SUMO Project

Deadline: December 28th

You should defend your project on December 29th or 31st.

Tasks:

1. Build your own Sioux Falls network from Fig. 1.
    - Each edge should be at least 200m.
    - Each edge should have at least 2 lanes.
    - Speed limit for all edges is 60kmph or 16.67m/s.
    - Priority for all edges is “-1” (priority -1).

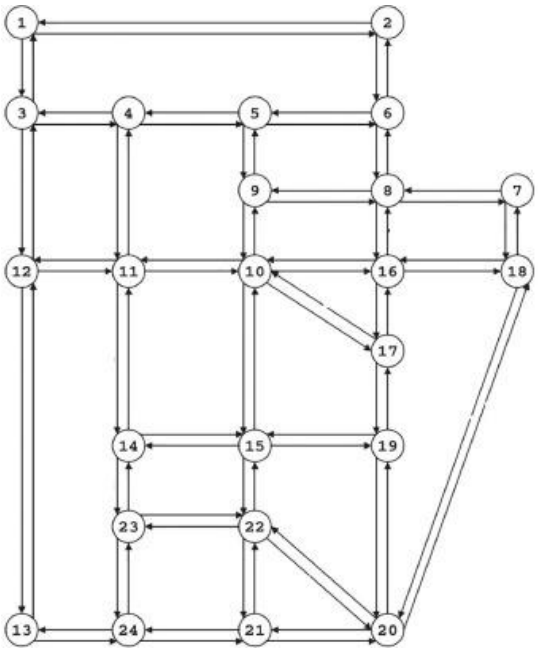

Figure 1. Sioux Falls network.

2. Define 3 vehicle types:
    - Naive passenger vehicles:
        - Acceleration: 2.6 m/s^2
        - Deceleration: 4.5 m/s^2
        - Sigma: 0.5
        - Length: 5 m
        - minGap: 2.5 m
        - They must not pass the speed limit (speedFactor=1).
        - Color: Yellow
        - vClass: passenger
        - guiShape: passenger/sedan

- Passenger vehicles in a rush:
  - Acceleration: 3.6 m/s^2
  - Deceleration: 5 m/s^2
  - Sigma: 1
  - Length: 5 m
  - minGap: 2 m
  - They can pass the speed limit (speedFactor=1.1).
  - Color: Red
  - vClass: passenger
  - guiShape: passenger/sedan

- Emergency vehicles:
  - Acceleration: 3.6 m/s^2
  - Deceleration: 5 m/s^2
  - Sigma: 1
  - Length: 6.5 m
  - minGap: 1.5 m
  - They can pass the speed limit (speedFactor=1.5).
  - vClass: passenger
  - guiShape: emergency

3. Make trips from Origin-Destination (OD) Demand data in Table 1 and Table 2.
   - Define flows for each OD (Choose an edge started from the origin and an edge ended at the destination).
   - All passenger vehicles are “Naive passenger vehicles”.
   - Flows should enter in an hour (3600 seconds).
   - Emergency Vehicles (EVs) should be defined separately.
   - Departure and arrival positions for all vehicles should be selected randomly.
   - Departure lanes for all vehicles should be selected freely.

Table 1. OD Demand data.

Origin	Destination	Demand	Origin	Destination	Demand
1	20	400	2	23	300
7	12	300	9	13	100
10	1	200	11	20	100
12	2	200	13	7	200
13	4	200	13	18	200
14	16	100	18	15	100
20	20	200	24	8	100

Table 2. EV trips.

Origin	Destination	Departure times
1	15	300,600,900,2400
4	18	600,3000
24	8	1000,2000,3000

4. Simulate.
    - Get tripInfo and edgeData as outputs.
    - Let's call this scenario "Base".

5. Put detectors on the shown edges in Fig. 2.
    - Red ones should force vehicles to change lanes to adjacent ones.
    - Blue ones should change the vehicle type of "Naive passenger vehicles" to "Passenger vehicles in a rush".
    - Detectors should cover all lanes. Red ones are in the middle of their edge and blue ones are in the beginning.

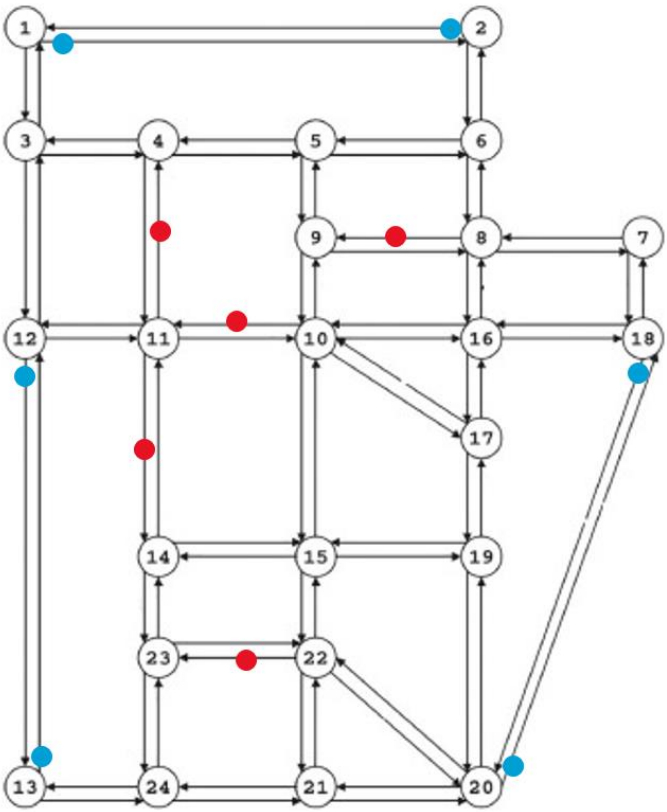

Figure 2. Detectors' locations.

6. Simulate with TraCI.
    - Get tripInfo and edgeData as outputs.
    - Let's call this scenario "Advanced"

7. Calculate the total travel time in both scenarios.

8. Write a report.
    - Explain each task.
    - Compare the results of Base and Advanced.

9. Submit the following files.
    - Network.xml
    - Route.xml
    - Det.add.xml
    - TraCI.py
    - Calculation.py
    - Base.tripinfo.xml
    - Base.edgedata.xml
    - Advanced.tripinfo.xml
    - Advanced.edgedata.xml
    - Report.pdf