KADIR HAS UNIVERSITY - Computer Engineering Dept.

CMPE 412 – Computer Simulation- 2025-Fall

LAB-PS-04 – Single Server Queue Simulation – Capacity effect

Queue Simulation in AnyLogic (Seconds)

Task 1: Change capacity of the resource used (25 pts)

1. You may create a new model for this task
2. Create source → queue → delay → release → sink chain .
3. Projects / Main / Simulation Main :
    a. stop → Stop at specified time
    b. start time →0
    c. stop time → 200
4. source :
    a. interarrival time → uniform (1,3),
    b. limited number of arrival →checked
    c. maximum number of arrivals → 20
5. Queue:
    a. Capacity →100
6. Delay
    a. Delay time → uniform (6,10),
    b. Capacity 1
    c. Force statistics collection→ checked
7. Add a resource pool unit in your model just below that chain (not connected anywhere)
    a. Resource type → static
    b. Capacity defined→ directly
    c. Capacity 1
8. Release / Properties
    a. Release Properties → Release : Specified quantity of resources
    b. Resource pool Object: select the pool you just included
    c. Quantity released→1
9. Add TimePlot ,put queue.size(). Inside value under properties, shows queue size / time.
10. For each plot change below options
    a. Display up to → 200
    b. Time window →200

Put a reasonable title in each plot

Run the model
Measure from the graph what is the maximum number of waiting customers / agents in the queue . Put it to your report

Put the configuration of all elements as snapshots and result of run screen to your LAB report

Task 2 : Increase the capacity (20 pts)
Run the same experiment as task 1 by changing the capacity property in Delay from 1 to 2
Measure the max queue.size() value can attain. Record it

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Put the same model elements result on your report.

Task 3: Measure different capacities , compare and comment (20 pts)
Run same experiment (task2) with capacity 3,4,5 and record the maximum queue.size
Prepare the below table and Comment what happens when capacity increased with same arrival and service / delay times. And put it in your LAB report (No need to put screenshot in this task)

Capacity	Max of queue.size()	Comment
1		
2		
3		
4		
5		

Task 4: additional measurements (20 pts)
Use capacity→ 3 for delay and add the additional time plots to your model
- Time Plot for showing instantly serviced customers using `delay.size()`
- Time Plot for showing average utilization using :
`100.0 * delay.size()/delay.capacity`

Put running model and all screenshots for model elements in your report

Task 5: Faster service than interarrival (15 pts)
Refer t o task 1 , change the time as follows and comment what happens.
   a. interarrival time → uniform (6,10),
   b. Delay time → uniform (1,3),

Put running model and all screenshot for model elements in your report

Delivery :
1. Your file should contain all tasks.
2. **Important naming rule**: name your file according to your course code, activity, surname, firstname using all uppercase
   For example: If your name is James Bond your file for LAB-PS-04 has to be named as :
   CMPE412-LAB-PS-04-BOND-JAMES
3. Please upload your file in LEARN system under "LAB-PS / LAB-PS-04"
4. **Attention**: incorrect naming of the file would result in loss of points
5. **Reminder for plagiarism: You should do your work ALONE. No consultation to your friends, no exchange of codes. No usage of any AI site / code generator or ready code from other web sites. You are entitled to explain or modify your code whenever requested.**

Good Luck