Task2:
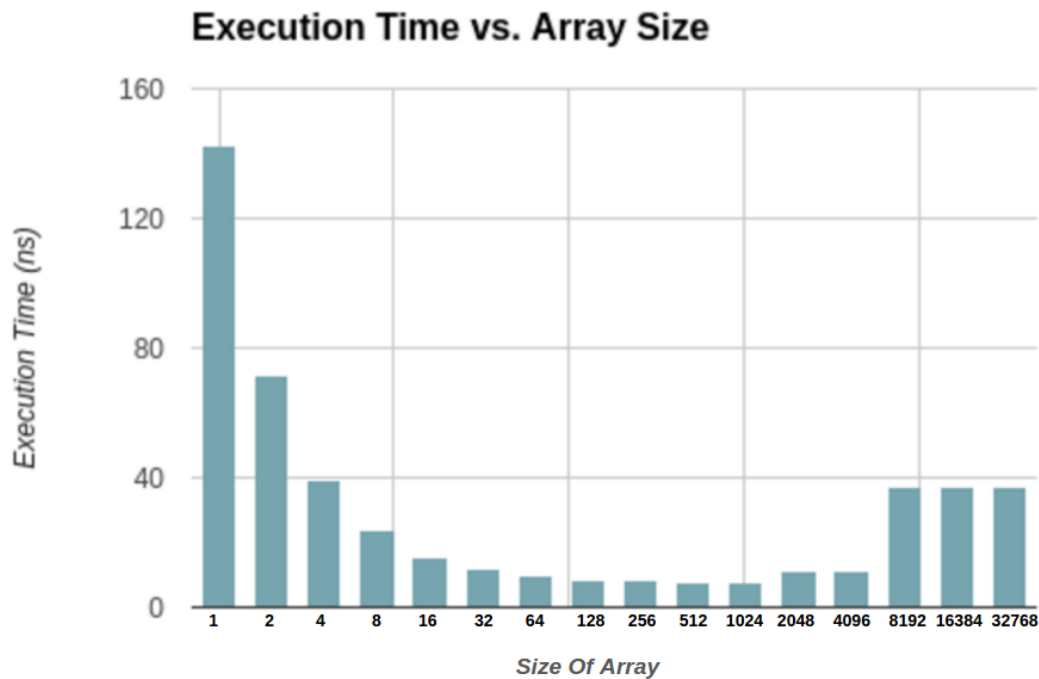
Execution time, hit rate of L1 instruction, L1 data and L2 unified caches for **Sequential Read** are tabulated and plotted as:
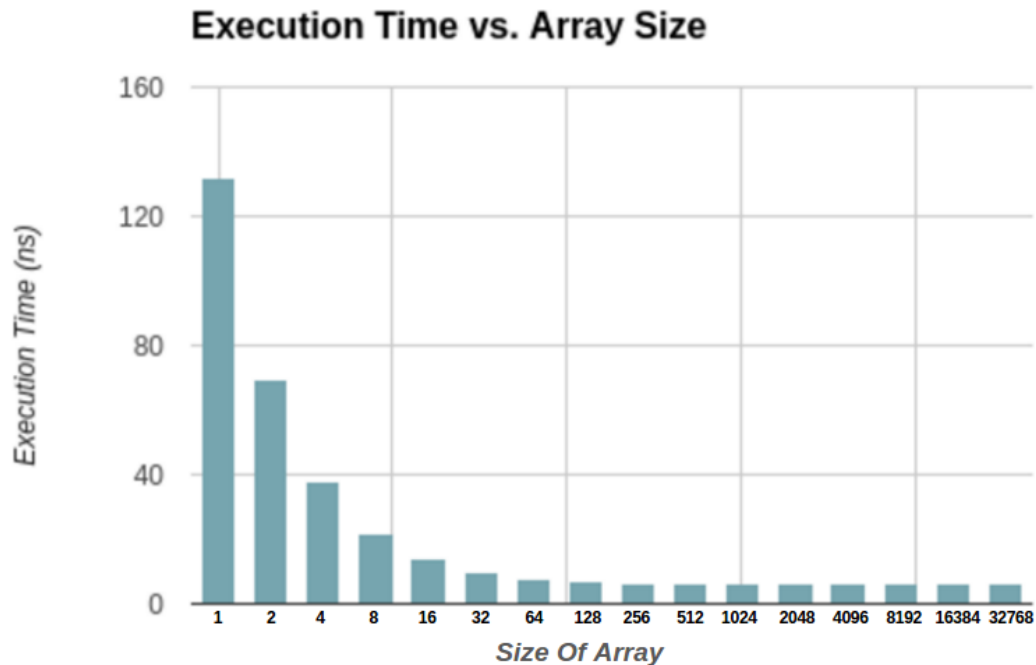
Array size	Execution Time (ns)	Il1 hitrate	Dl1 hitrate	Ul2 hitrate
1	142.66	0.9461574729	0.9372371401	0.5751633987
2	71.29	0.9457614261	0.9473539896	0.5785340314
4	39.4575	0.9586316627	0.9621494411	0.5790849673
8	23.58125	0.9720416443	0.9753271028	0.5805194805
16	15.654375	0.9830643967	0.9847492986	0.5816326531
32	11.6953125	0.9906036494	0.9906480147	0.5804455446
64	9.725	0.9950099713	0.9938850967	0.5765247411
128	8.729140625	0.9974935753	0.9955793537	0.5669050051
256	8.202070313	0.9988623436	0.9965167961	0.5484429066
512	7.986035156	0.9994273215	0.9968998507	0.5335731415
1024	7.896796875	0.9997127395	0.996537354	0.6002479083
2048	11.3226416	0.9998561001	0.8515831149	0.9891209298
4096	11.29961182	0.9999279888	0.8515557131	0.9895981621
8192	37.28325684	0.999963979	0.851542	0.02817261923
16384	37.27663147	0.9999819857	0.8515352195	0.02850944386
32768	37.27331573	0.9999909919	0.8515318022	0.02867781318

Execution time, hit rate of L1 instruction, L1 data and L2 unified caches for **Sequential Write** are tabulated and plotted as:
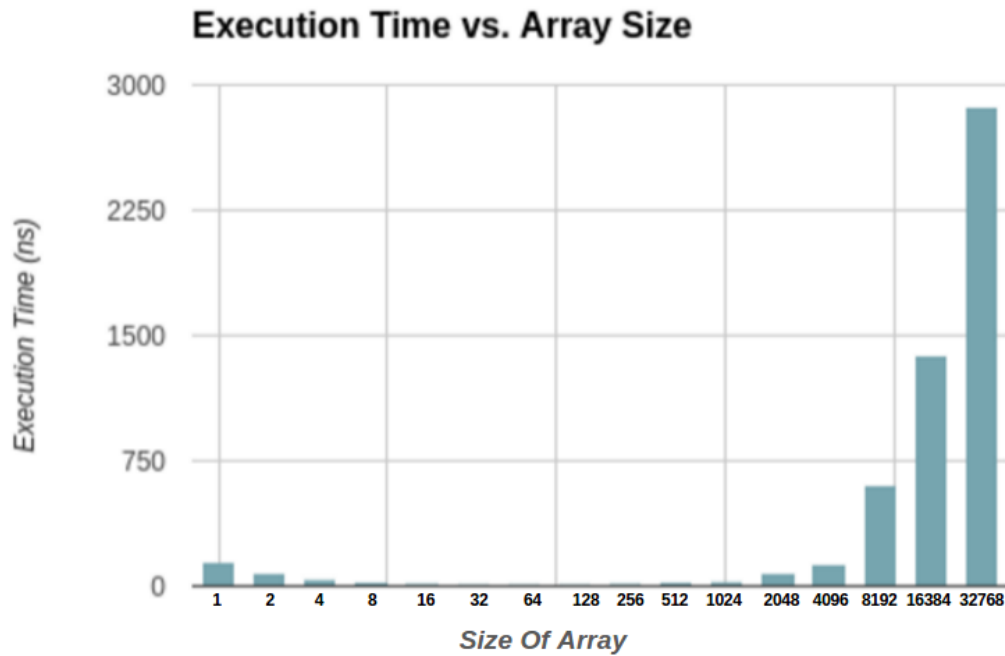
Array size	Execution Time (ns)	Il1 hitrate	Dl1 hitrate	Ul2 hitrate
1	131.96	0.9416058394	0.928359317	0.5803452855
2	69.26	0.9492261743	0.9399114485	0.5832223702
4	37.5575	0.9593183466	0.9543478261	0.5826666667
8	21.74625	0.9709957605	0.9689440994	0.5818908123
16	13.851875	0.9816053512	0.9806892454	0.578042328

32	9.913125	0.9894627317	0.9885432809	0.5667539267
64	7.95046875	0.994292448	0.9930386253	0.5465994962
128	6.957109375	0.9971034011	0.9954861479	0.5035714286
256	6.434023438	0.9986722769	0.9968687819	0.4219977553
512	6.217011719	0.9993298208	0.9974307426	0.3278116827
1024	6.108583984	0.9996633104	0.9969221005	0.4908730159
2048	6.054291992	0.9998312513	0.8001671116	0.9943632721
4096	6.027773438	0.9999155243	0.8000836235	0.9946390191
8192	6.01395752	0.9999577368	0.8000418287	0.4997301719
16384	6.006981812	0.999978862	0.8000209674	0.4998650991
32768	6.003490906	0.9999894294	0.8000104848	0.4999325529

Execution Time vs. Array Size

Execution time, hit rate of L1 instruction, L1 data and L2 unified caches for **Random Read** are tabulated and plotted as:

Array size	Execution Time (ns)	Il1 hitrate	Dl1 hitrate	Ul2 hitrate
1	148.85	0.9431701152	0.9370742783	0.5792759051
2	76.15	0.9417702589	0.9486493715	0.5865030675
4	44.5325	0.9598416651	0.9668669528	0.5888077859
8	26.55125	0.9715539074	0.9775484749	0.5900846433
16	17.85875	0.982559268	0.9860342556	0.5909631391
32	14.2928125	0.9909944958	0.9919673338	0.5895953757
64	12.335625	0.9953247608	0.9949245426	0.5853131749
128	13.27890625	0.9980754487	0.9969751837	0.5752895753
256	14.70367188	0.9992539789	0.997989211	0.5572959604
512	20.17523438	0.9997399903	0.9987604423	0.5402898551
1024	29.57172852	0.9999135863	0.9985197178	0.726758794
2048	75.1120166	0.9999761362	0.8965108932	0.9976459458
4096	134.5574268	0.9999929218	0.8743326708	0.9979918668
8192	610.1368481	0.9999981867	0.8717657475	0.3039512445
16384	1387.9191	0.9999995373	0.8725421172	0.09685922178
32768	2862.39273	0.9999998836	0.8734828529	0.03039833914

Execution Time vs. Array Size

Execution time, hit rate of L1 instruction, L1 data and L2 unified caches for **Random Write** are tabulated and plotted as:

Array size	Execution Time (ns)	Il1 hitrate	Dl1 hitrate	Ul2 hitrate
1	153.3	0.9478057647	0.9372561769	0.5791457286
2	77.445	0.946989809	0.9456859972	0.5856966708
4	45.1675	0.9624421609	0.9643911439	0.5880195599
8	26.84375	0.9729320052	0.9752901535	0.5893074119
16	17.98	0.9831277164	0.9844555768	0.5897129187
32	14.32875	0.9911764706	0.9910396281	0.588372093
64	12.32859375	0.9953884198	0.9943100189	0.5835140998
128	13.24929688	0.99809395	0.9966726548	0.5736434109
256	15.47960938	0.9992984091	0.997944441	0.5568369028
512	20.47619141	0.9997449317	0.9987133679	0.539976825
1024	29.63238281	0.9999139691	0.9984835742	0.7471931862
2048	67.49945801	0.9999741389	0.8890981084	0.9980065638
4096	137.137063	0.9999932058	0.8727536789	0.9981786732
8192	594.6136572	0.9999982134	0.8713191676	0.3427040728
16384	1363.681234	0.9999995377	0.8720890054	0.1212859104
32768	2875.506925	0.9999998851	0.8733507494	0.04274148135

Execution Time vs. Array Size