Centre for infrastructure, SustainableTransportation and Urban Planning

Indian Institute of Science (IISc), Bengaluru
Summer Internship: Round 1

The aim of this exam is to test your web development skills using React.js . This exam includes a web SPA development task and partial solutions will also be considered while shortlisting for subsequent rounds. Hence, you are encouraged to submit the best possible code. Follow the instructions below precisely.

- Plagiarism will result in instant disqualification. You must write your own code.
- You are required to host the coded web application in GitHub and share the link of the same while you submit your response.
- You are free to use any open-source libraries / frameworks for this coding exam.
- To make your submission, use the following Google form: submission link. You are allowed to make only one submission for this test. While submitting, you will be asked to upload three items:
  - A zip file consisting of the React.js code (or) drive link to the React.js code.
  - GitHub link of the webpage.
  - A report (format: *pdf*) summarizing all of the below information:
    - Pre-requisites for running the application in development mode
    - Details of the open-source frameworks or libraries used for development of the webpage
    - Any assumptions made while developing the code
    - Steps to run the code in development mode.
- Your submissions will be evaluated based on the quality of the report and codes. More weightage will be given to the styling of components and the overall look and feel of the webpage.
- Add comments to your code, so that any other person going through the code can find it easy to follow.
- The sample web page screenshots shared in this task need not be exactly re-created and you are free to experiment with the styling of the page. However, there should be no change to the logic and the format shared in the task.
- Make sure that the code shared is free of any compilation errors. It is okay if the task is incomplete, but the code should be free of compilation errors when it is run in the development code.
- In case you are submitting an incomplete code, please mention the details of the complete and in-complete portions of the task in the final report.
- The test commences on 8th April 2023 (10:00 AM). The last date for submission is 10th April 2023(10:00 AM). Late submissions will not be accepted.
- Feel free to route any queries related to the coding task to sandhyasouri@iisc.ac.in
- This project will be used to shortlist for the following projects:
  - Development of React.js based in-house transit / household data collection tool

All the best.

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Coding task: Design a React.js based UI with pages as described below:

(1) Page 1 (Home page)

Title of the page: Respondent Travel profile

Logic for page design:

This page should include two questions with radio button options. The questions and options to be shown are listed below:

Q1: What is your most frequently used means of travel from your home to work location?

Options for Q1 (to be shown as radio button):

- Bus
- Metro
- Own Two-wheeler
- Own Car
- Walk / Bicycle
- Auto
- App based ride hailing cab services including Ola / Uber

Q2: What is the total distance between your home and workplace?

Options for Q2 (to be shown as radio button):

- < 5 km
- 5 - 10 km
- 10- 15 km
- 15- 20 km
- 20- 25 km
- > 25 km

The responses selected for Q1 and Q2 in Page 1 will impact the display of options in Page 2.

(2) Page 2

Title of the page: Mode choice

Logic for page design:

In this page, a mode choice table is to be shown and the format of the same has been detailed below. The values to be shown in the table has to be picked up from a set of JSON files. A sample image of the mode choice table is shown at the end of this task.

For all the rows (1-7) in the mode choice table, the values to be displayed are to be taken from a set of JSON files which can be downloaded from this link. The JSON file has a list of attributes for each mode types and the structure of JSON has been explained below:

There is one JSON file for each distance band chosen as a response in Q2 of Page, and below table gives the mapping of the distance band to the JSON file name:

Distance band (option from Q1)	JSON file name
< 5 km	sample_db_0km.json
5 - 10 km	sample_db_5km.json

10- 15 km	sample_db_10km.json
15- 20 km	sample_db_15km.json
20- 25 km	sample_db_20km.json
> 25 km	sample_db_25km.json

Each JSON file (associated with one distance band) has data for a set of modes, and each mode has a set of attributes. The details of each mode key in the JSON is given below:

mode_1 - corresponds to the data of Bus Type 1

mode_2 - corresponds to the data of Bus Type 2

mode_4 - corresponds to the data of 'Metro' mode if the distance (Q2 response) is >5km

mode_4 - corresponds to the data of ' Walk / Bicycle' mode if the distance (Q2 response) is < 5km.

mode_5 - corresponds to the data of ' Ride-hailing Car' mode.

mode_7 - corresponds to the data of ' Auto' mode.

mode_8 - corresponds to the data of ' Own Car' mode.

mode_9 - corresponds to the data of Own Two-wheeler' mode.

Each mode has the below attribute and the below table shows the mapping of the variables from JSON to the mode choice table.

Row # in the mode choice table	Attribute description	Mode attribute in the JSON file
1	Name of the modes	mode keys corresponding to the mode names detailed above
2	Total travel time spent while inside the vehicle(s)	ivtt
2	Number of transfers	trans
3	Total travel time spent outside vehicle(s) = walktime + waittime	walktime waittime
4	Possible delay due to traffic congestion or other uncertainties	tvariab
5	Total one-way cost of travel	Tcost
6	Extent of crowding in the vehicle	Crowd
7	Service Type	Serv

Row #1 of Mode choice table: List of modes to be shown with a radio button option is needed for each mode.

- **Mode 1** shown in first column should always be 'Bus Type 1'. The value can also be picked up from the JSON file corresponding to key 'mode_1'.
- **Mode 2** shown in second column should always be 'Bus Type 2'. The value can also be picked up from the JSON file corresponding to key 'mode_2'.
- If Q2 response in Page 1 is <5km, **Mode 3** should be shown as 'Walk / Bicycle'. For all other responses of Q2, Mode 3 should be 'Metro'.

  Logic to show the title and the values for the mode in the third column is given below:

Q2 response option	Mode to be shown in 3rd column	mode variable to be picked	JSON file to be used
<5 km	Walk / Bicycle	mode_4	sample_db_0km.json
5 - 10 km	Metro	mode_4	sample_db_5km.json
10- 15 km	Metro	mode_4	sample_db_10km.json
15- 20 km	Metro	mode_4	sample_db_15km.json
20- 25 km	Metro	mode_4	sample_db_20km.json
> 25 km	Metro	mode_4	sample_db_25km.json

- If Q1 response in Page 1 is 'Own Two-wheeler', **Mode 4** should be shown as 'Own Two-wheeler'. If Q1 response in Page 1 is 'Own Car', **Mode 4** should be shown as 'Own Car'. For any other responses selected in Q1, **Mode 4** should be randomly picked between 'Own Car' and 'Own Two-wheeler'.

  Logic to show the mode name and the values for the mode in the fourth column is given below:

Q1 response option	Mode to be shown in 4th column	mode variable to be picked
Own Car	Own Car	mode_8
Own Two-wheeler	Own Two-wheeler	mode_9

- If Q1 response in Page 1 is 'Auto', **Mode 5** should be shown as 'Auto'. If Q1 response in Page 1 is 'App based ride hailing cab services including Ola / Uber', **Mode 5** should be shown as 'Ride hailing cab services'. For any other responses selected in Q1, **Mode 5** should be randomly picked between 'Auto' and 'Ride hailing cab services'.

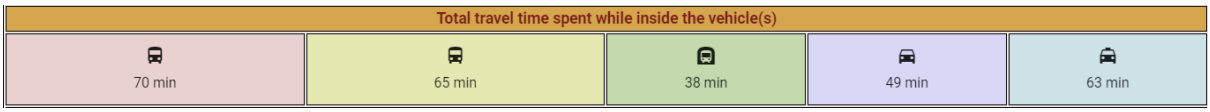
Logic to show the mode name and the values for the mode in the fifth column is given below:

Q1 response option	Mode to be shown in 4th column	mode variable to be picked
Auto	Auto	mode_7
App based ride hailing cab services including Ola / Uber	Ride-hailing Car	mode_5

For a respondent who has mentioned has travelled less than 5 km by Own Two-wheeler, row #1 of the mode choice table may look something like what is shown below:

Row #2 of Mode choice table: Total travel time spent while inside the vehicle(s)

Below is the sample layout for 0 transfers (i.e if the db json has trans attribute as 0) for mode_1 / mode_2. Trans will always be 0 for all other modes. IVTT values are to be picked up from the ivtt attribute corresponding to the mode.



Below is the sample layout for 1 transfers (i.e if the db json has trans attribute as 1) for mode_1 / mode_2. Trans will always be 0 for all other modes. IVTT values are to be picked up from the **ivtt** attribute corresponding to the mode.

Total travel time spent while inside the vehicle(s)				
1 transfer 80 min	75 min	42 min	49 min	63 min

Row #3 of Mode choice table: Total travel time spent outside vehicle(s)

This is the sum total of walktime and waittime attributes corresponding to a mode.

Total travel time spent outside vehicle(s)				
24 min	24 min	27 min	0 min	8 min

Row #4 of Mode choice table: Possible delay due to traffic congestion or other uncertainties

The value corresponding to tvariab attribute of each mode is to be shown.

Possible delay due to traffic congestion or other uncertainties				
... up to 18 min more	... up to 19 min more	... up to 5 min more	... up to 35 min more	... up to 14 min more

Row #5 of Mode choice table: Total one-way cost of travel

The value corresponding to tcost attribute of each mode is to be shown.

Total one-way cost of travel				
Rs. 68	Rs. 71	Rs. 61	Rs. 150	Rs. 425

Row #6 of Mode choice table: Extent of crowding in the vehicle

The value corresponding to crowd attribute of each mode is retrieved. Crowding information is required only for first 3 modes corresponding to public transport. The value retrieved from the JSON file is further mapped to the below JSON variable and information is displayed accordingly:

crowd_json:{1:"Many seats available",2:"Some seats available",3:"All seats occupied; standing space available",4:"Fully crowded or packed"},

Extent of crowding in the vehicle				
All seats occupied; standing space available	Many seats available	Fully crowded or packed		

Row #7 of Mode choice table: Service type

The value corresponding to serv attribute of each mode is retrieved. Service Type information is required only for first 2 modes (Bus Type 1 and Bus Type 2) corresponding to public transport. The value retrieved from the JSON file is further mapped to the below JSON variable and information is displayed accordingly:

servtype_json:{1:"Ordinary",2:"Express Non-AC",3:"Express AC"},

Some sample images of the mode choice table is shown below.

Bus Route 1	Bus Route 2	Metro/ Train	Own Car	Ola/ Uber Car
Total travel time spent while inside the vehicle(s)				
1 transfer 80 min	75 min	42 min	49 min	63 min
Total travel time spent outside vehicle(s)				
20 min	24 min	27 min	0 min	9 min
Possible delay due to traffic congestion or other uncertainties				
... up to 24 min more	... up to 18 min more	... up to 5 min more	... up to 28 min more	... up to 14 min more
Total one-way cost of travel				
Rs. 24	Rs. 107	Rs. 55	Rs. 130	Rs. 450
Extent of crowding in the vehicle				
Some seats available	Some seats available	All seats occupied; standing space available		
Service type				
Ordinary	Express Non-AC			

Bus Route 1	Bus Route 2	Metro/ Train	Own Car	Ola/ Uber Car
Total travel time spent while inside the vehicle(s)				
70 min	65 min	38 min	49 min	63 min
Total travel time spent outside vehicle(s)				
24 min	24 min	27 min	0 min	8 min
Possible delay due to traffic congestion or other uncertainties				
... up to 18 min more	... up to 19 min more	... up to 5 min more	... up to 35 min more	... up to 14 min more
Total one-way cost of travel				
Rs. 68	Rs. 71	Rs. 61	Rs. 150	Rs. 425
Extent of crowding in the vehicle				
All seats occupied; standing space available	Many seats available	Fully crowded or packed		
Service type				
Express Non-AC	Express AC			

Note:

- Icons are needed to visualize the transfers for 'Total travel time spent while inside the vehicle(s) (IVTT)'. Icons / colours shown in this image for all other sections of the Mode choice table (except IVTT) are a good-to-have feature and the styling need not be exactly same as shown in this image. You are free to use your creativity and CSS skills in the styling of the mode choice table.
- The values of each mode choice attribute displayed in the above sample images may not necessarily be consistent with the values shared in the JSON files for this coding task and these images have been shared just to gain an understanding of the layout shared and explained in the coding task.