

RWR 4015

Traffic Simulation for Planning Applications

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Week 1 | Hands-on:
Introduction to Traffic Simulation

Fall 2026

RoadwayVR

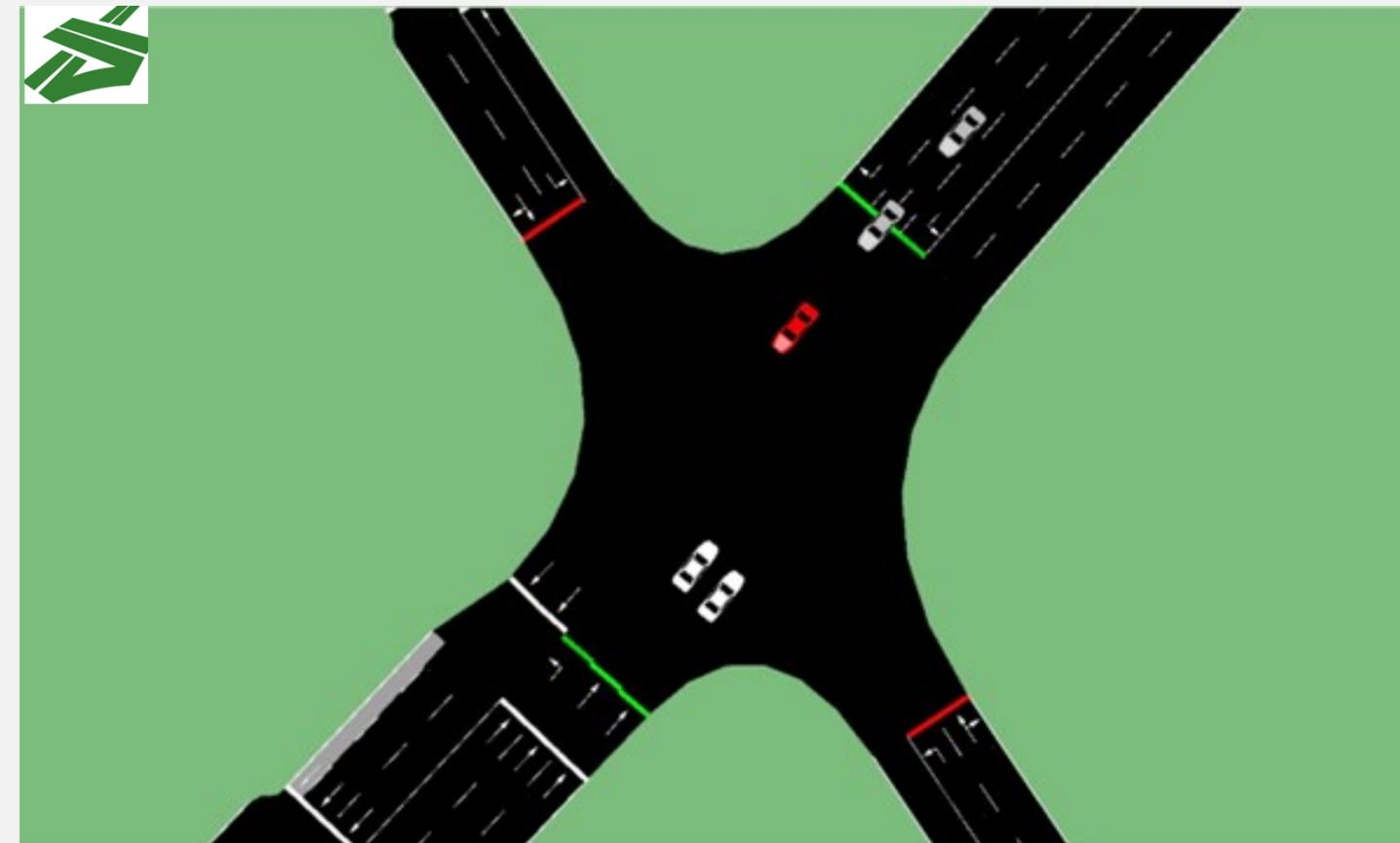


roadwayvr.github.io/TrafficSimulationforPlanningApplications



Agenda

- 1. Install Simulation of Urban Mobility (SUMO)**
- 2. Set Up SUMO Environment Variables**
- 3. Install Notepad++**
- 4. SUMO Files and User Interface**
- 5. Create a Simple Network with Car Traffic Demand**
- 6. Add Opposite Traffic Flow**



1. Install Simulation of Urban Mobility (SUMO)

1. In Google, search “SUMO Installation”
2. Select sumo.dlr.de that contains sumo installing
3. Download SUMO as in the image

Installing

Windows

There are four different binary packages for Windows depending on the license and feature set (GPL or commercial) to do with SUMO. If you want to install it locally and have administrator rights on your machine you do not have admin rights, use the correct zip, extract it into a desired folder using [7Zip](#) or [Winzip](#) tools, and documentation in HTML format.

- Download 64-bit installer: [sumo-win64-1.25.0.msi](#)
- Download 64-bit zip: [sumo-win64-1.25.0.zip](#)
- Download 64-bit installer with all extras (contains GPL code): [sumo-win64extra-1.25.0.msi](#)
- Download 64-bit zip with all extras (contains GPL code): [sumo-win64extra-1.25.0.zip](#)

Within the installation folder, you will find a folder named "**bin**". Here, you can find the executables in **docs/examples**. All other applications ([duarouter](#), [dfrouter](#), etc.) have to be run from the command line environment for you. If you feel unsure about the command line, please read [Running Programs from the Command Line](#).

If you want a bleeding edge nightly build or need tests or source files, you can download them from [SUMO Source Code](#).

For building SUMO from source see [building SUMO under Windows](#).

1. Install SUMO (Older Versions)

4. Sometimes, you need older versions (for example version 1.19):

5. In Google, search “sumo archive download 1.19”

6. Select SourceForge.net that contains sumo archive

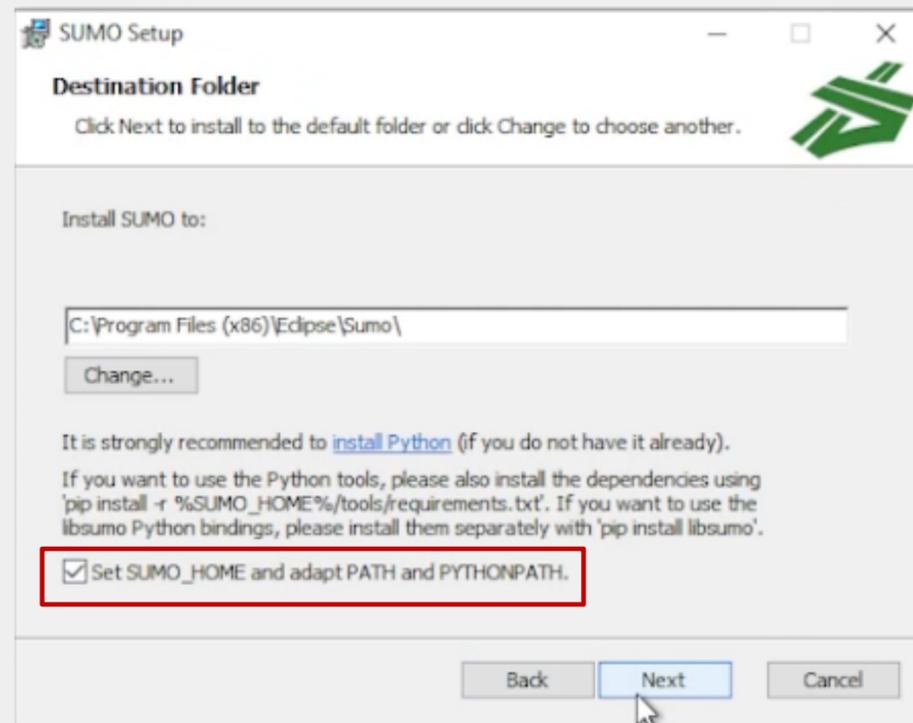
7. Download SUMO as in the image

The screenshot shows the SourceForge project page for SUMO. The page title is "Simulation of Urban MObility Files". Below the title, there is a description: "SUMO is a microscopic, multi-modal traffic simulation. Brought to you by: angelobanse, behrisch, namdre". The page has a navigation menu with tabs for Summary, Files, Reviews, Support, Wiki, Mailing Lists, Tickets, News, and Code. A green button labeled "Download Latest Version" is visible, along with a "Get an email when there's a new version of Simulation of Urban..." notification box. Below the navigation, there is a table listing files for version 1.19.0. The file "sumo-win64-1.19.0.msi" is highlighted with a red border.

Name	Modified	Size	Downloads / Week
Parent folder			
sumo_1.19.0.orig.tar.gz	2023-11-07	76.0 MB	9
sumo-win64extra-1.19.0.zip	2023-11-07	157.5 MB	3
sumo-win64extra-1.19.0.msi	2023-11-07	178.1 MB	8
sumo-win64-1.19.0.zip	2023-11-07	123.0 MB	2
sumo-win64-1.19.0.msi	2023-11-07	143.4 MB	19
sumo-src-1.19.0.zip	2023-11-07	75.8 MB	1
sumo-src-1.19.0.tar.gz	2023-11-07	71.7 MB	5
sumo-game-1.19.0.zip	2023-11-07	86.6 MB	0
Totals: 8 Items		912.0 MB	47

1. Install SUMO

8. When you install, make sure the SUMO_HOME is checked



2. Set Up SUMO Environment Variables

1. SUMO has two only graphical users
2. All other programs must be called using codes! (But I provided all the codes in this course)
3. We set Environment Variables so we can avoid typing SUMO directory in codes (See Next Slides)



Sumo-gui



Simulation Visualization Interface



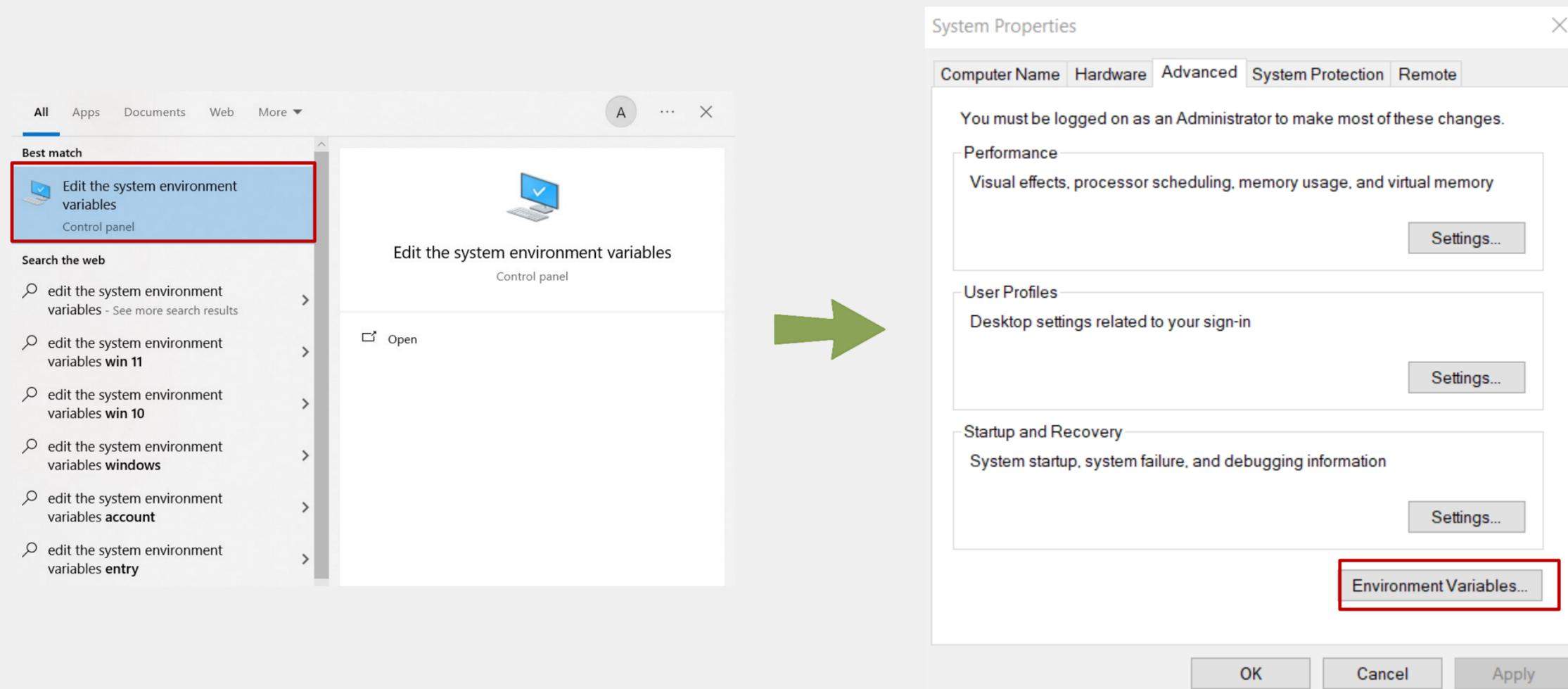
netedit



Simulation Creation Interface

2. Set Up SUMO Environment Variables

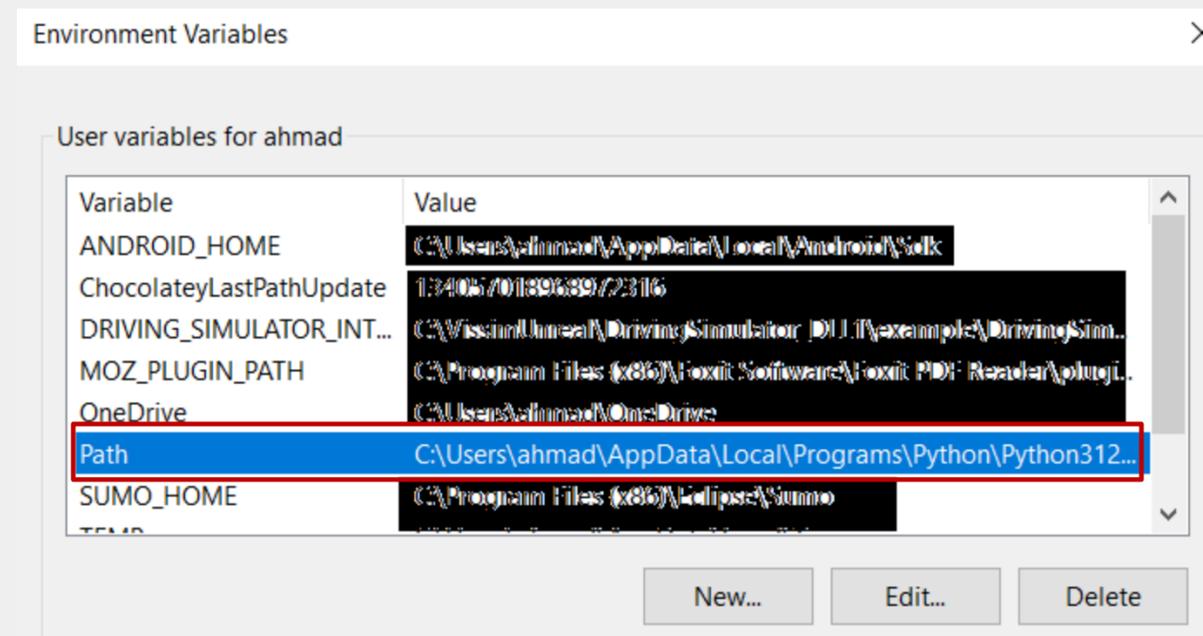
4. On the Windows search box (on the Taskbar) search for environment. The best match result should be the "Edit the system environment variables" option. Open it.



2. Set Up SUMO Environment Variables

5. Under user variables select PATH (or Path - Windows environment variables are case insensitive) and click Edit.

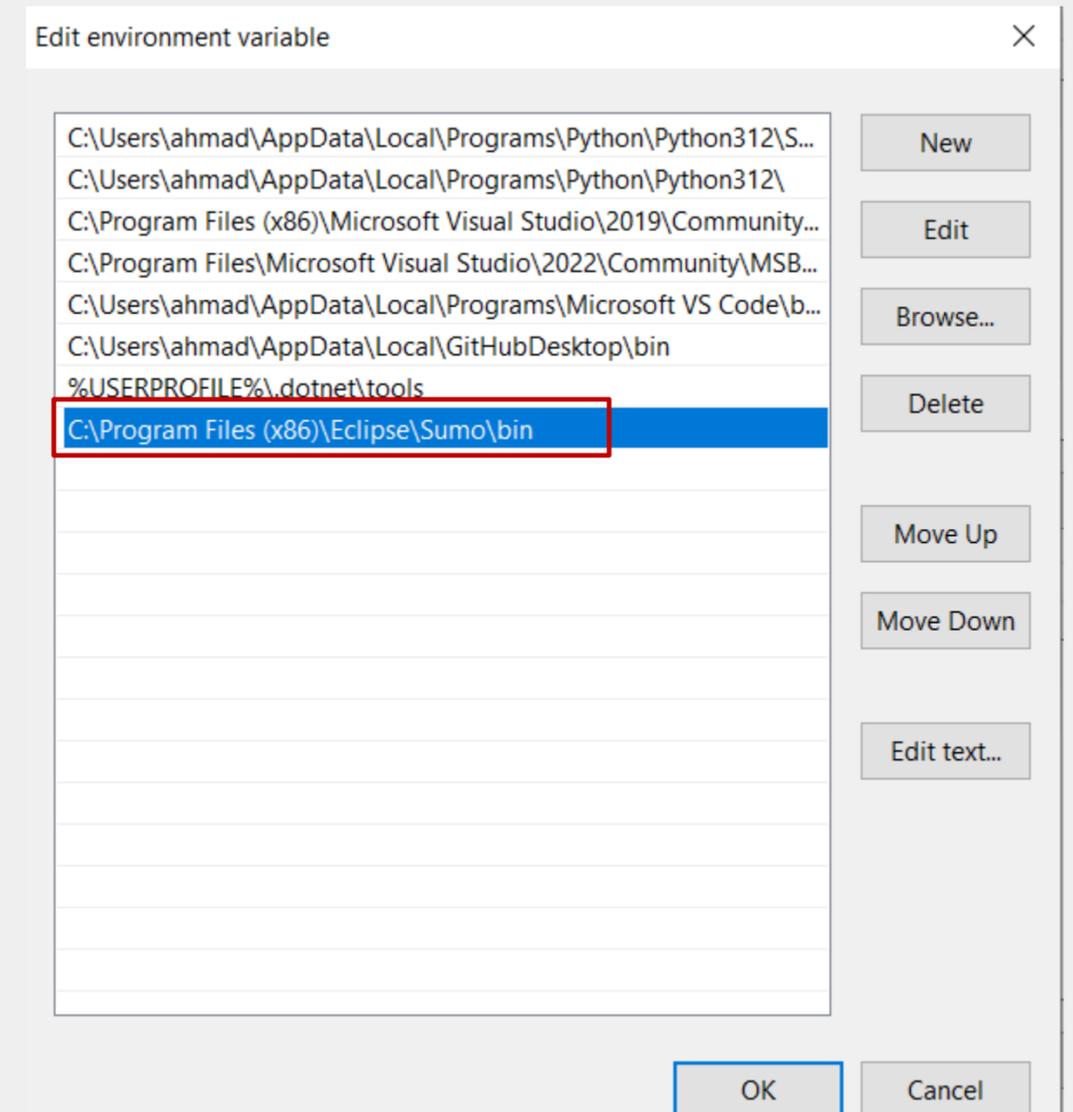
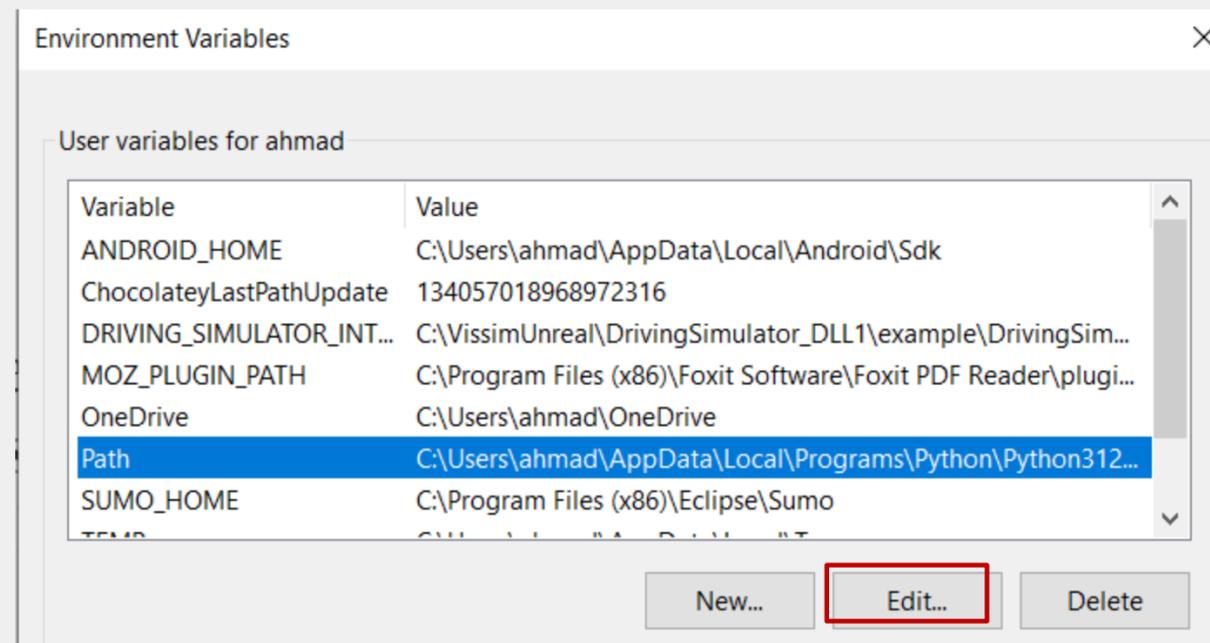
5.1. If no such variable exists, you must create it with the New-Button.



2. Set Up SUMO Environment Variables

6. First, find where you installed SUMO, likely, `C:\Program Files (x86)\Eclipse\Sumo\bin`
Once you find it, then copy the directory and

16. Select `PATH` → `Edit` → `New` → paste the “`C:\Program Files (x86)\Eclipse\Sumo\bin`” → `Select Okay`

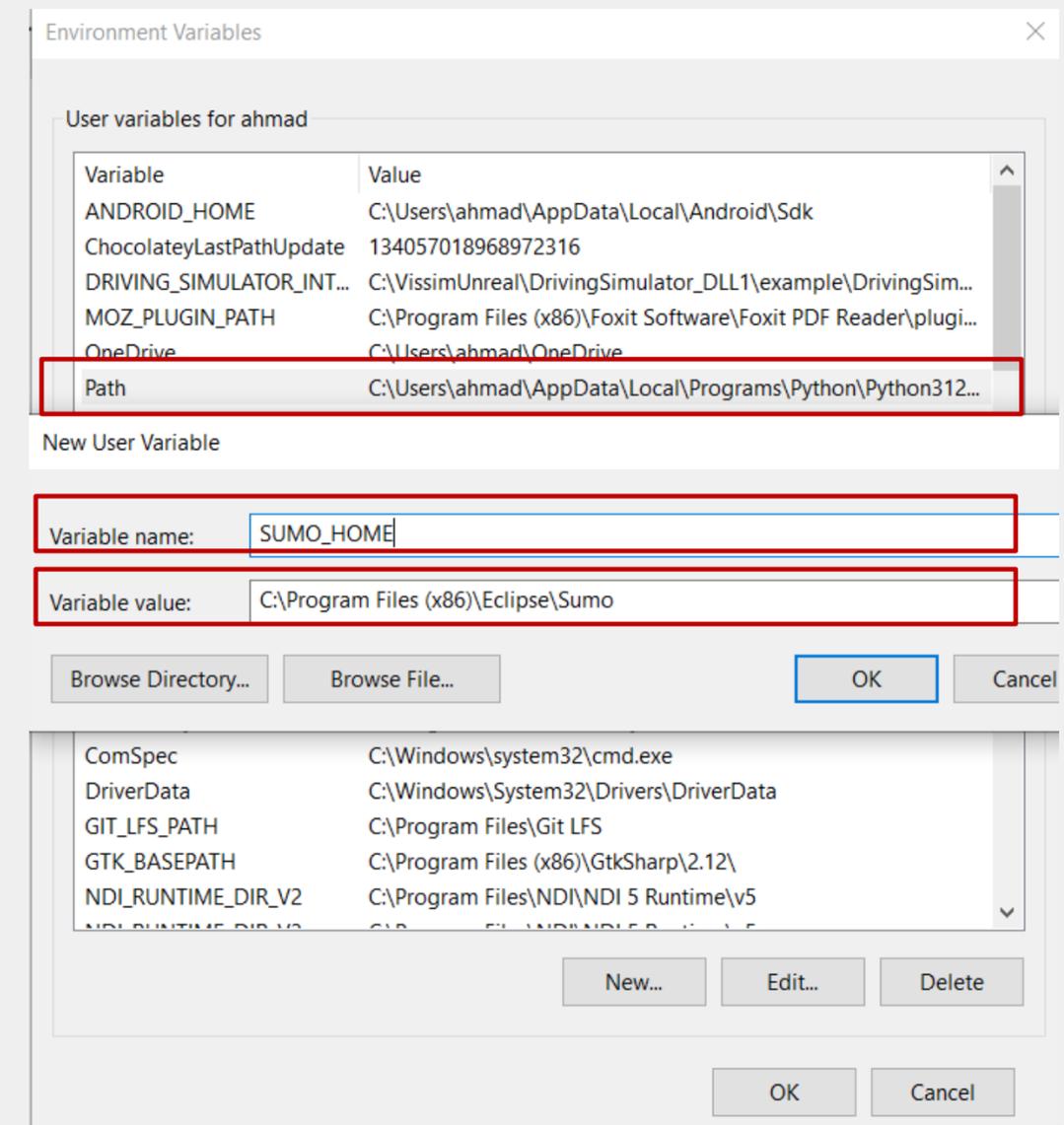


2. Set Up SUMO Environment Variables

17. Select Path → New → fill variable name and variable value as in the image

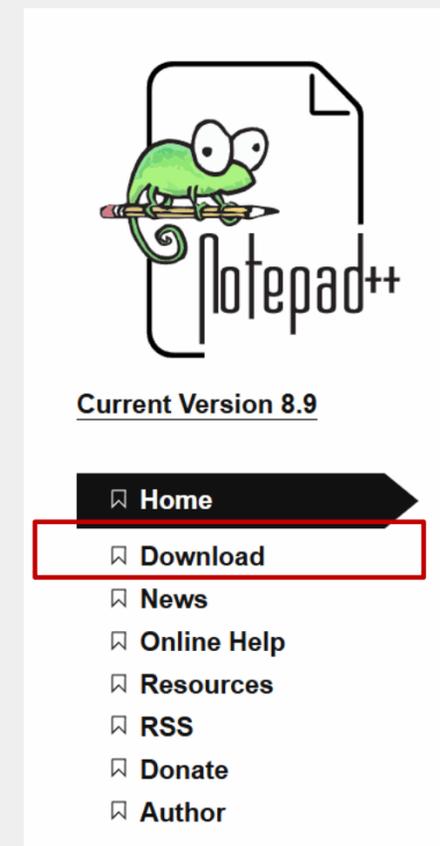
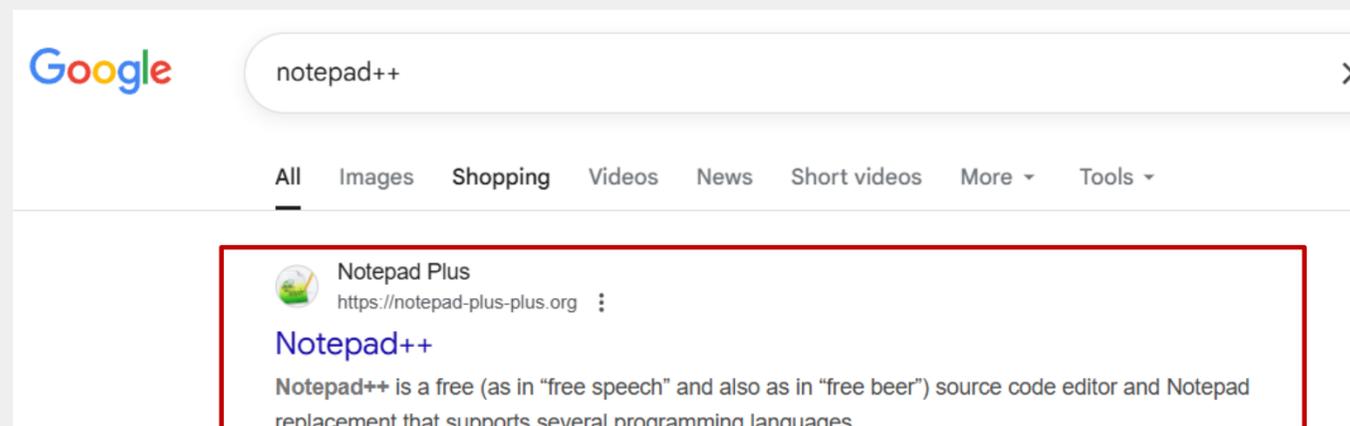
Variable name: SUMO_HOME

Variable value: C:\Program Files (x86)\Eclipse\Sumo



3. Install Notepad++

1. In Google, Search Notepad ++

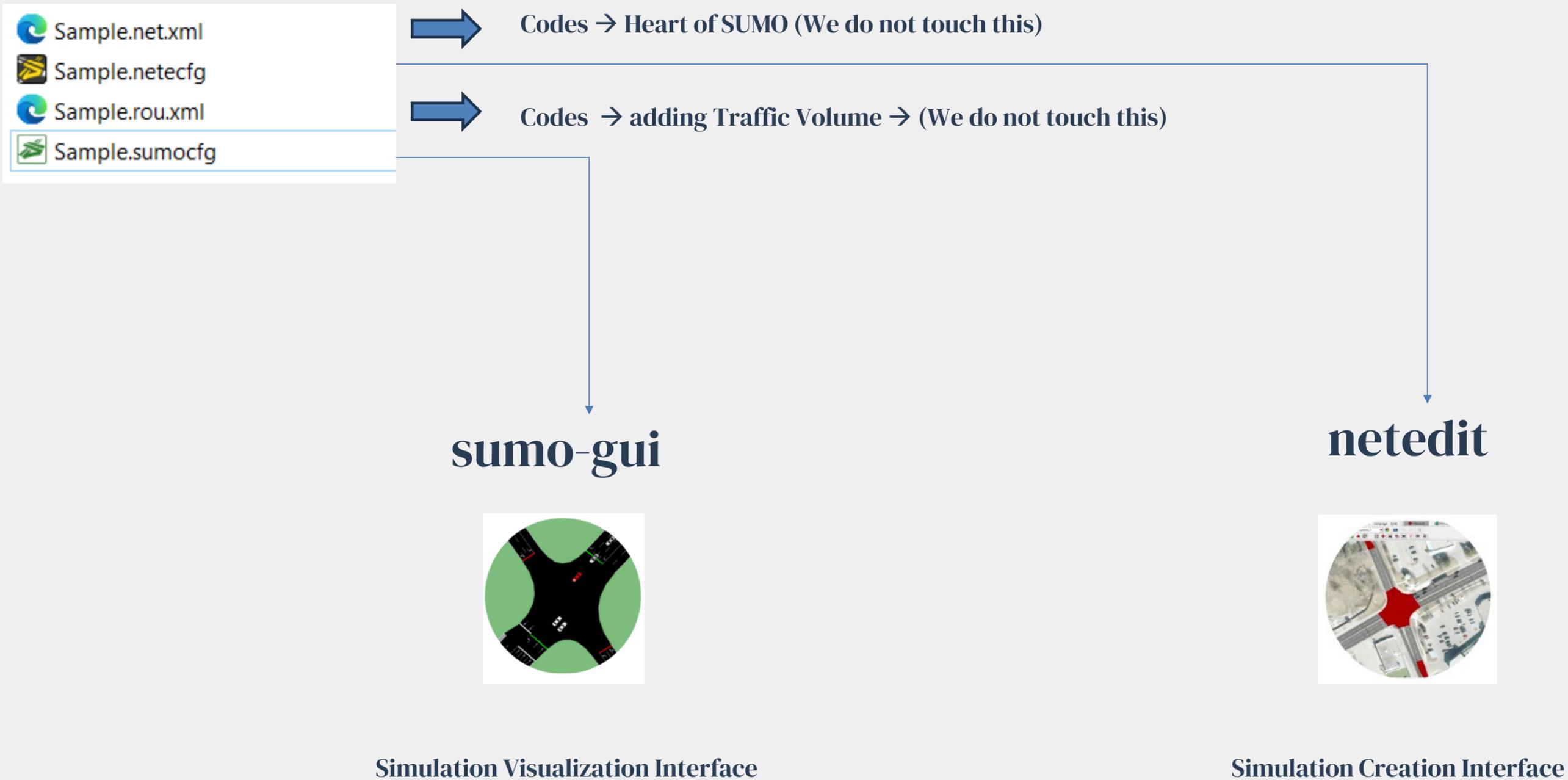


Download most recent version (version is not important)

Downloads

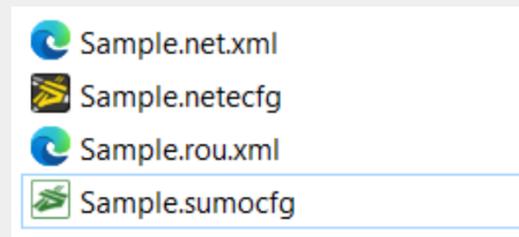
- Download Notepad++ v8.9: security enhancements
- Download Notepad++ v8.8.9: vulnerability-fix
- Download Notepad++ v8.8.8 (stable: auto-update triggered)
- Download Notepad++ v8.8.7 - Authenticity Guaranteed
- Download Notepad++ v8.8.6: Clarifying the CVE-2025-56383 Non-Issue

4. SUMO Files and User Interfaces

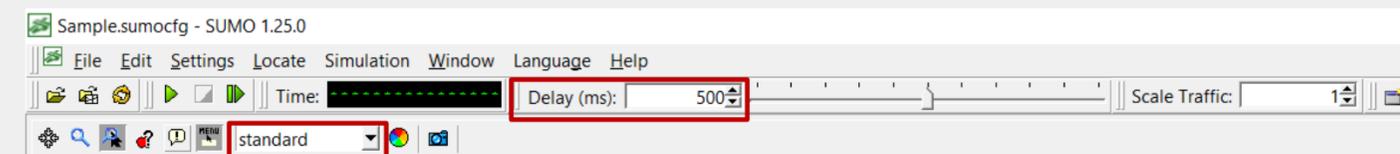


4.1. Simulation Visualization Interface (SUMO GUI)

1. Download Folder “SUMOSample” from Github
2. Extract the folder in Download folder
3. You should have four files as below



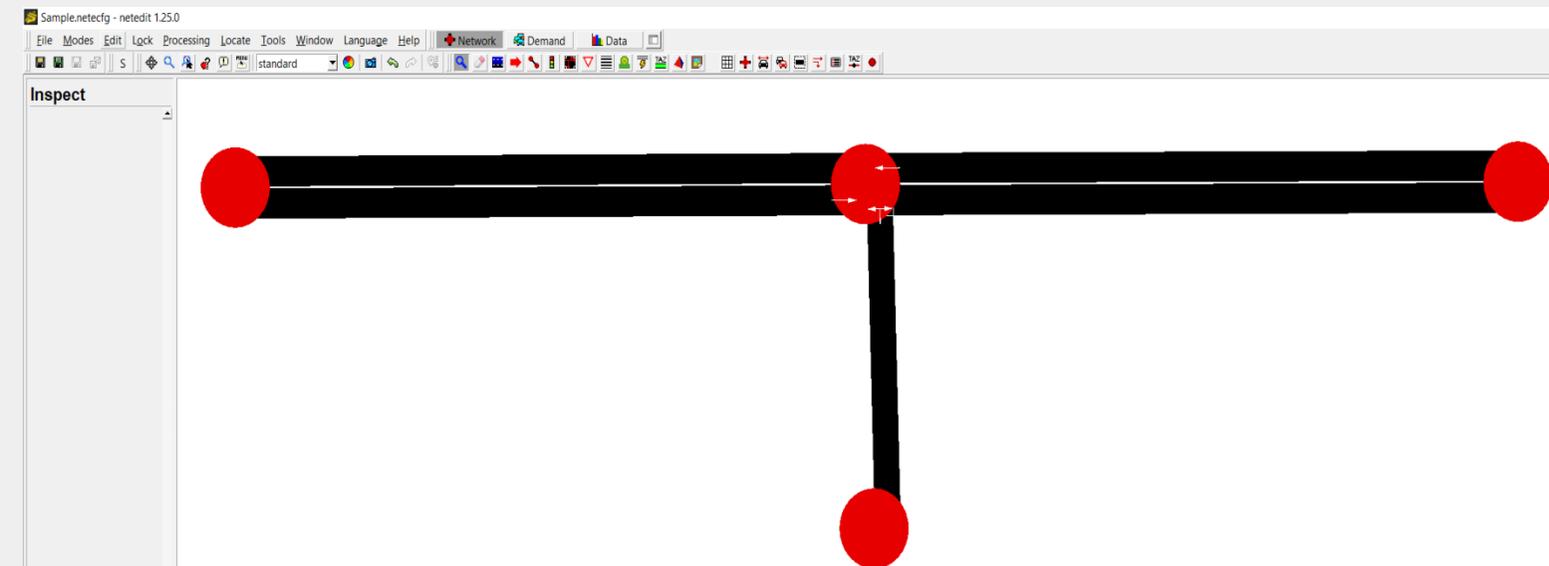
4. Run Sample.sumocfg → Increase delay to 500
5. Change Gui shape from “Standard” to “Real-World”
6. Hit “Play Button”



4.2. Simulation Creation Interface (SUMO netedit)

7. Run Sample.netecfg

8. Open netedit → this is interface we can change road network and add/modify traffic light, add cars



5. Create a Simple Network

1. Create a Folder called “Exercise1”
2. On the Windows search box (on the Taskbar) search for “netEdit” and open it
3. In netEdit → File → New Network
4. Select Network
5. Select “Creating junctions and edges”
6. Create below road (left click)
7. If Mistaken, use eraser



5. Create a Simple Network

8. Add Traffic Volume by Selecting Demand

9. Select Vehicle

10. Change “trip” to “flow”

11. Change the Volume per Hour to “1000”

12. Finish Route Creation

The screenshot shows the netedit 1.25.0 software interface. The 'Vehicles' panel on the left is expanded, showing the 'flow (from-to edges)' option selected in the 'Vehicle' dropdown. The 'Flow attributes' section shows 'vehPerHour' set to 1000. The 'Route creator' section at the bottom shows the 'Finish route creation' button. The main workspace on the right displays a network diagram with a highlighted green and orange edge. Red circles with numbers 8 through 12 are overlaid on the interface to indicate the steps: 8 (Demand button), 9 (Vehicle dropdown), 10 (flow dropdown), 11 (vehPerHour input), and 12 (Finish route creation button). A text label 'Start from here "Left Click"' points to the highlighted edge in the diagram.

netedit 1.25.0

File Modes Edit Lock Processing Locate Tools Window Language Help Network Demand Data

Vehicles

Vehicle

flow (from-to edges)

Parent vType

DEFAULT_VEHTYPE

Internal attributes

id	f_0
color	yellow
departLane	first
departPos	base
departSpeed	0
arrivalLane	current
arrivalPos	max
arrivalSpeed	current
line	
personNumber	0
containerNumber	0
departPosLat	center
arrivalPosLat	center
insertionCheck	all
begin	0.00

Flow attributes

terminate	end
spacing	vsPerHour
end	3600.00
vehPerHour	1000

Parameters

Edit parameters

Netedit attributes

route file

Help

Route creator

- Selected edges: 1
- Path edges: 1
- Length: 118.80
- Average speed: 13.89

Finish route creation

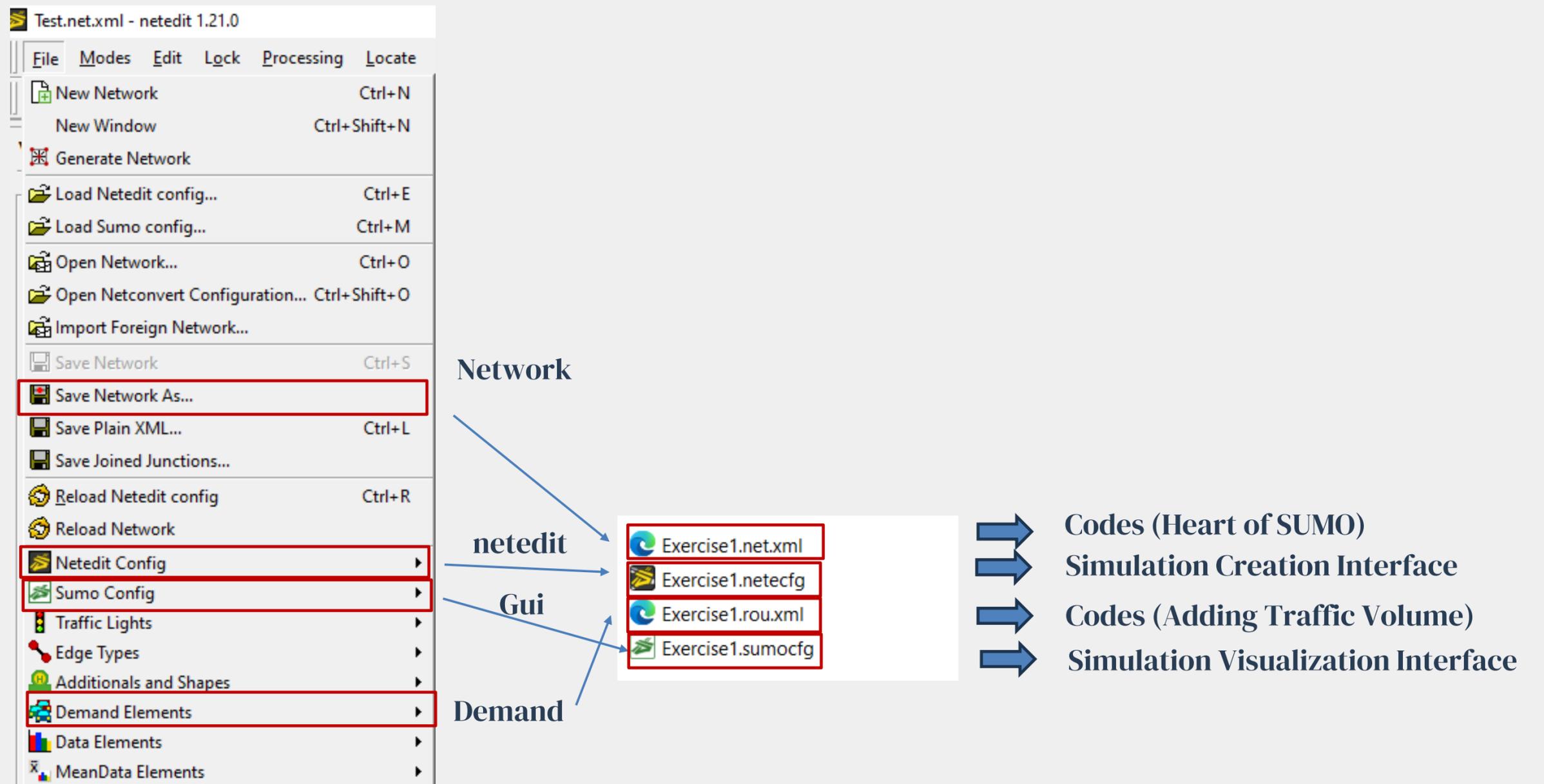
Abort route creation

Remove last edge

Start from here "Left Click"

5. Create a Simple Network

13. Save SUMO Files in Folder “Exercise1” as below (name each file as “Exercise1”)

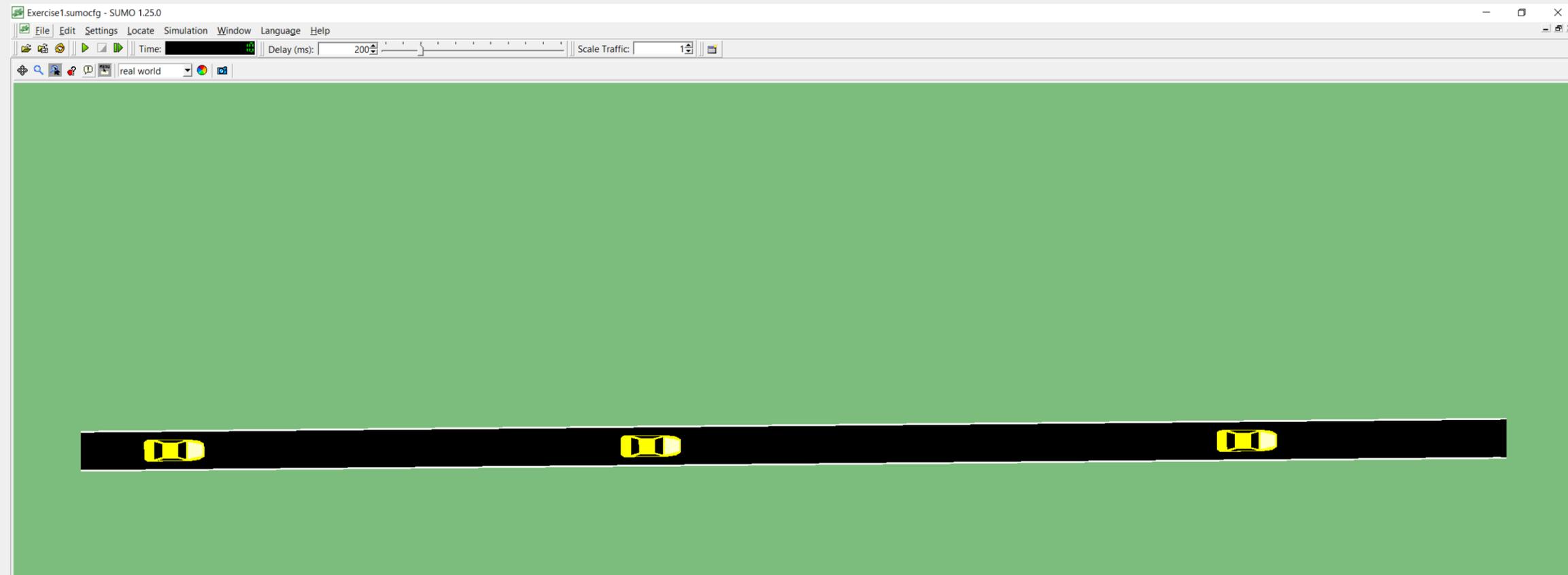


5. Create a Simple Network

14. Run SUMO Gui (Exercise1.sumocfg)

15. Increase delay to 200

16. Gui shape from “Standard” to “Real-World”





6. Add Opposite Traffic Flow

❑ Open netedit (Exercise1.netecfg) and do the following actions:

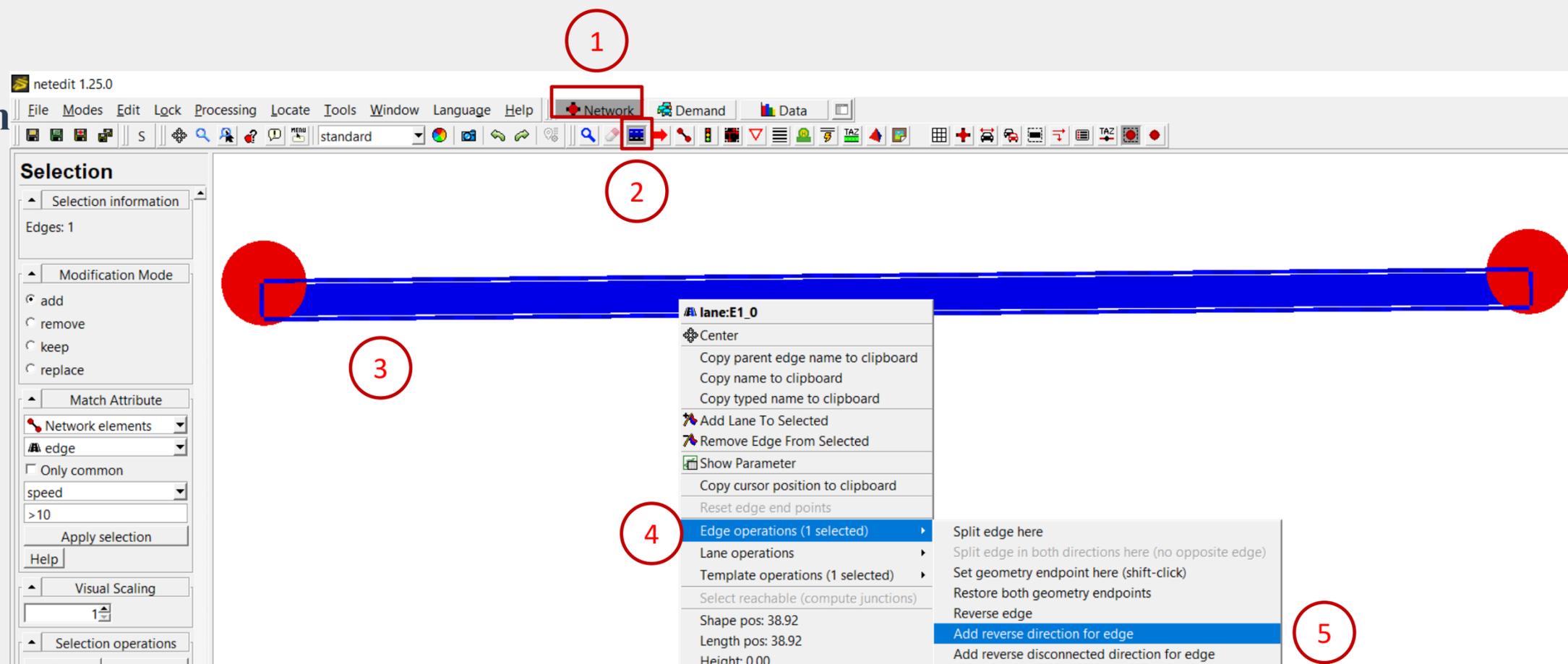
1. Select Network

2. Select “Selecting element”

3. Left click on the road

4. Right click and select Edge operation

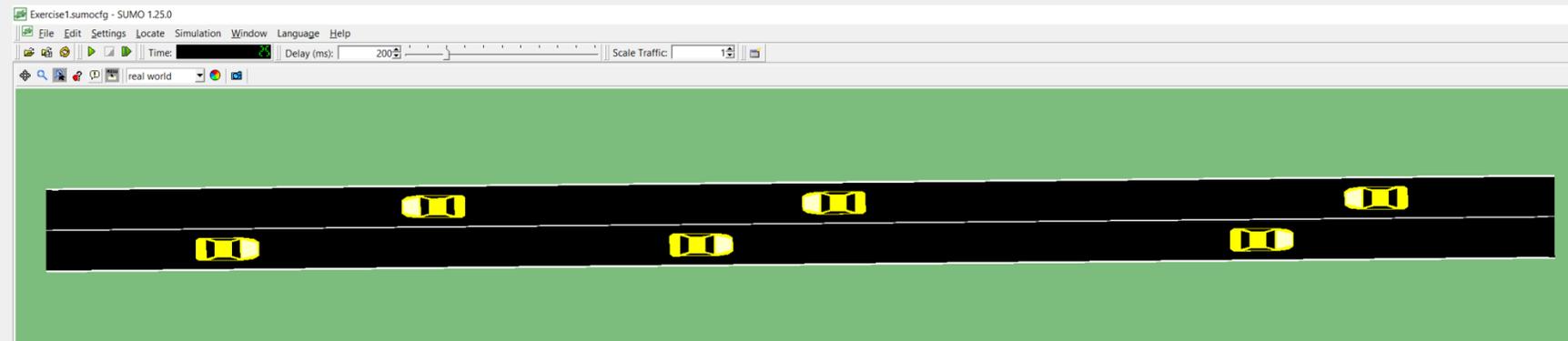
5. Add reverse direction for edge





6. Add Opposite Traffic Flow

6. The output should look like this
7. In fact, you added a reverse lane
8. Add opposite traffic flow input to the reverse direction with traffic volume of 1000
9. Save the files
10. Run SUMO Gui
11. The output should look like below:





6. Add Opposite Traffic Flow

➤ For Deselecting a lane, do the following:

1. Select Network

2. Select “Selecting element”

3. Press “Escape”

