Lab 1: Multi-tasked Food Distribution

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COSC 3319

Section 01

MWF

“C” Option

**“D-“ Requirements:**

Final Result:

[bill@Manjaro-HP DSA-Lab-1]$ vim Data.txt // Enter data 1 2

[bill@Manjaro-HP DSA-Lab-1]$ ./bin/productdistributionmain < Data.txt > res1.txt

// I/O redirection to use Data.txt as input and print results to result-3-1-2.txt

In file result-3-1-2.txt:

How many Product Generators?

How many points of sale?

B delivered.

GateKeeper insert accepted RICE B

Next grain shipment arrives 5.66092E-02 Time units!

B delivered.

GateKeeper insert accepted RICE B

Next grain shipment arrives 9.14843E-02 Time units!

B delivered.

Rejected by GateKeeper:

SQUASH B

Rejected = 1. Sent to another distribution facility!

Next grain shipment arrives 4.34619E-01 Time units!

...

Retail Sales successfuly sold STEAK M

FOWEL M Removed by GateKeeper for shipment.

B delivered.

Retail Sales successfuly sold WHEAT B

Retail Sales successfuly sold FOWEL M

GateKeeper insert accepted WHEAT B

Next grain shipment arrives 6.39829E-01 Time units!

WHEAT B Removed by GateKeeper for shipment.

M delivered.

GateKeeper insert accepted FOWEL M

Next grain shipment arrives 1.97321E-01 Time units!

Retail Sales successfuly sold WHEAT B

B delivered.

Hours of operation prior to closing: 40.367263000

Meat Packs Processed: 4

Non-meat Packs Processed: 9

Total Packets Processed: 13

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Queue Size | # of Gen | # of POS | Total food packs | Meat packs | Non-meat packs | sales |
| 10 | 1 | 1 | 10 | 2 | 8 | 10 |
| 10 | 1 | 2 | 13 | 2 | 11 | 13 |
| 10 | 1 | 3 | 16 | 4 | 12 | 19 |
| 10 | 1 | 4 | 15 | 4 | 11 | 21 |
| 10 | 2 | 1 | 3 | 0 | 3 | 3 |
| 10 | 2 | 2 | 13 | 2 | 11 | 13 |
| 10 | 2 | 3 | 13 | 2 | 11 | 13 |
| 10 | 2 | 4 | 13 | 2 | 11 | 13 |
| 10 | 3 | 1 | 3 | 0 | 3 | 3 |
| 10 | 3 | 2 | 3 | 0 | 3 | 3 |
| 10 | 3 | 3 | 3 | 0 | 3 | 3 |
| 10 | 3 | 4 | 3 | 0 | 3 | 3 |
| 15 | 3 | 4 | 3 | 0 | 3 | 3 |
| 20 | 3 | 4 | 3 | 0 | 3 | 3 |
| 5 | 1 | 2 | 13 | 3 | 10 | 13 |
| 4 | 1 | 2 | 13 | 4 | 9 | 13 |
| 3 | 1 | 2 | 13 | 4 | 9 | 13 |
| 2 | 1 | 2 | 5 | 2 | 3 | 7 |

In order to determine the minimum queue size to get the maximum number of sales, I first determined which combination of product generators and points of sale would result in the most sales. Highlighted in read are sales numbers that are likely the result of a race condition between the sales threads, since they are greater than the total number of packets processed. After excluding the race condition cases, the trial with the most sales and least threads used is the second trial, with 1 generator and 2 points of sale.

After determining the optimal combination of generators and points of sale, I gradually lowered the queue size until it began to adversely affect the performance.

**“C” Requirements:**