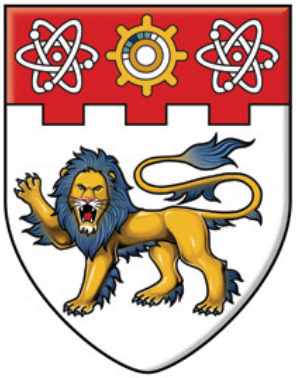


NANYANG TECHNOLOGICAL UNIVERSITY

Simulator Manual

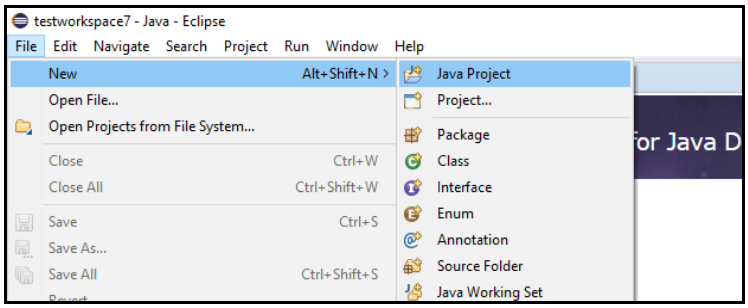
Building a Simulator for Electric Vehicles' Charging Behaviour

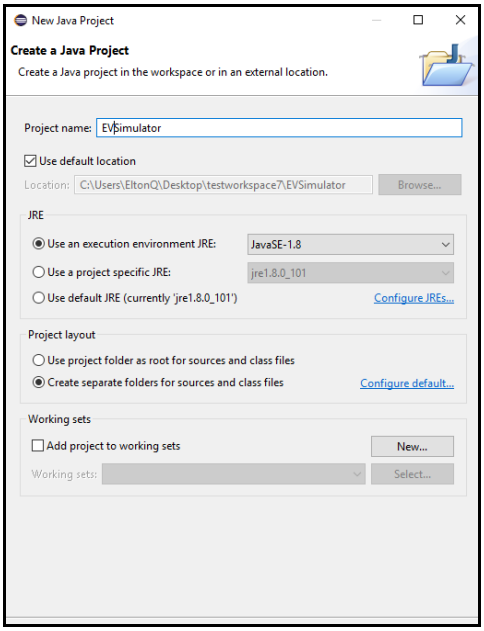
SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

Contents

Installation Manual

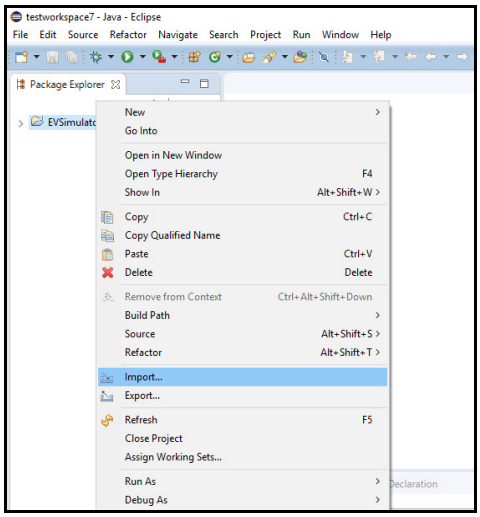
1. Create new Java project Eclipse



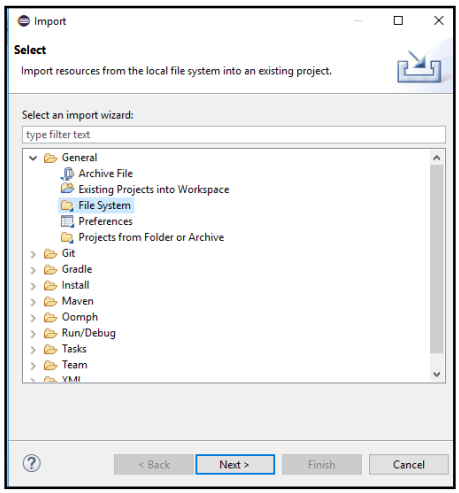


Click finish

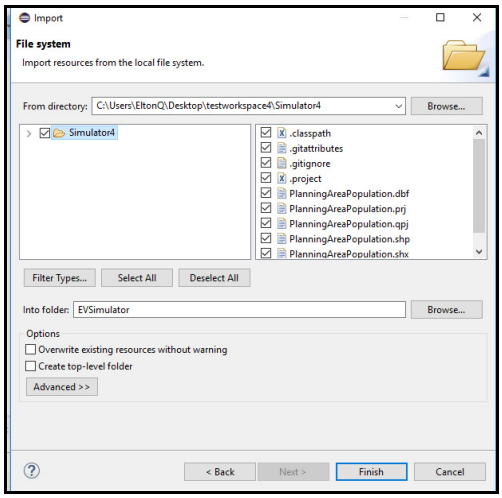
2. Import all the Source Code into java workspace:



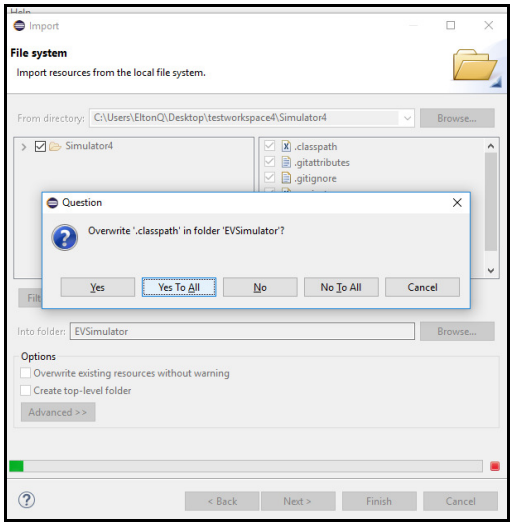
Select “File Systems”



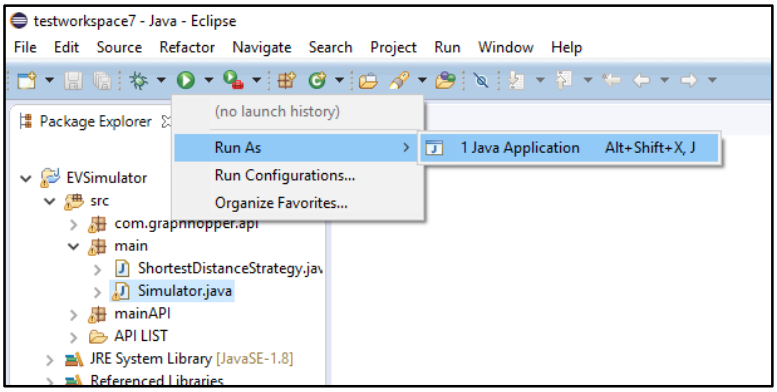
Click Finish



3. When prompted to overwrite files, click “Yes to All”

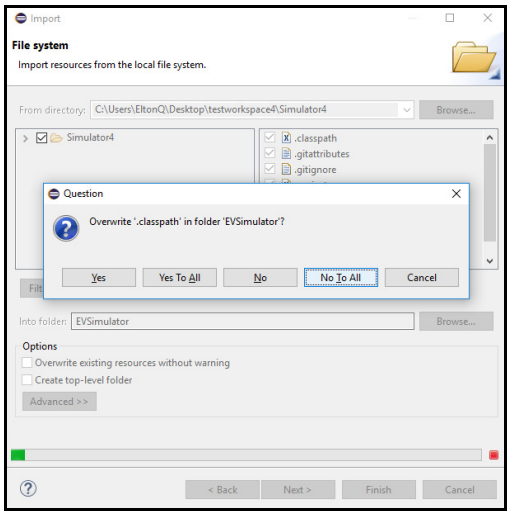


4. Select the file “src > main > Simulator.java” and Run as Java Application.

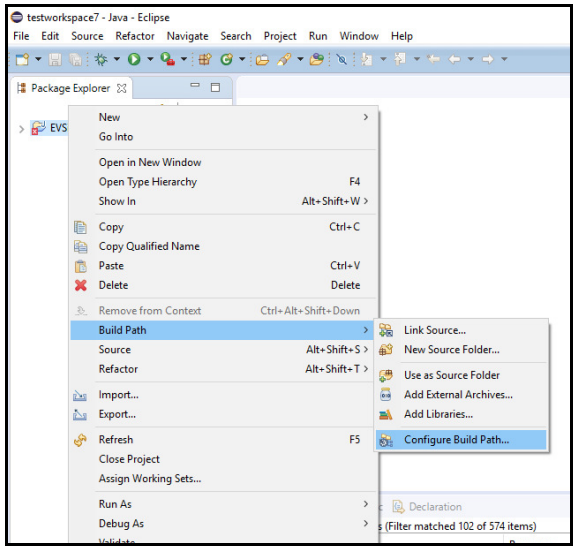


Alternatively

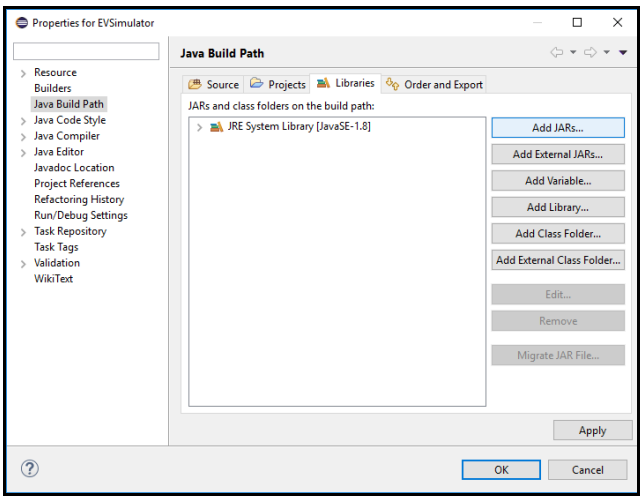
3. If an error occurs with class path, restart the import process (step 1 -2) and when prompted to overwrite files, click “No to All”

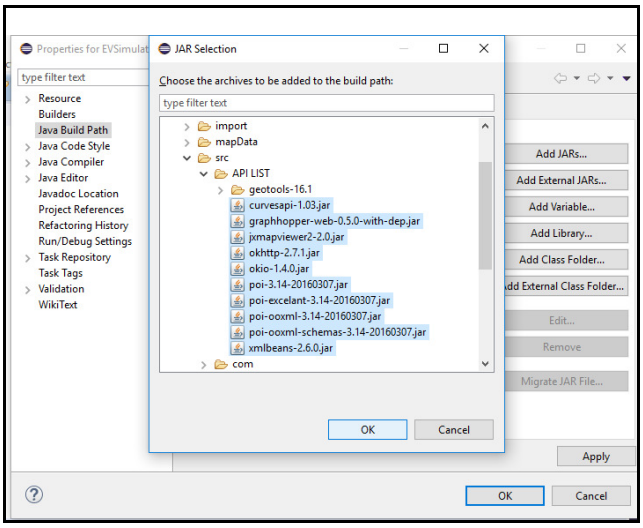


4. Right click on project and select configure build path.

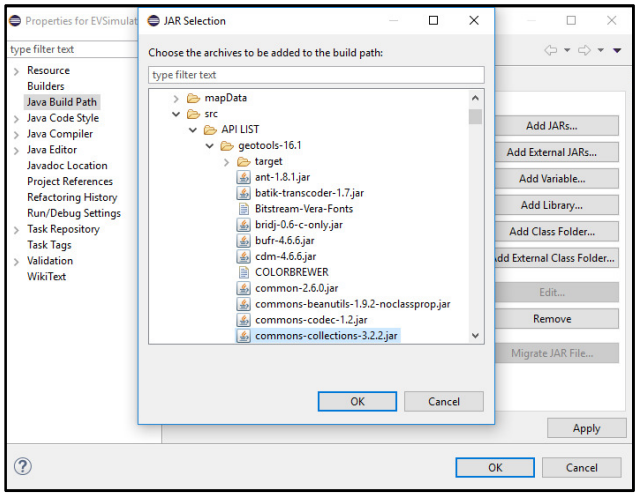


5. Under Libraries, add all the libraries in API LIST

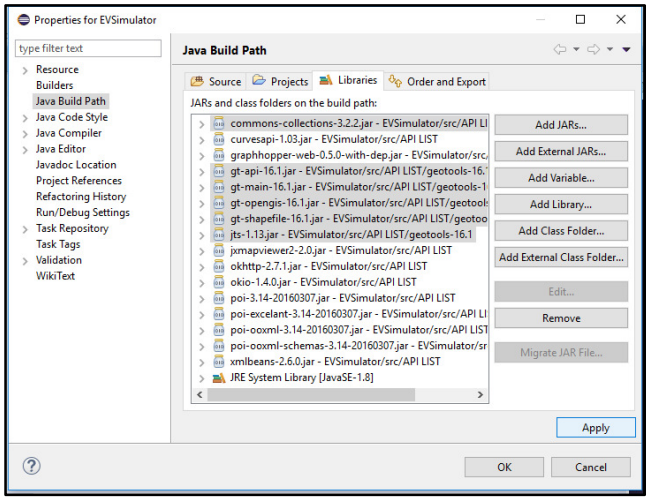




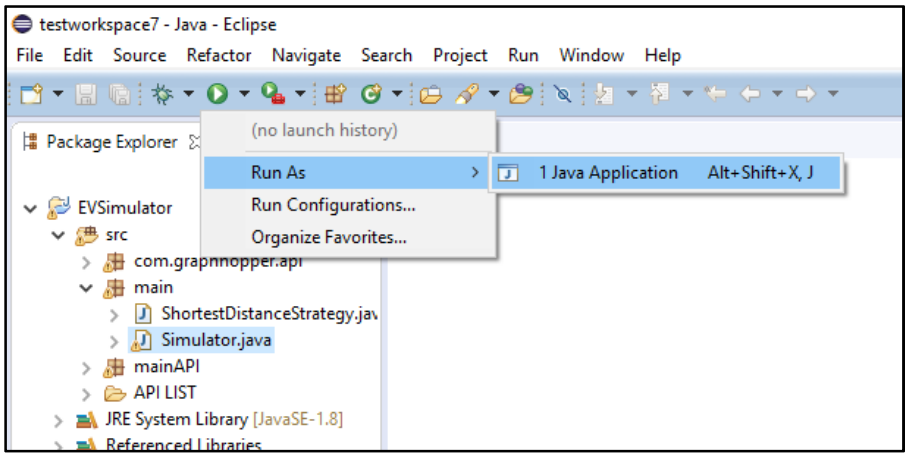
6. Then add GeoTools library
    i. commons-collections-3.2.2.jar
    ii. gt-api-16.1.jar
    iii. gt-main-16.1.jar
    iv. gt-opengis-16.1.jar
    v. gt-shapefile-16.1.jar
    vi. jts-1.13.jar



Click “Apply”



5. Select the file “src > main > Simulator.java” and Run as Java Application.

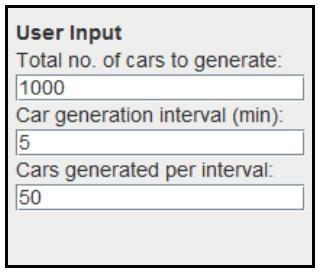


User Manual

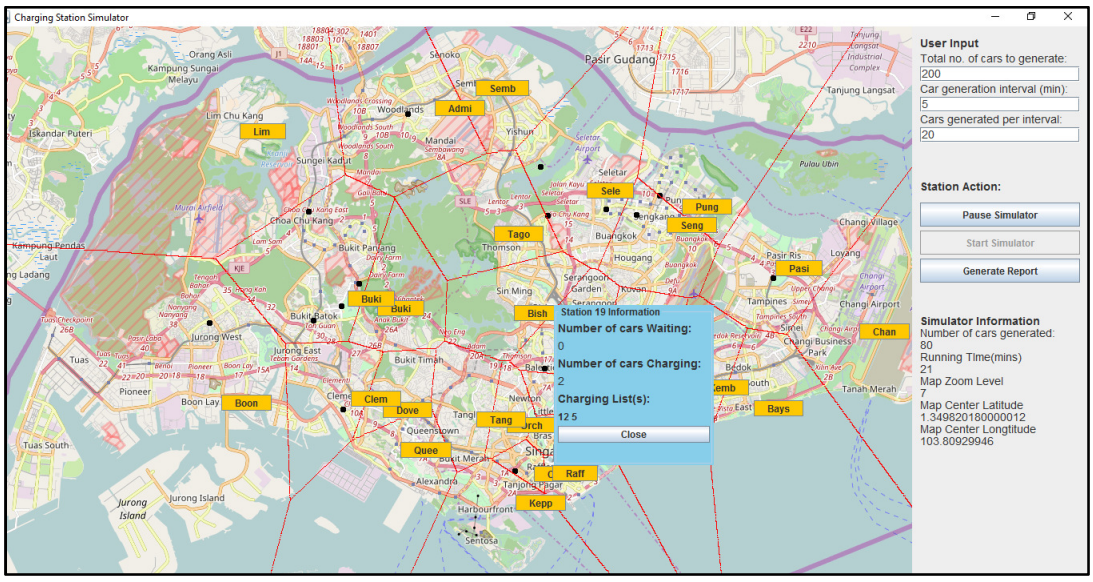
1. Replace “s.xlsx” in imports folder for the new simulation. The Excel file must be in the format {latitude, longitude, name, number of charging points}, where everything except name must be stored as in number format in Excel.

	A	B	C	D
1	1.283933	103.851455	Raffles Place	8
2	1.283896	103.843464	Chinatown	8
3	1.294166	103.786127	Queenstown	8
4	1.271236	103.835627	Keppel	8
5	1.311322	103.778653	Dover	8

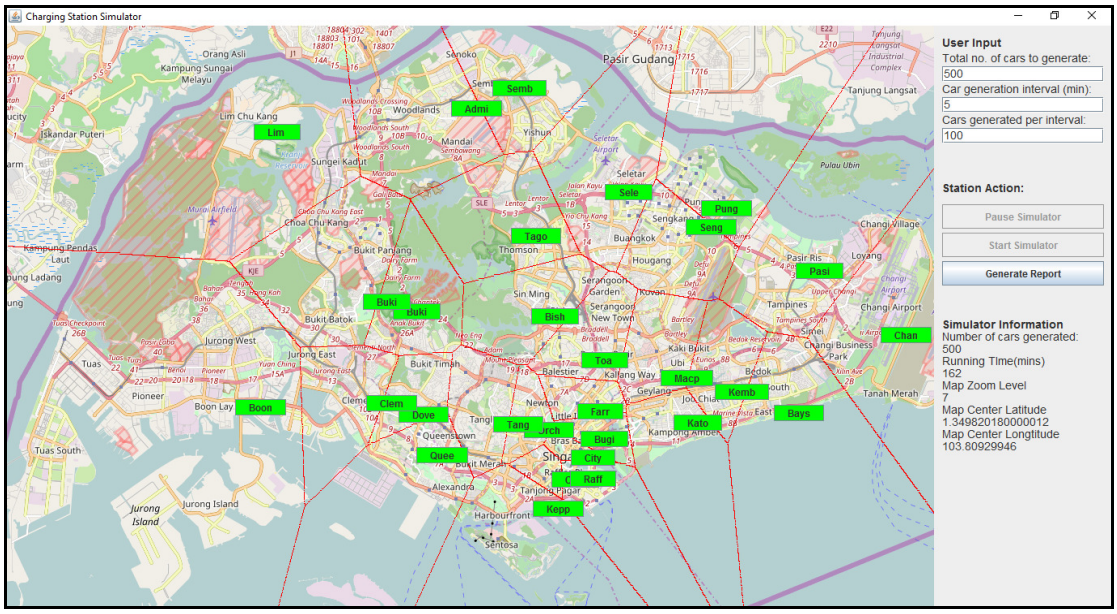
2. Run the simulator.
3. Input desired “Total no. of cars to generate”, “Car generation interval” and “Cars generated per interval” in the user panel



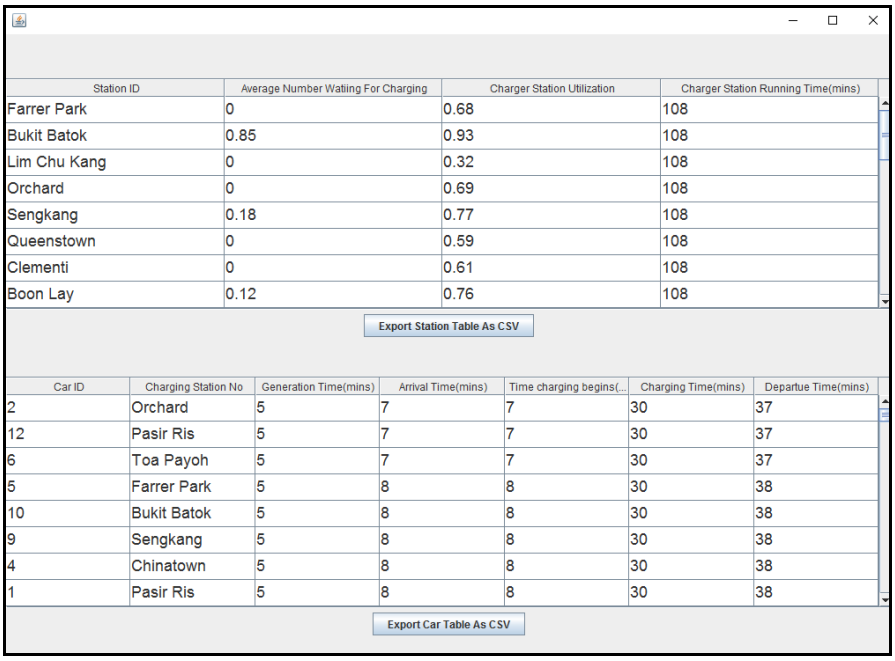
4. Click Start Simulator.
5. Click on station to see details in the station.



6. Pause simulator at any time as desired.
7. Simulator ends when car production stops and all the stations turn green



8. Click on Generate Report to get simulation report.



Station ID	Average Number Waiting For Charging	Charger Station Utilization	Charger Station Running Time(mins)
Farrer Park	0	0.68	108
Bukit Batok	0.85	0.93	108
Lim Chu Kang	0	0.32	108
Orchard	0	0.69	108
Sengkang	0.18	0.77	108
Queenstown	0	0.59	108
Clementi	0	0.61	108
Boon Lay	0.12	0.76	108

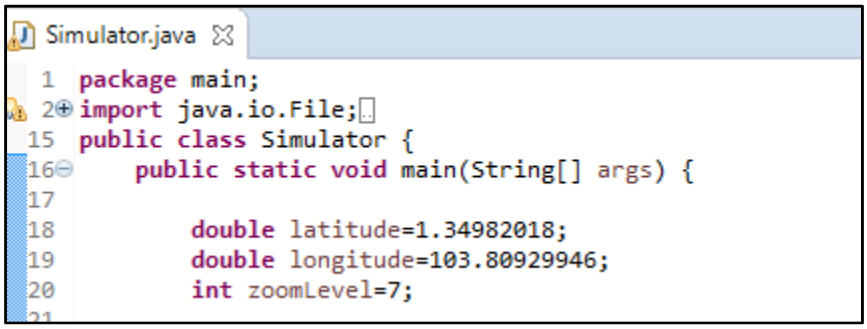
Export Station Table As CSV

Car ID	Charging Station No	Generation Time(mins)	Arrival Time(mins)	Time charging begins(...	Charging Time(mins)	Departue Time(mins)
2	Orchard	5	7	7	30	37
12	Pasir Ris	5	7	7	30	37
6	Toa Payoh	5	7	7	30	37
5	Farrer Park	5	8	8	30	38
10	Bukit Batok	5	8	8	30	38
9	Sengkang	5	8	8	30	38
4	Chinatown	5	8	8	30	38
1	Pasir Ris	5	8	8	30	38

Export Car Table As CSV

Instructions to Alter the Simulator to Simulate Other Cities

1. Under src > main> Simulator.java, change “latitude”, “longitude” and “zoomLevel” to encompass the new city.



2. Replace “s.xlsx” in imports folder for the new city retain the name “s.xlsx”
3. Replace OpenStreetMap data from https://www.openstreetmap.org/export with desired new city’s OpenStreetMap data
4. Replace all 5 files of “PlanningAreaPopulation.*” with the shapefile of the new city and retain the name “PlanningAreaPopulation.*” . Use QGIS to edit the attributes so that the shapefile has the attributes {“OBJECTID”, “PLN_AREA_N”, “Population”}.
5. Compile and run the simulator.