1. *initial array ordering situation: random*

n	time(milliseconds)	ratio	lg ratio
50	0.13	——	——
100	0.14	1.077	1.04
200	0.17	1.214	1.102
400	0.22	1.294	1.138
800	0.47	2.136	1.462
1600	1.55	3.298	1.816
3200	5.28	3.406	1.846
6400	21.38	4.049	2.012
12800	78.41	3.667	1.915
25600	355.46	4.533	2.129
51200	1653.74	4.653	2.157

lg ratio seems to converge to a constant 2.025
Running time is about aN^b with b=2.025
Run the program (for a sufficient large value of N)

n	time(milliseconds)
12000	69.77

$69.77 = a * 12000^{2.025}$
$\Rightarrow a = 3.831 * 10^{-7}$

Running time is about $3.831 * 10^{-7} * N^{2.025}$ milliseconds.

2. *initial array ordering situation: ordered*

n	time(milliseconds)	ratio	lg ratio
50	0.08	——	——
100	0.15	1.875	1.369
200	0.11	0.733	0.856
400	0.19	1.727	1.314
800	0.32	1.684	1.298
1600	0.34	1.063	1.031
3200	0.31	0.912	0.955
6400	0.39	1.258	1.122
12800	0.58	1.487	1.219
25600	0.77	1.326	1.152
51200	1.07	1.389	1.179

lg ratio seems to converge to a constant 1.168
Running time is about aN^b with b=1.168
Run the program (for a sufficient large value of N)

n	time(milliseconds)
12000	0.55

$0.55 = a * 12000^{1.168}$
$\Rightarrow a = 9.460 * 10^{-6}$

Running time is about $9.460 * 10^{-6} * N^{1.168}$ milliseconds.

3. initial array ordering situation: partially ordered

n	time(milliseconds)	ratio	lg ratio
50	0.10	——	——
100	0.17	1.7	1.304
200	0.16	0.941	0.970
400	0.25	1.563	1.250
800	0.51	2.04	1.428
1600	1.51	2.961	1.721
3200	6.71	4.444	2.108
6400	20.68	3.082	1.756
12800	80.62	3.898	1.974
25600	338.37	4.197	2.049
51200	——	——	——

lg ratio seems to converge to a constant 1.926
Running time is about aN^b with b=1.926
Run the program (for a sufficient large value of N)

n	time(milliseconds)
12000	69.21

$69.21 = a * 12000^{1.926}$
$\Rightarrow a = 9.630 * 10^{-7}$

Running time is about $9.630 * 10^{-7} * N^{1.926}$ milliseconds.

4. initial array ordering situation: reverse-ordered

n	time(milliseconds)	ratio	lg ratio
50	0.10	——	——
100	0.29	2.9	1.703
200	0.19	0.655	0.809
400	0.26	1.368	1.170
800	0.80	3.077	1.754
1600	3.70	4.625	2.151
3200	12.17	3.289	1.814
6400	41.87	3.440	1.855

12800	164.81	3.936	1.984
25600	653.99	3.968	1.992
51200	——	——	——

lg ratio seems to converge to a constant 1.944
Running time is about aN^b with b=1.944
Run the program (for a sufficient large value of N)

n	time(milliseconds)
12000	145.38

$145.38 = a * 12000^{1.944}$
$=> a = 1.708 * 10^{-6}$

Running time is about $1.708 * 10^{-6} * N^{1.944}$ milliseconds.