EE4204 Report

A0226612M

Results plotted using two computers: -

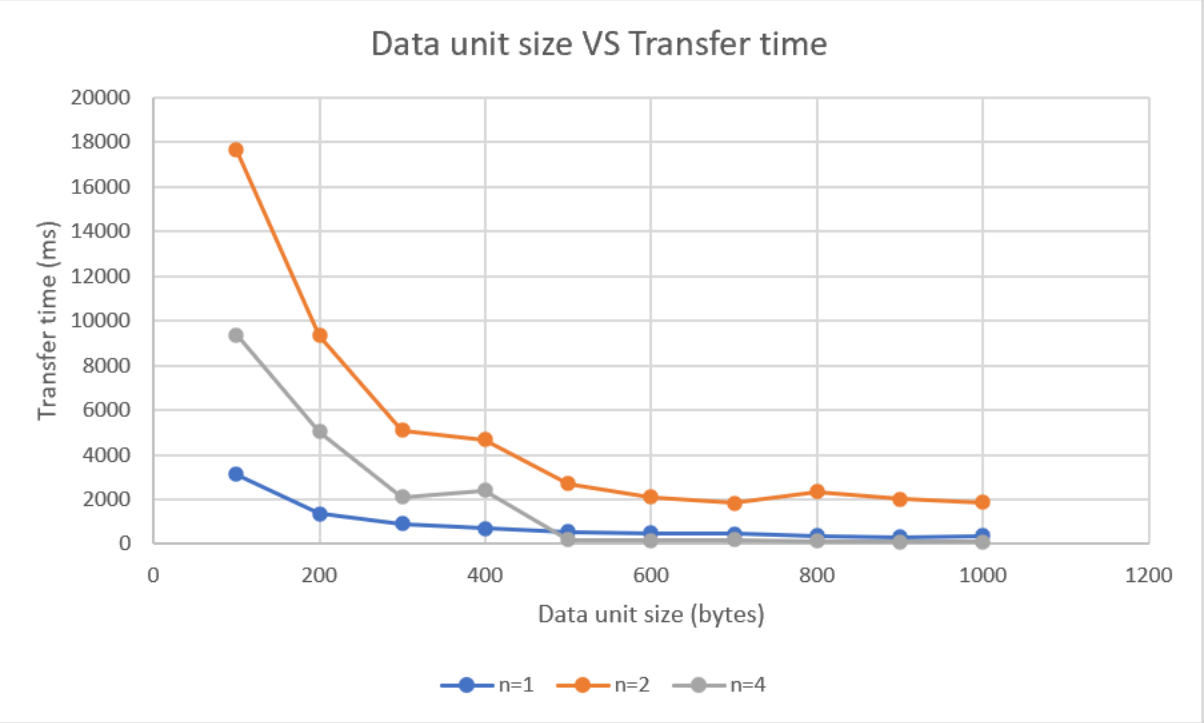
A) Transfer time VS Data-length (Data unit size)

Results computed using TWO COMPUTERS			
Transfer Time (ms)			
	Average	Reading for	Transfer time (ms)
DATALEN (bytes)	n=1	n=2	n=4
100	3105.703333	17659.46667	9376.7
200	1342.323333	9329.76	5031.6
300	898.5	5088.223333	2104.666667
400	685.9333333	4676.31	2394.1
500	562.5366667	2694.666667	194.1166667
600	500.5666667	2114.653333	157.9
700	447.6	1838.8	178.6333333
800	367.3166667	2332.3	132.3366667
900	322.2666667	2006.9	115.1333333
1000	375.0356667	1867.453333	96.46666667

The following values of Transfer time were recorded by taking the average value of 3 readings corresponding to each Datalen. The values which were used to calculate the average are as follows:

	n=1			n=2			n=4			
Trial 1	Trial 2	Trial 3		Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	DATALEN (bytes)
2760.097	3450.021	3106.992		17759	17476.9	17742.5	9384.3	9424.9	9320.9	100
1331.99	1350.28	1344.7		9458.5	9232.87	9297.91	5765.1	4605.9	4723.8	200
893.3	872.7	929.5		5065.2	5078.3	5121.17	2130	2088.6	2095.4	300
668	721	668.8		4711.9	4634.13	4682.9	2399.2	2366	2417.1	400
561.61	643.5	482.5		2883.1	2613.8	2587.1	205.15	165.5	211.7	500
497.7	510	494		2096.29	2104.47	2143.2	140.7	182.9	150.1	600
416.81	490.41	435.58		1897.1	1841.5	1777.8	179.8	205.5	150.6	700
363.91	363.71	374.33		2336.6	2301.2	2359.1	133.6	132.36	131.05	800
319.1	320.9	326.8		2064.4	2021.3	1935	111.8	108.1	125.5	900
341.676	470.528	312.903		1855.3	1867.46	1879.6	99.2	94.3	95.9	1000

Transfer time VS Datalen graph is as follows:-



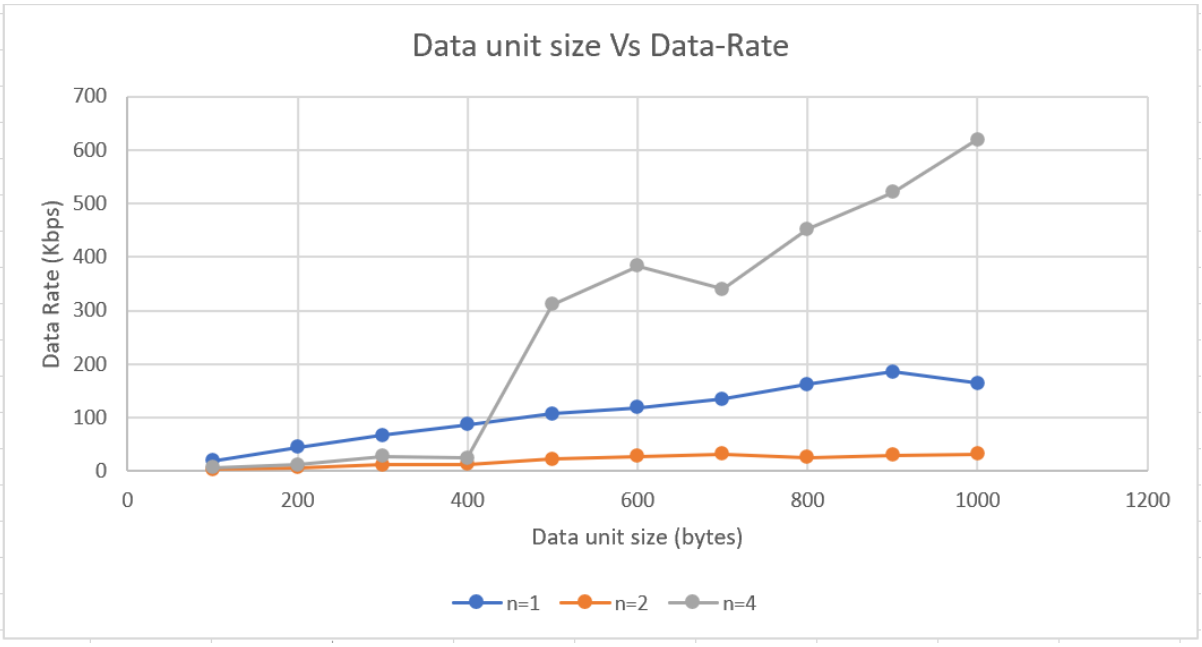
B) Data-Rate VS Datalen (Data unit size)

Data Rate (KBps)			
	Average	Reading for	Data-rate (KBps)
DATALEN (Bytes)	n=1	n=2	n=4
100	19.41	3.383333333	6.373333333
200	44.51333333	6.406666667	12
300	66.58666667	11.7	28.36666667
400	87.26666667	12.75333333	24.93333333
500	107.8	22.23666667	311.6
600	119.34	28.23333333	383
700	134.21	32.5	340.0666667
800	162.8033333	25.56666667	451.71
900	185.4666667	29.80666667	521.1666667
1000	164.3833333	32.01333333	619.7

The following values of Data rate were recorded by taking the average value of 3 readings corresponding to each Datalen. The values which were used to calculate the average are as follows:-

	n=1			n=2			n=4			
Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	DATALEN (bytes)
21.66	17.33	19.24	3.36	3.42	3.37	6.37	6.34	6.41	100
44.8	44.28	44.46	6.32	6.47	6.43	10.37	12.98	12.65	200
66.93	68.51	64.32	11.8	11.7	11.6	28	28.6	28.5	300
89.5	82.9	89.4	12.6	12.9	12.76	24.9	25.2	24.7	400
106.5	92.9	124	20.73	22.87	23.11	291.4	361.1	282.3	500
120	117.02	121	28.5	28.4	27.8	424	326.8	398.2	600
143.45	121.92	137.26	31.5	32.4	33.6	332.4	290.8	397	700
164.3	164.39	159.72	25.5	25.9	25.3	447.2	451.7	456.23	800
187.3	186.2	182.9	28.96	29.58	30.88	534.4	552.9	476.2	900
174.99	127.07	191.09	32.22	32.01	31.81	602.3	633.6	623.2	1000

Data Rate VS Datalen graph is as follows:-



Results plotted using one computer: -

A) Transfer time VS Data-length (Data unit size)

Results computed using ONE COMPUTER

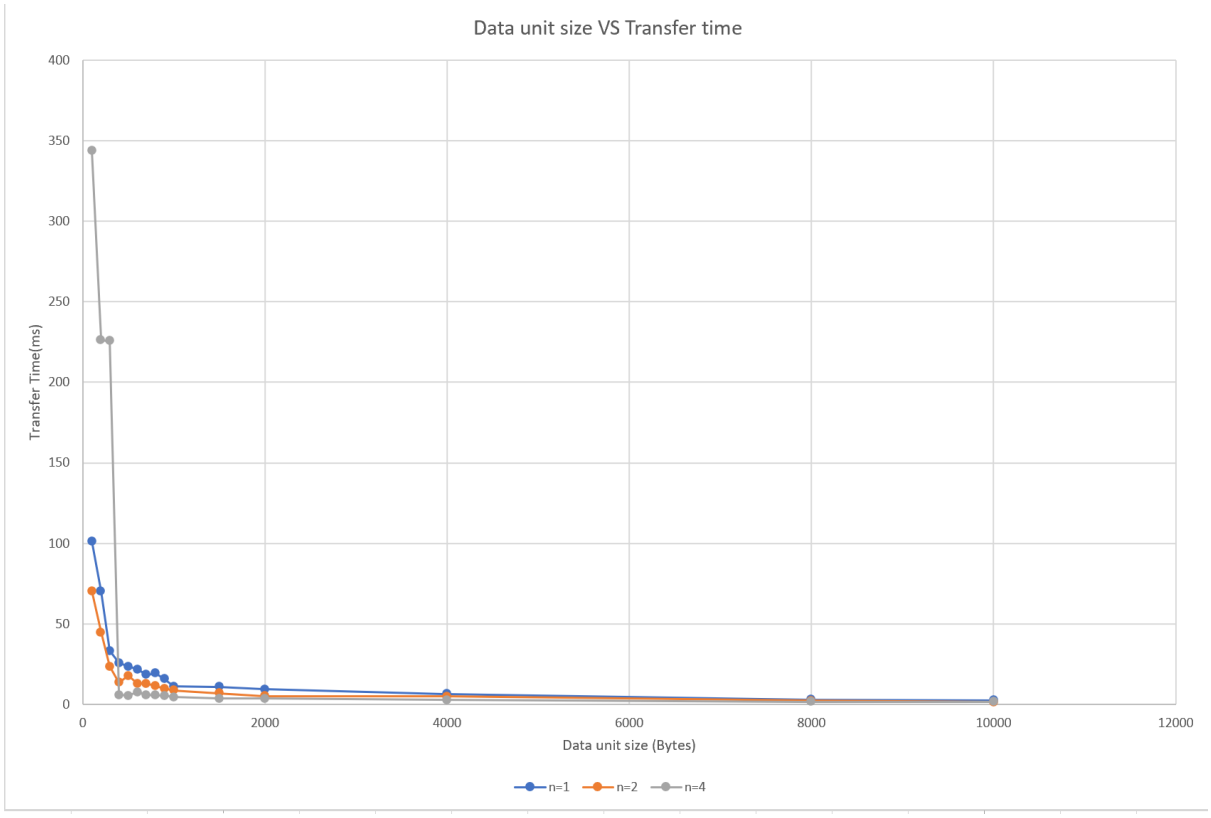
Transfer Time (ms)

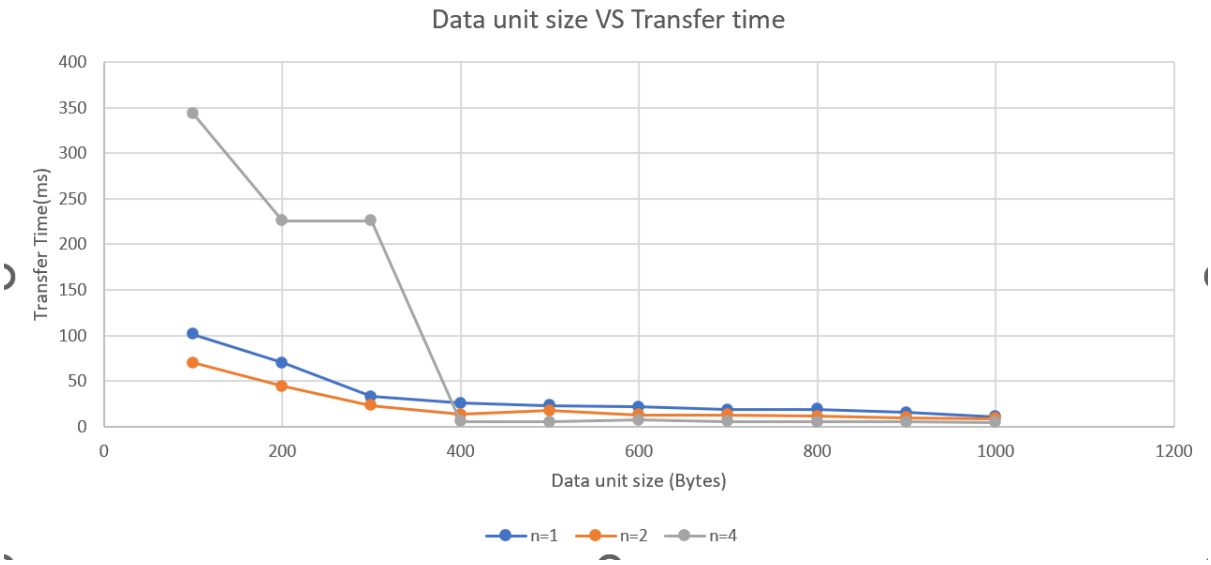
DATALEN (Bytes)	Average Reading for n=1	Reading for n=2	Transfer time (ms) n=4
100	101.4	70.318	343.9923333
200	70.11766667	44.63666667	226.108
300	33.32066667	23.539	225.8376667
400	25.697	13.516	5.901333333
500	23.40666667	17.72433333	5.380333333
600	21.87533333	12.98666667	7.464333333
700	18.45766667	12.96433333	5.945
800	19.35	11.327	5.594333333
900	15.77266667	9.793666667	5.359666667
1000	11.18466667	8.788	4.621
1500	10.87766667	6.92	3.656666667
2000	9.34	5.129	3.666666667
4000	6.404333333	5.005666667	2.735
8000	2.928666667	2.177333333	1.620333333
10000	2.469	1.320966667	1.617333333

The following values of Transfer time were recorded by taking the average value of 3 readings corresponding to each Datalen. The values which were used to calculate the average are as follows:

n=1			n=2			n=4			
Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	DATALEN (Bytes)
103.157	85.439	115.604	70.405	70.424	70.125	331.1	350.069	350.808	100
65.033	68.523	76.797	40.39	52.834	40.686	332.522	329.459	16.343	200
36.694	34.754	28.514	20.01	26.822	23.785	353.04	11.732	312.741	300
29.395	23.84	23.856	11.1	15.656	13.792	5.654	6.403	5.647	400
25.118	23.346	21.756	18.126	17.762	17.285	4.872	5.783	5.486	500
25.466	18.204	21.956	12.584	12.622	13.754	7.36	6.647	8.386	600
17.771	18.991	18.611	11.064	12.893	14.936	5.152	6.827	5.856	700
19.467	17.522	21.061	10.065	12.99	10.926	5.316	5.661	5.806	800
15.396	16.405	15.517	9.646	9.671	10.064	5.167	5.434	5.478	900
13.578	9.517	10.459	8.889	6.74	10.735	3.626	5.453	4.784	1000
10.112	9.982	12.539	6.989	7.596	6.175	3.664	3.65	3.656	1500
8.736	9.904	9.38	5.937	5.216	4.234	3.679	4.002	3.319	2000
6.949	6.023	6.241	5.592	5.536	3.889	2.256	2.265	3.684	4000
2.508	3.333	2.945	2.072	2.065	2.395	1.544	1.648	1.669	8000
2.536	2.417	2.454	1.1219	1.287	1.554	1.828	1.551	1.473	10000

Transfer time VS Datalen graph is as follows:-





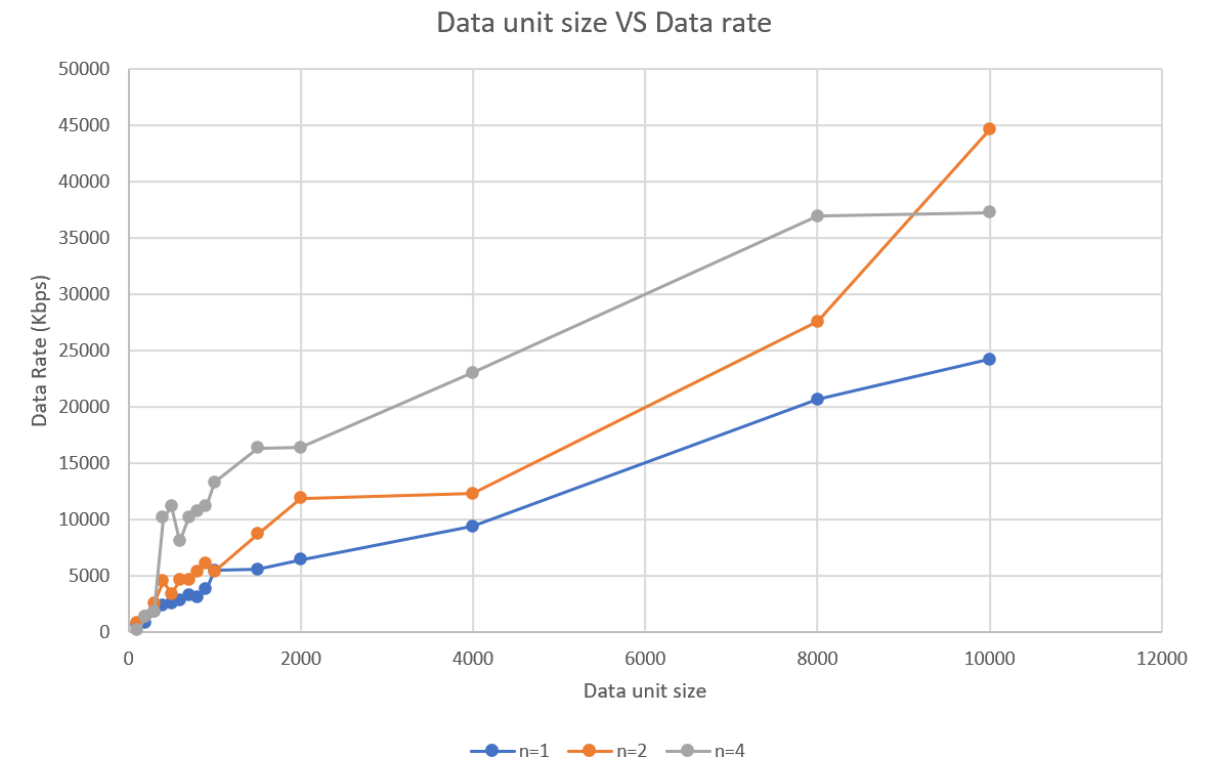
B) Data-Rate VS Datalen (Data unit size)

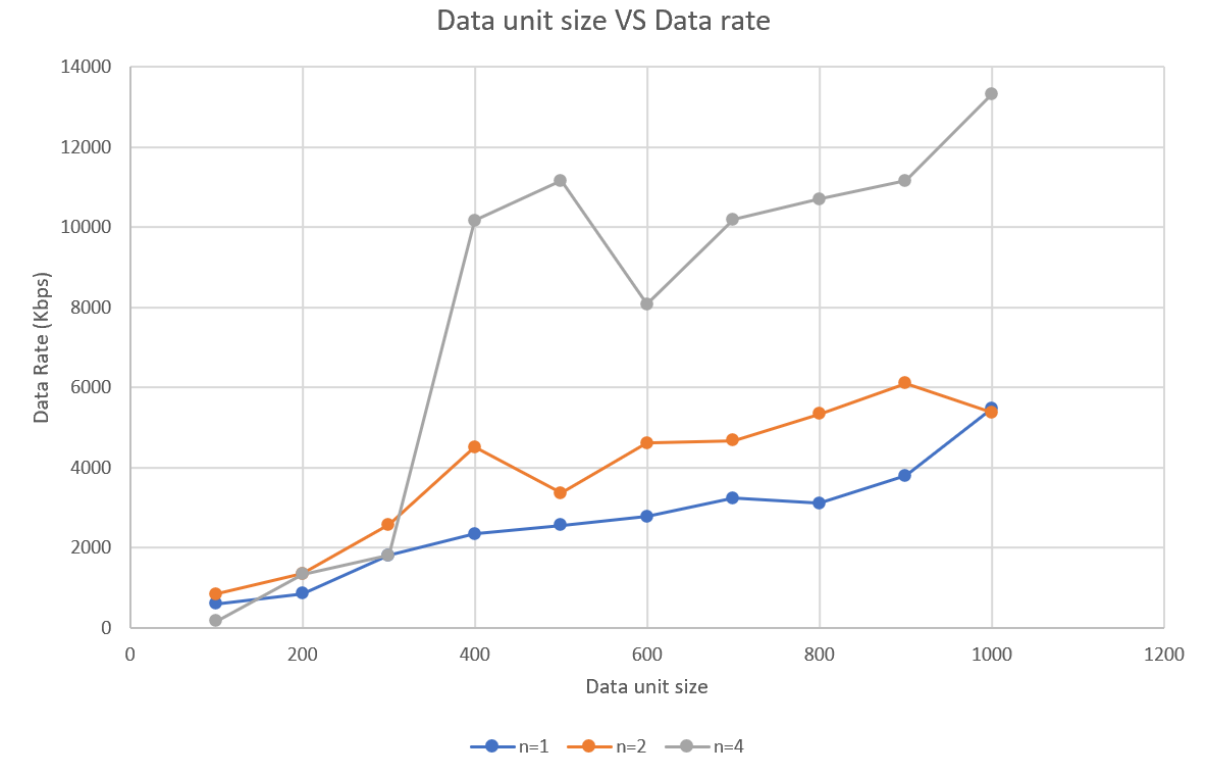
Data Rate (KBps)			
	Average	Reading for	Data-rate (KBps)
DATALEN (Bytes)	n=1	n=2	n=4
100	598.895014	850.3259667	173.9436667
200	856.869359	1360.5755	1339.798333
300	1815.645533	2577.101033	1819.042
400	2349.543333	4513.753433	10167.3594
500	2562.966453	3374.776063	11170.47537
600	2785.290367	4612.010715	8083.211267
700	3241.968667	4681.7325	10191.5497
800	3107.665867	5338.74378	10702.83201
900	3793.9535	6107.574033	11163.56759
1000	5467.7729	5384.968	13317.92173
1500	5557.239067	8703.339833	16351.8146
2000	6418.73784	11885.57548	16402.88633
4000	9370.889367	12289.41977	23044.3726
8000	20694.60867	27592.94457	36944.61133
10000	24227.23867	44662.301	37284.47867

The following values of Data rate were recorded by taking the average value of 3 readings corresponding to each Datalen. The values which were used to calculate the average are as follows:-

	n=1			n=2			n=4			
Trial 1	Trial 2	Trial 3		Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	DATALEN (Bytes)
579.631042	699.832	517.222		849.272	849.0429	852.663	180.588	170.803	170.44	100
919.425537	872.5974	778.58514		1480.3912	1131.7144	1469.6209	179.277	181.488	3658.63	200
1629.503	1720.4637	2096.9699		2988.156	2229.2519	2513.8952	169.366	5096.57	191.19	300
2034.121	2508.0957	2506.4133		5386.7563	3819.174	4335.33	10575.345	9338.2792	10588.454	400
2380.4841	2560.07006	2748.3452		3298.7421	3366.34399	3459.2421	12272.7822	10339.4459	10899.198	500
2347.9541	3284.607	2723.31		4751.509766	4737.205	4347.31738	8124.0488	8995.487	7130.098	600
3364.638	3148.491	3212.777		5404.284	4637.6328	4003.2807	11605.7841	8758.312	10210.553	700
3071.5058	3412.453	2839.0388		5940.686	4603.00244	5472.5429	11247.7431	10562.26855	10298.48437	800
3883.6711	3644.803	3853.3864		6198.7353	6182.711	5941.2758	11572.09277	11003.496	10915.114	900
4403.6674	6282.7568	5716.8945		6726.628	8871.365	556.911	16490.0722	10965.156	12498.537	1000
5913.0732	5990.082	4768.562		8555.301	7871.6425	9683.076	16319.0498	16381.635	16354.759	1500
6844.4365	6037.257	6374.52002		10071.24	11463.38	14122.10644	16252.514	14940.78	18015.365	2000
8604.5478	9927.4453	9580.675		10692.5966	10800.7587	15374.904	26503.988	26398.6738	16230.456	4000
23840.91	17939.69	20303.226		28857.625	28955.447	24965.7617	38726.03	36282.16	35825.644	8000
23577.681	24738.51	24365.525		49050.863	46459.21	38476.83	32709.519	38551.25	40592.667	10000

Data Rate VS Datalen graph is as follows:-





Assumptions made:

The following assumptions are made in the experiment and the implementation of the socket program:-

1. Data and acknowledgement packets will always be received and will not be lost during transmission. As such, there is no need to account for timeouts.
2. Error occurs purely because of corrupted data packet received on the server end. Acknowledgement packets received by the client will never be corrupted.

About the code: The code overall implements a TCP-based client-server socket program for transferring a large message using a jumping window protocol. Here, the message transmitted from the client to server is read from a large file. The message is split into short data-units (DUs) which are sent and acknowledged in batches of size n. The sender sends n DUs and then waits for an ACK before sending the next batch of n DUs. It repeats the above procedure until the entire file is sent and the acknowledgement for the last batch is received. The receiver sends an ACK after receiving n DUs. It repeats the above procedure, until the acknowledgement for the last batch is sent. It is probable that the last batch may have less than n DUs. When the whole file transfer takes place, the program terminates.