

Bubble Insertion Sort

468295173

ok

468295173

ok

468295173

out of order

~~468~~

462895173

ok

462895173

out of order

462859173

ok

out of order

462851973

ok

out of order

462851793

ok

out of order

462851793

Merge Sort

468295173

46829 5173

46 829 51 73

46 8 29 5 1 7 3

46 289 15 37

24689 1357

123456789

Insertion Sort (The line indicates the end of sublist)

468295173

468295173

468295173

246895173

246895173

245689173

1245689173

~~12345689~~

1245678913

123456789

Quick sort (First pivot)

~~468295173~~

~~12345689~~

468295173

208 4 68957

1234 4 68957 9

657 8

123456789

Quick sort (median of three pivot)

468295173

median = 5.9

46825173

46825173

4213 5 687

678

213 4

12345678

Bottom-up merge sort using run

468295173

11 x x 1 x

462895137

x x 1 1 x

246891357

123456789

Insertion sort

2152 | 3180 725 1781 1248 4590 2990 633

2152 3181 |

725 2152 3181 |

725 1781 2152 3181 |

725 1248 1781 2152 3181 |

725 1248 1781 2152 3181 4590 |

725 1248 1781 2152 2990 3181 4590 |

633 725 1248 1781 2152 2990 3181 4590

Quick sort (picking the first element as a pivot)

(2152) 3180 725 1781 (1248) 4590 2990 633

~~725 1781 3180~~

633 725 1248 1781 2152 2990 3180 4590

Quick sort (using the median of three pivot)

(2152) 3180 725 1781 (1248) 4590 2990 (633)

633 3180 725 1781 1248 4590 2990 2152

(1248)

633 725 1248 1781 2152 ~~3180~~ 2990 3180 4590

③ Quick sort would be good for sorting a bookshelf

④ Yes, you can add a delete to remove items you don't need

Merge sort

2152 3180 725 1781 1248 4590 2990 633

2152 3180 725 1781

1248 4590 2990 633

2152 3180 725 1781

1248 4590 2990 633

2152 3180 725 1781

1248 4590 2990 633

3180 2152 725 1781

1248 4590 633 2990

725 1781 2152 3180

633 1248 2990 4590

633 725 1248 1781 2152 2990 3180 4590

Bottom up merge sort using run

2152 3180 725 1781 1248 4590 2990 633

2152 3180 725 1781 1248 4590 633 2990

725 1781 2152 3180 633 1248 2990 4590

633 725 1248 1781 2152 2990 3180 4590