EE8203: HIGH PERFORMANCE COMPUTING

Project Results

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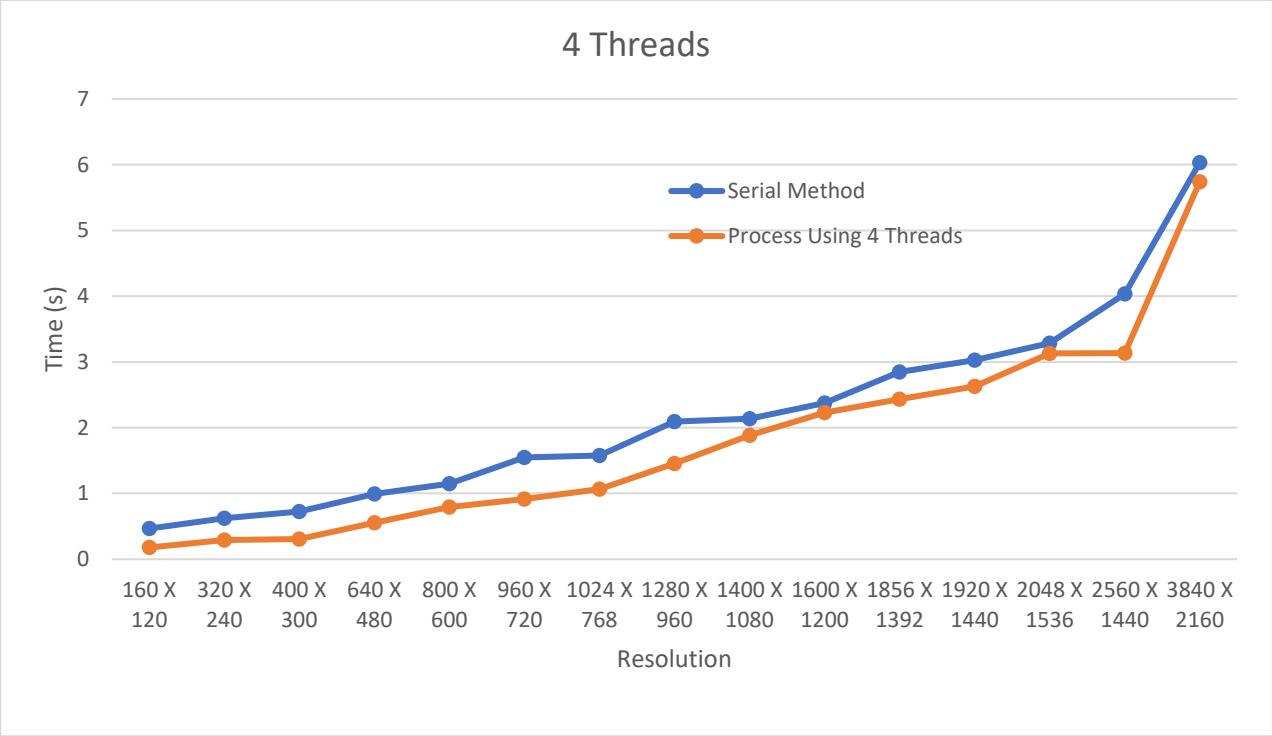
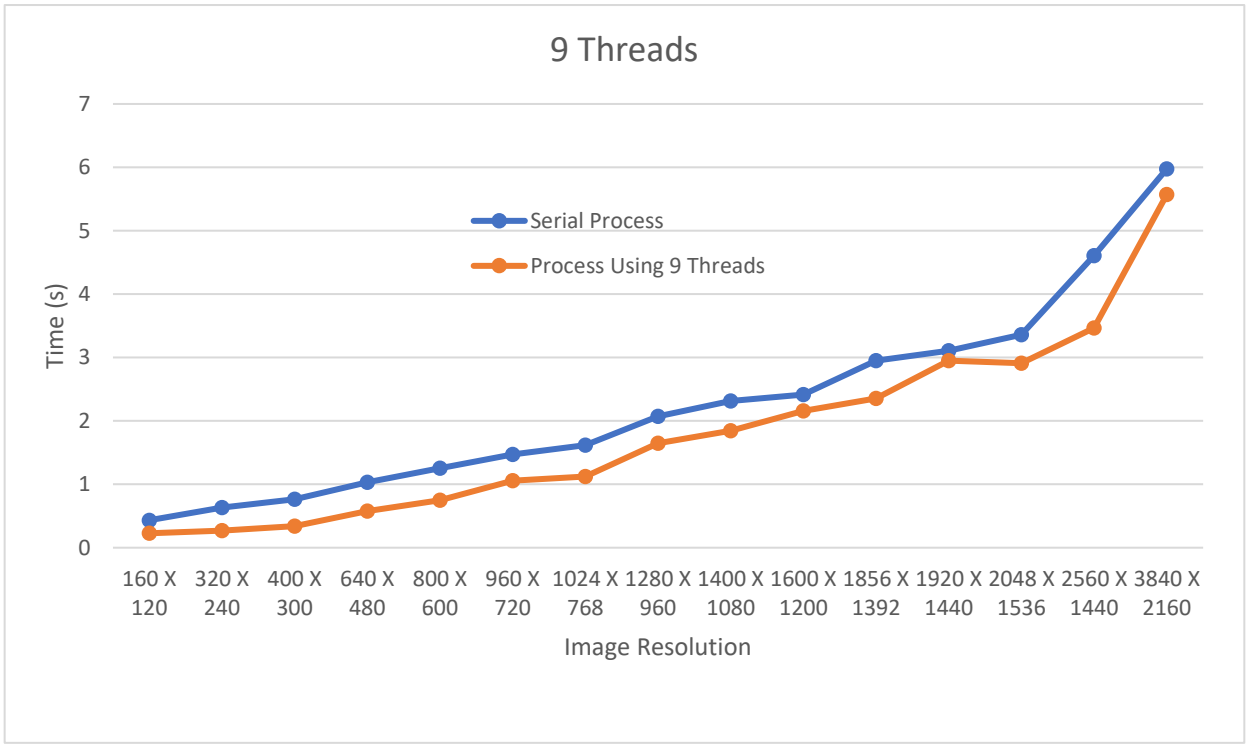
For 4 Threads														
Resolution	Serial Method					Average	Parallel Method					Average	Speed Up	Accuracy
160 X 120	0.402	0.499	0.478	0.506	0.444	**0.4658**	0.159	0.209	0.136	0.261	0.123	**0.1776**	**2.623**	100%
320 X 240	0.593	0.607	0.623	0.597	0.683	**0.6206**	0.187	0.239	0.361	0.278	0.392	**0.2914**	**2.130**	100%
400 X 300	0.724	0.78	0.72	0.71	0.699	**0.7266**	0.348	0.286	0.316	0.314	0.279	**0.3086**	**2.355**	100%
640 X 480	0.964	1.024	0.951	1.039	0.995	**0.9946**	0.534	0.547	0.463	0.633	0.588	**0.553**	**1.799**	100%
800 X 600	1.177	1.131	1.17	1.126	1.129	**1.1466**	0.794	0.747	0.688	0.931	0.796	**0.7912**	**1.449**	100%
960 X 720	1.565	1.51	1.649	1.488	1.538	**1.55**	0.905	0.895	0.986	0.808	0.978	**0.9144**	**1.695**	100%
1024 X 768	1.624	1.56	1.477	1.577	1.658	**1.5792**	1.113	1.073	1.003	1.054	1.09	**1.0666**	**1.481**	100%
1280 X 960	2.194	2.295	1.79	2.1	2.076	**2.091**	1.52	1.325	1.385	1.415	1.619	**1.4528**	**1.439**	100%
1400 X 1080	2.156	2.2	2.094	2.103	2.119	**2.1344**	1.6	1.592	1.708	2.731	1.783	**1.8828**	**1.134**	100%
1600 X 1200	2.3	2.411	2.459	2.398	2.314	**2.3764**	2.121	2.113	2.43	2.4	2.094	**2.2316**	**1.065**	100%
1856 X 1392	2.758	2.782	2.873	3.014	2.815	**2.8484**	2.194	2.543	2.374	2.446	2.601	**2.4316**	**1.171**	100%
1920 X 1440	3.097	3.033	2.884	2.987	3.129	**3.026**	2.422	2.672	2.727	2.508	2.821	**2.63**	**1.151**	100%
2048 X 1536	3.086	3.618	3.308	2.997	3.423	**3.2864**	3.304	2.869	2.491	3.867	3.115	**3.1292**	**1.050**	100%
2560 X 1440	3.913	4.095	3.9	3.903	4.358	**4.0338**	2.827	2.897	2.793	3.418	3.727	**3.1324**	**1.288**	100%
3840 X 2160	5.504	5.692	6.218	6.548	6.195	**6.0314**	5.554	6.087	5.532	5.665	5.862	**5.74**	**1.051**	100%



Graph 01: The Time consumption between the Serial Method and the 4-Thread Method for variable thresholding

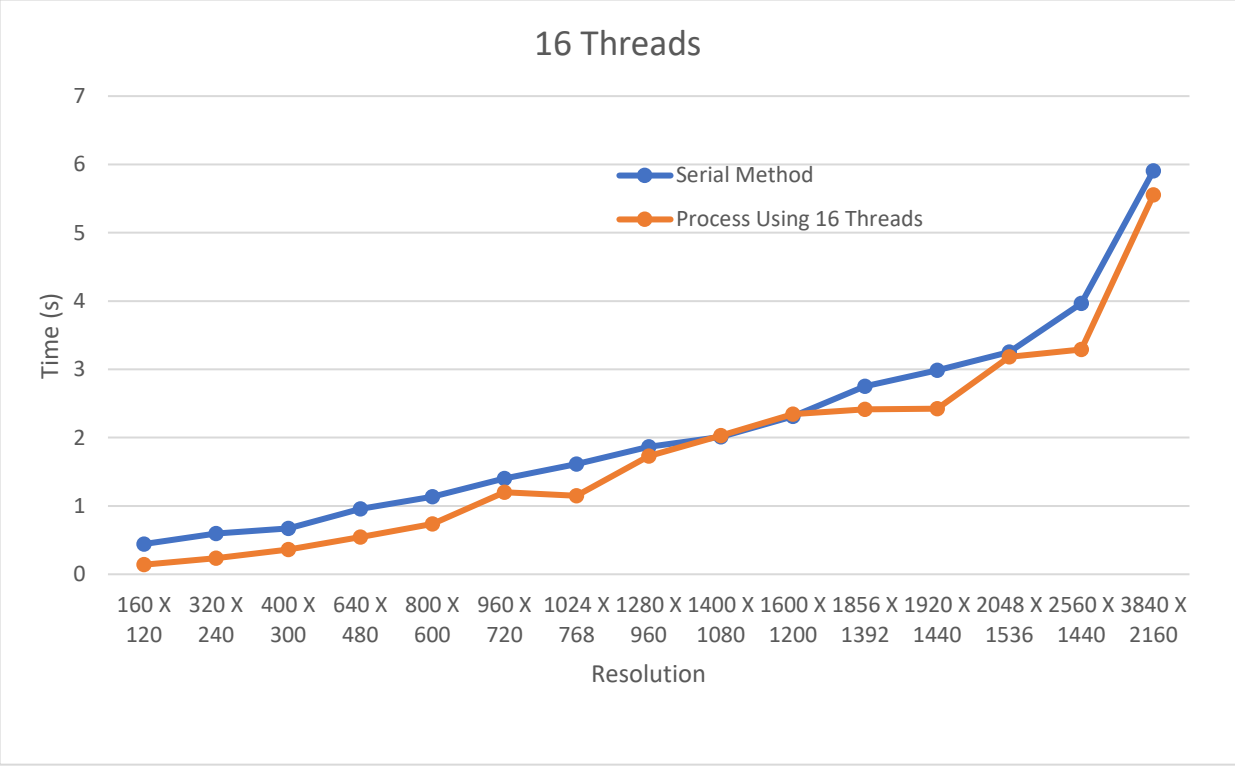
For 9 Threads														
Resolution	Serial Method Time					Average	Thread Method Time					Average	Speed Up	Accuracy
160 X 120	0.445	0.352	0.442	0.439	0.488	**0.4332**	0.129	0.236	0.209	0.289	0.273	**0.2272**	**1.907**	100%
320 X 240	0.665	0.717	0.579	0.6	0.611	**0.6344**	0.283	0.201	0.195	0.358	0.299	**0.2672**	**2.374**	100%
400 X 300	0.735	0.706	0.792	0.892	0.701	**0.7652**	0.355	0.393	0.293	0.318	0.339	**0.3396**	**2.253**	100%
640 X 480	1.008	1.036	1.077	0.99	1.038	**1.0298**	0.549	0.637	0.647	0.534	0.521	**0.5776**	**1.783**	100%
800 X 600	1.38	1.229	1.225	1.121	1.314	**1.2538**	0.755	0.742	0.721	0.757	0.761	**0.7472**	**1.678**	100%
960 X 720	1.496	1.414	1.493	1.473	1.492	**1.4736**	1.009	1.134	0.949	1.029	1.165	**1.0572**	**1.394**	100%
1024 X 768	1.659	1.54	1.503	1.555	1.82	**1.6154**	1.03	1.141	1.027	1.088	1.317	**1.1206**	**1.442**	100%
1280 X 960	2.004	2.082	2.067	2.109	2.094	**2.0712**	1.751	1.693	1.568	1.603	1.619	**1.6468**	**1.258**	100%
1400 X 1080	2.148	2.964	2.22	2.16	2.091	**2.3166**	1.844	1.9	1.822	1.79	1.869	**1.845**	**1.256**	100%
1600 X 1200	2.579	2.326	2.468	2.465	2.247	**2.417**	2.08	2.114	2.254	2.237	2.102	**2.1574**	**1.120**	100%
1856 X 1392	2.791	2.776	3.462	2.959	2.765	**2.9506**	2.45	2.297	2.303	2.46	2.259	**2.3538**	**1.254**	100%
1920 X 1440	3.101	3.102	3.219	3.083	3.037	**3.1084**	3.07	2.763	3.111	2.766	3.051	**2.9522**	**1.053**	100%
2048 X 1536	3.469	3.181	3.351	3.227	3.567	**3.359**	3.118	3.19	2.515	2.524	3.208	**2.911**	**1.154**	100%
2560 X 1440	4.475	5.606	4.433	4.846	3.681	**4.6082**	3.323	3.261	3.914	3.482	3.353	**3.4666**	**1.329**	100%
3840 X 2160	5.901	6.166	6.543	5.622	5.648	**5.976**	5.438	5.534	5.727	5.565	5.588	**5.5704**	**1.073**	100%



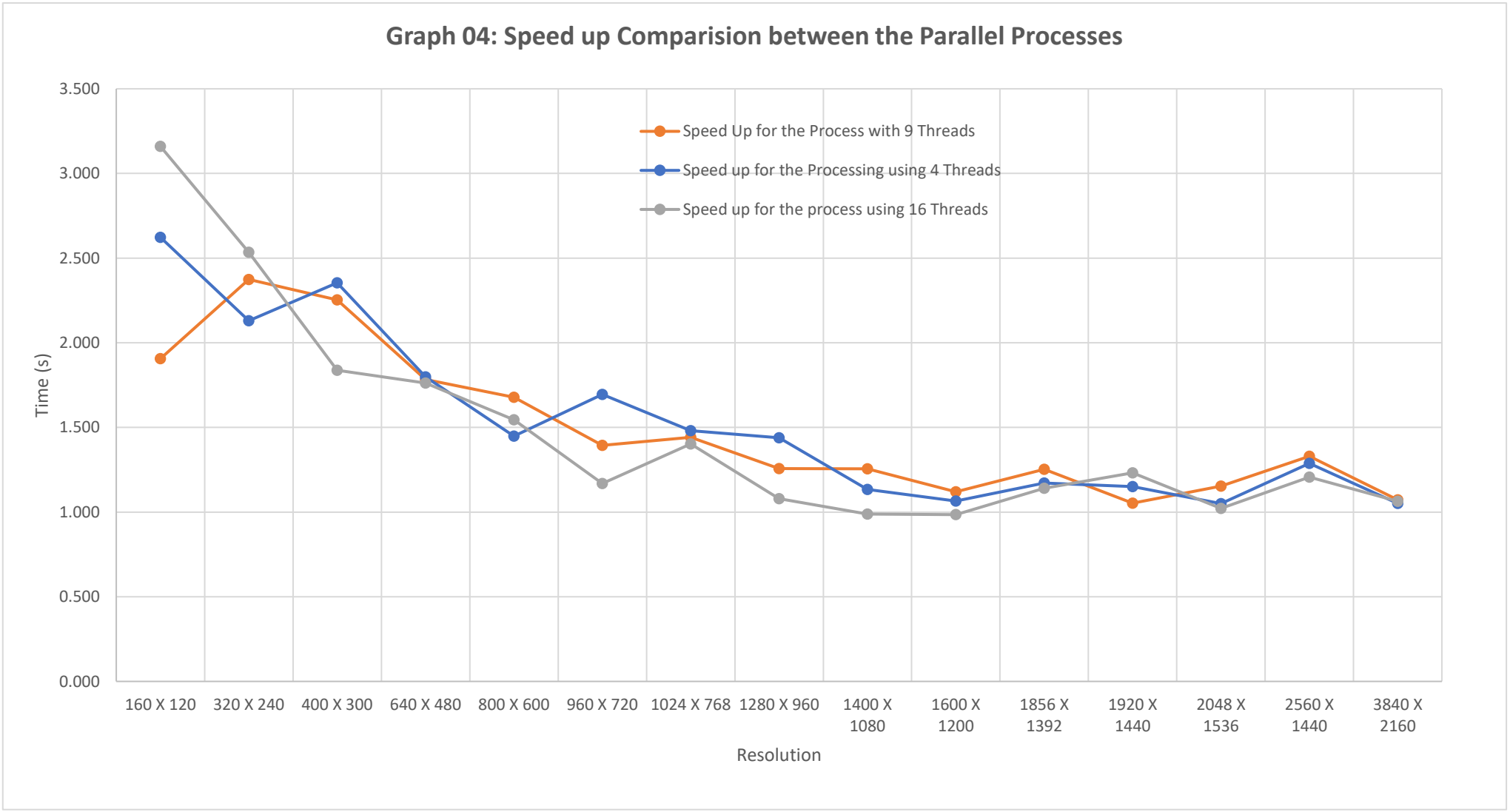
Graph 02: The Time consumption between the Serial Method and the 9-Thread Method for variable thresholding

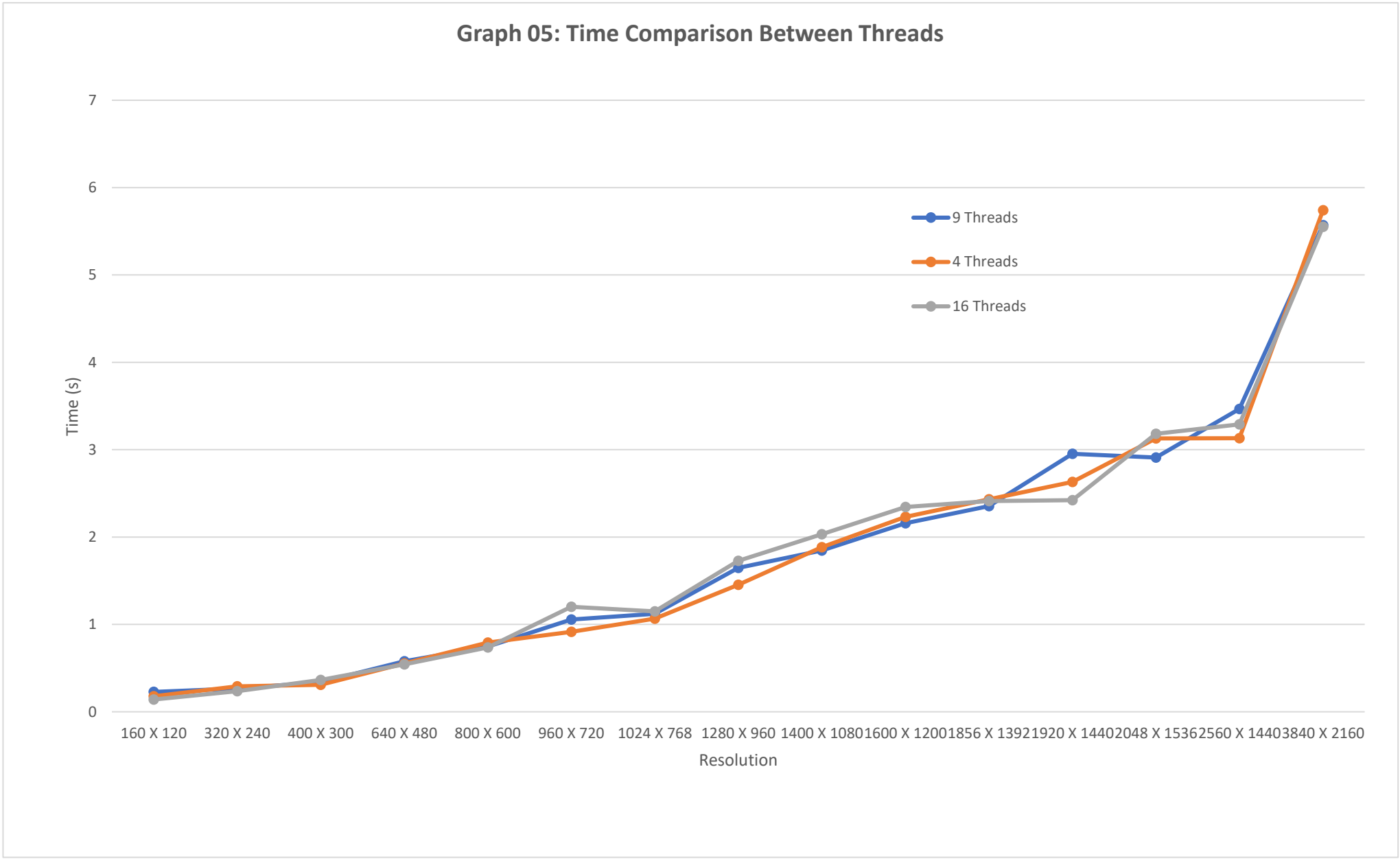
For 16 Threads

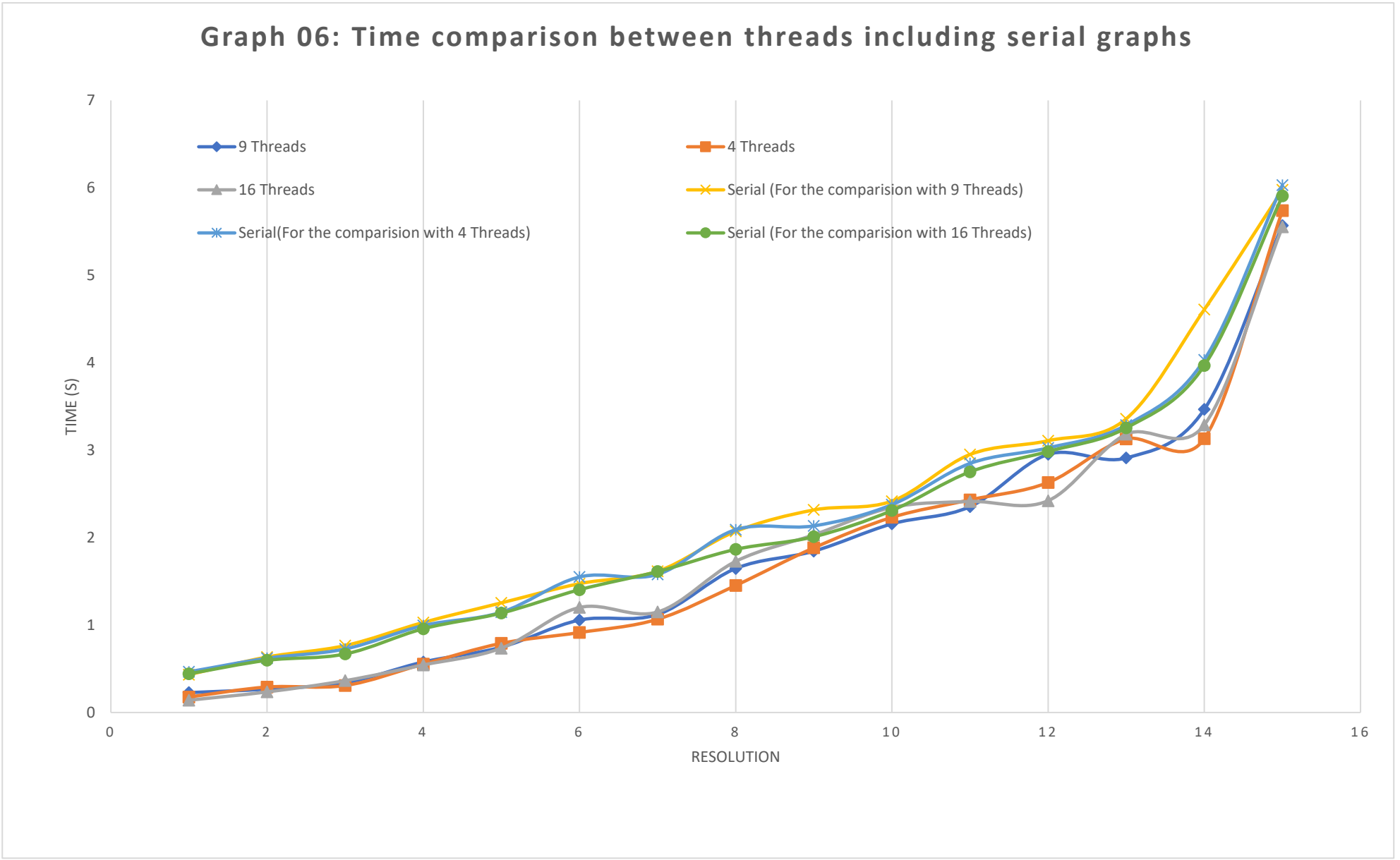
Resolution	Serial Method Time					Average	Thread Method Time					Average	Speed Up	Accuracy
160 X 120	0.47	0.542	0.38	0.383	0.44	**0.443**	0.122	0.148	0.149	0.101	0.181	**0.1402**	3.160	100%
320 X 240	0.529	0.636	0.576	0.614	0.629	**0.5968**	0.262	0.267	0.258	0.204	0.186	**0.2354**	2.535	100%
400 X 300	0.868	0.623	0.628	0.615	0.611	**0.669**	0.33	0.435	0.344	0.384	0.327	**0.364**	1.838	100%
640 X 480	1.054	0.902	0.978	0.943	0.912	**0.9578**	0.542	0.547	0.53	0.524	0.575	**0.5436**	1.762	100%
800 X 600	1.137	1.175	1.16	1.078	1.134	**1.1368**	0.768	0.666	0.68	0.815	0.749	**0.7356**	1.545	100%
960 X 720	1.477	1.33	1.36	1.465	1.391	**1.4046**	1.177	1.445	1.105	1.229	1.049	**1.201**	1.170	100%
1024 X 768	1.663	1.622	1.571	1.569	1.633	**1.6116**	1.155	1.141	1.082	1.225	1.143	**1.1492**	1.402	100%
1280 X 960	2.092	1.752	1.727	1.938	1.82	**1.8658**	1.468	1.499	2.576	1.489	1.609	**1.7282**	1.080	100%
1400 X 1080	2.128	2.096	2.011	1.871	1.941	**2.0094**	2.639	1.897	1.855	1.958	1.81	**2.0318**	0.989	100%
1600 X 1200	2.358	2.418	2.217	2.293	2.261	**2.3094**	2.255	2.23	2.188	2.477	2.573	**2.3446**	0.985	100%
1856 X 1392	2.703	2.602	2.671	2.846	2.939	**2.7522**	2.295	2.217	2.269	2.611	2.674	**2.4132**	1.140	100%
1920 X 1440	3.321	2.987	2.934	2.845	2.839	**2.9852**	2.255	2.142	2.39	3.095	2.228	**2.422**	1.233	100%
2048 X 1536	3	2.932	3.476	3.571	3.292	**3.2542**	2.604	3.137	3.262	4.147	2.762	**3.1824**	1.023	100%
2560 X 1440	3.885	3.84	3.883	3.965	4.265	**3.9676**	2.92	3.285	3.307	3.203	3.731	**3.2892**	1.206	100%
3840 X 2160	5.871	5.485	6.805	5.668	5.705	**5.9068**	5.656	5.166	5.548	5.478	5.915	**5.5526**	1.064	100%



Graph 03: The Time consumption between the Serial Method and the 16-Thread Method for variable thresholding


Graph 04: Speed up Comparision between the Parallel Processes
Speed Up for the Process with 9 Threads
Speed up for the Processing using 4 Threads
Speed up for the process using 16 Threads
Time (s)
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000
160 X 120
320 X 240
400 X 300
640 X 480
800 X 600
960 X 720
1024 X 768
1280 X 960
1400 X 1080
1600 X 1200
1856 X 1392
1920 X 1440
2048 X 1536
2560 X 1440
3840 X 2160
Resolution


Graph 05: Time Comparison Between Threads
7
6
5
4
3
2
1
0
Time (s)
9 Threads
4 Threads
16 Threads
160 X 120
320 X 240
400 X 300
640 X 480
800 X 600
960 X 720
1024 X 768
1280 X 960
1400 X 1080
1600 X 1200
1856 X 1392
1920 X 1440
2048 X 1536
2560 X 1440
3840 X 2160
Resolution


Graph 06: Time comparison between threads including serial graphs
9 Threads
4 Threads
16 Threads
Serial (For the comparision with 9 Threads)
Serial(For the comparision with 4 Threads)
Serial (For the comparision with 16 Threads)
TIME (S)
RESOLUTION
0
1
2
3
4
5
6
7
0
2
4
6
8
10
12
14
16