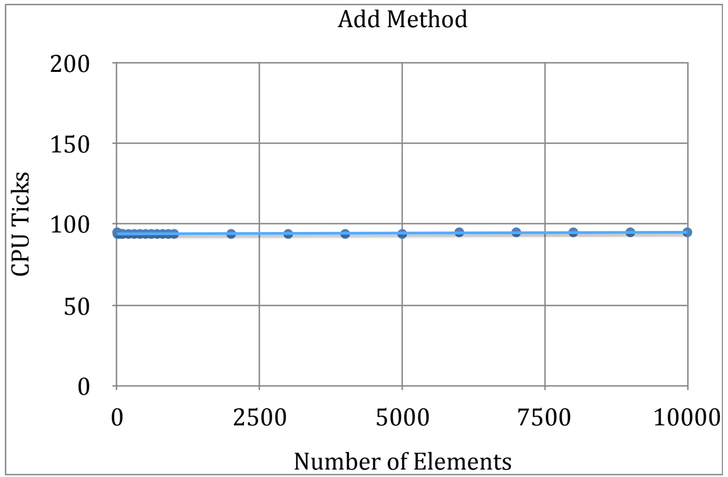
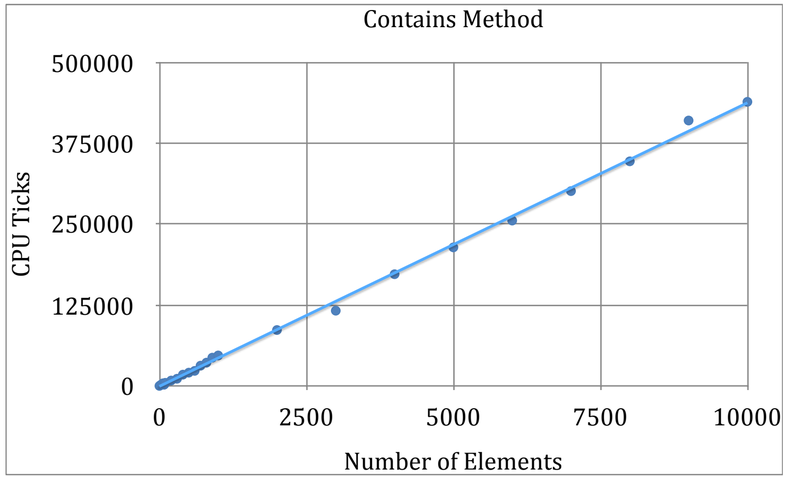
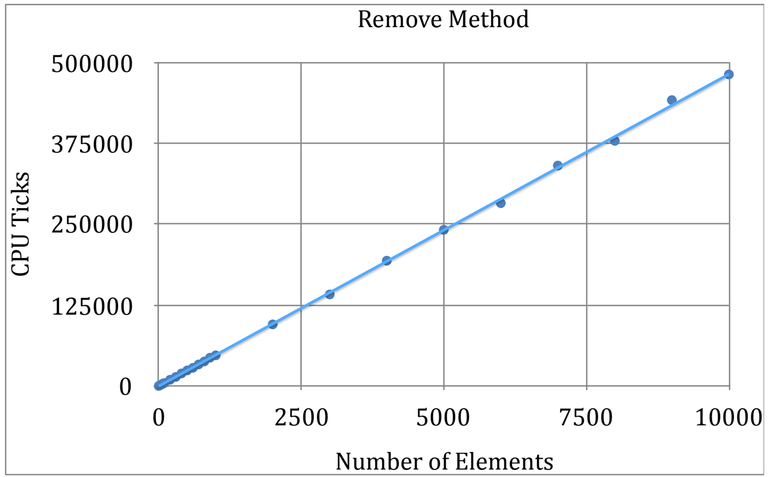
Data Structure 0

Add Method																														
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	95	95	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	95	95	95	95	95
Contains Method																														
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	190	285	285	285	1503	1604	2505	2845	4180	3953	1954	3177	4948	8464	11249	17593	20665	23393	31464	36117	43832	47241	86544	116384	172754	214220	255626	301157	347174	410226	439101
Remove Method																														
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	95	144	293	507	978	1466	1931	2478	2770	3395	3897	4335	4631	9715	14024	19477	24128	28070	33357	37914	43791	47416	95262	141475	193643	241341	282500	340662	378857	441763	481447



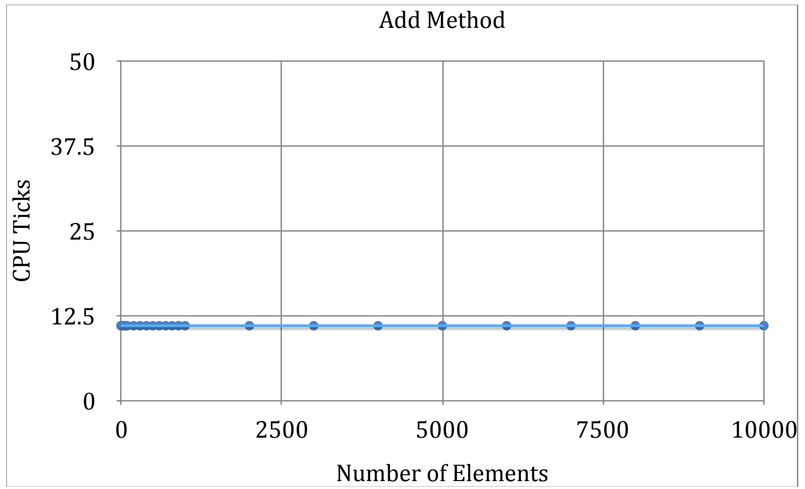


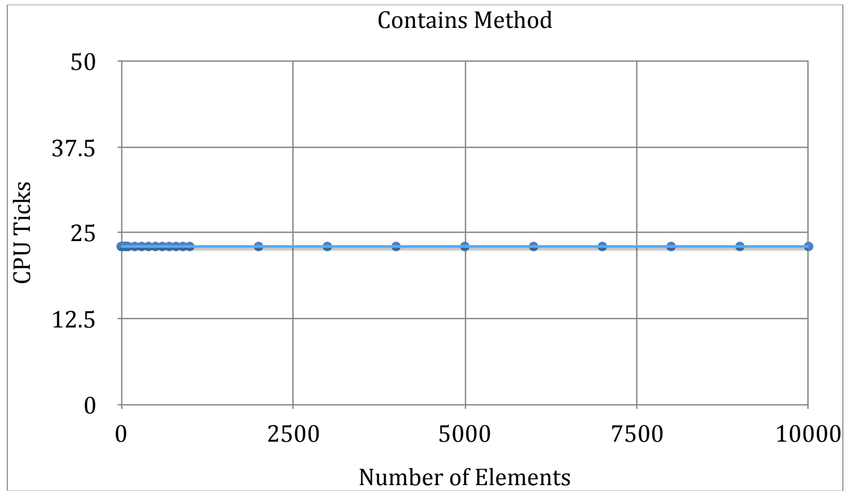


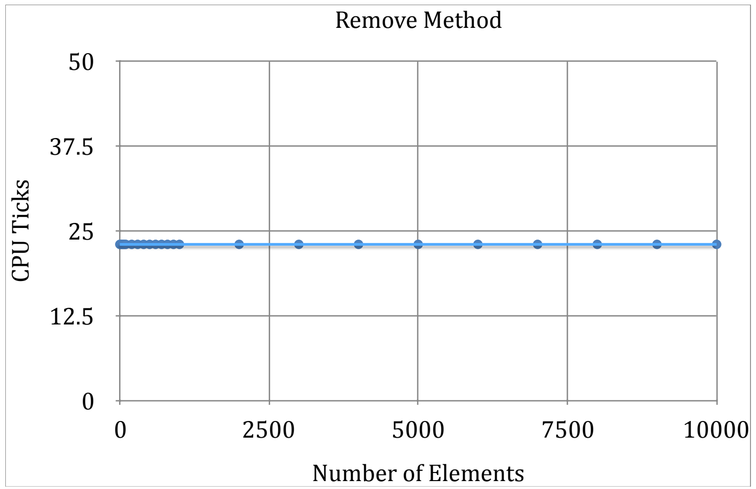
Because this data structure has a O(1) time complexity for Add, and O(N) for Contains and Remove, this data is a DoublyLinkedList.

Data Structure 1

Add Method																														
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Contains Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Remove Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23



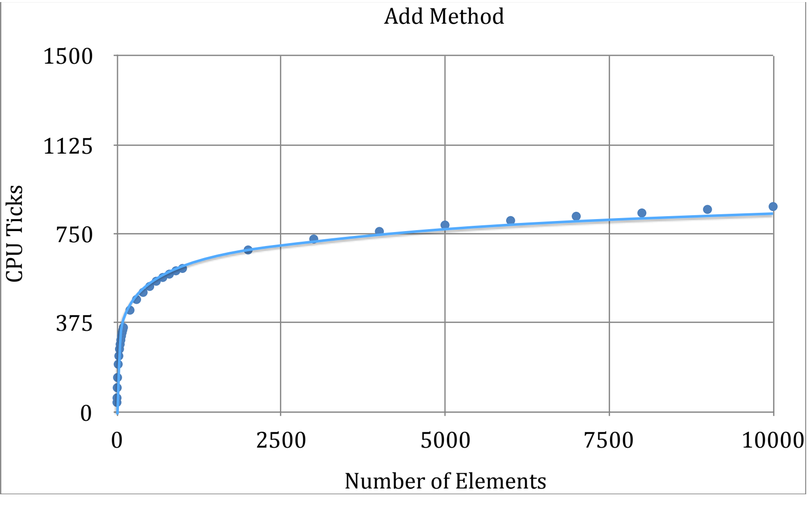


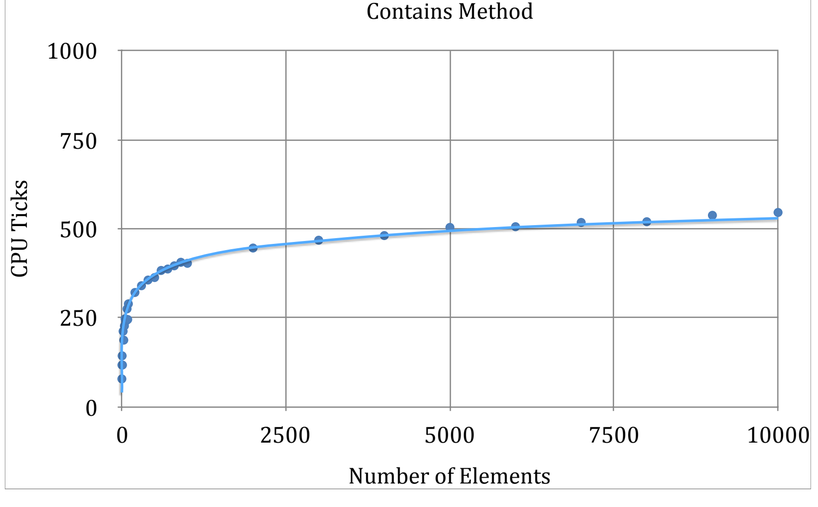


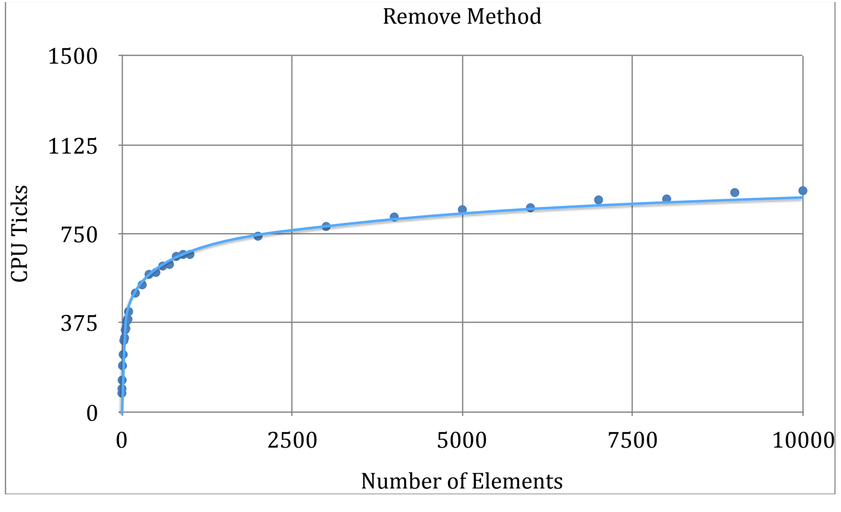
Because this data structure has a O(1) time complexity for Add, Contains, and Remove, this data structure must be a HashSet

Data Structure 2

Add Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	39	58	101	144	200	235	264	284	302	319	333	344	355	428	473	503	528	550	566	580	594	604	682	728	760	787	806	824	838	853	865
Contains Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	78	117	143	117	212	187	227	247	242	242	275	245	289	321	340	356	363	383	387	396	406	403	446	468	481	504	506	518	520	538	546
Remove Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	78	97	133	194	241	300	311	345	351	381	388	390	422	500	535	579	587	614	621	655	663	663	740	781	821	852	860	893	897	924	932



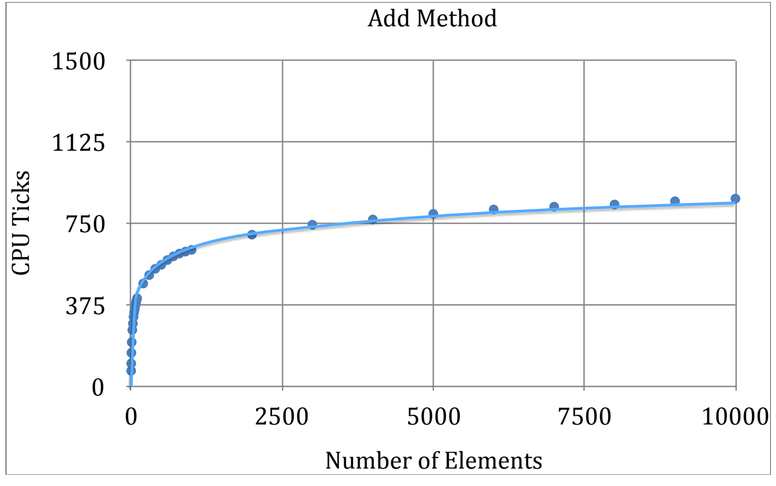


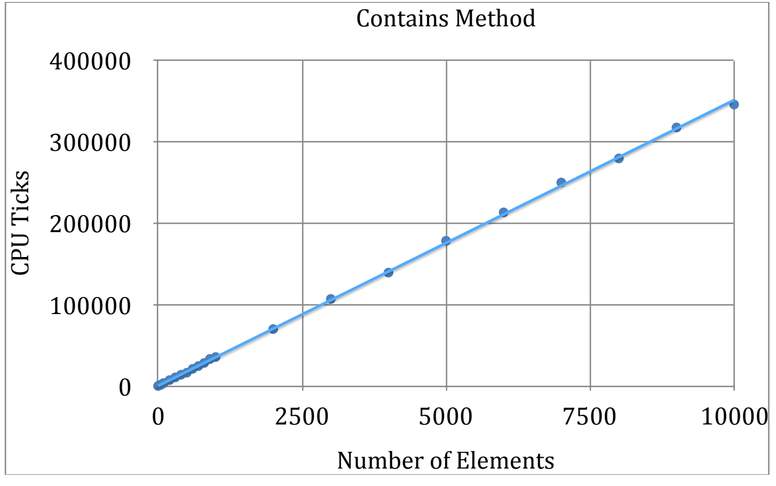


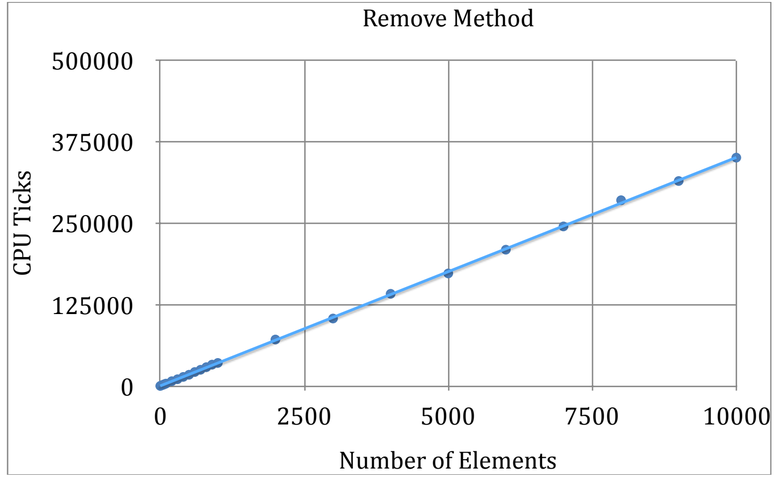
Because this data structure has a O(log(n)) time complexity for Add, Contains, Remove, this data structure must be a binary search tree

Data Structure 3

Add Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	70	104	153	202	258	288	319	339	352	369	383	395	404	472	511	540	558	580	597	610	619	627	697	743	767	793	813	826	836	851	863
Contains Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	69	69	282	300	992	909	1327	1004	1883	2321	3054	2805	3668	7263	10616	13853	16301	21103	24508	28284	33256	35612	69939	106969	139282	178388	213254	249941	279523	317545	345744
Remove Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	139	174	322	485	862	1207	1607	1930	2225	2541	3021	3352	3703	7385	10424	13986	17298	21528	24962	28938	32853	35437	71389	103640	141573	172848	209294	245035	285249	314743	350637



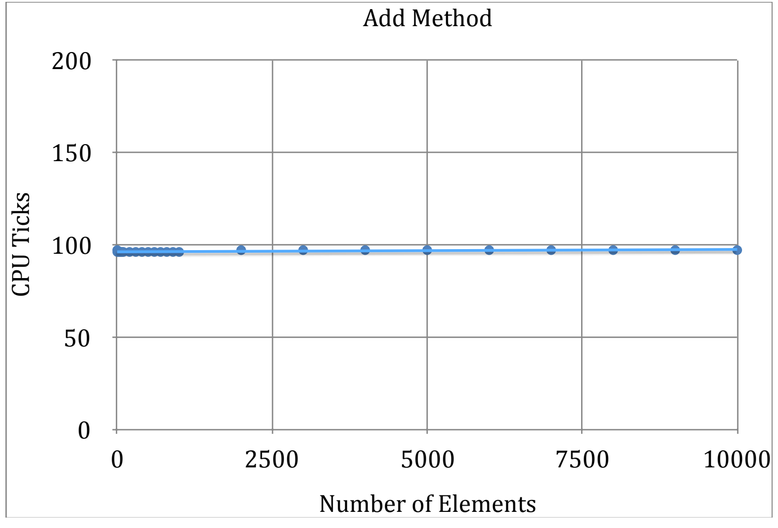


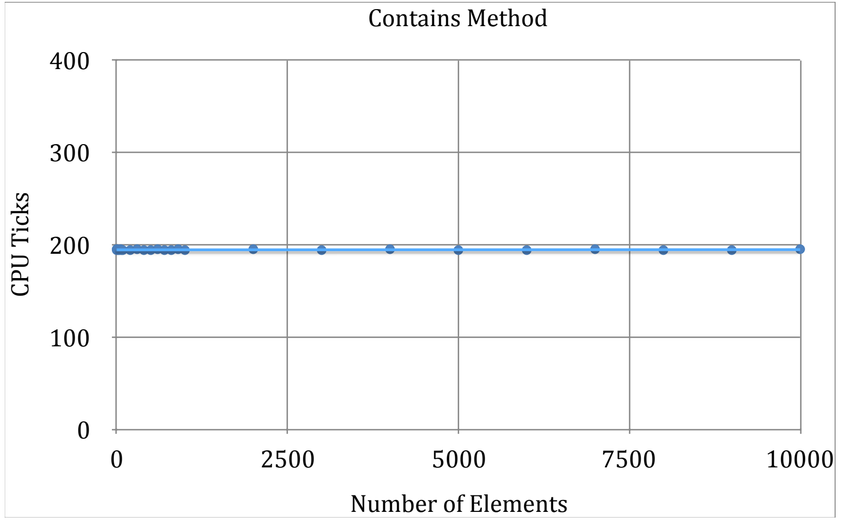


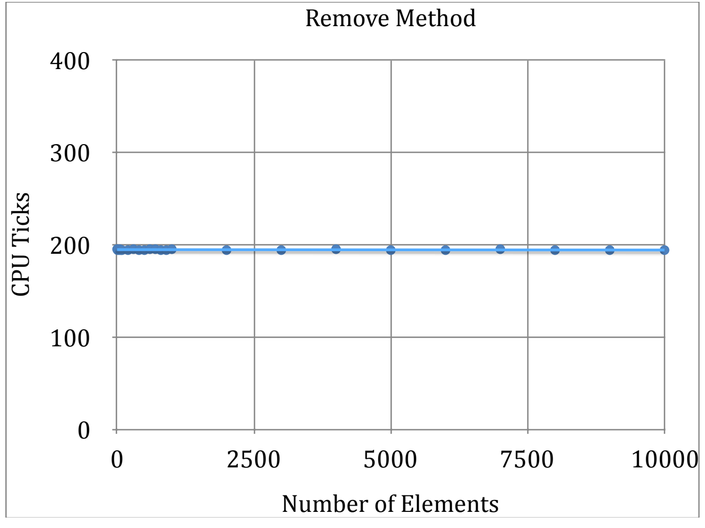
Because this data structure has a O(log(n)) time complexity for Add and O(N) time complexity for Contains and Remove, this data structure must be a Heap

Data Structure 4

Add Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	97	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	97	97	97	97	97	97	97	97	97
Contains Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	195	194	194	195	194	194	194	194	195	194	194	194	194	194	195	194	194	195	194	194	195	194	195	194	195	194	194	195	194	194	195
Remove Method																															
Number of	1	2	5	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
CPU Ticks:	195	195	195	194	195	195	194	195	195	194	194	194	194	194	195	194	194	195	195	194	194	195	194	194	195	194	194	195	194	194	194







Because this data structure has a O(1) time complexity for Add, Contains and Remove, this data structure must be a HashSet