

## 1. Project Overview

### 1.1 Purpose

The goal of this project is to build a Java-based control and visualization layer for the SUMO traffic simulator using the libtraci interface.

Milestone 1 focuses on establishing the project foundation through architecture design, component planning, and the demonstration of a working SUMO integration.

### 1.2 System Description

The system provides a communication pipeline between Java 21 and SUMO 1.25.0 via libtraci.

This enables the application to load SUMO configurations, start and control simulations programmatically, inspect traffic entities, and later visualize them through a GUI.

Milestone 1 establishes: - Portable SUMO integration - Working Java libtraci SUMO communication - Basic simulation control (load config, step execution) - Architecture design for future GUI, logic, and analytics modules - Mockups and class structure for upcoming milestones - Repository setup and technical documentation

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## 2. Team Roles

Member	Responsibility
<b>Ilias</b>	GitHub management, README, documentation, project overview
<b>Selim</b>	Java development, SUMO integration, connection demo
<b>Yilin</b>	Java development, SUMO integration, connection demo
<b>Enes</b>	GUI mockups (map, control panel, dashboard)
<b>Alex</b>	Architecture design, class design, structural planning

All team members contribute equally to discussions, testing, refinement, and overall project progress.

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### 3. Time Plan (Feature → Schedule)

#### Milestone 1 – Foundation (Due: 27.11.2025)

Status: COMPLETED

Feature / Task	Status
GitHub repository setup, .gitignore, structure	Done
Java 21 project configuration	Done
SUMO portable integration	Done
libtraci integration + demo (run .sumocfg, step simulation)	Done
Technology stack summary	Done
Project overview documentation	Done
Architecture diagram	Done
Class design (Vehicle, TrafficLight, Controller)	Done
GUI mockups (Map, Control Panel, Dashboard)	Done
Time plan	Done
Team roles	Done

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#### Milestone 2 – Functional Prototype (Due: 14.12.2025)

Feature / Task	Status
Vehicle spawning via libtraci	To Do
Traffic light inspection & control	To Do
Basic GUI prototype (Swing/JavaFX)	To Do
Real-time simulation controller	To Do
Statistics extraction	To Do
Javadoc documentation	To Do
User guide draft	To Do
Stress test scenario	To Do

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#### Milestone 3 – Final Application (Due: 18.01.2026)

Feature / Task	Status
Full interactive GUI with visualization	To Do
Vehicle grouping & filtering	To Do
Traffic light adaptation logic	To Do
Export tools (CSV, PDF)	To Do
Final documentation & project cleanup	To Do

Feature / Task	Status
Final testing & presentation preparation	To Do