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CS273
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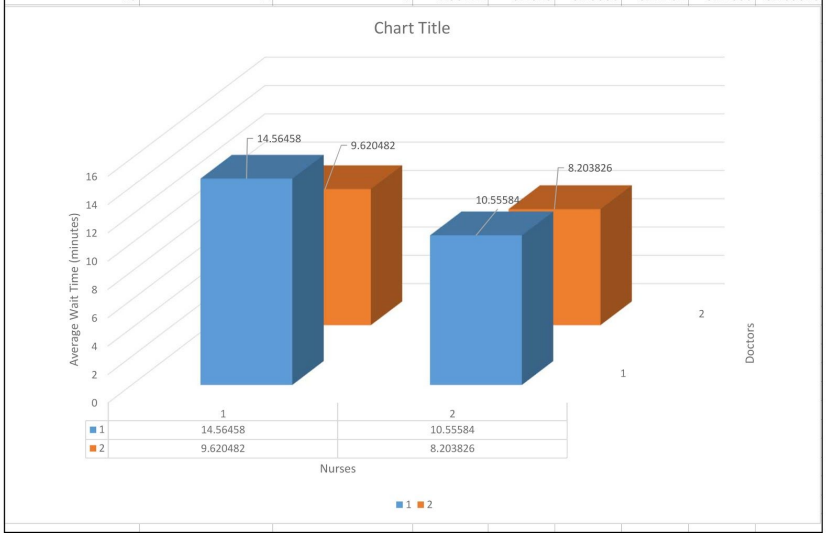
Final Report

"Hey look at me I'm writing a document. I'm so cool. So cool."
- Luke T. Lattig on using word processing software, 2016

Initial Design and Alterations + Things Learned:

More than a few changes were necessary in the transition from design to implementation. For example, in our design we didn't include a way to read in names or assign them to patients, and that had to be added in the course of the coding. The Doctor and Nurse treatment queues were pared down from their UML design to only have the constructor and update function, and the implementation of TreatmentQueue as a friend class of WaitingRoomQueue was made impossible by some facet of C++ we can't claim to understand. The patient class was made to have many more variables (more similar to the planes in the airport sim than what we had set in the UML), and the Simulation class was made to have a few more display functions so that the program could be used as instructed in the prompt. One of the lessons learned from this simulation was that deleting a part of a vector with an iterator while in a loop using an iterator is a bad idea. It resulted in random crashes that were hard to track down. A fix was to use indexes instead and to increase the index only if a result wasn't found to delete. That way the loop checks twice, once for first the object in that index, and then for the new object that's in place of the deleted object.

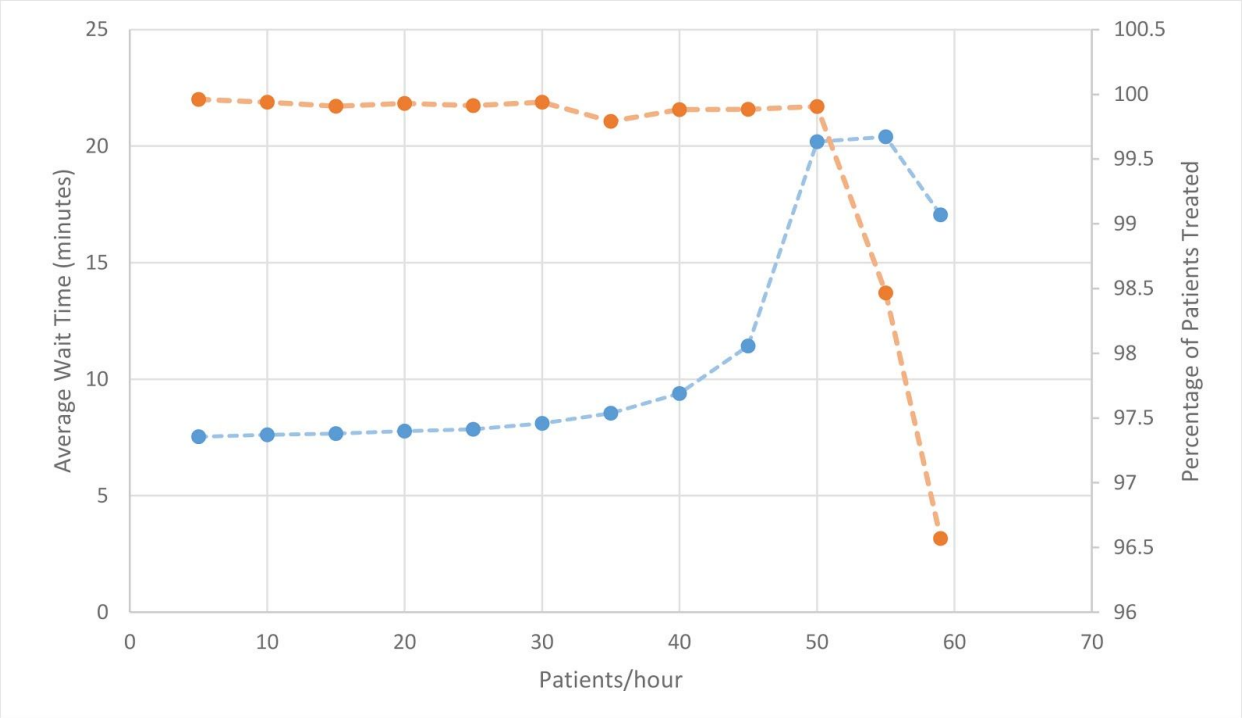
Patient Arrival Rate:	Number of doctors:	Number of Nurses:	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average
10	1	1	14.8104	13.6423	15.2854	14.6388	14.446	14.56458
10	1	2	10.2342	10.5706	10.6458	10.3603	10.7718	10.51654
10	2	1	9.6487	9.89608	9.61354	9.56273	9.38136	9.620482
10	2	2	7.93772	8.4818	8.25336	8.17292	8.17333	8.203826



Hospital Specific Summary Requirements:

During our simulation, as Doctors and Nurses increased, the average wait time for patients decreased. The difference between adding an extra nurse versus an extra doctor seems to indicate that adding an extra doctor has more advantage than adding an extra nurse by around .5-.7 minutes of wait time. This would indicate that there is an advantage to an extra doctor since they can take from both low and high priority queues in our simulation. Since the average accounts for both low and high priority patients, the high priority queue would have more of a bottleneck than a queue of low priority patients.

Patient Arrival Rate	Doctors:	Nurses:	Average Wait Time			Percentage of People Treated				Average Wait Time	Average Percentage:
			Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3			
5	3	5	7.6275	7.30105	7.65389	100	99.8835	100		7.52748	99.96116667
10	3	5	7.68175	7.66529	7.49849	99.8788	100	99.9396		7.615176667	99.93946667
15	3	5	7.81982	7.56922	7.61265	100	99.846	99.8816		7.66723	99.9092
20	3	5	7.92168	7.70119	7.70994	99.9121	99.9695	99.9078		7.777603333	99.9298
25	3	5	7.83755	7.98095	7.74644	99.9063	99.8811	99.9518		7.85498	99.91306667
30	3	5	8.13238	8.08961	8.10409	99.9398	99.9204	99.9611		8.108693333	99.94043333
35	3	5	8.5904	8.53328	8.4989	99.493	99.8969	99.9831		8.54086	99.791
40	3	5	9.19636	9.73847	9.2381	99.8659	99.8658	99.9114		9.390976667	99.88103333
45	3	5	11.2871	10.9143	12.093	99.868	99.9081	99.8811		11.43146667	99.88573333
50	3	5	18.3462	14.2053	28.0297	99.9169	99.8817	99.9169		20.19373333	99.90516667
55	3	5	22.8285	21.9553	16.4154	98.4201	98.2596	98.7199		20.39973333	98.46653333
59	3	5	18.0629	15.1964	17.8908	97.1313	96.2159	96.3644		17.05003333	96.57053333



“Please excuse my partner [he is wonderful] and thank you for dealing with him.”

- Bao Tran, 2016 (implied words denoted by [] and added by Luke)