliance, a camera, or any other device designed to connect to the internet.
  - **Unbox and Assemble:** Unbox the device and assemble it according to the manufacturer's instructions. This may include attaching antennas, connecting cables, or inserting batteries.
- **Power On:** Power on the device by plugging it into an electrical outlet, using batteries, or any other power source specified by the manufacturer.
- **4. Connect to a Network:** Most IoT devices connect to the internet via Wi-Fi or Ethernet. Follow the device's instructions to connect it to your local network.

- **Wi-Fi:** Enter the network name (SSID) and password through the device's interface.

- **Ethernet:** Plug in an Ethernet cable to connect directly to your router.

- **5. Download the Companion App:** Many IoT devices come with companion mobile apps. Download the app from the App Store (iOS) or Google Play (Android) and follow the app's instructions to set up your device.

- **6. Device Configuration:** Configure the device using the app or a web-based interface, if applicable. You may need to set preferences, configure sensors, or define how the device should interact with other smart devices.

- **7. Create User Accounts:** If the device requires user accounts or cloud service integration, create accounts on the respective platforms and link the device to your account.

- **8. Firmware/Software Updates:** Check for and install any firmware or software updates for the IoT device to ensure it has the latest features, security patches, and bug fixes.

- **9. Set Up Automation and Integration:** If your device is part of a smart home or smart office ecosystem, integrate it with other devices or platforms (e.g., Amazon Alexa, Google Assistant, or Apple HomeKit). Set up automation routines or voice control, if desired.

- **10. Security Considerations:** Pay attention to security. Change default passwords, enable encryption, and follow best practices for securing your IoT device. Be cautious about sharing sensitive data with the device.

PLATFORM DEVELOPMENT

MIT APP INVERTER

Create an MIT App Inventor Account: To get started, visit the MIT App Inventor website and create an account.

- Start a New Project: After logging in, start a new project. You can choose from a blank project or use one of the provided templates.

- Design the User Interface: Use the drag-and-drop interface to design your app's user interface. Add components like buttons, labels, images, and text boxes.

- Program the App: Use the visual blocks to program the app's functionality. This includes defining how buttons and other components will respond to user interactions.

- Test the App: Use the built-in emulator or connect your Android device to the MIT App Inventor platform to test your app in real-time.

- Refine and Debug: As you test your app, you may encounter issues or want to make improvements. Refine your code and design as needed.

- Package and Distribute: Once you're satisfied with your app, you can package it and distribute it via the Google Play Store or other distribution methods.

Create an MIT App Inventor Account: To get started, visit the MIT App Inventor website and create an account.

- ❖ Start a New Project: After logging in, start a new project. You can choose from a blank project or use one of the provided templates.

- ❖ Design the User Interface: Use the drag-and-drop interface to design your app's user interface. Add components like buttons, labels, images, and text boxes.

- ❖ Program the App: Use the visual blocks to program the app's functionality. This includes defining how buttons and other components will respond to user interactions.

- ❖ Test the App: Use the built-in emulator or connect your Android device to the MIT App Inventor platform to test your app in real-time.

- ❖ Refine and Debug: As you test your app, you may encounter issues or want to make improvements. Refine your code and design as needed.

- ❖ Package and Distribute: Once you're satisfied with your app, you can package it and distribute it via the Google Play Store or other distribution methods.

PROGRAM IMPLEMENTATION

1. **Gather Data:** Collect data related to the transportation system, such as routes, schedules, passenger data, and traffic conditions. This data is crucial for optimization.
2. **Data Analysis:** Analyze the collected data to identify patterns, areas for improvement, and opportunities for optimization.
3. **Algorithm Development:** Develop optimization algorithms to improve aspects of the transportation system, such as route planning, scheduling, and resource allocation.
4. **Software Development:** Create software that implements your optimization algorithms. This could include a web-based dashboard, mobile apps for passengers, and backend systems for managing transportation data.
5. **Integration:** Integrate your software with real-time data sources, such as GPS tracking and traffic information, to ensure your system responds to current conditions.
6. **Testing:** Thoroughly test your system in a controlled environment to ensure that it works as expected and optimizes transportation routes and schedules.

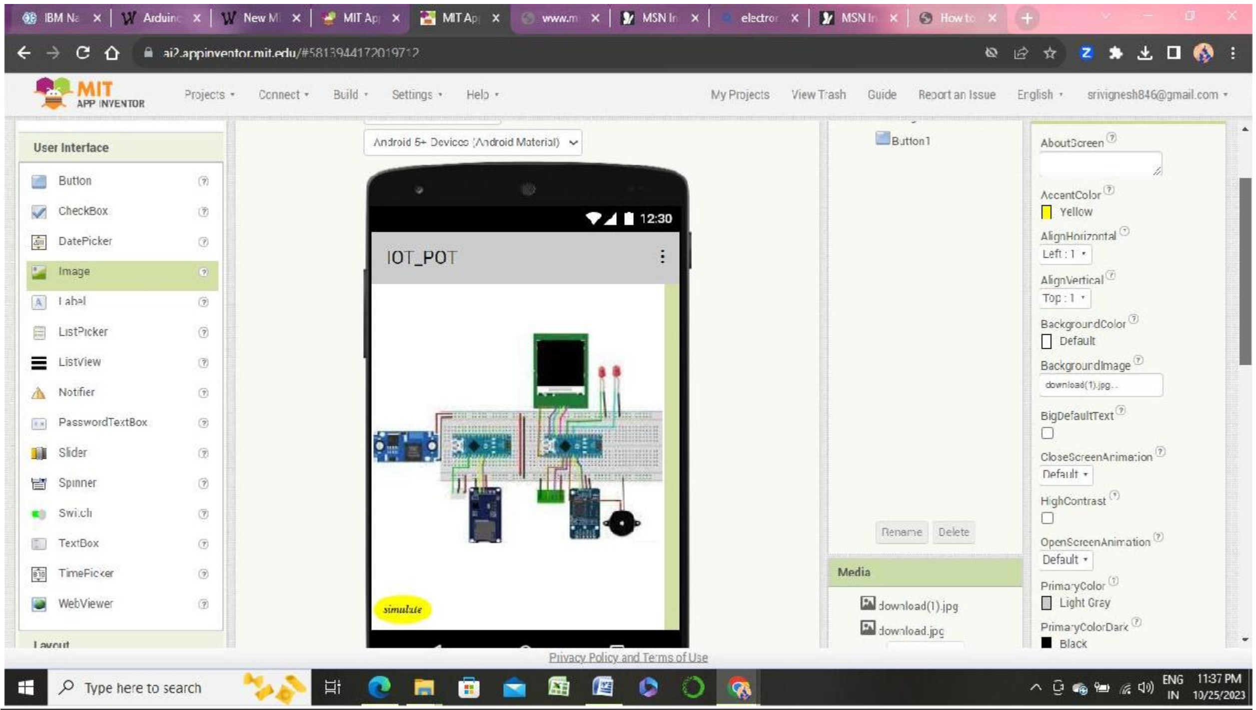
code

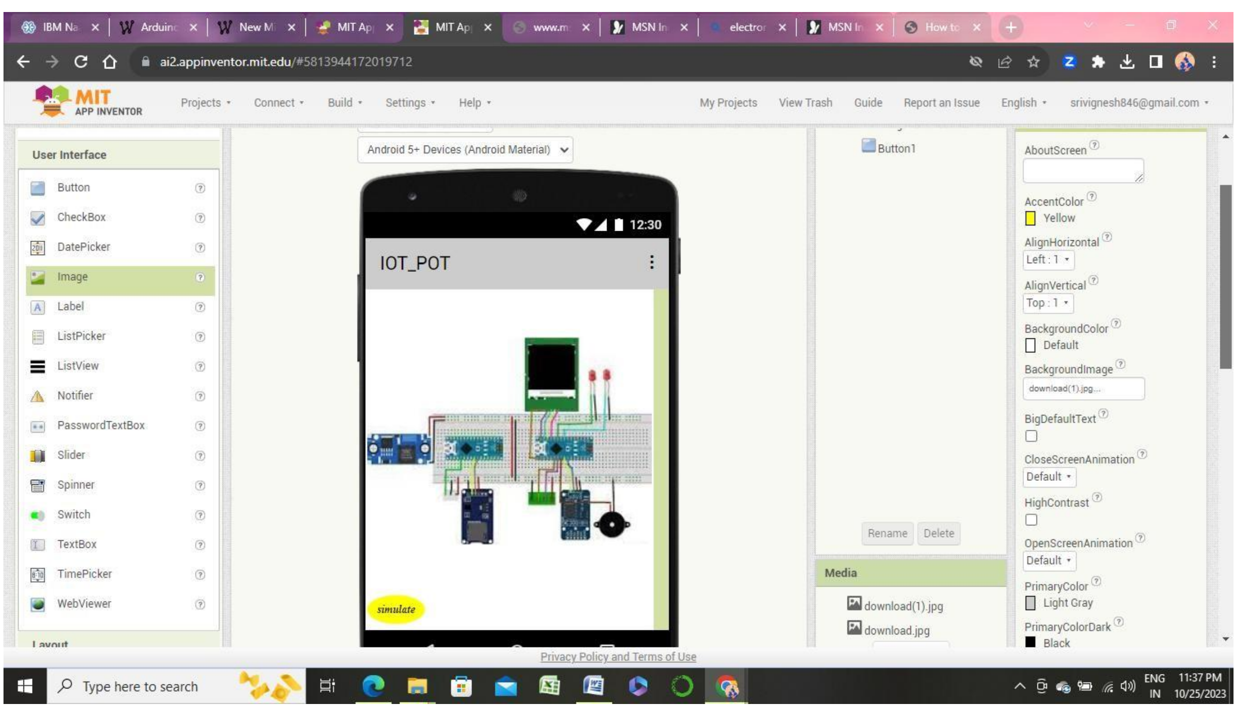
```
#define BLYNK_TEMPLATE_ID
"TMPL26V4fGv5q"
#define BLYNK_TEMPLATE_NAME "Test"
#define BLYNK_AUTH_TOKEN
"XEHxNF_Ur1Nt2p7wB5B20dNI1ZUwj34P"

#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>

int duration1 = 0;
int distance1 = 0;
int duration2 = 0;
int distance2 = 0;
int dis1 = 0;
int dis2 = 0;
int dis_new1 = 0;
int dis_new2 = 0;
int entered = 0;
int left = 0;
int inside = 0;
```

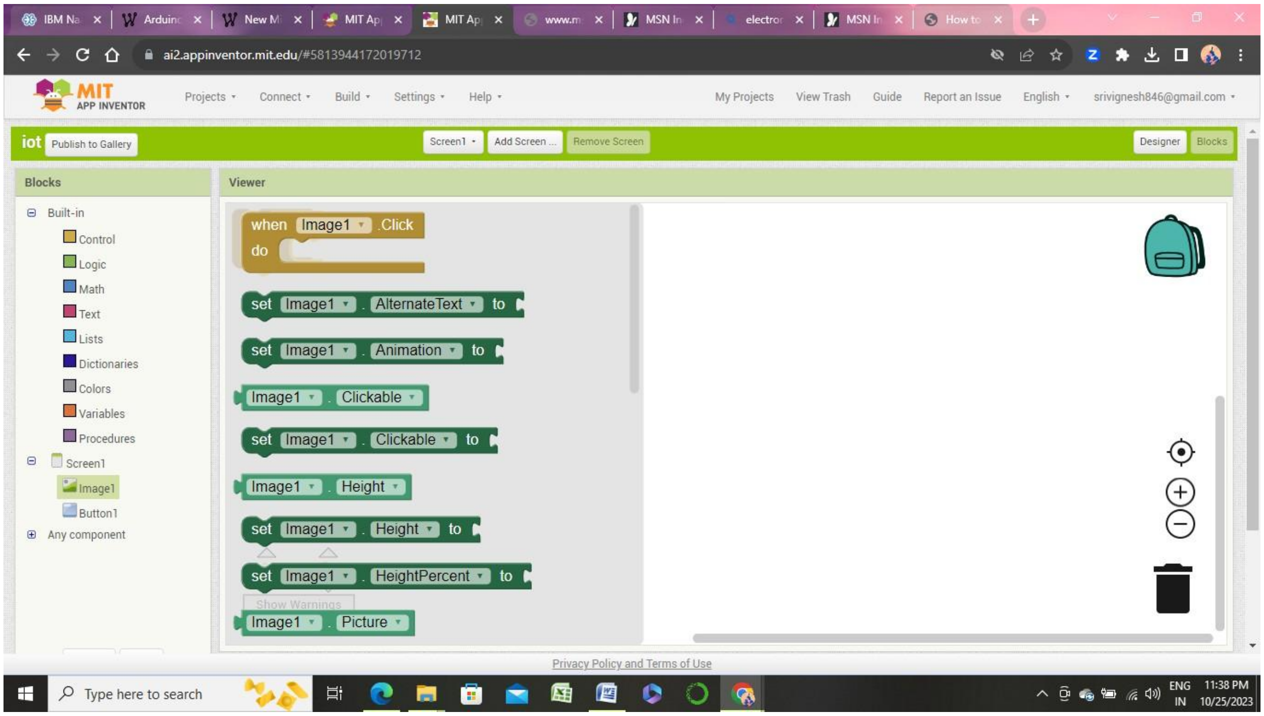
```
#define LED 2
#define PIN_TRIG1 15
#define PIN_ECHO1 14
#define PIN_TRIG2 13
#define PIN_ECHO2 12
BlynkTimer timer;

char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "Wokwi-GUEST";   // your network
SSID (name)
char pass[] = "";
#define BLYNK_PRINT Serial

long get_distance1() {
  // Start a new measurement:
  digitalWrite(PIN_TRIG1, HIGH);
  delayMicroseconds(10);
  digitalWrite(PIN_TRIG1, LOW);

  // Read the result:
  duration1 = pulseIn(PIN_ECHO1, HIGH);
  distance1 = duration1 / 58;
  return distance1;
}
```

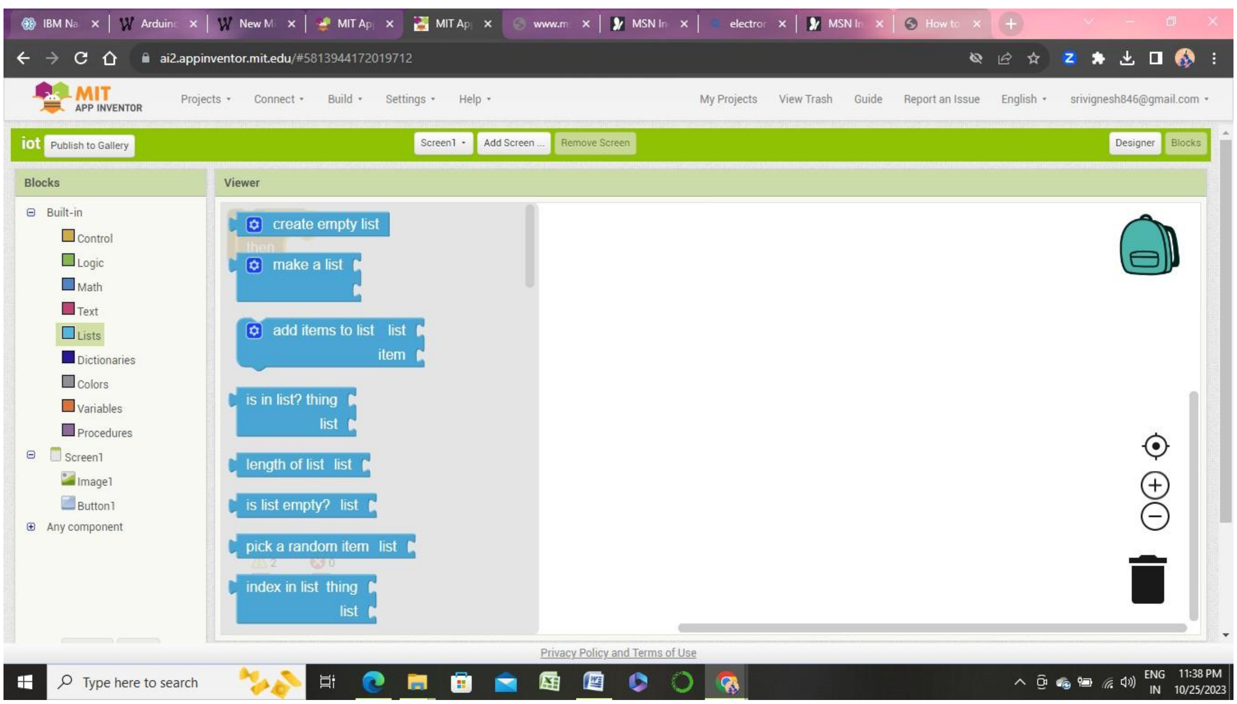
```
long get_distance2() {
  // Start a new measurement:
  digitalWrite(PIN_TRIG2, HIGH);
  delayMicroseconds(10);
  digitalWrite(PIN_TRIG2, LOW);

  // Read the result:
  duration2 = pulseIn(PIN_ECHO2, HIGH);
  distance2 = duration2 / 58;
  return distance2;
}

void myTimer() {
  Serial.println("100");
  dis_new1 = get_distance1();
  dis_new2 = get_distance2();
  if (dis1 != dis_new1 || dis2 != dis_new2){
    Serial.println("200");
    if (dis1 < dis2){
      Serial.println("Enter loop");
      entered = entered + 1;
      inside = inside + 1;
      digitalWrite(LED, HIGH);
```

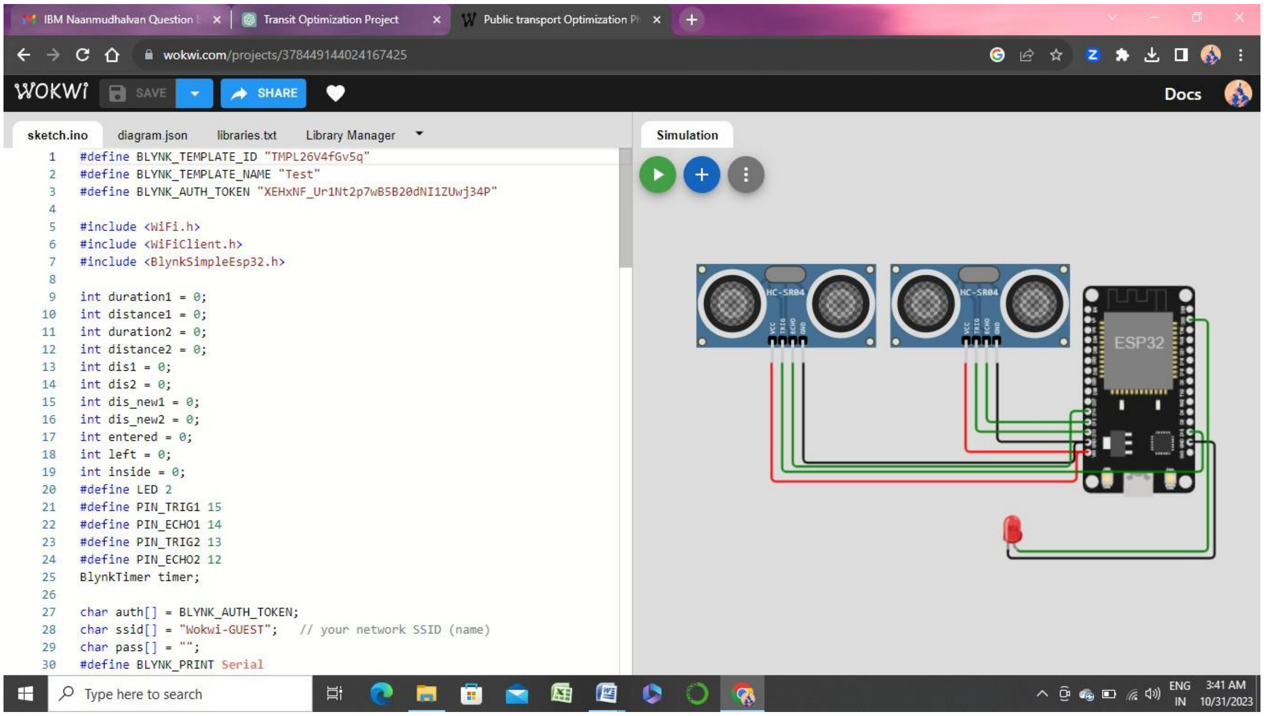
```
    Blynk.virtualWrite(V0, entered);
    Blynk.virtualWrite(V2, inside);
    dis1 = dis_new1;
    delay(1000);
    digitalWrite(LED, LOW);
  }
  if (dis1 > dis2){
    Serial.println("Leave loop");
    left = left + 1;
    inside = inside - 1;
    Blynk.virtualWrite(V1, left);
    Blynk.virtualWrite(V2, inside);
    dis2 = dis_new2;
    delay(1000);
  }

}
```


ai2.appinventor.mit.edu/#5813944172019712
MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
srivignesh846@gmail.com
User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Layout
Android 5+ Devices (Android Material)
12:30
IOT_POT
simulate
Button1
Rename
Delete
Media
download(1).jpg
download.jpg
AboutScreen
AccentColor
Yellow
AlignHorizontal
Left : 1
AlignVertical
Top : 1
BackgroundColor
Default
BackgroundImage
download(1).jpg...
BigDefaultText
CloseScreenAnimation
Default
HighContrast
OpenScreenAnimation
Default
PrimaryColor
Light Gray
PrimaryColorDark
Black
Privacy Policy and Terms of Use
Type here to search
ENG
IN
11:37 PM
10/25/2023

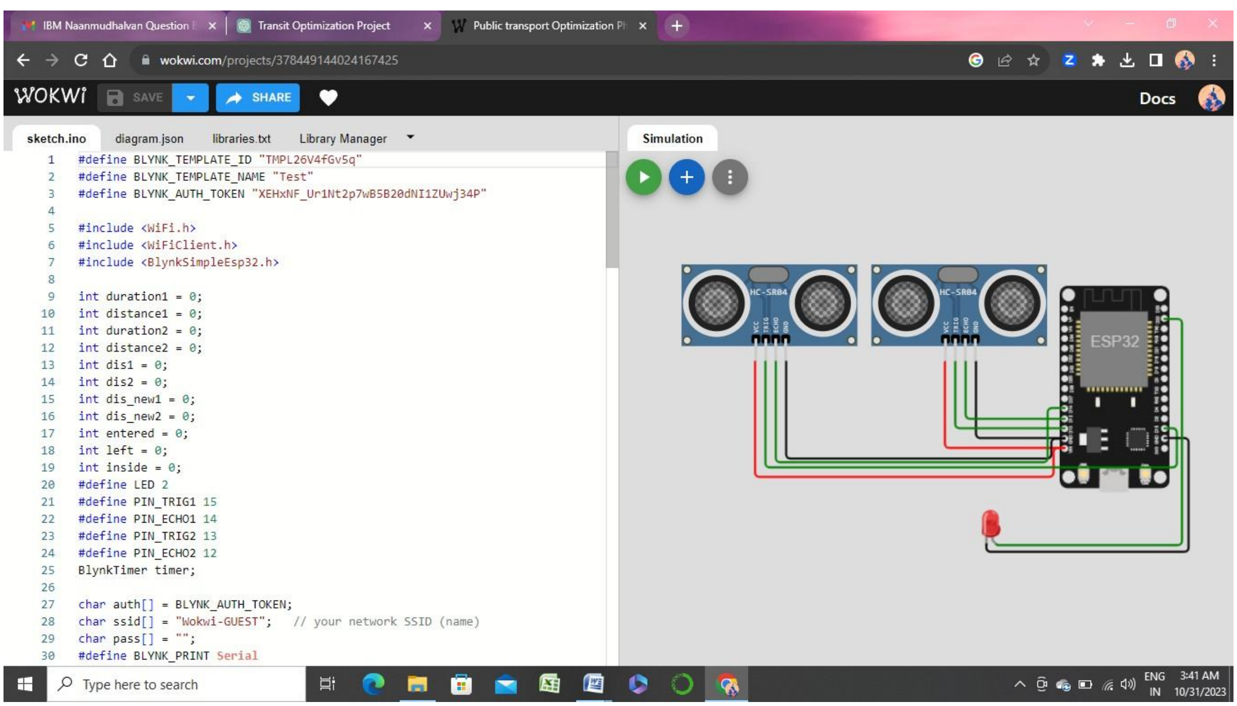

ai2.appinventor.mit.edu/#5813944172019712
MIT APP INVENTOR
Projects
Connect
Build
Settings
Help
My Projects
View Trash
Guide
Report an Issue
English
srivignesh846@gmail.com
User Interface
Button
CheckBox
DatePicker
Image
Label
ListPicker
ListView
Notifier
PasswordTextBox
Slider
Spinner
Switch
TextBox
TimePicker
WebViewer
Layout
Android 5+ Devices (Android Material)
12:30
IOT_POT
simulate
Button1
Rename
Delete
Media
download(1).jpg
download.jpg
AboutScreen
AccentColor
Yellow
AlignHorizontal
Left : 1
AlignVertical
Top : 1
BackgroundColor
Default
BackgroundImage
download(1).jpg...
BigDefaultText
CloseScreenAnimation
Default
HighContrast
OpenScreenAnimation
Default
PrimaryColor
Light Gray
PrimaryColorDark
Black
Privacy Policy and Terms of Use
Type here to search
ENG
IN
11:37 PM
10/25/2023


ai2.appinventor.mit.edu/#5813944172019712
MIT APP INVENTOR
Projects Connect Build Settings Help
My Projects View Trash Guide Report an Issue English srivignesh846@gmail.com
iot Publish to Gallery
Screen1 Add Screen ... Remove Screen
Designer Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
Screen1
Image1
Button1
Any component
Viewer
when Image1 .Click
do
set Image1 . AlternateText to
set Image1 . Animation to
Image1 . Clickable
set Image1 . Clickable to
Image1 . Height
set Image1 . Height to
set Image1 . HeightPercent to
Image1 . Picture
Privacy Policy and Terms of Use
Type here to search
11:38 PM
10/25/2023

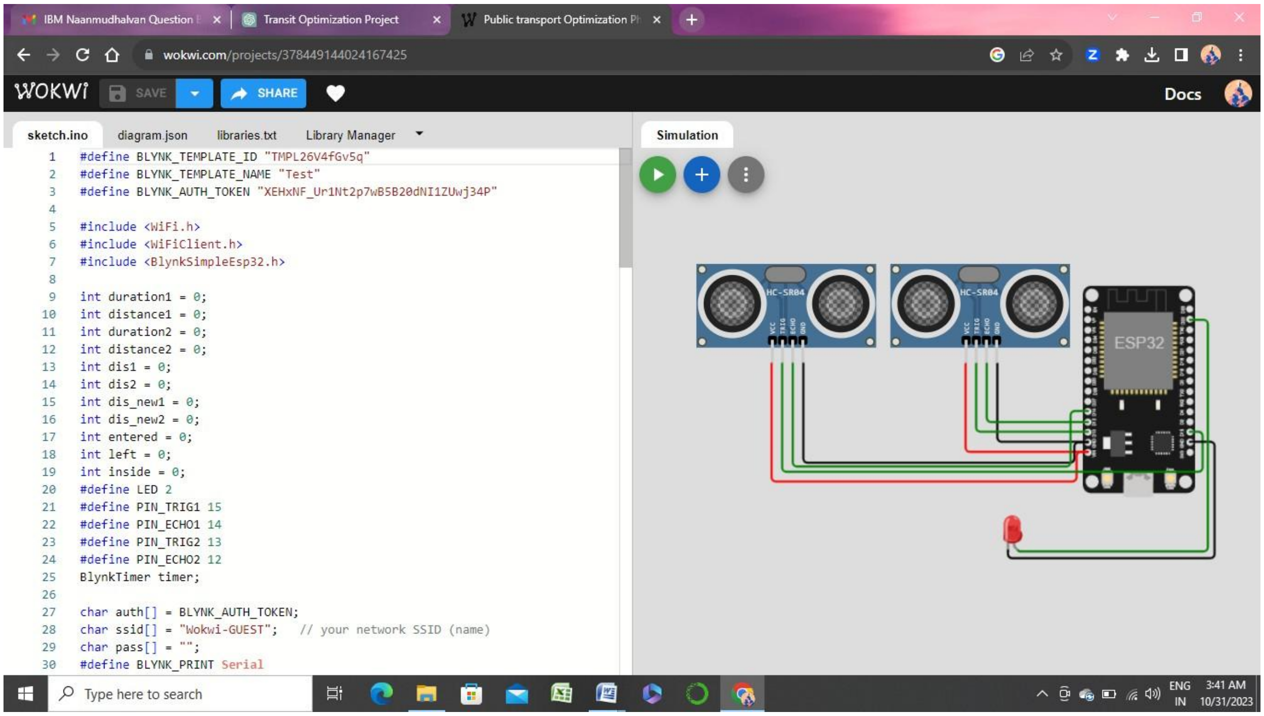

ai2.appinventor.mit.edu/#5813944172019712
MIT APP INVENTOR
Projects Connect Build Settings Help
My Projects View Trash Guide Report an Issue English srivignesh846@gmail.com
iot Publish to Gallery
Screen1 Add Screen ... Remove Screen
Designer Blocks
Blocks
Built-in
Control
Logic
Math
Text
Lists
Dictionaries
Colors
Variables
Procedures
Screen1
Image1
Button1
Any component
Viewer
create empty list
make a list
add items to list list
item
is in list? thing
list
length of list list
is list empty? list
pick a random item list
index in list thing
list
Privacy Policy and Terms of Use
Type here to search
11:38 PM
10/25/2023

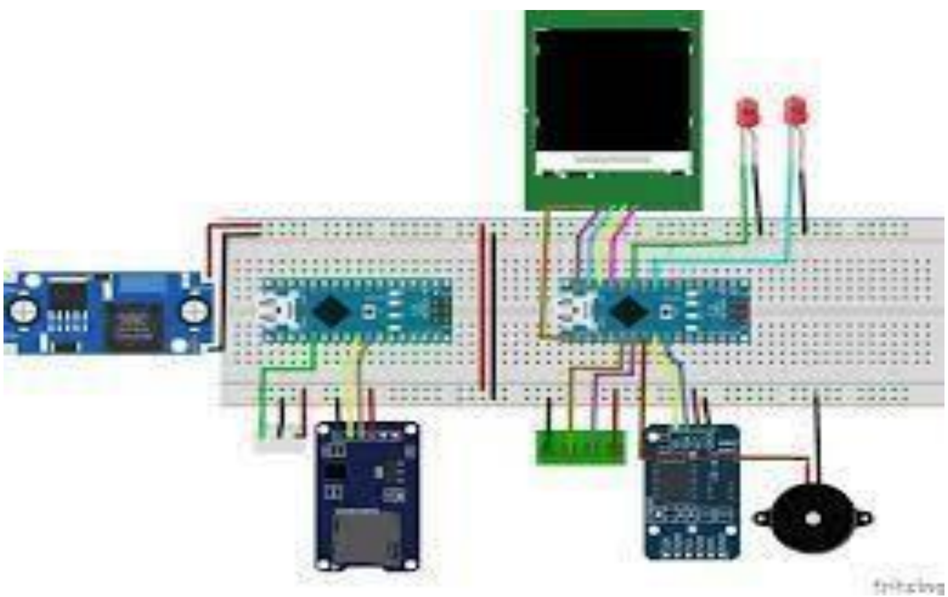


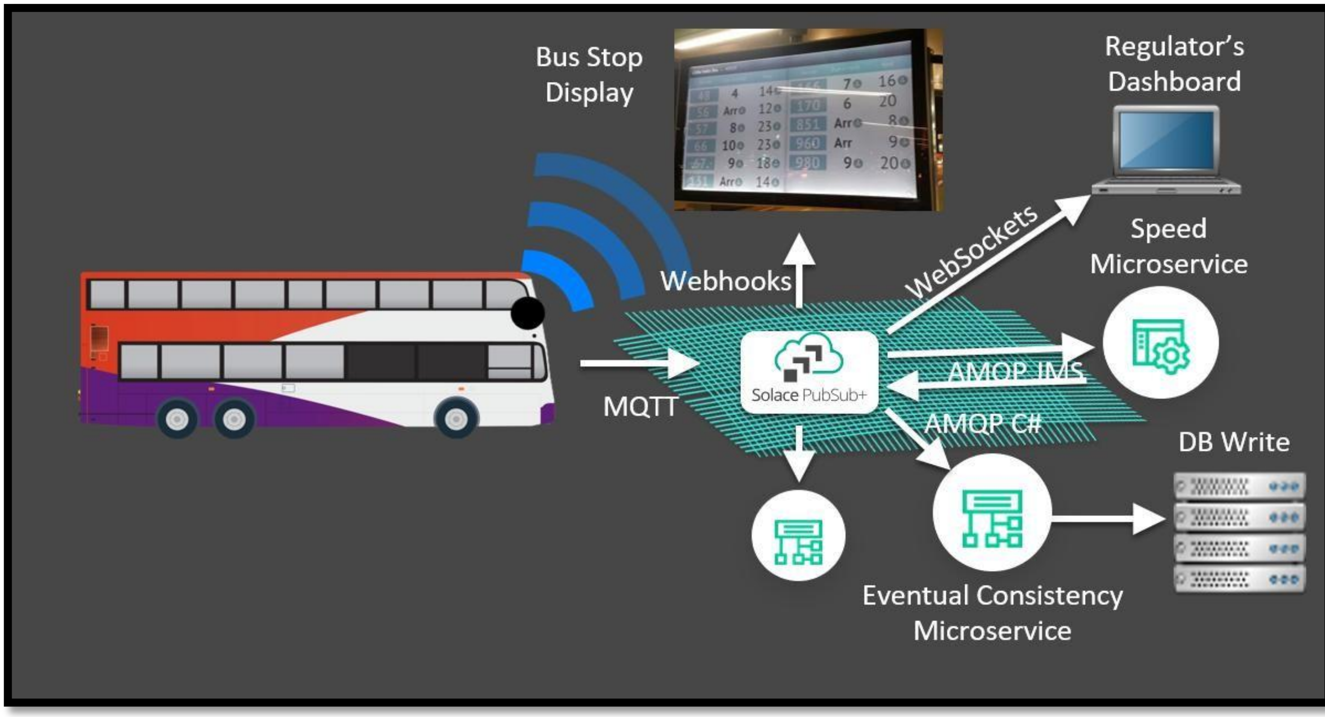
IBM Naanmudhalvan Question
Transit Optimization Project
Public transport Optimization Pr
wokwi.com/projects/378449144024167425
WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
#define BLYNK_TEMPLATE_ID "TMPL26V4fGv5q"
#define BLYNK_TEMPLATE_NAME "Test"
#define BLYNK_AUTH_TOKEN "XEHxNF_Ur1Nt2p7wB5B20dNI1ZUwj34P"
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
int duration1 = 0;
int distance1 = 0;
int duration2 = 0;
int distance2 = 0;
int dis1 = 0;
int dis2 = 0;
int dis_new1 = 0;
int dis_new2 = 0;
int entered = 0;
int left = 0;
int inside = 0;
#define LED 2
#define PIN_TRIG1 15
#define PIN_ECHO1 14
#define PIN_TRIG2 13
#define PIN_ECHO2 12
BlynkTimer timer;
char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "Wokwi-GUEST";   // your network SSID (name)
char pass[] = "";
#define BLYNK_PRINT Serial
HC-SR04
HC-SR04
ESP32
Type here to search
ENG
IN
3:41 AM
10/31/2023



IBM Naanmudhalvan Question
Transit Optimization Project
Public transport Optimization Pr
wokwi.com/projects/378449144024167425
WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
#define BLYNK_TEMPLATE_ID "TMPL26V4fGv5q"
#define BLYNK_TEMPLATE_NAME "Test"
#define BLYNK_AUTH_TOKEN "XEHxNF_Ur1Nt2p7wB5B20dNI1ZUwj34P"
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
int duration1 = 0;
int distance1 = 0;
int duration2 = 0;
int distance2 = 0;
int dis1 = 0;
int dis2 = 0;
int dis_new1 = 0;
int dis_new2 = 0;
int entered = 0;
int left = 0;
int inside = 0;
#define LED 2
#define PIN_TRIG1 15
#define PIN_ECHO1 14
#define PIN_TRIG2 13
#define PIN_ECHO2 12
BlynkTimer timer;
char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "Wokwi-GUEST";   // your network SSID (name)
char pass[] = "";
#define BLYNK_PRINT Serial
HC-SR04
HC-SR04
ESP32
Type here to search
ENG
IN
3:41 AM
10/31/2023


IBM Naanmudhalvan Question
Transit Optimization Project
Public transport Optimization
wokwi.com/projects/378449144024167425
WOKWI
SAVE
SHARE
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
Simulation
#define BLYNK_TEMPLATE_ID "TMPL26V4fGv5q"
#define BLYNK_TEMPLATE_NAME "Test"
#define BLYNK_AUTH_TOKEN "XEHxNF_Ur1Nt2p7wB5B20dNI1ZUwj34P"
#include <WiFi.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
int duration1 = 0;
int distance1 = 0;
int duration2 = 0;
int distance2 = 0;
int dis1 = 0;
int dis2 = 0;
int dis_new1 = 0;
int dis_new2 = 0;
int entered = 0;
int left = 0;
int inside = 0;
#define LED 2
#define PIN_TRIG1 15
#define PIN_ECHO1 14
#define PIN_TRIG2 13
#define PIN_ECHO2 12
BlynkTimer timer;
char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "Wokwi-GUEST"; // your network SSID (name)
char pass[] = "";
#define BLYNK_PRINT Serial
HC-SR04
HC-SR04
ESP32
Type here to search
ENG
IN
3:41 AM
10/31/2023





Bus Stop
Display
Regulator's
Dashboard
WebSockets
Speed
Microservice
Webhooks
Solace PubSub+
MQTT
AMQP JMS
AMQP C#
DB Write
Eventual Consistency
Microservice