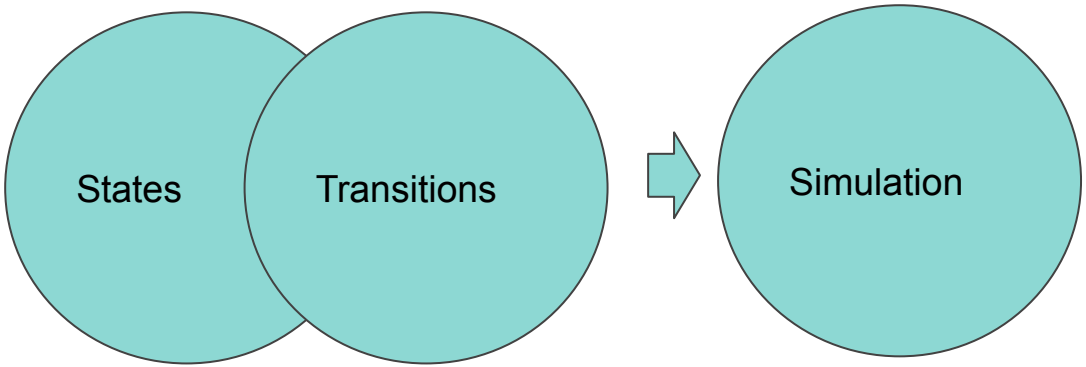
Python vs Rust...
(for simulation)

Alisa Dammer
ML Engineer at FREE NOW (former mytaxi)

What is Simulation?

Approximate imitation



Types

Continuous

- Physics
- Biology
- Chemistry
- Advanced engineering systems

Discrete-event

- Taxi
- Post Office
- Manufacturing pipeline
- Network protocols

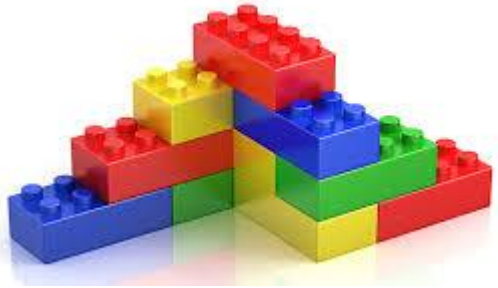
Mixed

- Forestry
- Health care
- Higher complexity systems

Tools

- Frameworks (GUST)
- Libraries (SimPy)
- Game Engines (Unity)
- Programming languages

Important points



Scenario

- Spawn 0..N taxi requests with P chance
- Request can be assigned to a FREE car only
- Request gets cancelled after X seconds, if not assigned
- Cars are either FREE or OCCUPIED
- 1 day of simulation

Criteria

Objective:

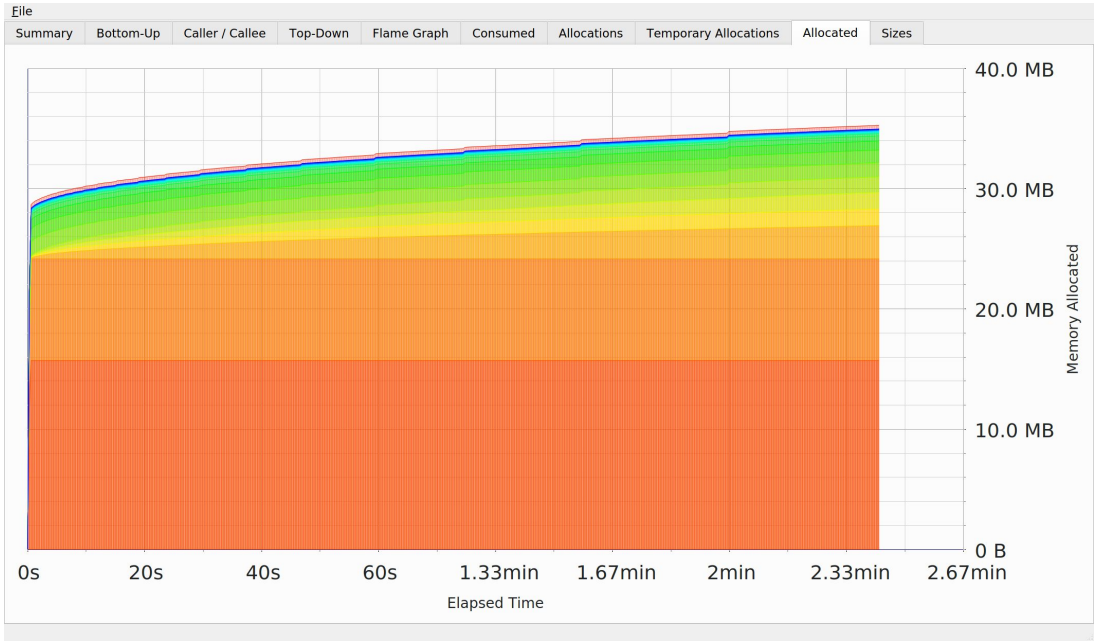
- Amount of code
- Testing simplicity
- Documentation generation (API or usage manual)
- Performance
- Memory usage
- Ecosystem
- Language versions (Major updates, breaking changes, etc.)

Subjective:

- Code simplicity
- Development speed

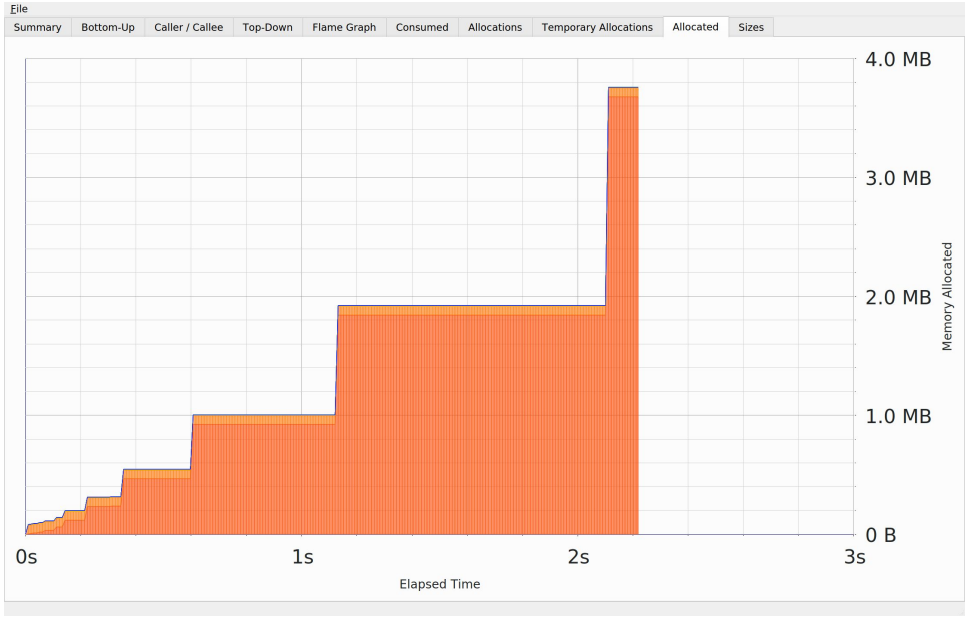
Python

- Lines: 94,
- Performance: 209.036s+-16.96s
- Memory usage:



Rust

- Lines: 160
- Performance: 154.5ms +- 4.4ms
- Memory usage:



Comparison

criteria	Python	Rust
Amount of code		
Test Simplicity		
Documentation		
Memory efficiency		
Performance		
Ecosystem		
Versions		
Simplicity		
Development speed		

Conclusion

What do you want to reach and what are your pain points?