

Performance Table: Traditional vs SA-Optimized QuickSort

AT	LS	LCM	LCO	FS	FCM	FCO	RS	RCM	RCO	MS	MCM	MCO	SAS	SACM	SACO
SA	0	55	110.0	20	55	110.0	12	32	52.0	14	22	26.0	8	22	26.0
UA	12	23	30.0	18	26	40.0	14	25	38.0	20	23	32.0	18	22	26.0
RSA	5	45	90.0	13	45	90.0	15	26	42.0	15	19	24.0	13	19	24.0
NSA	7	20	32.0	11	17	24.0	11	20	34.0	9	18	28.0	13	16	20.0
DA1	30	465	930.0	60	465	930.0	56	465	930.0	60	465	930.0	58	465	930.0
DA2	41	134	234.0	70	135	238.0	61	134	234.0	64	134	234.0	58	134	234.0
DA3	14	41	72.0	24	36	62.0	22	41	72.0	23	41	72.0	20	36	62.0

Performance Table: Average metrics

	Last	First	Random	Median	SAQS
Swaps	15.5	30.8	27.28	29.28	26.28
Comparisons	111.85	111.28	106.14	103.14	102
Cost	214	213.42	200.28	192.28	188.85

Abbreviation Legend

Pivot Selection Strategy Metrics:

1. **LS** - Last Pivot selection strategy total swaps
2. **LCM** - Last Pivot selection strategy total comparisons
3. **LCO** - Last Pivot selection strategy total cost
4. **FS** - First Pivot Selection strategy total swaps
5. **FCM** - First Pivot selection strategy total comparisons
6. **FCO** - First Pivot selection strategy total cost
7. **RS** - Random Pivot selection strategy total swaps
8. **RCM** - Random Pivot selection strategy total comparisons
9. **RCO** - Random Pivot selection strategy total cost
10. **MS** - Median Pivot selection strategy total swaps
11. **MCM** - Median Pivot selection strategy total comparisons
12. **MCO** - Median Pivot selection strategy total cost
13. **SAS** - Simulated Annealing QuickSort Total Swaps
14. **SACM** - Simulated Annealing Total Comparisons

15. **15. SACO** - Simulated Annealing Final Total Cost

AT - Array Types:

16. 16. **SA** - Sorted Array
17. 17. **UA** - Unsorted Array
18. 18. **RSA** - Reverse/Inverse Sorted Array
19. 19. **NSA** - Nearly Sorted Array
20. 20. **DA1, DA2, DA3** - Duplicate Arrays

Test Arrays:

1. **SA:** [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
2. **UA:** [20, 382, 78, 292, 1000, 889, 2, 10, 92, 3, 11]
3. **RSA:** [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
4. **NSA:** [11, 12, 13, 14, 2, 1, 20, 30, 19]
5. **DA1:** [1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
6. **DA2:** [100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90, 100, 49, 90]
7. **DA3:** [10, 4, 10, 4, 10, 4, 10, 4, 10, 4, 10, 4]