Task Performance

Objective:

At the end of the exercise, the students should be able to:

- Perform a simple output analysis.

Instructions:
Analyze the given simulation output and perform a simple analysis by answering the following questions. **(60 points)**

Car-Wah Service Simulation
The output of a simulation run of a car-wash service model can possibly be summarized on two (2) output files; the output file containing the listing of the sequence of events (known as the trace), and the file containing the computed performance metrics and statistical summary of the simulation.

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OOSimL model: Simple Model of Car-Wash System
Simulation date: 9/19/2008 time: 13:47
------------------------ TRACE -------------------------------
Time: 0 Arrivals  holds for 9.839
Time: 0 Wash_machine deactivated
Time: 9.839 Arrivals  holds for 10.372
Time: 9.839 Car1 enqueued into Customer Queue
Time: 9.839 Wash_machine to reactivate
Time: 9.839 Car1 deactivated
Time: 9.839 Car1 dequeued from Customer Queue
Time: 9.839 Wash_machine holds for 13.354
Time: 20.212 Arrivals  holds for 3.211
Time: 20.212 Car2 enqueued into Customer Queue
Time: 20.212 Car2 deactivated
Time: 23.193 Car1 to reactivate
Time: 23.193 Car2 dequeued from Customer Queue
Time: 23.193 Wash_machine holds for 10.743
Time: 23.193 Car1 terminating
Time: 23.423 Arrivals  holds for 17.068
Time: 23.423 Car3 enqueued into Customer Queue
Time: 23.423 Car3 deactivated
Time: 33.936 Car2 to reactivate
Time: 33.936 Car3 dequeued from Customer Queue
Time: 33.936 Wash_machine holds for 11.203
Time: 33.936 Car2 terminating
Time: 40.491 Arrivals  holds for 9.237
Time: 40.491 Car4 enqueued into Customer Queue
Time: 40.491 Car4 deactivated
Time: 45.139 Car3 to reactivate
Time: 45.139 Car4 dequeued from Customer Queue
Time: 45.139 Wash_machine holds for 11.273
Time: 45.139 Car3 terminating
Time: 49.728 Arrivals  holds for 3.253
Time: 49.728 Car5 enqueued into Customer Queue
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Time: 403.316 Car35 terminating
Time: 413.782 Car36 to reactivate
Time: 413.782 Car37 dequeued from Customer Queue
Time: 413.782 Wash_machine holds for 10.743
Time: 413.782 Car36 terminating
Time: 424.524 Car37 to reactivate
Time: 424.524 Car38 dequeued from Customer Queue
Time: 424.524 Wash_machine holds for 10.957
Time: 424.524 Car37 terminating
Time: 435.481 Car38 to reactivate
Time: 435.481 Car39 dequeued from Customer Queue
Time: 435.481 Wash_machine holds for 10.967
Time: 435.481 Car38 terminating
Time: 446.448 Car39 to reactivate
Time: 446.448 Car40 dequeued from Customer Queue
Time: 446.448 Wash_machine holds for 9.666
Time: 446.448 Car39 terminating
Time: 456.115 Car40 to reactivate
Time: 456.115 Car41 dequeued from Customer Queue
Time: 456.115 Wash_machine holds for 11.403
Time: 456.115 Car40 terminating
Time: 467.518 Car41 to reactivate
Time: 467.518 Car42 dequeued from Customer Queue
Time: 467.518 Wash_machine holds for 9.868
Time: 467.518 Car41 terminating
Time: 477.386 Car42 to reactivate
Time: 477.386 Wash_machine deactivated
Time: 477.386 Car42 terminating
---------------------------------------------------------------

End Simulation of Simple Model of Car-Wash System
 date: 9/19/2008 time: 13:47
```

```
OOSimL model: Simple Model of Car-Wash System
Simulation date: date: 9/19/2008 time: 13:47
--------------------STATISTICS REPORT-------------------------
---------------------------------------------------------------
Squeue: Customer Queue
Capacity of queue: 40
Number of observations: 84
Max number of objects in queue: 15
Average number of objects in queue: 2
Average time in queue: 5.583055910617741
Queue utilization: 0.3632765518093226
Queue usage: 0.19106458005225158
---------------------------------------------------------------
Random generator: Inter-arrival
Distribution: Negative exponential
Number of obs: 42
Seed: 7
Mean: 7.5
---------------------------------------------------------------
Random generator: Service Period
Distribution: Normal
Number of obs: 42
Seed: 13
Mean: 11.25
Standard deviation: 1.25
---------------------------------------------------------------

End Simulation of Simple Model of Car-Wash System
 date: 9/19/2008 time: 13:47

Total number of cars serviced: 42
Car average wait period: 81.885
Average period car spends in the shop: 93.017
Machine utilization: 0.992
```

Note: OOSimL means Object-Oriented Simulation Language. OOSimL was designed and developed for teaching object-oriented simulations for undergraduate programs in computing sciences, promoting object-oriented concepts and principles.

Questions:

1. How many cars received the service in the simulation? **(2 points)**
2. What time-related components were recorded in the simulation? **(3 points)**
3. Give at least three (3) statistical computation that was performed in the problem. **(3 points)**
4. How many random/pseudorandom number generators were used in the simulation? **(2 points)**
5. Can the simulation above be considered a stochastic simulation? Why or why not? **(Essay: 10 points)**
6. Is the number of observations or simulation runs enough to deduce definitive inferences regarding the system? Why or why not? **(Essay: 10 points)**
7. In your opinion, what specific output analysis method is appropriate for the car-wash service simulation? Rationalize your answer. **(Essay: 10 points)**
8. If you are to classify the car-wash service simulation, is it a terminating or a non-terminating simulation? Why? **(Essay: 10 points)**
9. Is it possible to create a frequency plot for the statistical report of the car-wash service simulation? Why or why not? **(Essay: 10 points)**

Grading Rubric:

Performance Indicator	Points
Correct ideas and concepts were utilized.	7
The ideas and concepts were presented clearly.	3
Total	**10**