Python vs Rust...
(for simulation)

Alisa Dammer
ML Engineer at FREEnow
What is Simulation?

Approximate imitation

- States
- Transitions
- Simulation

https://www.youtube.com/watch?v=hgry3vkul5Y
<table>
<thead>
<tr>
<th>Types</th>
<th>Continuous</th>
<th>Discrete-event</th>
<th>Mixed</th>
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<tbody>
<tr>
<td></td>
<td>- Physics</td>
<td>- Taxi</td>
<td>- Forestry</td>
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<td>- Biology</td>
<td>- Post Office</td>
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<td>- Chemistry</td>
<td>- Manufacturing pipeline</td>
<td>- Higher complexity systems</td>
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<td>- Advanced engineering systems</td>
<td>- Network protocols</td>
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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:
<table>
<thead>
<tr>
<th>criteria</th>
<th>Python</th>
<th>Rust</th>
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<tr>
<td>Amount of code</td>
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<td>[Red]</td>
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<tr>
<td>Test Simplicity</td>
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<td>[Red]</td>
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<tr>
<td>Documentation</td>
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<tr>
<td>Memory efficiency</td>
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Conclusion

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