Queueing & Python

pip install ciw

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What is a Queue?
What is a Queue?
Features

http://ciw.readthedocs.io
Distributions
Priority Queues
Baulking

$P(\text{baulk} \mid x \text{ in queue}) = b(x)$
\[ b(x) = \begin{cases} \frac{x}{20} & \text{if } x \leq 2 \\ \frac{x}{x+3} & \text{if } 2 < x \leq 10 \\ 1 & \text{otherwise} \end{cases} \]
Server Schedules
Server Schedules
Server Schedules
Server Schedules
Server Schedules
Server Schedules
On duty, not busy

On duty, busy

Off duty, busy

Server 1 for (-40, 0)

Server 2 for (-40, 0)

Server 3 for (-40, 0)

Server 1 for (0, 40)

Server 1 for (65, 110)

Server 2 for (65, 110)

Server 1 for (110, 150)

Server 2 for (110, 150)

Server 3 for (110, 150)

Server 1 for (150, 190)
CiwVis

https://ciwpython.github.io/CiwVis/
Academic Uses

**Theoretical Work**
Investigating deadlock in queueing networks.
(Geraint Palmer, Prof. Paul Harper, Dr. Vincent Knight)

**Practical Work**
Modelling an ophthalmology clinic to strategise scheduling.
(Lieke Hölscher, Dr. Jennifer Morgan)
Investigating Deadlock
Investigating Deadlock
Expected Time to Deadlock From State (0)

- Analytical Mean
- Simulation Results

Time to Deadlock from (0)

µ

1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0
Modelling Ophthalmology Clinic
Thank you!

@GeraintPalmer
@CiwPython
http://ciw.readthedocs.io
https://github.com/geraintpalmer/Ciw
https://ciwpython.github.io/CiwVis/