# Ciw

An open source discrete event simulation library for Python

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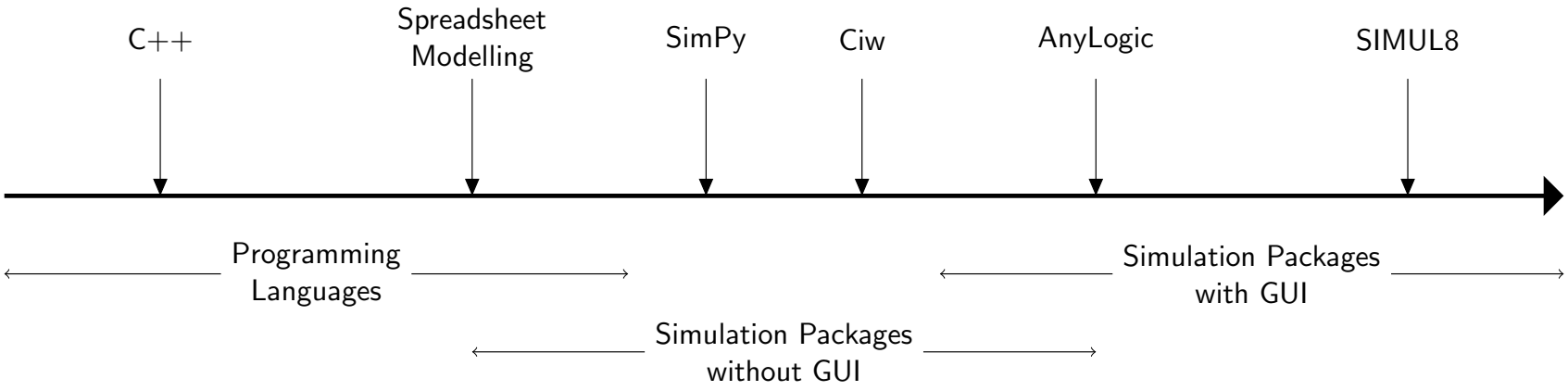
C++
Spreadsheet Modelling
SimPy
Ciw
AnyLogic
SIMUL8
Programming Languages
Simulation Packages with GUI
Simulation Packages without GUI

```
import ciw

N = ciw.create_network(
    Arrival_distributions=[['Exponential', 3.0]],
    Service_distributions=[['Exponential', 6.0]],
    Number_of_servers=[1]
)

ciw.seed(1)
Q = ciw.Simulation(N)
Q.simulate_until_max_time(50)
recs = Q.get_all_records()
```

| | id_number | customer_class | node | arrival_date | waiting_time | service_start_date | service_time | service_end_date | time_blocked | exit_date | destination |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 1 | 0.048097 | 0.000000 | 0.048097 | 0.313359 | 0.361456 | 0.0 | 0.361456 | -1 |
| **1** | 2 | 0 | 1 | 0.529087 | 0.000000 | 0.529087 | 0.049077 | 0.578164 | 0.0 | 0.578164 | -1 |
| **2** | 3 | 0 | 1 | 0.757106 | 0.000000 | 0.757106 | 0.099485 | 0.856592 | 0.0 | 0.856592 | -1 |
| **3** | 4 | 0 | 1 | 1.108568 | 0.000000 | 1.108568 | 0.259098 | 1.367665 | 0.0 | 1.367665 | -1 |
| **4** | 5 | 0 | 1 | 1.141421 | 0.226244 | 1.367665 | 0.004793 | 1.372458 | 0.0 | 1.372458 | -1 |
| **5** | 6 | 0 | 1 | 1.743574 | 0.000000 | 1.743574 | 0.094498 | 1.838071 | 0.0 | 1.838071 | -1 |
| **6** | 7 | 0 | 1 | 2.222461 | 0.000000 | 2.222461 | 0.000351 | 2.222812 | 0.0 | 2.222812 | -1 |
| **7** | 8 | 0 | 1 | 2.418956 | 0.000000 | 2.418956 | 0.213080 | 2.632036 | 0.0 | 2.632036 | -1 |
| **8** | 9 | 0 | 1 | 2.505542 | 0.126494 | 2.632036 | 0.484226 | 3.116262 | 0.0 | 3.116262 | -1 |
| **9** | 10 | 0 | 1 | 3.277863 | 0.000000 | 3.277863 | 0.005178 | 3.283041 | 0.0 | 3.283041 | -1 |
| **10** | 11 | 0 | 1 | 3.286455 | 0.000000 | 3.286455 | 0.129934 | 3.416389 | 0.0 | 3.416389 | -1 |
| **11** | 12 | 0 | 1 | 4.219565 | 0.000000 | 4.219565 | 0.079997 | 4.299561 | 0.0 | 4.299561 | -1 |
| **12** | 13 | 0 | 1 | 4.300935 | 0.000000 | 4.300935 | 0.091397 | 4.392332 | 0.0 | 4.392332 | -1 |
| **13** | 14 | 0 | 1 | 4.310759 | 0.081574 | 4.392332 | 0.041772 | 4.434104 | 0.0 | 4.434104 | -1 |
| **14** | 15 | 0 | 1 | 4.502777 | 0.000000 | 4.502777 | 0.114134 | 4.616911 | 0.0 | 4.616911 | -1 |

```
N = ciw.create_network(
    Arrival_distributions={
        'Class 0': [['Exponential', 2.0], ['Exponential', 4.0]],
        'Class 1': [['Exponential', 2.0], ['Exponential', 3.0]]},
    Service_distributions={
        'Class 0': [['Deterministic', 0.5], ['Uniform', 0.2, 0.9]],
        'Class 1': [['Exponential', 2.0], ['Uniform', 0.3, 0.7]]},
    Transition_matrices={
        'Class 0': [[0.0, 0.0], [0.5, 0.0]],
        'Class 1': [[0.0, 0.2], [0.5, 0.1]]},
    Number_of_servers=[1, 2],
    Queue_capacities=[20, 'Inf'],
    Priority_classes={
        'Class 0': 1,
        'Class 1': 0},
    Class_change_matrices={
        'Node 1': [[0.0, 1.0], [0.0, 1.0]],
        'Node 2': [[0.8, 0.2], [0.0, 1.0]]}
)
```

https://github.com/CiwPython/Ciw

@CiwPython

**Ciw: An open source discrete event simulation library.**
*Palmer GI, Knight VA, Harper PR, Hawa, AL.* Under Review
PrePrint: https://arxiv.org/abs/1710.03561