

IOT Task 3 report

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RESULTS:

T - is defined as the time it takes for a request to first arrive in the system till the time it is serviced completely and leaves the system.

D - is defined as the time it takes for a request to first arrive in the system until it enters the buffer space.

For Part 1:

The service times were varied in the range of 1 to 6: viz. 1, 2, 3, 4, 5, 6

The following are the values obtained for the Super Means for the values of T and D

For T =>

Service Time: =>	1	2	3	4	5	6
Super mean	1.1016169 55251114	2.5089807 572594367	4.5049520 5917726	7.8692829 5454043	16.591125 238483098	704.41271 56252503
95th percentile value	1.7976681 95095921	4.5166190 28526347	9.1846811 89512958	17.270750 172163318	42.280078 51684168	2071.3478 92215752
Confidence interval	[1.097741 798165972 5, 1.1054921 12336255]	[2.494358 260055396 4, 2.5236032 54463477]	[4.457473 554490647 , 4.5524305 63863872]	[7.720433 542383382 , 8.0181323 66697477]	[15.62894 5525106 0, 17.553304 95186014]	[584.6056 601533121 , 824.21977 10971884]

For D =>

Service Time: =>	1	2	3	4	5	6
Super mean	0.0	0.0026016 153251871	0.0263868 387373468	0.2490939 347097294	2.8308710 761732687	663.54461 80210437
95th percentile value	0.0	0.0	0.0	0.1175608 890948933 6	18.822529 966774773	2007.5566 913306136
Confidence interval	[0.0, 0.0]	[0.000700 977226547 8488, 0.0045022 53423826]	[0.017352 472612949 49, 0.0354212 04861744]	[0.197873 995495937 5, 0.3003138 73923521]	[2.100084 369393924 6, 3.5616577 82952613]	[541.6494 899220352 , 785.43974 61200522]

For value of T- > for service time 2, 2.5, 3, 3.5, 4, 4.5, 5

Service time	Means	95th percentile	Confidence interval
2	2.508980757259436 7	4.516619028526347	[2.494358260055396 4, 2.523603254463477]
2.5	3.401694019942039 6	6.610820510636877	[3.37521822867237, 3.428169811211701]
3	4.50495205917726,	9.184681189512958	[4.457473554490647 , 4.552430563863872]
3.5	5.933938173695431,	12.79654203514613	[5.849134416144975 , 6.018741931245887]
4	7.86928295454043	17.27075017216331 8	[7.720433542383382 , 8.018132366697477]

4.5	11.063213016987936,	25.305387802501464	[10.740666345942614, 11.385759688033257]
5	16.591125238483098	42.28007851684168	[15.628945525106055, 17.55330495186014]

Part 2: In this task the buffer size was varied from 2 to 8 : with values 2, 3, 4, 5, 6, 7, 8

The following are the values obtained for the Super Means for the values of T and D

For T =>

Buffer Size = >	2	3	4	5	6	7	8
Super mean	18.188632455332066	17.125271133879767	17.135373114824844	17.0793710922018	16.736485731887807	16.840907000781666	17.176479680651877
95th percentile value	54.80246900915466	47.05375254100974	42.95860254623442	42.58660551619862	41.7027696405652	42.8847444702726	44.559455007606395
Confidence interval	[17.30737887931399, 19.06988603135014]	[16.249802628033375, 18.00073963972616]	[16.205930566204305, 18.064815663445383]	[16.309478168544285, 17.849264015859315]	[15.89856131496985, 17.574410148805764]	[16.051939443309756, 17.629874558253576]	[16.308850112158467, 18.044109249145286]

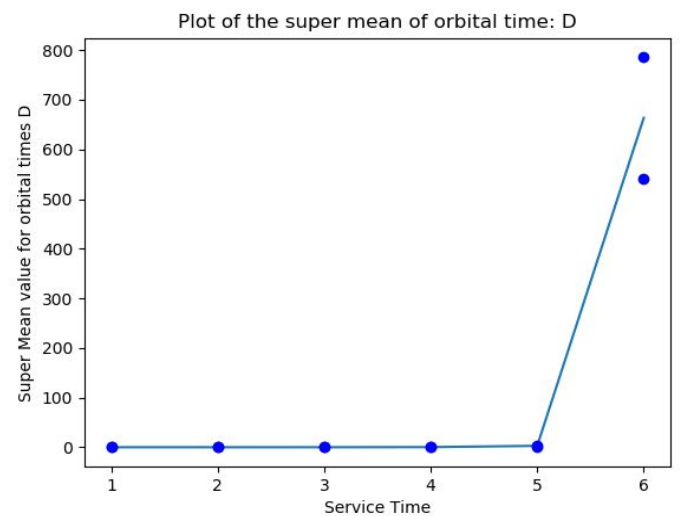
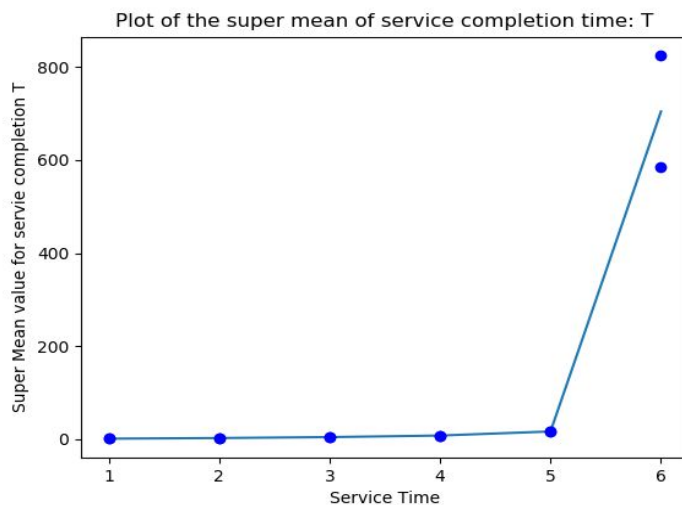
For D =>

Buffer Size = >	2	3	4	5	6	7	8
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Super mean	7.452614 1150130 83	4.569213 7890732 29	2.258025 1008467 47	0.438010 7211505 7255	0.124047 5432176 4386	0.056328 7583777 32074	0.036729 5827810 28294
95th percentile value	40.90160 9466533 36	28.51869 5701501 347	14.51111 0949653 04	1.097214 3813614 82	0.111447 3972062 1147	0.232737 7567329 6768	0.0
Confidence interval	[6.65240 6042522 534, 8.252822 1875036 32]	[3.89196 8238622 8645, 5.246459 3395235 95]	[1.66002 8065014 1679, 2.856022 1366793 26]	[0.29340 3671781 5425, 0.582617 7705196 026]	[0.05294 8290024 21042, 0.195146 7964110 773]	[0.00388 3703786 5909543, 0.108773 8129688 732]	[-0.0302 6799885 451406, 0.103727 1644165 7065]

CONCLUSION

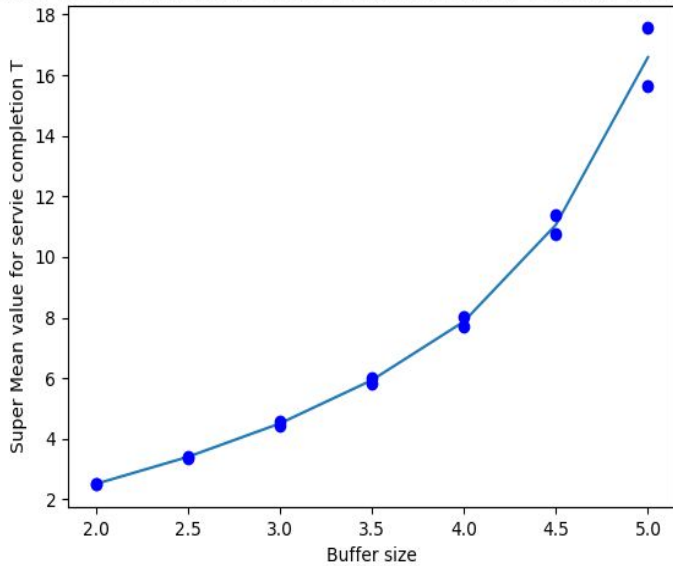
Part 1: for service time -> 1, 2, 3, 4, 5, 6



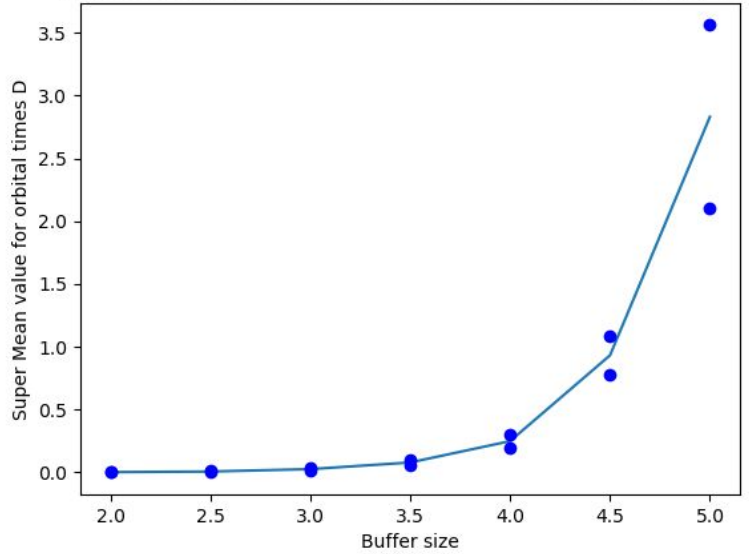
For values of service time incrementing at intervals of 0.5 ->

2, 2.5, 3, 3.5, 4, 4.5.

Plot of the super mean of service completion time: T vs range of Buffer :



Plot of the super mean of orbital time: D vs range of Buffer size



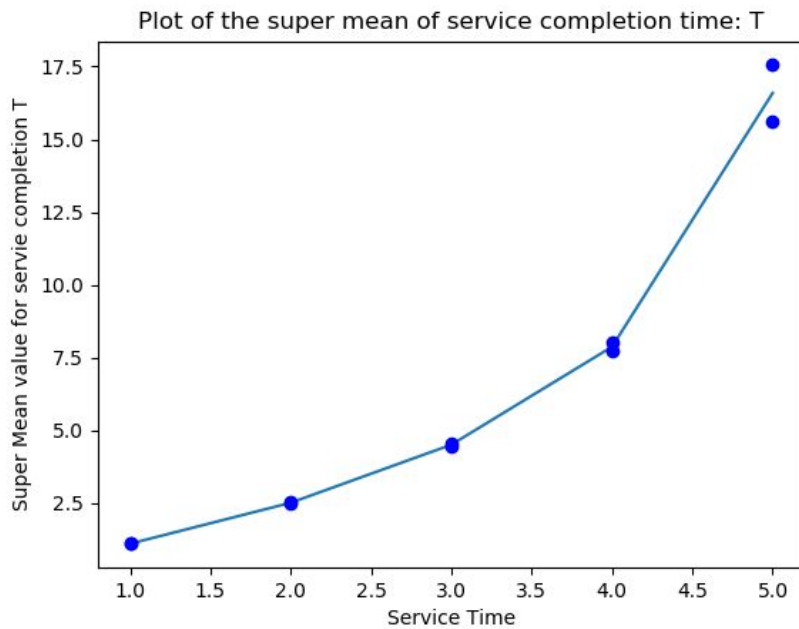
Mean T- > Increases as we increase service time

95th percentile for T - > Increases as we increase service time

Confidence Interval - > Increases as we increase the service time

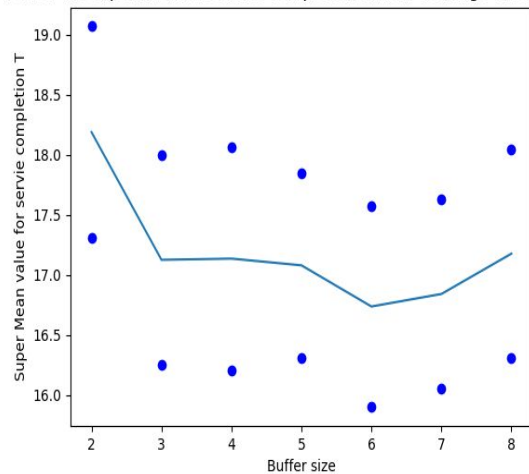
As we see from the above plots and values obtained , as we increase the value of service completion time for each request from 1 through 6 we see an increase in the Super Mean value as well as an increase in the value of confidence interval for the simulation system. This helps us in establishing a theory that we can less accurately predict the service completion time of a new request as we increase the service completion time of the system. Therefore as service time increases we can say with lesser probability that a particular request will get serviced in the said time as the 95 percent confidence size increases.

If we look at only 5 values we see an increasing graph perfectly as the sixth one increases drastically compared to first 5.

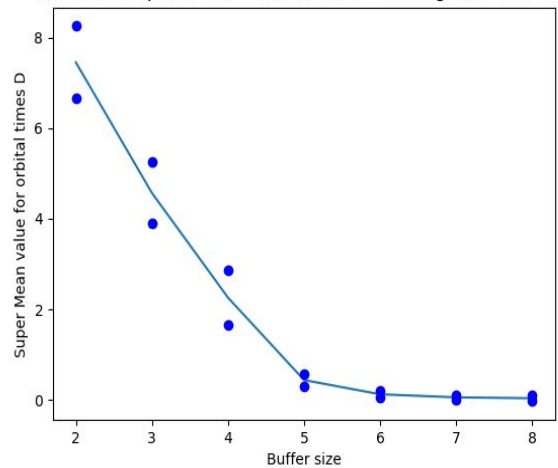


Part 2:

Plot of the super mean of service completion time: T vs range of Buffer size



Plot of the super mean of orbital time: D vs range of Buffer size



Mean D -> Decreases as we increase buffer size

95th percentile -> Decreases as we increase buffer size

Confidence interval -> Decreases as we increase buffer size

As we increase the buffer size while keeping the service time constant we see a decrease in the value of the mean of the orbital time and its confidence interval size also decreases. This helps us establish a theory that as buffer size increases we can service more packets in the same time interval and hence predict more accurately the mean orbital time of the system. Hence we can say with a higher probability the time it takes for a new request to enter the buffer. Therefore we see a decrease in the confidence interval as we increase the buffer size.