

Programming Assignment-4

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After including all the libraries in the program we open "inp-params.txt" which initiates the following global variables P,C,l1,l2.

The variables are defined globally along with wastingtime and cwastingtime, which are used in calculating the average times.

After that we make P threads which is equal to number of passengers and a 2-D Array which filled from 0 to C-1 by 1,2,3,..... C in the 1st row and all 0's in the 2nd row.

For getting instant time, we use the function "func_time" so that the function returns the time in hours mins and seconds.

We make two exponential distributions and pass the value of l1, l2 in the constructor Later this can be used to obtain random numbers d1 and d2 with values that are exponentially distributed with an average of l1, l2 seconds.

Thread Function:

(*we initialized a semaphore in main function that takes C as input.)

Now in the thread function, when thread enters here it checks the semaphore value through **sem_wait(&sem)** and lets the thread enter into critical section. In critical section we check which car is available and assign it to the passenger. To make sure the same car is not used by another thread we change the value of arr[j][1] to 1 to the cars that are currently in operation and the value off arr[j][1] for cars not in operation or that completed their operation is 0.

Now after getting into car we wait according to the exponential distribution of l2 time and the passenger leaves the car.

After some sleep time that we find according to exponential distribution of I_1 the given passenger again requests for a ride.

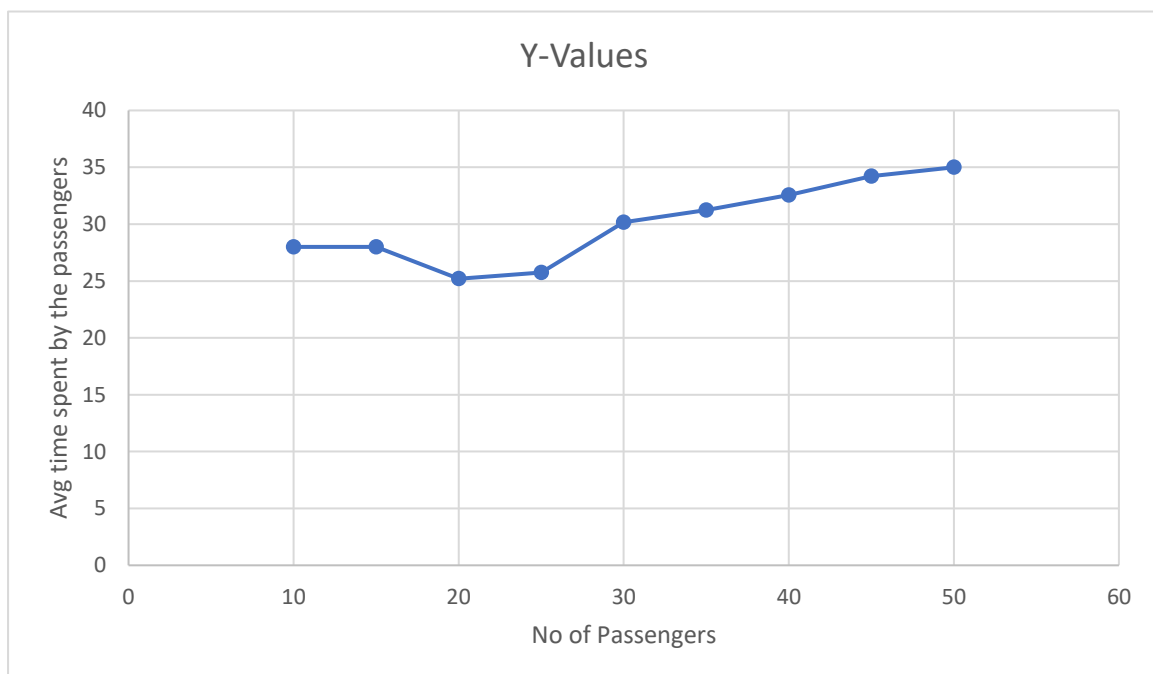
This goes on till a passenger completes k rides, after completion we get average time spent by a person in museum and average time taken by all cars during the whole process.

OUTPUT ANALYSIS:

Avg time taken by passengers vs No of passengers

** for the complete below values ,we are taking

1. I_1, I_2 as 5,5
2. The value of k is fixed to 5
3. for this graph no of cars is fixed to 25
4. the increment in no of passengers each time is 5.



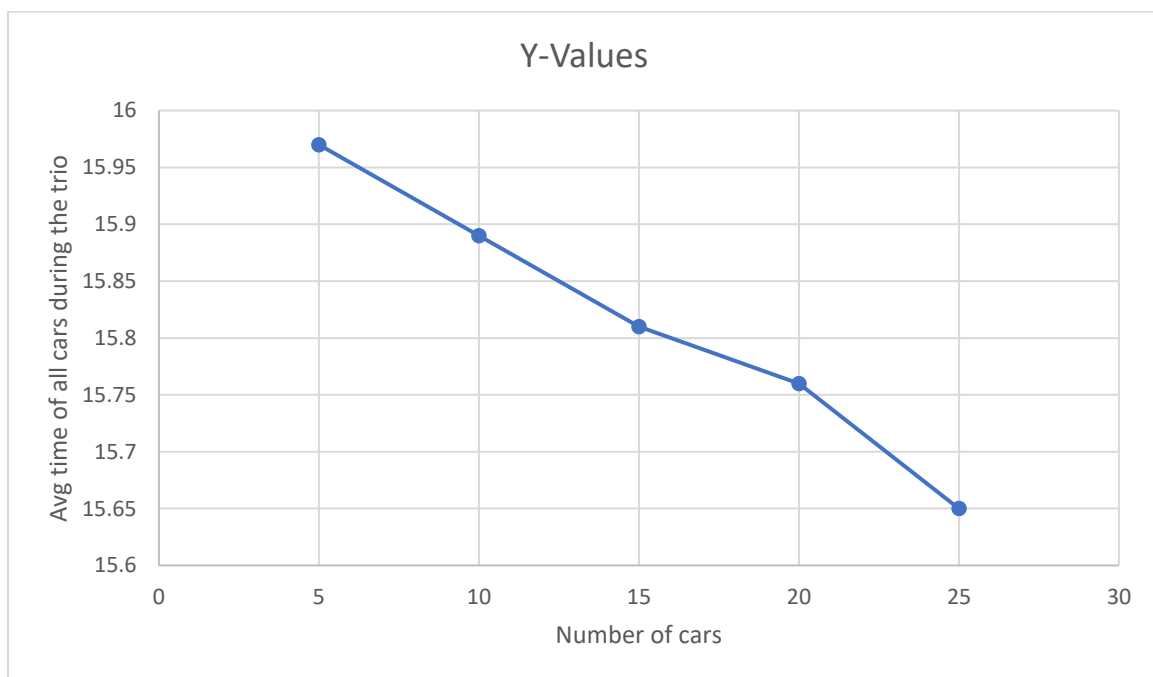
X-axis: Passenger count; Y-axis: Average time spent by passengers

As we can see the time decreases till 25, from then the avg time keeps on increasing.

This shows that as number of passengers cross the number of cars, the passengers would have to wait for completion of others.

Avg Time of all cars at the end vs No of cars

- 1. I1,I2 as 5,5**
- 2. The value of k is fixed to 3**
- 3. for this graph no of passengers is fixed to 50**
- 4. the increment in no of passengers each time is 5.**



□

X-axis: No of cars, Y-axis: avg time taken by all cars to finish

As we can see the Avg time decreases as the number of cars are increasing.

This is because as the number of cars are increasing, and no of trips are constant so average waiting time would be decreasing as the same number of trips is now driven by more number of cars.

Conclusion:

1. When the number of passengers are more than number of cars, there will be waiting time for a passenger and hence his total time in museum increases resulting in increase of average.
2. As the number of cars are increasing the no of trips is constant hence the average time decreases.