

# CSCI803 Assignment

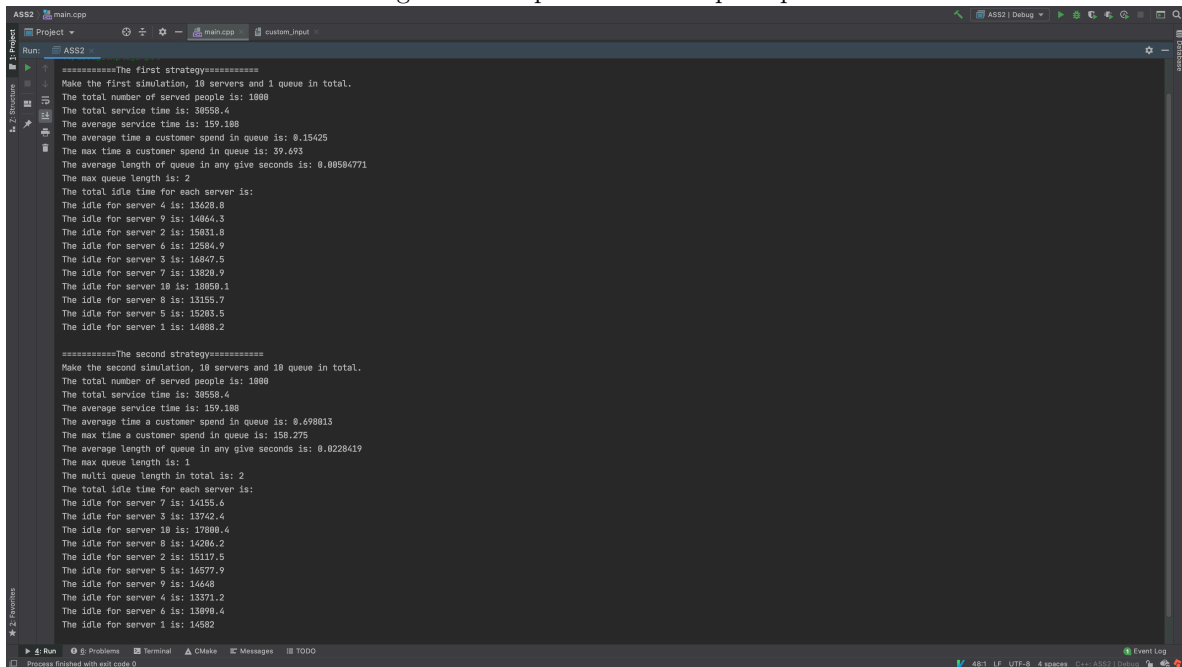
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## Result Analysis

To better analyze the results, I customized a set of input data to compare with the data already provided.

Figure 1: Output of ass2-sample-input



```
ASS2 main.cpp
Project main.cpp custom_input
Run: ASS2

=====The first strategy=====
Make the first simulation, 10 servers and 1 queue in total.
The total number of served people is: 1890
The total service time is: 39558.4
The average service time is: 159.188
The average time a customer spend in queue is: 0.15425
The max time a customer spend in queue is: 39.493
The average length of queue in any give seconds is: 0.09584771
The max queue length is: 2
The total idle time for each server is:
The idle for server 4 is: 13428.8
The idle for server 9 is: 14864.3
The idle for server 2 is: 15831.8
The idle for server 6 is: 12584.9
The idle for server 3 is: 14847.5
The idle for server 7 is: 13023.9
The idle for server 10 is: 10850.1
The idle for server 8 is: 13155.7
The idle for server 5 is: 15203.5
The idle for server 1 is: 14888.2

=====The second strategy=====
Make the second simulation, 10 servers and 10 queue in total.
The total number of served people is: 1890
The total service time is: 39558.4
The average service time is: 159.188
The average time a customer spend in queue is: 0.698813
The max time a customer spend in queue is: 158.275
The average length of queue in any give seconds is: 0.8228419
The max queue length is: 1
The multi queue length in total is: 2
The total idle time for each server is:
The idle for server 7 is: 14155.6
The idle for server 3 is: 13742.4
The idle for server 10 is: 17080.4
The idle for server 8 is: 14286.2
The idle for server 2 is: 15117.5
The idle for server 5 is: 16577.9
The idle for server 9 is: 14648
The idle for server 4 is: 13371.2
The idle for server 6 is: 13890.4
The idle for server 1 is: 14562

Process finished with exit code 0
```

Figure 2: Output of custom-input

```

=====The first strategy=====
Make the first simulation, 10 servers and 1 queue in total.
The total number of served people is: 325
The total service time is: 169.6
The average service time is: 2.98653
The average time a customer spend in queue is: 0.000339125
The max time a customer spend in queue is: 0.118216
The average length of queue in any give seconds is: 0.000649857
The max queue length is: 1
The total idle time for each server is:
The idle for server 1 is: 47.1753
The idle for server 8 is: 42.0991
The idle for server 5 is: 54.4182
The idle for server 7 is: 53.5112
The idle for server 2 is: 55.9189
The idle for server 10 is: 86.5879
The idle for server 3 is: 98.751
The idle for server 4 is: 75.2629
The idle for server 9 is: 76.1585
The idle for server 6 is: 135.5

=====The second strategy=====
Make the second simulation, 10 servers and 10 queue in total.
The total number of served people is: 325
The total service time is: 169.6
The average service time is: 2.98653
The average time a customer spend in queue is: 0.00127362
The max time a customer spend in queue is: 0.413926
The average length of queue in any give seconds is: 0.00244861
The max queue length is: 1
The multi queue length in total is: 1
The total idle time for each server is:
The idle for server 4 is: 68.6861
The idle for server 8 is: 42.0991
The idle for server 1 is: 44.3074
The idle for server 7 is: 53.5112
The idle for server 4 is: 65.479
The idle for server 10 is: 86.5879
The idle for server 3 is: 98.751
The idle for server 9 is: 72.5707
The idle for server 5 is: 69.07
The idle for server 2 is: 136.812

```

It can be seen that whether it is a custom data set or a data set that has been provided, in addition to the service time and average service time of the strategy 1, the service time and average service time are consistent with the strategy 2, the time each customer spends in the queue, the maximum time the customer is in the queue, and the average queue length is lower than strategy two, and for the idle time of each server, the idle time of each server in strategy one on average is also lower than strategy two which each customer spends a little bit more time in the queueon.

Taken together, strategy one is more efficient than strategy two