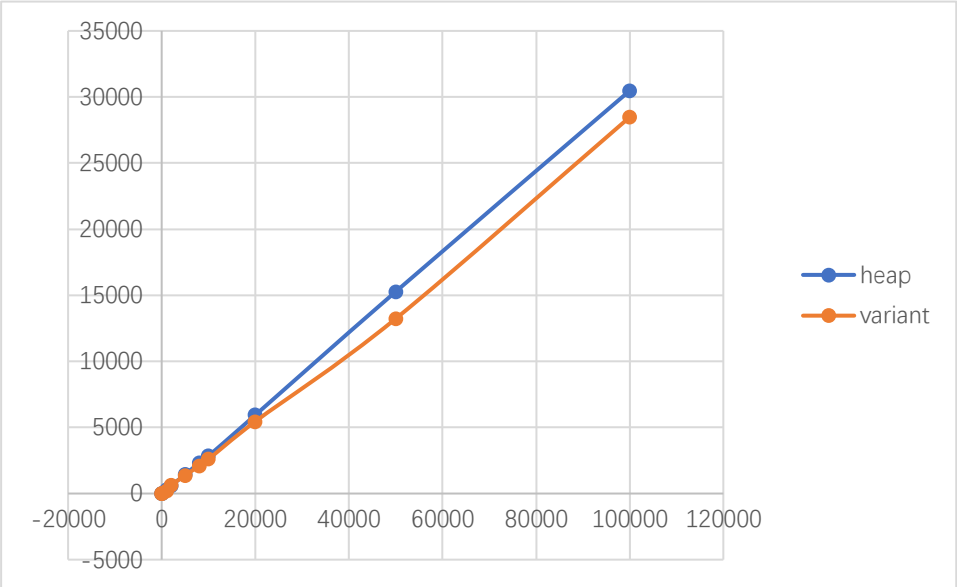
Below is the comparison of time execution between the original Heap Sort and its variant in different n sizes: 10, 100, 1000, 2000, 5000, 8000, 10000, 20000, 50000, 100000, 500000.

	10		100		1000		2000		5000		8000		10000		20000		50000		100000		500000	
	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant	heap	variant
1	0	0	0	0	1001	0	0	999	1000	998	2000	2001	2996	1999	5999	6001	15001	13001	30002	26001	175013	148011
2	0	0	0	0	998	0	1000	1000	2001	1001	4001	2000	3001	3000	4001	7001	16002	14999	29003	30003	182016	162554
3	0	0	0	0	0	0	0	0	1008	2000	2999	3000	2000	2001	5000	6003	18000	15001	29001	27000	192013	154012
4	0	0	0	0	1000	0	1000	1001	992	2000	2000	2001	2000	2000	5002	4999	14001	12001	29001	36001	173019	153477
5	0	0	0	0	0	1000	0	0	999	1001	2000	2001	2999	3000	8000	5001	17000	13001	29003	27002	180028	178400
6	0	0	0	0	0	0	0	1000	1001	999	2001	1999	2001	2001	5001	7001	13001	12000	29002	27002	169017	162012
7	0	0	0	0	0	0	1000	0	1001	1000	3000	2002	3997	2000	5000	5000	20000	13000	28933	27002	166018	147099
8	0	0	0	0	0	1001	0	1000	999	2000	3000	1999	3999	2001	5001	5003	18003	12000	29004	27001	166083	181101
9	0	0	0	0	998	0	1000	0	1001	1001	2000	2000	3000	2003	5002	7000	14001	13001	32004	27002	179824	163811
10	0	0	0	0	0	0	0	1000	999	999	2001	2000	3001	1999	8000	6001	16001	16999	31002	27001	180068	151183
11	0	0	0	0	0	1000	1001	0	1002	1002	2002	2001	2002	2000	6001	6998	14001	12003	29002	27002	229529	178452
12	0	0	0	0	1000	0	0	1000	1000	0	2999	999	2000	2000	5000	4999	14002	12000	32003	27002	183013	156849
13	0	0	0	0	0	0	1002	0	998	2000	2998	3001	3000	2001	5000	5000	17001	19000	30000	27002	171566	151014
14	0	0	0	0	0	999	0	1003	999	1999	3000	3000	2002	2000	8001	8002	14002	13001	30003	26002	170624	152306
15	0	0	0	0	0	0	999	0	2002	2000	2000	2000	2998	2000	7000	6001	14001	13001	29000	27002	172719	152284
16	0	0	0	0	999	0	0	0	1998	1000	2001	1000	2001	2000	6001	5001	17002	12002	29207	26001	183301	150572
17	0	0	0	0	0	1001	0	998	2000	1000	1999	2000	3000	4002	5000	5000	14001	12002	29002	30483	171677	165984
18	0	0	0	0	0	0	1000	0	2001	1001	2001	2000	2000	2998	4999	5000	14003	13002	29006	31004	171345	151089
19	0	0	0	0	1002	0	1000	1000	999	2000	2000	2000	3999	3001	8000	5002	16002	12001	46002	32000	175309	150976
20	0	0	0	0	0	0	1000	0	1000	1999	2001	2000	3999	2000	5001	5003	21000	13002	32020	27003	171042	151904
21	0	0	0	0	0	0	1001	1001	2000	1001	1999	2001	3001	2001	5001	5996	14000	12509	30004	28004	169015	156504
22	0	0	0	0	998	0	0	0	1000	1000	2000	2001	3001	2000	5001	7000	13000	13001	31519	27002	206192	151038
23	0	0	0	0	0	0	0	1000	1001	1000	4001	2000	3001	2000	5227	5000	14001	12001	30003	32002	176429	168027
24	0	0	0	0	0	1000	1000	0	1000	1000	4002	2000	1999	2000	5001	4001	14000	13002	30002	32000	177743	150954
25	0	0	0	0	0	0	1000	1000	1000	1000	3001	2001	2000	2000	5000	4002	13001	14002	30002	26002	185079	160035
26	0	0	0	0	0	0	0	0	2003	1000	4002	1000	2000	2000	5000	9001	13998	12001	29004	27001	182016	159478
27	0	0	0	0	0	0	1000	1000	1997	1000	1996	2000	2001	2000	8001	6001	13999	13000	29005	26999	192022	155737
28	0	0	0	0	0	0	999	0	2000	1000	2000	2004	3001	1999	6000	6999	14001	12510	29003	27001	173017	154025
29	0	0	0	0	0	0	0	1000	1999	1000	6002	2999	2002	2000	5000	6003	14001	12001	29003	27002	190505	170068
30	0	0	0	0	999	0	1001	0	1000	1000	3012	3000	2998	2002	5001	5000	15001	12000	30001	27002	181275	152195
31	0	0	0	0	0	1001	0	1001	2001	2001	2986	2000	2999	2000	8503	5001	14001	11997	36001	27001	177805	152668
32	0	0	0	0	0	0	0	1001	1999	1997	2004	2000	5004	2001	5001	7999	14002	13002	30000	47004	189211	158790
33	0	0	0	0	1000	0	1000	1001	1000	999	1999	1002	4997	2000	5000	5000	15001	12003	29008	32770	166012	155291
34	0	0	0	0	1000	1001	1000	0	1999	2000	2999	1000	3000	3000	8001	5001	18002	16000	29003	30002	165666	159551
35	0	0	0	0	0	0	0	1001	1002	2000	3001	3002	2997	3000	5999	8001	14001	13002	28998	27001	168578	170806
36	0	0	0	0	0	0	1000	999	1001	2001	2002	3000	3000	3001	5000	5000	19002	12001	30002	27003	167459	154053
37	0	0	0	0	0	1000	999	1000	1998	2000	1998	3001	2001	2000	5000	5002	14002	11999	30005	26002	166227	158865
38	0	0	0	0	0	0	1000	999	2000	2000	2000	1999	4001	4001	9001	4999	16002	13003	29001	29002	183916	154021
39	0	0	0	0	1001	1000	0	1002	2000	2001	2000	3003	3999	3000	5001	5000	15002	13001	32001	27002	169513	163016
40	0	0	0	0	0	0	0	0	1001	2000	1002	1998	3000	3000	5001	8001	14002	13001	29002	26974	178308	158990
41	0	0	0	0	0	1002	1001	0	999	999	2000	2001	2003	2001	5000	6000	14002	17001	30436	30004	172086	178317
42	0	0	0	0	0	0	1000	1000	1001	996	3001	2000	2000	2001	5001	4999	14002	11999	30002	29005	171600	153199
43	0	0	0	0	1001	0	999	1000	1000	999	2000	1999	3000	2000	8002	4999	16001	16001	30002	33001	192063	154047
44	0	0	0	0	999	0	1000	1001	1001	1001	2000	2003	2994	2003	5001	8001	14002	16001	29007	27003	169117	153430
45	0	0	0	0	0	0	0	999	1999	1000	3001	1000	2002	1999	4999	4000	13002	21005	29002	27002	172109	156021
46	0	0	0	0	0	0	1000	1000	2001	1000	1999	1000	1999	2002	9000	4001	14005	13999	29002	29002	197015	151544
47	0	0	0	0	0	0	1000	1001	1001	2000	2997	3001	2001	2999	5002	8001	15000	13003	31002	28000	168455	192020
48	0	0	0	0	0	1000	1000	0	3001	2000	2001	2000	2001	2001	7999	4001	14000	14999	33004	25998	196372	162950
49	0	0	0	0	0	0	1000	1001	1999	2001	2000	998	2999	2000	6001	4999	15997	16001	45004	29001	170361	159016
50	0	0	0	0	0	0	0	0	1001	1999	2000	1001	2001	2000	5001	5001	16004	12000	39000	28000	172017	156026
51	0	0	0	0	1000	0	1000	999	2000	1002	2000	2000	2000	2002	5000	5000	17001	13001	30005	32002	174034	156668
52	0	0	0	0	0	0	0	1000	2001	1000	2000	2000	2000	1999	5000	5001	17001	12003	29002	30847	174684	158099
53	0	0	0	0	1000	0	1002	1000	998	999	2000	1000	4000	4000	5002	5000	14002	13000	30003	31003	171913	171952
54	0	0	0	0	0	1001	0	0	1000	1000	2000	998	4000	4000	5001	7000	14001	13002	30001	33002	202519	156662
55	0	0	0	0	0	0	1000	0	2000	1998	2005	998	2999	2000	5000	5001	14000	12999	30002	27003	172281	153068
56	0	0	0	0	1000	1000	1000	1000	1993	2000	1000	3000	1999	4000	7997	5000	14000	16001	29001	26002	174235	153037
57	0	0	0	0	0	0	0	1001	2001	2001	1000	2000	2001	4005	5001	4000	16001	13001	30000	27001	176298	155545
58	0	0	999	0	1004	0	0	998	2000	1001	3000	1997	2000	4997	5000	4002	15003	13001	30003	26004	172028	160023
59	0	0	0	977	0	0	1001	999	2001	1998	1999	3001	2000	4000	5000	4000	17005	17015	29001	27508	208002	167276
60	0	0	0	0	0	0	999	0	2003	1003	2000	3001	2162	4001	8002	3998	16000	13001	29001	27001	175016	155233
61	0	0	0	0	0	0	0	1000	1997	1000	2001	2002	1992	2998	5000	4001	13976	13002	30002	27002	176046	152595
62	0	0	0	0	1000	0	1000	1000	1001	2000	2000	1000	2999	1998	5001	4000	14017	13001	29001	27001	170065	150507
63	0	0	0	0	0	0	1001	1001	2030	999	2000	1001	2017	2000	5000	4002	19995	11999	29002	27002	174536	156660
64	0	0	0	0	1000	0	0	1001	970	1000	1000	1000	3999	3000	5000	4000	14001	14000	32003	39004	201000	173982
65	0	0	1001	0	0	0	999	0	1999	2003	1000	1001	3001	3002	8000	4001	18004	12000	34005	28514	205979	182978
66	0	0	0	0	1000	0	0	999	2000	999	3000	2002	2001	1999	5001	4001	16002	13000	30002	27002	200594	163491
67	0	0	0	0	0	0	0	999	1000	1999	2999	3000	3001	2000	5001	4004	14001	12001	30000	33003	180031	152242
68	0	0	0	0	1000	0	998	0	1001	1001	2000	2000	2000	3000	12000	4001	14004	15000	30002	27023	225979	164066
69	0	0	0	0	0	1001	0	0	1000	1000	4001	1002	2000	3001	7999	4002	14002	12999	28999	26002	201016	153026
70	0	0	0	0	1000	0	1000	0	2000	999	3002	2005	2004	2000	5002	3999	17000	12001	31000	27000	174892	157011
71	0	0	0	0	0	1001	0	1000	1000	1002	2998	2001	3998	2000	6001	4000	16002	13000	29006	27004	199068	203766
72	0	0	0	0	1000	0	1000	1001	1997	1999	2002	1999	3999	2001	6000	4000	20004	12003	29001	26002	181013	154574
73	0	0	0	0	0	0	0	999	1999	2000	1999	2000	3001	3999	5999	4001	13976	13001	30002	26999	169013	157232
74	0	0	0	0	998	0	1001	1000	1001	2000	2001	2997	4000	4001	5000	4001	17002	16000	30004	27002	194648	155315
75	0	0	0	0	0	0	0	0	1000	1998	2000	3001	3004	3001	7002	5000	15001	13004	29001	28524	170982	159756
76	0	0	0	0	998	0	1001	0	1000	1000	2000	2999	1997	3000	6004	7003	14000	11999	29001	27001	174098	155282
77	0	0	0	0	0	0	999	1000	1001	1001	2000	1999	2001	3000	8002	7999	13001	13002	30003	26002	173143	179005
78	0	0	0	0	0	0	1001	1000	998	1999	2000	3000	4000	3006	6005	7000	14000	13002	30003	27002	177706	166010
79	0	0	0	0	0	0	999	1000	1002	1001	2000	2001	2999	3994	5997	5996	19004	12002	29002	27002	176597	163686
80	0	0	0	0	0	0	0	1004	1999	1001	1000	2001	3003	4000	4999	5000	14001	13003	36003	27001	221004	154264
81	0	0	0	0	0	0	0	0	1000	999	1001	3000	1998	3996	6000	5001	26004	13001	30002	27003	187018	151935
82	0	0	0	0	0	0	1001	1000	1001	1000	2001	2996	3001	3000	5003	5001	17999	17709	32003	26004	182014	176466
83	0	0	0	0	0	0	1000	999	1999	999	4000	3001	2000	4001	8000	4999	19003	12001	33006	27001	180012	154011
84	0	0	0	0	0	0	0	0	2000	999	2999	2001	4001	3001	5002	7000	19002	13002	29002	27002	182030	155941
85	0	0	0	0	0	0	1000	1000	3000	996	2000	2000	4000	2999	5000	7001	13003	13001	29002	26001	170442	158652
86	0	0	0	0	0	0	0	1000	1000	1000	3002	3001	2998	2001	4999	7000	14001	11999	29002	27001	224916	155597
87	0	0	0	0	0	999	1000	0	1002	1001	2999	2998	3002	3000	8002	5001	14002	12001	30002	27002	174025	152014
88	0	0	0	0	0	0	999	1000	2002	1000	3000	2000	4000	2000	5000	4001	14002	13001	30003	27002	185015	157156
89	0	0	0	0	0	0	999	1000	1997	2000	2000	2001	4001	2000	8002	4000	14007	11985	29004	27000	199019	161850
90	0	0	0	0	0	1000	1000	0	1000	1999	2001	2000	3000	4001	7000	4001	14001	13002	29001	31003	207533	151039
91	0	0	0	0	1001	0	1000	0	1000	999	1000	3002	1999	4000	7002	4001	13000	12001	30002	30001	190525	151941
92	0	0	0	0	0	0	0	1001	1001	1001	2999	3998	2000	6002	4002	14001	12999	29002	33001	183085	155283
93	0	0	0	0	0	999	1002	0	1001	999	3000	2998	3000	2001	5510	4005	15001	13001	29001	29000	183014	151546
94	0	0	0	0	0	999	999	998	1001	2003	2000	3998	2001	4509	4001	14001	12001	37000	27002	180016	152032
95	0	0	0	0	0	0	0	0	1001	1000	1997	2000	3000	1999	5002	7999	14001	12001	29000	26002	178788	169637
96	0	0	0	0	0	0	1000	0	1000	2001	2001	2001	1999	2000	5001	6999	14003	12002	29371	27003	173063	152091
97	0	0	0	0	0	0	0	1000	1002	1001	1000	2001	4002	2001	6000	5000	14002	12001	34019	37005	188013	172513
98	0	0	0	0	0	0	0	0	1999	2001	1000	1999	3999	4001	5031	5000	14001	12999	30003	29000	173015	155679
99	0	0	0	0	0	0	1000	1000	1001	999	2996	2000	2001	2001	5998	11004	14001	12002	30005	34003	176545	154625
100	0	0	0	0	0	0	1003	0	998	2001	3002	2000	2999	2000	9000	10998	17002	13003	32006	31001	199623	151017
Average	0	0	20	9.77	269.97	200.05	590.06	610.08	1439.98	1369.94	2310.18	2090.22	2841.7	2600.24	5938.33	5450.52	15271.03	13228.17	30477.25	28478.1	181765.4	159278.1

In order to get a fair comparison, I recorded 100 times of each size of n and calculated the average.

n	heap	variant
10	0	0
100	20	9.77
1000	269.97	200.05
2000	590.06	610.08
5000	1439.98	1369.94
8000	2310.18	2090.22
10000	2841.7	2600.24
20000	5938.33	5450.52
50000	15271.03	13228.17
100000	30477.25	28478.1

Below is the graph showing relationship of these two algorithms.



As expected, since the variant algorithm is actually optimized based on the original Heap Sort by reducing some comparison tests in Max-Heapify, the time complexity of the original Heap Sort is higher than its variant. Although there is not much difference for small sizes of n, according to the graph even 20000, after the n gets bigger, the difference of two algorithm is shown. Also, the original Heap Sort is a upper bound time complexity of its variant.