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Table 1 Runtime measurements of sort algorithms based on data files in Input Folder

Size of Data	Runtime in nano secs	Sorting Algorithm(H, S or I)	GAP SEQUENCE for Shell Sort	File Name in Input Folder
10000	49921766157	H		asc10K. dat
10000	1025922	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc10K. dat
10000	626978	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc10K. dat
10000	226247	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc10K. dat
10000	219553	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc10K. dat
10000	121825	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc10K. dat
10000	287830	I		asc10K. dat
1000	54925900	H		asc1K. dat
1000	12495	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc1K. dat
1000	11603	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc1K. dat
1000	12049	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc1K. dat
1000	16958	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc1K. dat
1000	12049	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc1K. dat
1000	29452	I		asc1K. dat
20000	462838891343	H		asc20K. dat
20000	401623	S	{1, 4, 13, 40, 121, 364,	asc20K. dat

			1093, 3280, 9841, 29524}	
20000	379756	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc20K. dat
20000	618052	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc20K. dat
20000	623408	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc20K. dat
20000	1458783	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc20K. dat
20000	1266896	I		asc20K. dat
2000	754771053	H		asc2K. dat
2000	62029	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc2K. dat
2000	67830	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc2K. dat
2000	66491	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc2K. dat
2000	68276	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc2K. dat
2000	418580	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc2K. dat
2000	102637	I		asc2K. dat
50	37485	H		asc50. dat
50	4463	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc50. dat
50	2231	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc50. dat
50	2232	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc50. dat

50	34361	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc50. dat
50	9371	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc50. dat
50	4462	I		asc50. dat
500	15390177	H		asc500. dat
500	18743	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc500. dat
500	18296	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc500. dat
500	18296	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc500. dat
500	27221	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc500. dat
500	18296	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc500. dat
500	27667	I		asc500. dat
5000	8370637375	H		asc5K. dat
5000	91927	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	asc5K. dat
5000	85233	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	asc5K. dat
5000	84340	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	asc5K. dat
5000	87465	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	asc5K. dat
5000	93266	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	asc5K. dat
5000	153509	I		asc5K. dat
10000	63316020278	H		dup10K. dat

10000	3415576	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup10K. dat
10000	1104908	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup10K. dat
10000	2339229	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup10K. dat
10000	1080811	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup10K. dat
10000	1024584	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup10K. dat
10000	55029877	I		dup10K. dat
1000	56080342	H		dup1K. dat
1000	79432	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup1K. dat
1000	67830	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup1K. dat
1000	96836	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup1K. dat
1000	69168	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup1K. dat
1000	65599	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup1K. dat
1000	905435	I		dup1K. dat
20000	588534034388	H		dup20K. dat
20000	2895698	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup20K. dat
20000	2673468	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup20K. dat
20000	7789246	S	{1, 10, 30, 60, 120, 360,	dup20K. dat

			1080, 3240, 9720, 29160}	
20000	2585111	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup20K. dat
20000	2859999	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup20K. dat
20000	297876309	I		dup20K. dat
2000	649443307	H		dup2K. dat
2000	847424	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup2K. dat
2000	237850	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup2K. dat
2000	372170	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup2K. dat
2000	228925	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup2K. dat
2000	240974	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup2K. dat
2000	1459675	I		dup2K. dat
50	34362	H		dup50. dat
50	4463	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup50. dat
50	2678	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup50. dat
50	1785	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup50. dat
50	2232	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup50. dat
50	1785	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup50. dat

50	1785	I		dup50. dat
500	11714884	H		dup500. dat
500	37484	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup500. dat
500	36146	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup500. dat
500	45071	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup500. dat
500	35699	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup500. dat
500	34808	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup500. dat
500	64260	I		dup500. dat
5000	10393178664	H		dup5K. dat
5000	564502	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	dup5K. dat
5000	5332655	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	dup5K. dat
5000	5744541	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	dup5K. dat
5000	696592	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	dup5K. dat
5000	808600	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	dup5K. dat
5000	8622836	I		dup5K. dat
10000	67329968183	H		ran10K. dat
10000	1191926	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran10K. dat
10000	1105801	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran10K. dat

10000	2604299	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran10K. dat
10000	2951034	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran10K. dat
10000	1701095	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran10K. dat
10000	44726027	I		ran10K. dat
1001	85040006	H		ran1K. dat
1001	77647	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran1K. dat
1001	72738	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran1K. dat
1001	89250	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran1K. dat
1001	76308	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran1K. dat
1001	72292	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran1K. dat
1001	214199	I		ran1K. dat
20000	483910691192	H		ran20K. dat
20000	2537362	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran20K. dat
20000	2384299	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran20K. dat
20000	5499105	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran20K. dat
20000	2890790	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran20K. dat
20000	2878741	S	{1, 3, 23, 71, 143, 379,	ran20K. dat

			1237, 3413, 10433, 31001}	
20000	97193551	I		ran20K. dat
2000	453627767	H		ran2K. dat
2000	189655	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran2K. dat
2000	172251	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran2K. dat
2000	261501	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran2K. dat
2000	171805	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran2K. dat
2000	178052	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran2K. dat
2000	900974	I		ran2K. dat
50	29898	H		ran50. dat
50	3570	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran50. dat
50	2678	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran50. dat
50	2677	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran50. dat
50	2231	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran50. dat
50	2677	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran50. dat
50	2678	I		ran50. dat
500	9655453	H		ran500. dat
500	33915	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran500. dat
500	34808	S	{1, 5, 17, 53, 149, 373,	ran500. dat

			1123, 3371, 10111, 30341}	
500	37931	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran500.dat
500	34807	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran500.dat
500	33022	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran500.dat
500	58458	I		ran500.dat
5000	5453122616	H		ran5K.dat
5000	601095	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	ran5K.dat
5000	572981	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	ran5K.dat
5000	1069655	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	ran5K.dat
5000	488640	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	ran5K.dat
5000	481947	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	ran5K.dat
5000	5686083	I		ran5K.dat
10000	41259011295	H		rev10K.dat
10000	297200	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev10K.dat
10000	273550	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev10K.dat
10000	269088	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev10K.dat
10000	350305	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev10K.dat

10000	299432	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev10K. dat
10000	49322373	I		rev10K. dat
1000	43177548	H		rev1K. dat
1000	23651	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev1K. dat
1000	24098	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev1K. dat
1000	26328	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev1K. dat
1000	23651	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev1K. dat
1000	25882	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev1K. dat
1000	449817	I		rev1K. dat
20000	367306954764	H		rev20K. dat
20000	1073225	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev20K. dat
20000	1074118	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev20K. dat
20000	1231196	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev20K. dat
20000	1160689	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev20K. dat
20000	1172738	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev20K. dat
20000	206778496	I		rev20K. dat
2000	421883521	H		rev2K. dat
2000	44625	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev2K. dat

2000	53549	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev2K. dat
2000	53549	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev2K. dat
2000	49534	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev2K. dat
2000	48641	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev2K. dat
2000	1690384	I		rev2K. dat
50	17850	H		rev50. dat
50	1339	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev50. dat
50	1339	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev50. dat
50	1338	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev50. dat
50	893	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev50. dat
50	1339	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev50. dat
50	2231	I		rev50. dat
500	5470099	H		rev500. dat
500	11602	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev500. dat
500	12049	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev500. dat
500	12049	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev500. dat
500	11157	S	{1, 7, 19, 67, 131, 371,	rev500. dat

			1211, 3353, 9851, 29651}	
500	11603	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev500. dat
500	107992	I		rev500. dat
5000	6340627691	H		rev5K. dat
5000	417242	S	{1, 4, 13, 40, 121, 364, 1093, 3280, 9841, 29524}	rev5K. dat
5000	228925	S	{1, 5, 17, 53, 149, 373, 1123, 3371, 10111, 30341}	rev5K. dat
5000	374848	S	{1, 10, 30, 60, 120, 360, 1080, 3240, 9720, 29160}	rev5K. dat
5000	229371	S	{1, 7, 19, 67, 131, 371, 1211, 3353, 9851, 29651}	rev5K. dat
5000	236958	S	{1, 3, 23, 71, 143, 379, 1237, 3413, 10433, 31001}	rev5K. dat
5000	15519588	I		rev5K. dat