



OTTO VON GUERICKE
UNIVERSITÄT
MAGDEBURG

INF

FAKULTÄT FÜR
INFORMATIK

Simulation Project

Team B - Smart Intersection

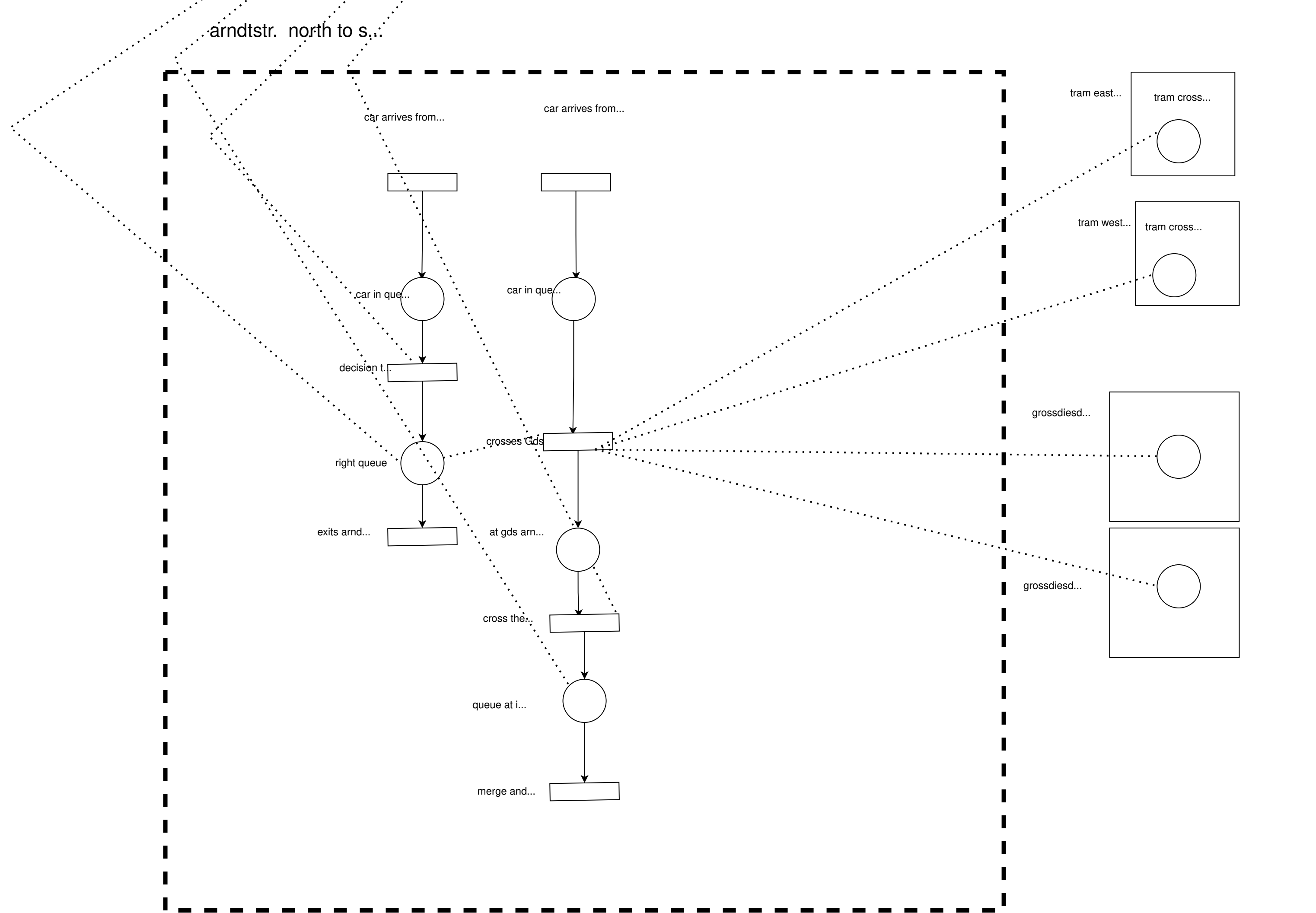
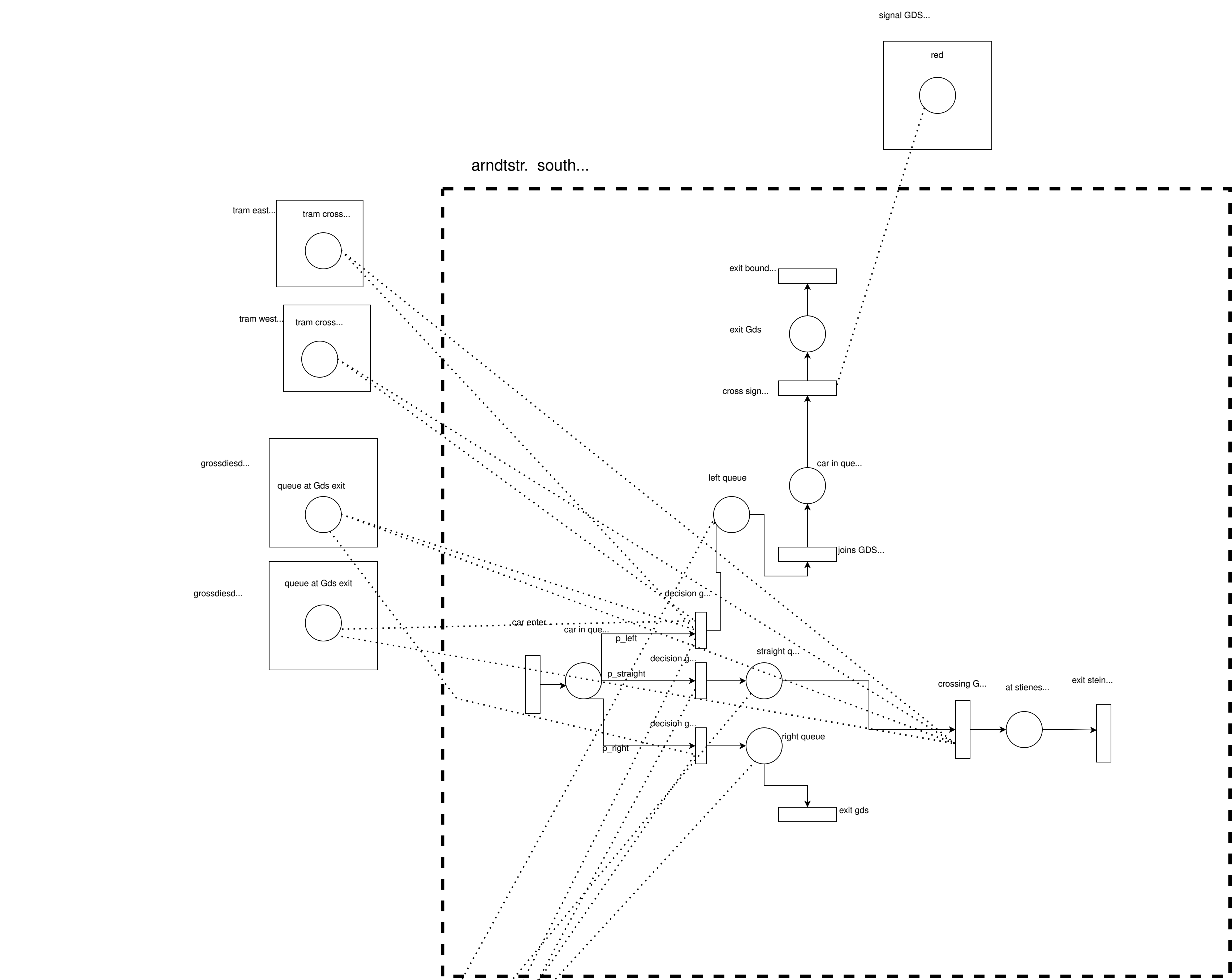
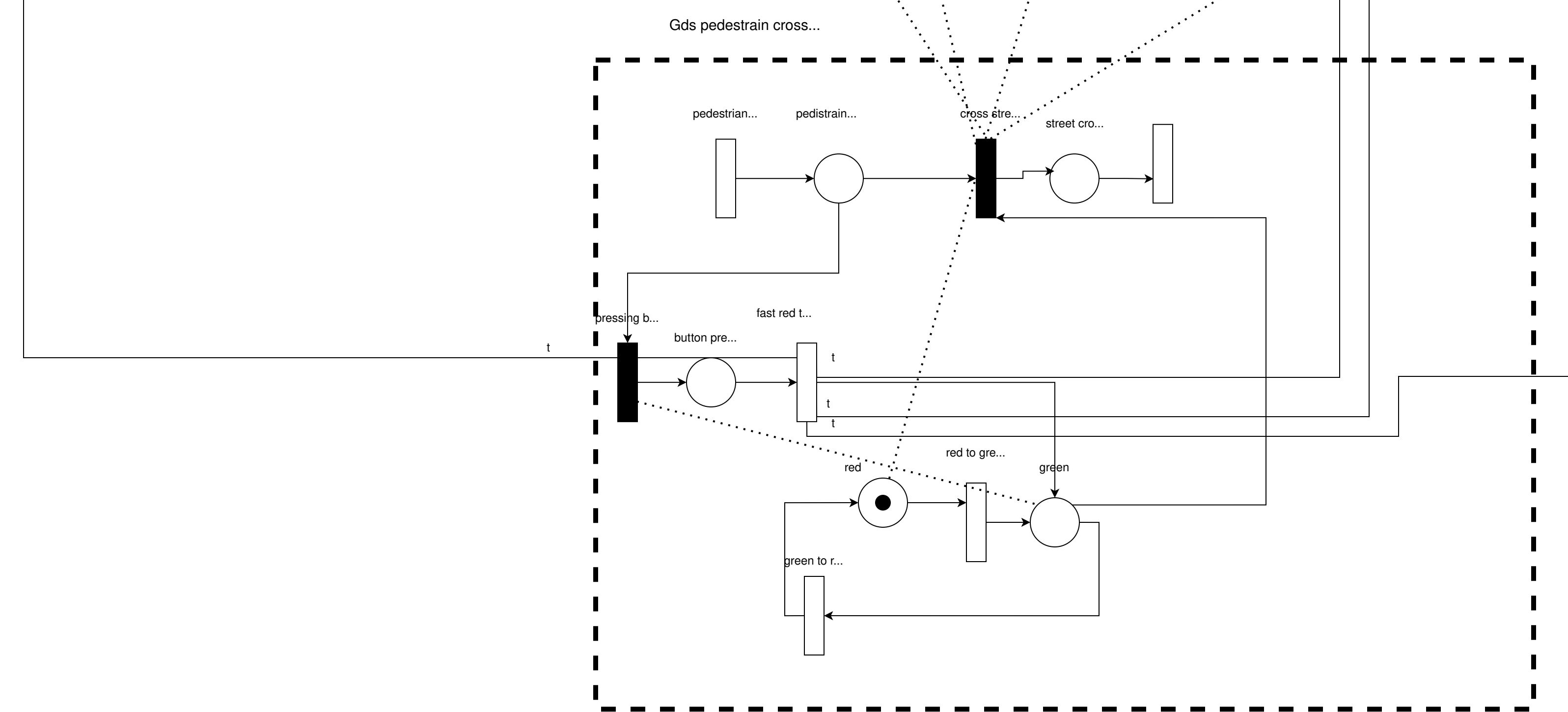
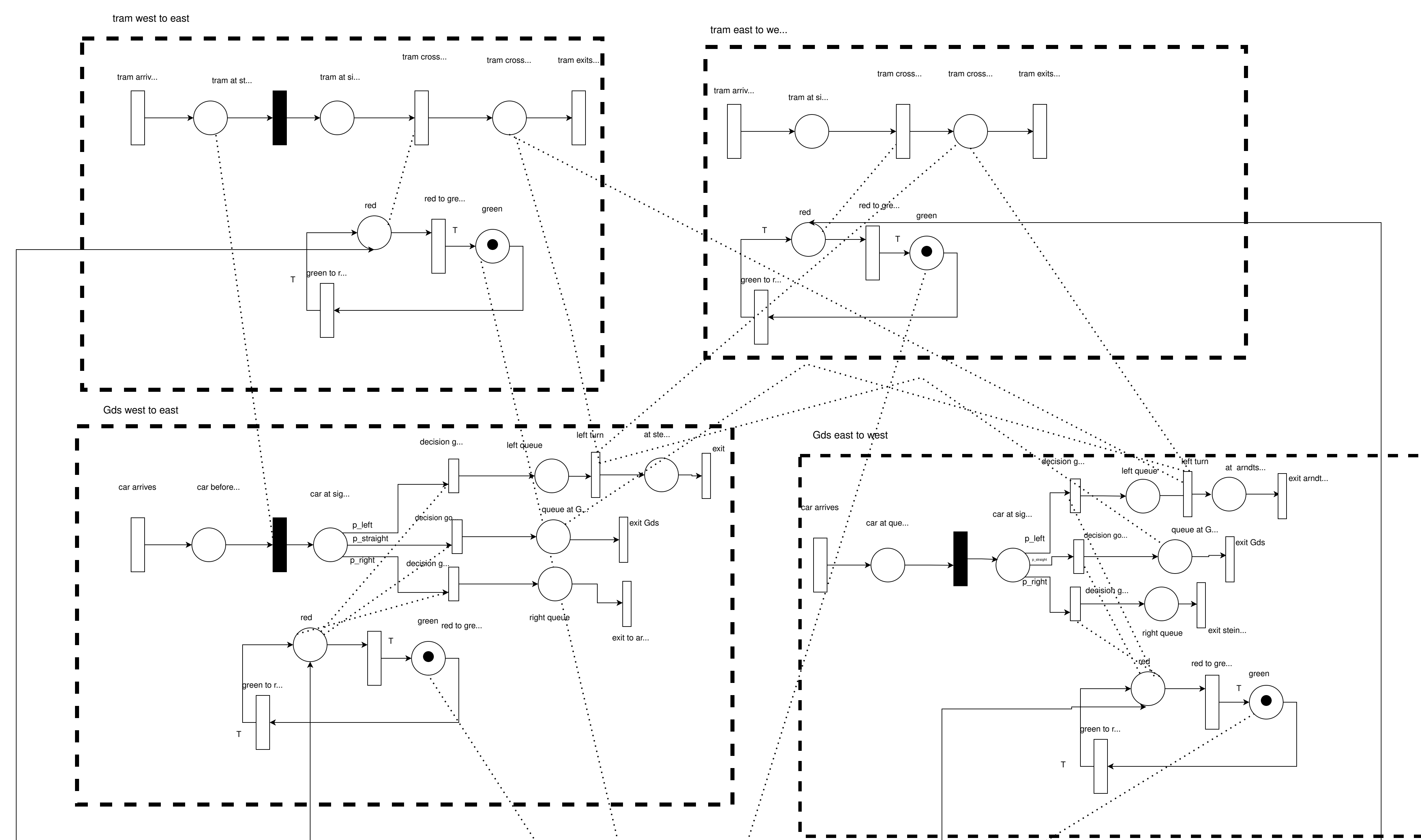
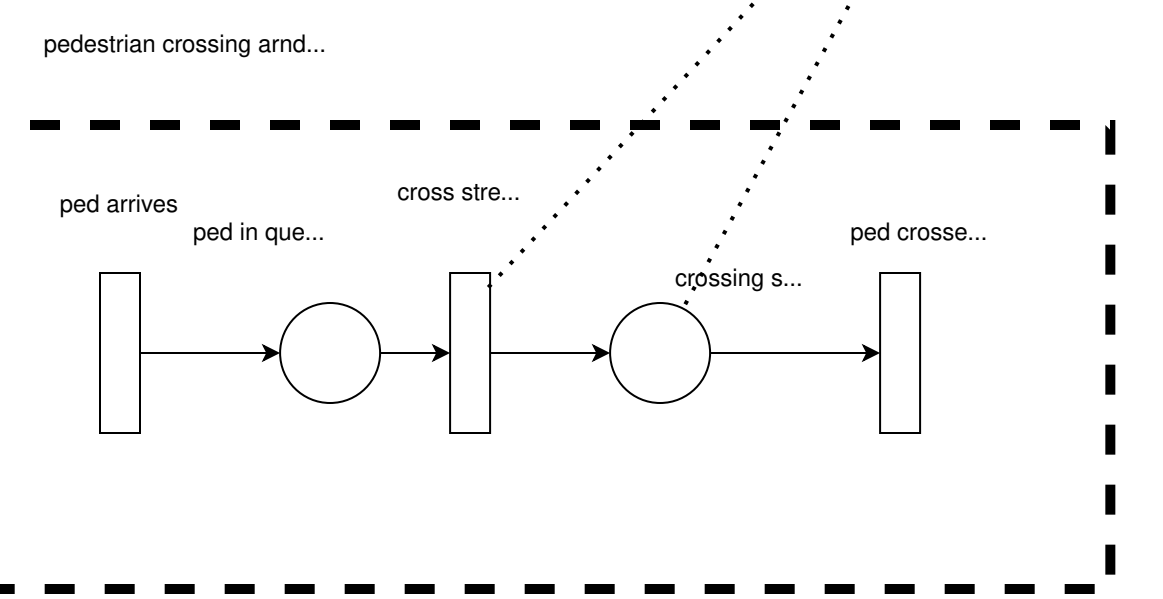
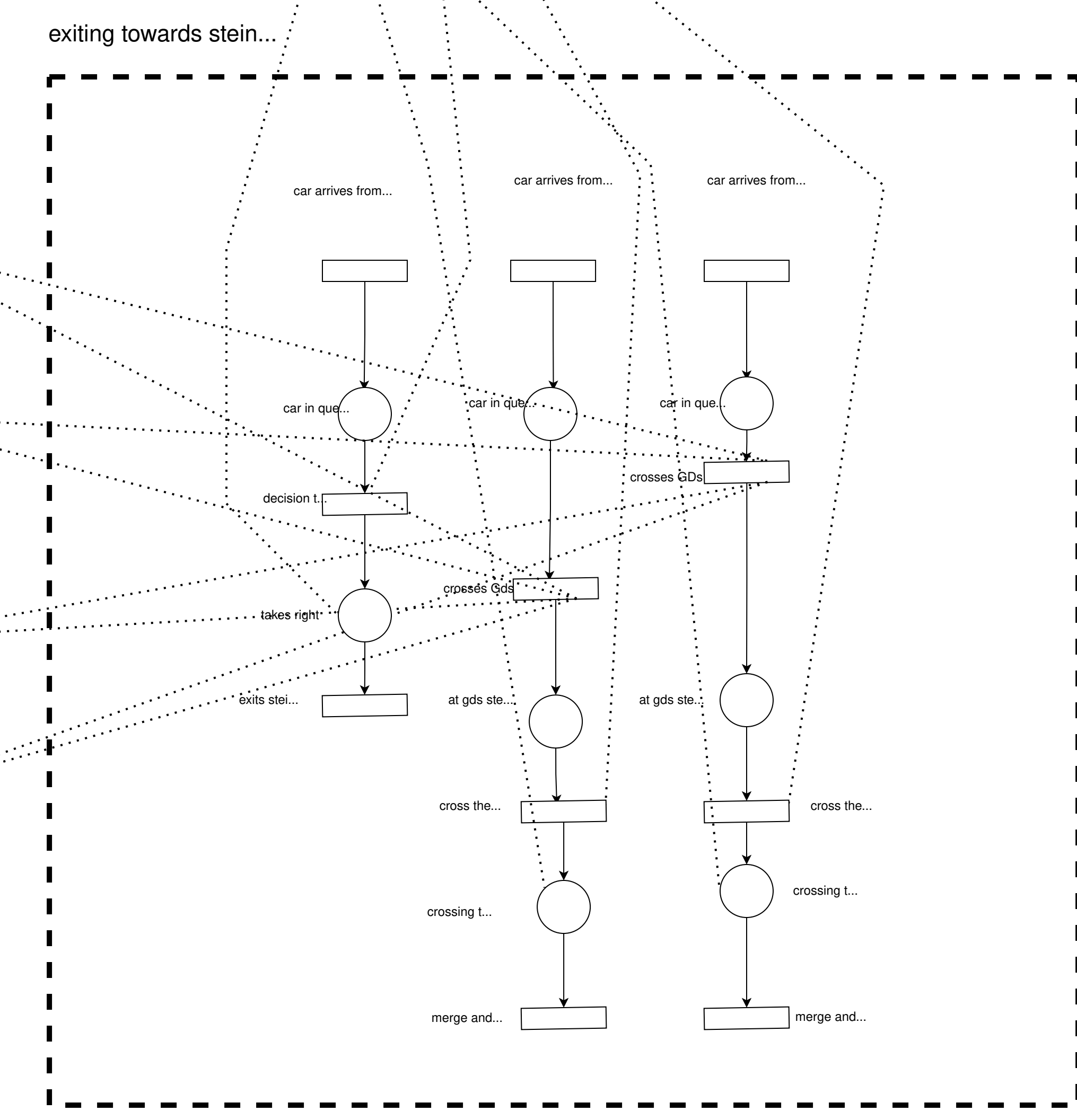
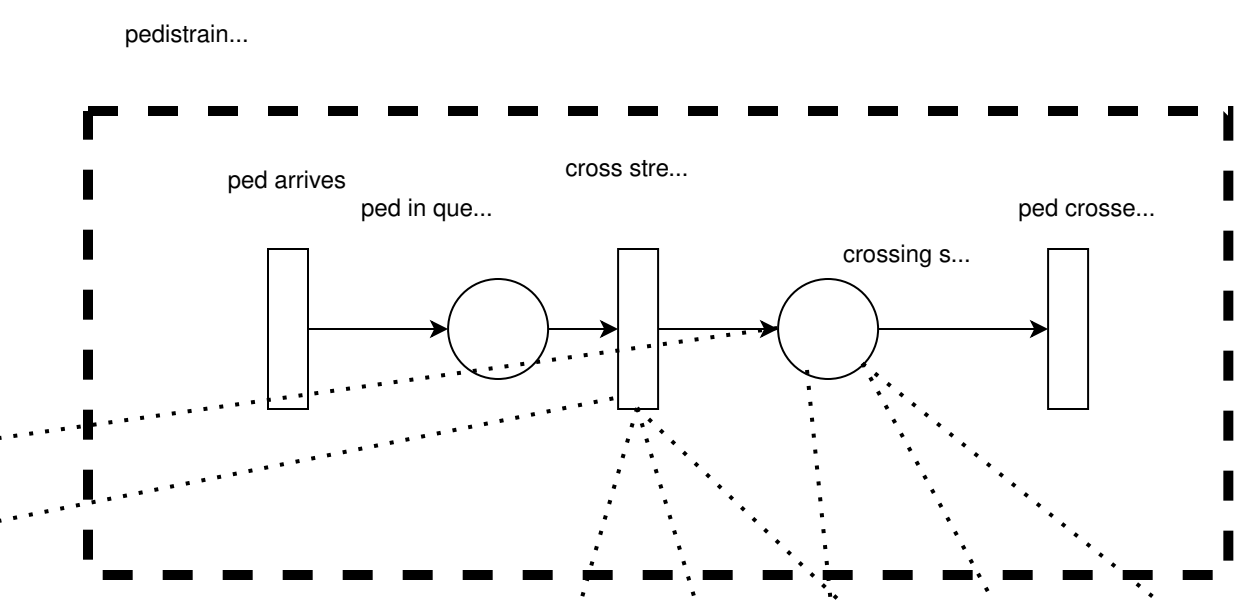
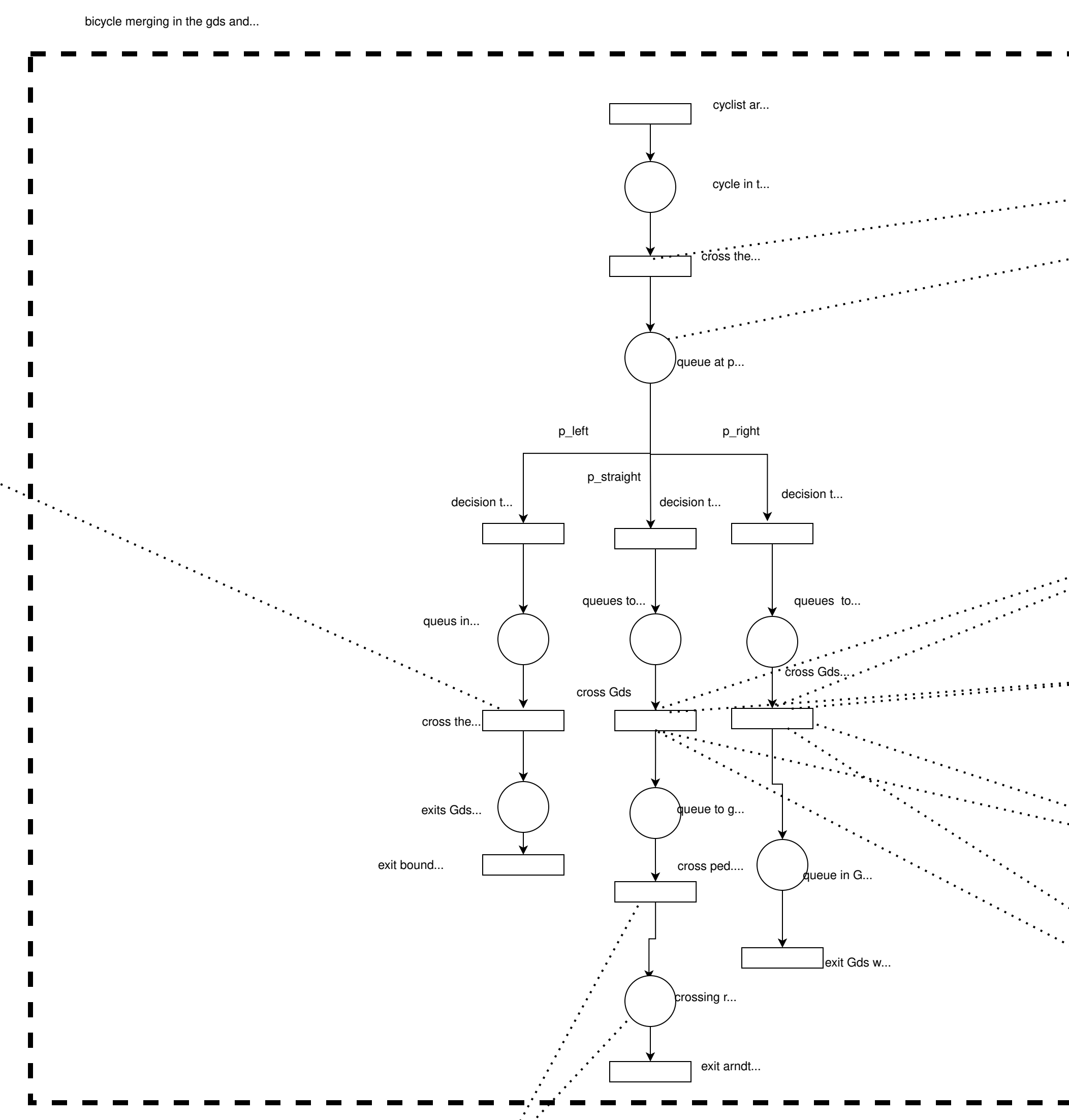
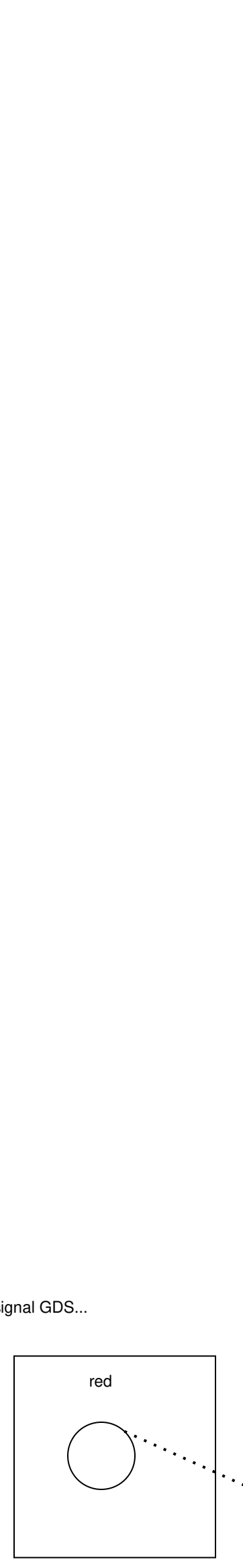
Objectives for Milestone 3

Intersection
analysis &
assumptions

Event list &
distribution

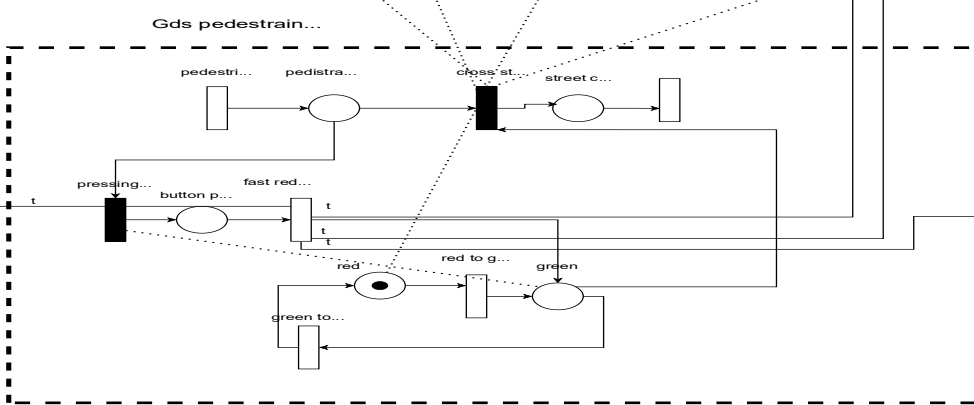
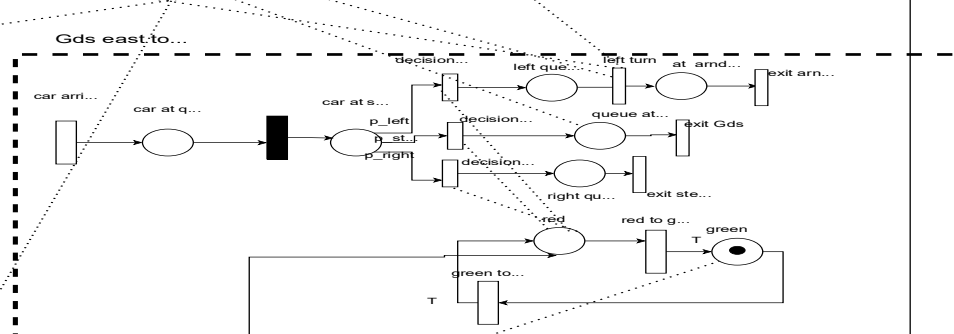
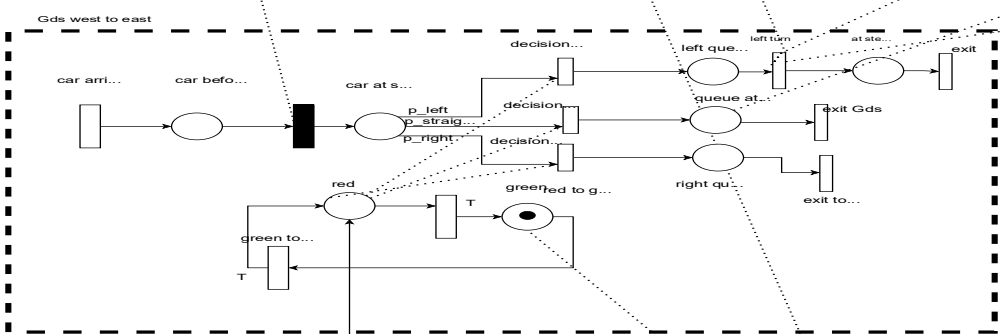
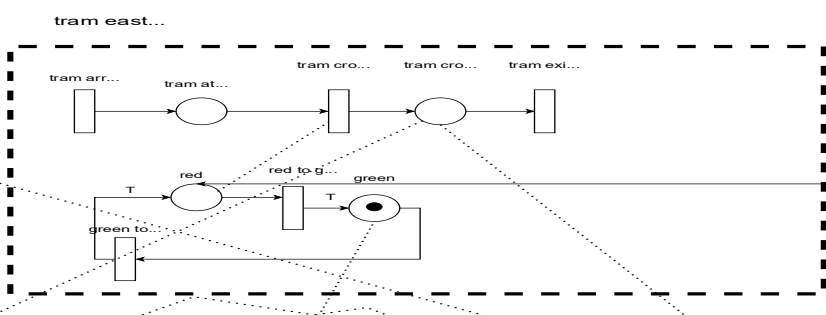
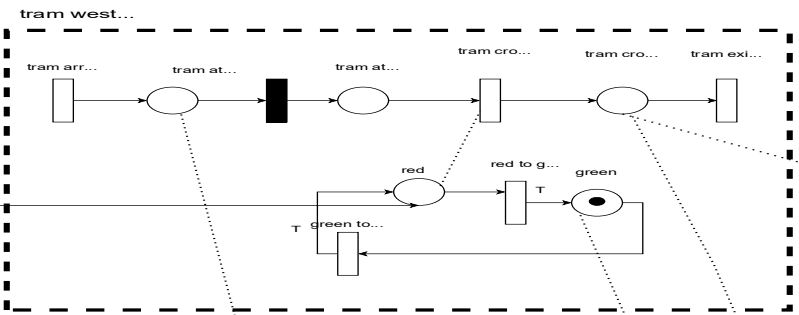
Baseline Petri
net

Experiment
Design



Assumptions

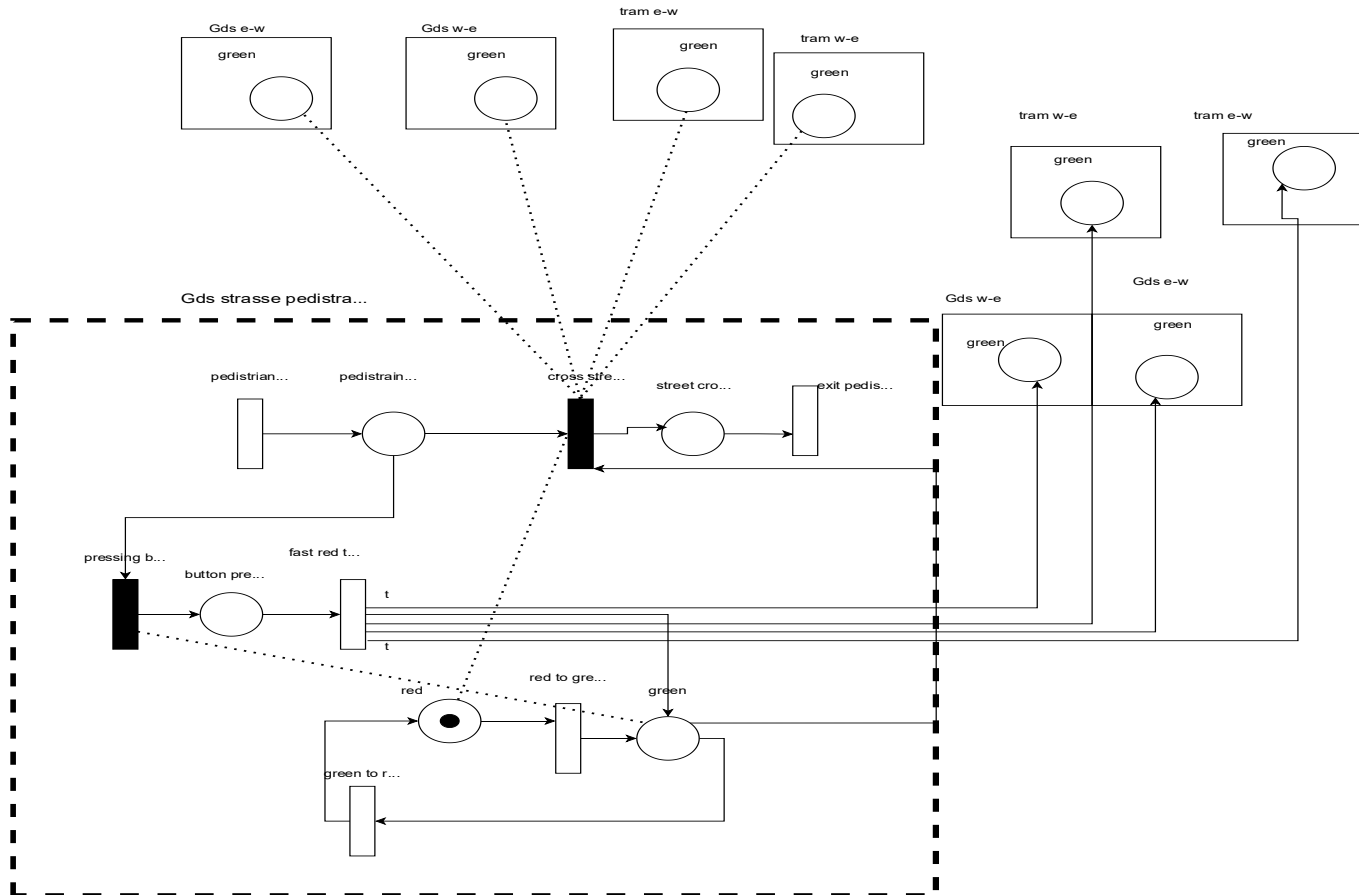
1. Vehicle arrivals is stochastic.
2. Trams and cars use separate lanes (trams left, cars right).
3. Tram has absolute priority over cars at the signal.
4. Tram arrivals are not based on a fixed timetable.
5. The passengers onboarding and offboarding time is not considered.
7. One-way regulation on Steinigstraße is fully respected for cars.
8. Bicycles will follow car rules.
9. Traffic signal transitions after time T .
10. Pedestrian stop button triggers all-red signals after a delay t .



West to east

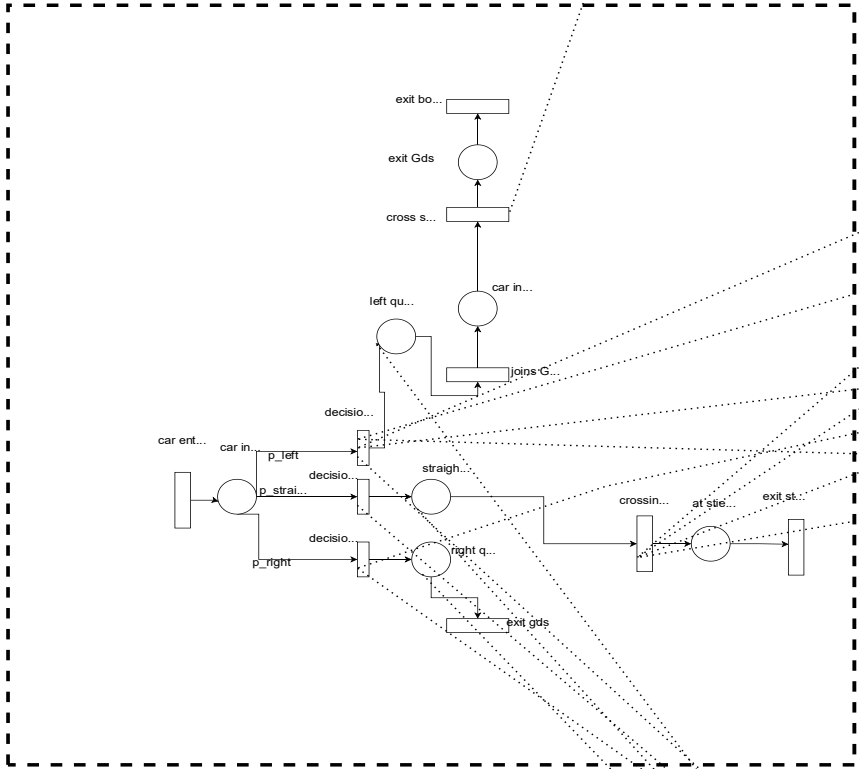
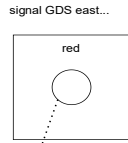
East to west

Große Diesdorfer Straße

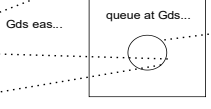
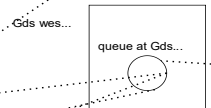
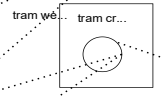
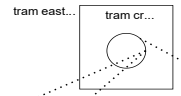
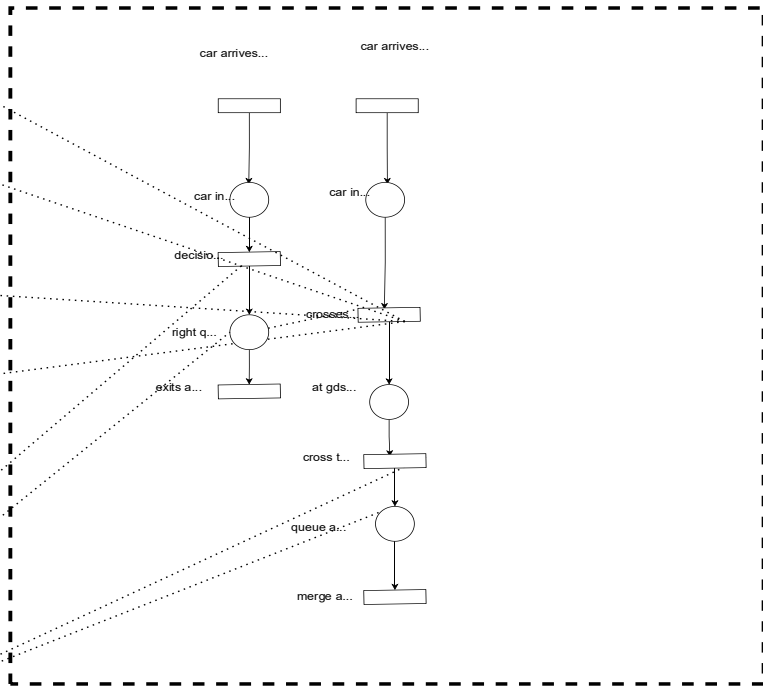


Pedestrian crossing Große Diesdorfer Straße

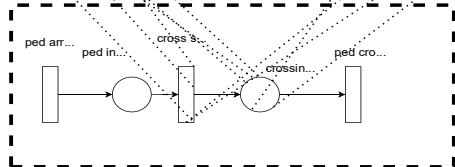
arndtstr. south...



arndtstr. north to s...

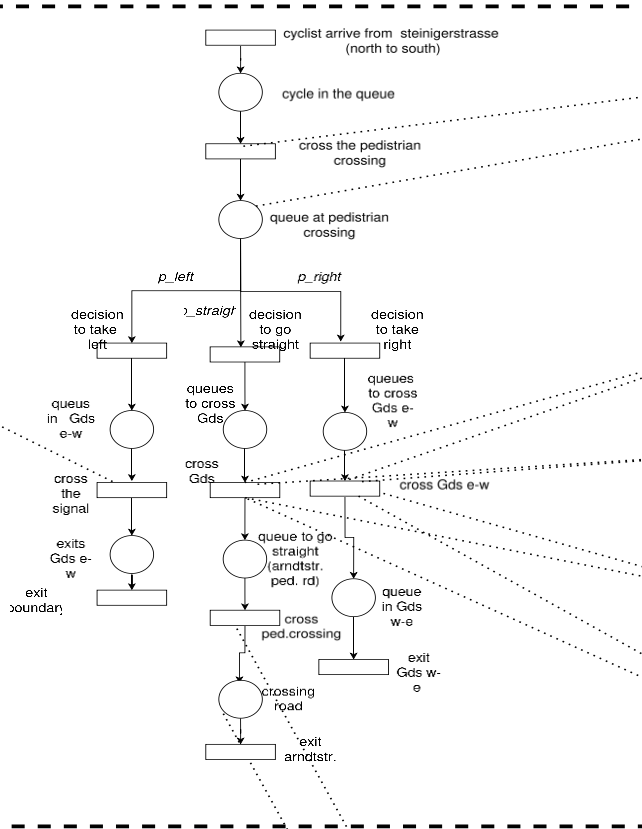


pedestrian crossing a...

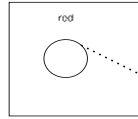


Arndtstraße

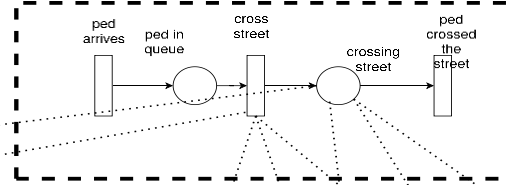
bicycle merging in the gds and arndtstrs.



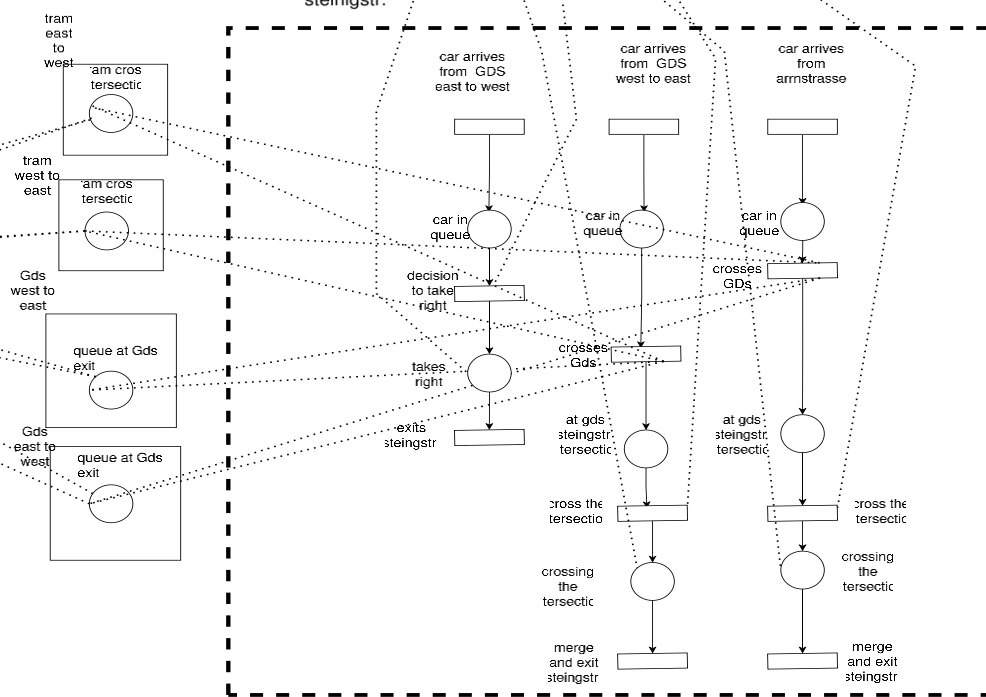
signal GDS east to west



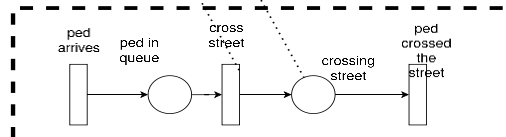
pedestrian crossing steingstr.



exiting towards steingstr.



pedestrian crossing arndtstr.



Steinigstraße

Experiments that will be performed

- Adding traffic light on Arndtstraße
- Adding traffic lights for pedestrian crosswalks
- Speed limit
- Traffic light priority (to high volume street)

Quantities to be Measured

Category	Quantities to be Measured
Arrivals	Vehicle and Tram arrivals.
Turning probabilities	Left-turn, right-turn, and straight movements probability
Pedestrian flow	Pedestrian arrival counts
Signal data	Existing signal timings
Public transport	Tram dwell times at the stop
Queue	Queue length

The Quantities Used as Simulation Results

- Average Queue Length.
- Average Waiting Time.
- Vehicle throughput.
- Pedestrians Crossing Delay.
- Tram Crossing Delay.

Type of Event and distribution

#	Event	Primary / Secondary	Distribution
1	Tram arrives	Primary	Stochastic
2	Car arrives	Primary	Stochastic
3	Pedestrian arrives	Primary	Stochastic
4	Cyclist arrives	Primary	Stochastic
5	Red to green	Secondary	Timed
6	Green to red	Secondary	Timed
7	Fast red to green	Secondary	Timed - button triggered

8	Tram crosses signal	Secondary	Timeless
9	Car crosses GDS	Secondary	Empirical
10	Pedestrian crosses street	Secondary	Empirical
11	Decision left / straight / right	Secondary	Timeless
12	Tram at stops	Secondary	Deterministic
13	Merge and exit	Secondary	Timeless

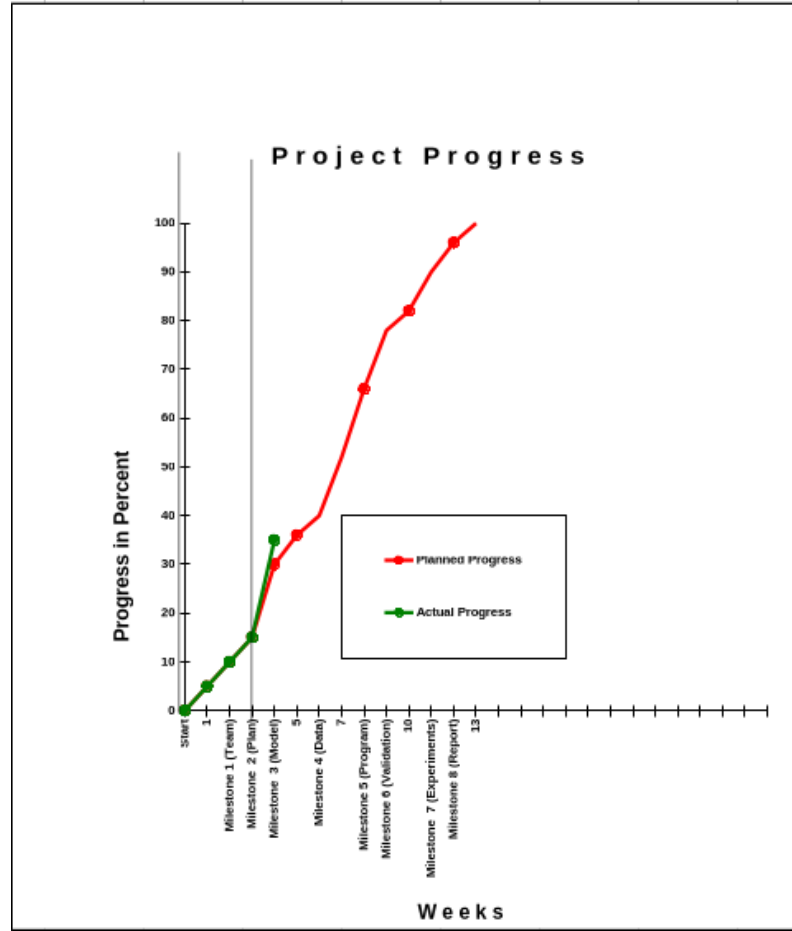
Data is Based on

- On-site traffic observations of vehicle.
- Pedestrian counts at crossing points.
- Tram timetable and observed dwell times.
- Existing signal timings.
- Vehicle turning movement counts (left/straight/right).
- Queue length and waiting time observations.
- Peak vs off-peak traffic period measurements.

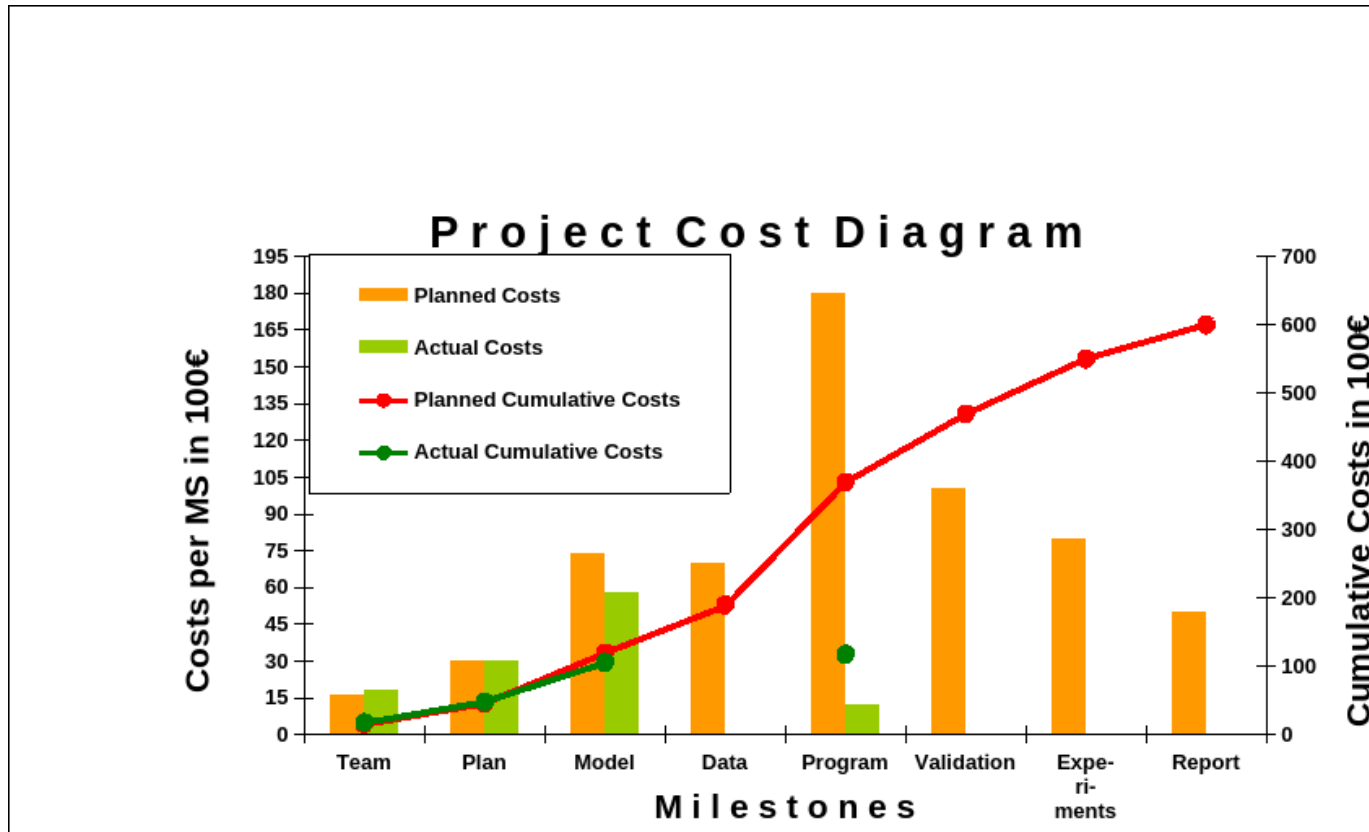
Lessons Learned and Experience Gained

- Came up with a solution for the pedestrian signal through the team's collective inputs and collaborative discussions
- Learned how to convert a real world traffic problem into a conceptual simulation model using stochastic Petri nets.
- Understood the importance of assumptions and simplifications when exact real-world data is unavailable.

Progress so far



COST INCURRED SO FAR



Thank You

Any Questions