Shilpa Chirackel
861060176

CS 177: Lab Assignment 2

Task 1

1. Did you need to make any changes to the original code to compile and run it on your system? If yes, what were they?

Answer:

Yes, I had to make changes to the original code to compile and run it on my system. I had to change some of the header files as the given header files are deprecated.

I changed:

#include <iostream.h> → #include <iostream>

#include <iomanip.h> → #include <iomanip>

I also added in the standard namespace (using namespace std;) because it was giving an error that cout is an undeclared identifier. In addition, I modified event queue to use a STL priority queue and car queue to use STL FIFO queue.

2. What were your input values and seed values? For these inputs, what is the optimal number of pumps to maximize profit?

Answer:

Input Values:

Report Interval:	1000
EndingTime:	10000
numPumps:	3
seed:	4 seeds -- 4, 2, 1, 1
optimal Num:	3

3. What strategy did you use to arrive at the optimal value? (Hit and trial, systematic searching etc?)

Answer:

I used systematic searching to arrive at the optimal value. I started with 10 pumps, and I got a negative profit. I then halved the number of pumps (5 pumps) to find I have a positive profit. With 3 pumps, I saw that the total profit is $71.48. I had feeling that 3 pumps is optimal. To make sure 3 is the optimal number, I checked the profit gained from 1 and 2 pumps. The profit generated from 1 and 2 pumps is lower than profit generated from 3 pumps.

Num Pumps	Total Profit
1	$38.65

2	$63.72
3	$71.48
5	$50.80
10	$-44.79

Task 2

1. Using the same inputs that you used for Task 1, what was the maximum queue length during your simulation? For this, simply print out the maximum queue size for each stats report.

```
[Shilpas-MacBook-Air:Downloads shilpachirackel$ ./a.out
1000
10000
3
This simulation run uses 3 pumps and the following random number seeds:
4
         4
2
         2
1
         1
1
         1
  Current Total  NoQueue Car->Car Average Number  Average  Pump    Total  Lost     Max
    Time   Cars Fraction   Time   Litres  Balked    Wait  Usage   Profit Profit   Size
-------------------------------------------------------------------------------------
    1000     16   0.803   62.500  32.248      0   14.068  0.845   -47.10   0.00      0
    2000     35   0.739   57.143  34.981      4   19.344  0.829   -32.28   2.89      1
    3000     53   0.642   56.604  36.292      6   30.896  0.870   -16.64   4.73      0
    4000     63   0.731   63.492  35.471      6   25.747  0.775    -8.86   4.73      0
    5000     84   0.653   59.524  33.710     10   34.768  0.801     4.56   6.23      1
    6000    107   0.612   56.075  34.891     17   42.105  0.823    22.94  10.39      0
    7000    116   0.658   60.345  34.376     17   40.091  0.776    29.30  10.39      1
    8000    138   0.590   57.971  34.713     23   51.147  0.799    43.75  16.01      0
    9000    158   0.558   56.962  35.149     27   54.028  0.813    59.47  19.37      0
   10000    180   0.537   55.556  34.445     32   53.415  0.832    71.48  23.52      1
Shilpas-MacBook-Air:Downloads shilpachirackel$
```

2. What were the specific changes that you made in your code to compute this?

I added a maxQueueSize field to the carQueueClass. I incremented the value in the insert function and decremented the value in the getNext function. I also added a function to return the value of maxQueueSize in carQueueClass. I also added the field in the snapshot function of StatsClass to print out in the table.