## Research Question

How does varying the reaction behavior of car agents (specifically their acceleration and deceleration rates) affect overall traffic smoothness and congestion levels in a grid-based environment?

## Hypothesis

If car agents accelerate and decelerate more smoothly (i.e., with smaller changes per tick), then traffic flow will become more consistent, resulting in higher average speeds, fewer stopped cars, and lower average wait times.

## Experiment Method

| **Step** | **To Do** |
| --- | --- |
| 1 | Varying the acceleration value (e.g., set it to 0.05, 0.1, 0.2). |
| 2 | Keeping other variables constant (num-cars, grid-size, ticks-per-cycle). |
| 3 | For each setting, running the simulation and measuring: |
|  | - Average Speed over time |
|  | - Average Wait Time over time |
|  | - Number of Stopped Cars |
| 4 | Comparing results across different acceleration values to see how traffic smoothness changes. |

## Metrics To Use

* **Average Speed** (higher = smoother traffic)
* **Average Wait Time** (lower = smoother flow)
* **Stopped Cars count** (lower = fewer jams)