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CISC 231

Enter the number of tellers.

3

Is there a drive-thru? Enter true or false.

true

RESULTS:

Total Elapsed Time: 200 seconds.

Total Number of Customers Helped: 4 customers.

Average Customer Wait Time: 25 seconds.

Standard Deviation of Wait Times: 50.0 seconds.

Teller 0 helped 2 customers.

Teller 1 helped 1 customers.

Teller 2 helped 1 customers.

Teller 0 was idle 0.0% of the time, with a standard Deviation of 0.0 seconds.

Teller 1 was idle 50.0% of the time, with a standard Deviation of 70.71067811865476 seconds.

Teller 2 was idle 50.0% of the time, with a standard Deviation of 70.71067811865476 seconds.

Test Input 2 Results:

Enter the number of tellers.

3

Is there a drive-thru? Enter true or false.

true

RESULTS:

Total Elapsed Time: 538 seconds.

Total Number of Customers Helped: 5 customers.

Average Customer Wait Time: 11 seconds.

Standard Deviation of Wait Times: 22.271057451320086 seconds.

Teller 0 helped 2 customers.

Teller 1 helped 1 customers.

Teller 2 helped 2 customers.

Teller 0 was idle 2.0% of the time, with a standard Deviation of 5.196152422706632 seconds.

Teller 1 was idle 58.0% of the time, with a standard Deviation of 214.25218785347326 seconds.

Teller 2 was idle 62.0% of the time, with a standard Deviation of 190.8114252344445 seconds.

Enter the number of tellers.

Result.txt

3
Is there a drive-thru? Enter true or false.
true

RESULTS:

Total Elapsed Time: 1219 seconds.
Total Number of Customers Helped: 5 customers.
Average Customer Wait Time: 347 seconds.
Standard Deviation of Wait Times: 477.04192687855016 seconds.

Teller 0 helped 5 customers.
Teller 1 helped 0 customers.
Teller 2 helped 0 customers.

Teller 0 was idle 0.0% of the time, with a standard Deviation of 0.0 seconds.
Teller 1 was idle 100.0% of the time, with a standard Deviation of N/A seconds.
Teller 2 was idle 100.0% of the time, with a standard Deviation of N/A seconds.

Test Input 4 Results:
Enter the number of tellers.
3
Is there a drive-thru? Enter true or false.
true

RESULTS:

Total Elapsed Time: 145135 seconds.
Total Number of Customers Helped: 1120 customers.
Average Customer Wait Time: 1203 seconds.
Standard Deviation of Wait Times: 1312.763497359673 seconds.

Teller 0 helped 474 customers.
Teller 1 helped 368 customers.
Teller 2 helped 278 customers.

Teller 0 was idle 9.0% of the time, with a standard Deviation of 83.99404740813482 seconds.
Teller 1 was idle 23.0% of the time, with a standard Deviation of 277.62024421860883 seconds.
Teller 2 was idle 40.0% of the time, with a standard Deviation of 911.7910944947861 seconds.

Test Input 4 Results with 4 tellers:
Enter the number of tellers.
4
Is there a drive-thru? Enter true or false.
true

RESULTS:

Total Elapsed Time: 144552 seconds.
Total Number of Customers Helped: 1120 customers.

Average Customer Wait Time: 671 seconds.
Standard Deviation of Wait Times: 883.7997510748688 seconds.

Result.txt

Teller 0 helped 437 customers.
Teller 1 helped 339 customers.
Teller 2 helped 200 customers.
Teller 3 helped 144 customers.

Teller 0 was idle 10.0% of the time, with a standard Deviation of 76.60287200882223 seconds.
Teller 1 was idle 34.0% of the time, with a standard Deviation of 364.1222322242903 seconds.
Teller 2 was idle 58.0% of the time, with a standard Deviation of 1432.8576342400524 seconds.
Teller 3 was idle 69.0% of the time, with a standard Deviation of 2438.8380430032657 seconds.

Test Input 4 Results with 5 tellers:
Enter the number of tellers.
5
Is there a drive-thru? Enter true or false.
true

RESULTS:

Total Elapsed Time: 144663 seconds.
Total Number of Customers Helped: 1120 customers.
Average Customer Wait Time: 458 seconds.
Standard Deviation of Wait Times: 703.2325362211279 seconds.

Teller 0 helped 421 customers.
Teller 1 helped 297 customers.
Teller 2 helped 162 customers.
Teller 3 helped 131 customers.
Teller 4 helped 109 customers.

Teller 0 was idle 13.0% of the time, with a standard Deviation of 80.06247560499239 seconds.
Teller 1 was idle 38.0% of the time, with a standard Deviation of 410.51796550212026 seconds.
Teller 2 was idle 64.0% of the time, with a standard Deviation of 1691.015671127858 seconds.
Teller 3 was idle 77.0% of the time, with a standard Deviation of 2772.2694674219533 seconds.
Teller 4 was idle 80.0% of the time, with a standard Deviation of 3258.6985132104505 seconds.

Test Input 4 Results with no drive thru window:
Enter the number of tellers.
3
Is there a drive-thru? Enter true or false.
false

RESULTS:

Result.txt

Total Elapsed Time: 144778 seconds.
Total Number of Customers Helped: 1120 customers.

Average Customer Wait Time: 1202 seconds.
Standard Deviation of Wait Times: 1244.7325013833292 seconds.

Teller 0 helped 465 customers.
Teller 1 helped 410 customers.
Teller 2 helped 245 customers.

Teller 0 was idle 6.0% of the time, with a standard Deviation of 54.230987451824994 seconds.
Teller 1 was idle 25.0% of the time, with a standard Deviation of 271.02582902741943 seconds.
Teller 2 was idle 40.0% of the time, with a standard Deviation of 959.5524998664742 seconds.

Summary:

Adding additional tellers decreased the average customer wait time significantly. Removing the drive thru did not provide a substantial improvement. Overall the more tellers we add, the faster the customers are helped. However it can result in higher idle times for tellers.