

Sebastian Sobkowiak

Algorytmy i struktury danych

Projekt nr 1 sortowanie

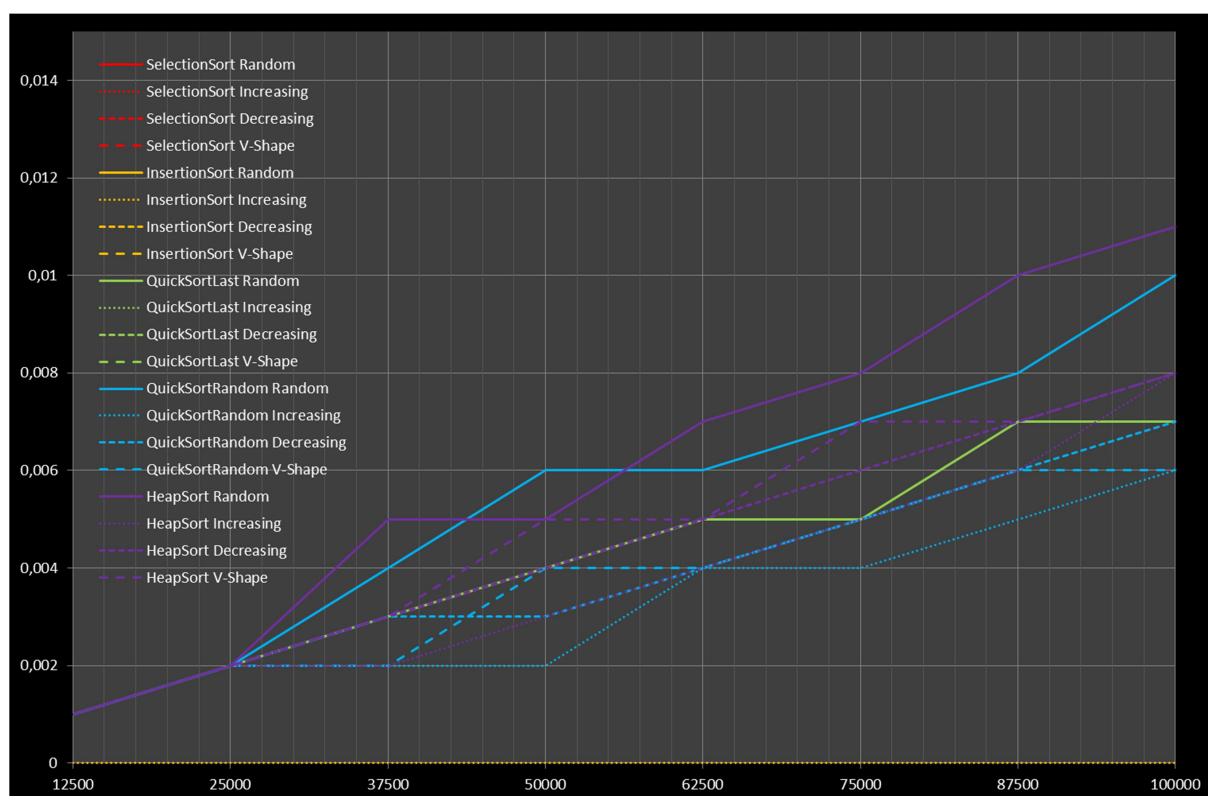
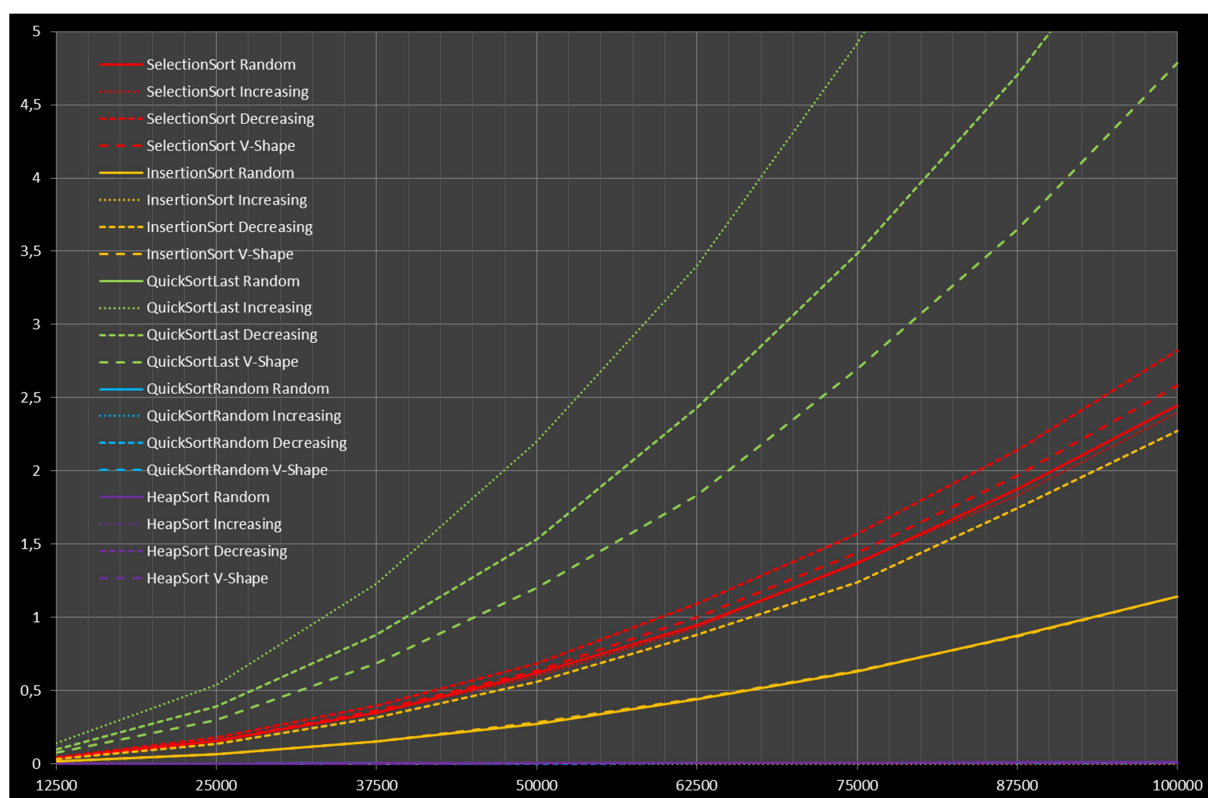
Próba nr 1, wielkości instancji: { 12500,25000,37500,50000,62500,75000,87500,100000 }

Uzyskane dane:

Nazwa algorytmu sortowania | Rodzaj wypełnienia danych | wielkość instancji | czas wykonania w s

SelectionSort Random	12500	0,04	QuickSortLast Decreasing	12500	0,101
SelectionSort Random	25000	0,16	QuickSortLast Decreasing	25000	0,393
SelectionSort Random	37500	0,347	QuickSortLast Decreasing	37500	0,884
SelectionSort Random	50000	0,618	QuickSortLast Decreasing	50000	1,536
SelectionSort Random	62500	0,947	QuickSortLast Decreasing	62500	2,429
SelectionSort Random	75000	1,372	QuickSortLast Decreasing	75000	3,484
SelectionSort Random	87500	1,876	QuickSortLast Decreasing	87500	4,703
SelectionSort Random	100000	2,446	QuickSortLast Decreasing	100000	6,139
SelectionSort Increasing	12500	0,038	QuickSortLast V-Shape	12500	0,074
SelectionSort Increasing	25000	0,152	QuickSortLast V-Shape	25000	0,297
SelectionSort Increasing	37500	0,348	QuickSortLast V-Shape	37500	0,684
SelectionSort Increasing	50000	0,596	QuickSortLast V-Shape	50000	1,205
SelectionSort Increasing	62500	0,933	QuickSortLast V-Shape	62500	1,833
SelectionSort Increasing	75000	1,381	QuickSortLast V-Shape	75000	2,699
SelectionSort Increasing	87500	1,835	QuickSortLast V-Shape	87500	3,647
SelectionSort Increasing	100000	2,399	QuickSortLast V-Shape	100000	4,786
SelectionSort Decreasing	12500	0,045	QuickSortRandom Random	12500	0,001
SelectionSort Decreasing	25000	0,178	QuickSortRandom Random	25000	0,002
SelectionSort Decreasing	37500	0,395	QuickSortRandom Random	37500	0,004
SelectionSort Decreasing	50000	0,687	QuickSortRandom Random	50000	0,006
SelectionSort Decreasing	62500	1,094	QuickSortRandom Random	62500	0,006
SelectionSort Decreasing	75000	1,573	QuickSortRandom Random	75000	0,007
SelectionSort Decreasing	87500	2,145	QuickSortRandom Random	87500	0,008
SelectionSort Decreasing	100000	2,823	QuickSortRandom Random	100000	0,01
SelectionSort V-Shape	12500	0,041	QuickSortRandom Increasing	12500	0,001
SelectionSort V-Shape	25000	0,16	QuickSortRandom Increasing	25000	0,002
SelectionSort V-Shape	37500	0,364	QuickSortRandom Increasing	37500	0,002
SelectionSort V-Shape	50000	0,637	QuickSortRandom Increasing	50000	0,002
SelectionSort V-Shape	62500	1,001	QuickSortRandom Increasing	62500	0,004
SelectionSort V-Shape	75000	1,44	QuickSortRandom Increasing	75000	0,004
SelectionSort V-Shape	87500	1,971	QuickSortRandom Increasing	87500	0,005
SelectionSort V-Shape	100000	2,582	QuickSortRandom Increasing	100000	0,006
InsertionSort Random	12500	0,017	QuickSortRandom Decreasing	12500	0,001
InsertionSort Random	25000	0,068	QuickSortRandom Decreasing	25000	0,002
InsertionSort Random	37500	0,153	QuickSortRandom Decreasing	37500	0,003
InsertionSort Random	50000	0,275	QuickSortRandom Decreasing	50000	0,003
InsertionSort Random	62500	0,443	QuickSortRandom Decreasing	62500	0,004
InsertionSort Random	75000	0,633	QuickSortRandom Decreasing	75000	0,005
InsertionSort Random	87500	0,874	QuickSortRandom Decreasing	87500	0,006
InsertionSort Random	100000	1,14	QuickSortRandom Decreasing	100000	0,007
InsertionSort Increasing	12500	0	QuickSortRandom V-Shape	12500	0,001
InsertionSort Increasing	25000	0	QuickSortRandom V-Shape	25000	0,002
InsertionSort Increasing	37500	0	QuickSortRandom V-Shape	37500	0,002
InsertionSort Increasing	50000	0	QuickSortRandom V-Shape	50000	0,004
InsertionSort Increasing	62500	0	QuickSortRandom V-Shape	62500	0,004
InsertionSort Increasing	75000	0	QuickSortRandom V-Shape	75000	0,005
InsertionSort Increasing	87500	0	QuickSortRandom V-Shape	87500	0,006
InsertionSort Increasing	100000	0	QuickSortRandom V-Shape	100000	0,006
InsertionSort Decreasing	12500	0,033	HeapSort Random	12500	0,001
InsertionSort Decreasing	25000	0,137	HeapSort Random	25000	0,002
InsertionSort Decreasing	37500	0,314	HeapSort Random	37500	0,005
InsertionSort Decreasing	50000	0,56	HeapSort Random	50000	0,005
InsertionSort Decreasing	62500	0,882	HeapSort Random	62500	0,007
InsertionSort Decreasing	75000	1,243	HeapSort Random	75000	0,008
InsertionSort Decreasing	87500	1,747	HeapSort Random	87500	0,01
InsertionSort Decreasing	100000	2,276	HeapSort Random	100000	0,011
InsertionSort V-Shape	12500	0,016	HeapSort Increasing	12500	0,001
InsertionSort V-Shape	25000	0,067	HeapSort Increasing	25000	0,002
InsertionSort V-Shape	37500	0,153	HeapSort Increasing	37500	0,002
InsertionSort V-Shape	50000	0,283	HeapSort Increasing	50000	0,003
InsertionSort V-Shape	62500	0,446	HeapSort Increasing	62500	0,004
InsertionSort V-Shape	75000	0,637	HeapSort Increasing	75000	0,005
InsertionSort V-Shape	87500	0,87	HeapSort Increasing	87500	0,006
InsertionSort V-Shape	100000	1,142	HeapSort Increasing	100000	0,008
QuickSortLast Random	12500	0,001	HeapSort Decreasing	12500	0,001
QuickSortLast Random	25000	0,002	HeapSort Decreasing	25000	0,002
QuickSortLast Random	37500	0,003	HeapSort Decreasing	37500	0,003
QuickSortLast Random	50000	0,004	HeapSort Decreasing	50000	0,004
QuickSortLast Random	62500	0,005	HeapSort Decreasing	62500	0,005
QuickSortLast Random	75000	0,005	HeapSort Decreasing	75000	0,006
QuickSortLast Random	87500	0,007	HeapSort Decreasing	87500	0,007
QuickSortLast Random	100000	0,007	HeapSort Decreasing	100000	0,008
QuickSortLast Increasing	12500	0,141	HeapSort V-Shape	12500	0,001
QuickSortLast Increasing	25000	0,538	HeapSort V-Shape	25000	0,002
QuickSortLast Increasing	37500	1,229	HeapSort V-Shape	37500	0,003
QuickSortLast Increasing	50000	2,204	HeapSort V-Shape	50000	0,005
QuickSortLast Increasing	62500	3,401	HeapSort V-Shape	62500	0,005
QuickSortLast Increasing	75000	4,921	HeapSort V-Shape	75000	0,007
QuickSortLast Increasing	87500	6,711	HeapSort V-Shape	87500	0,007
QuickSortLast Increasing	100000	8,814	HeapSort V-Shape	100000	0,008

Wykres w zależności od wielkości instancji:



Algorytmy HeapSort oraz QuickSort z losowo wybieranym elementem podziału wykonały się o rzędy wielkości szybciej niż pozostałe.

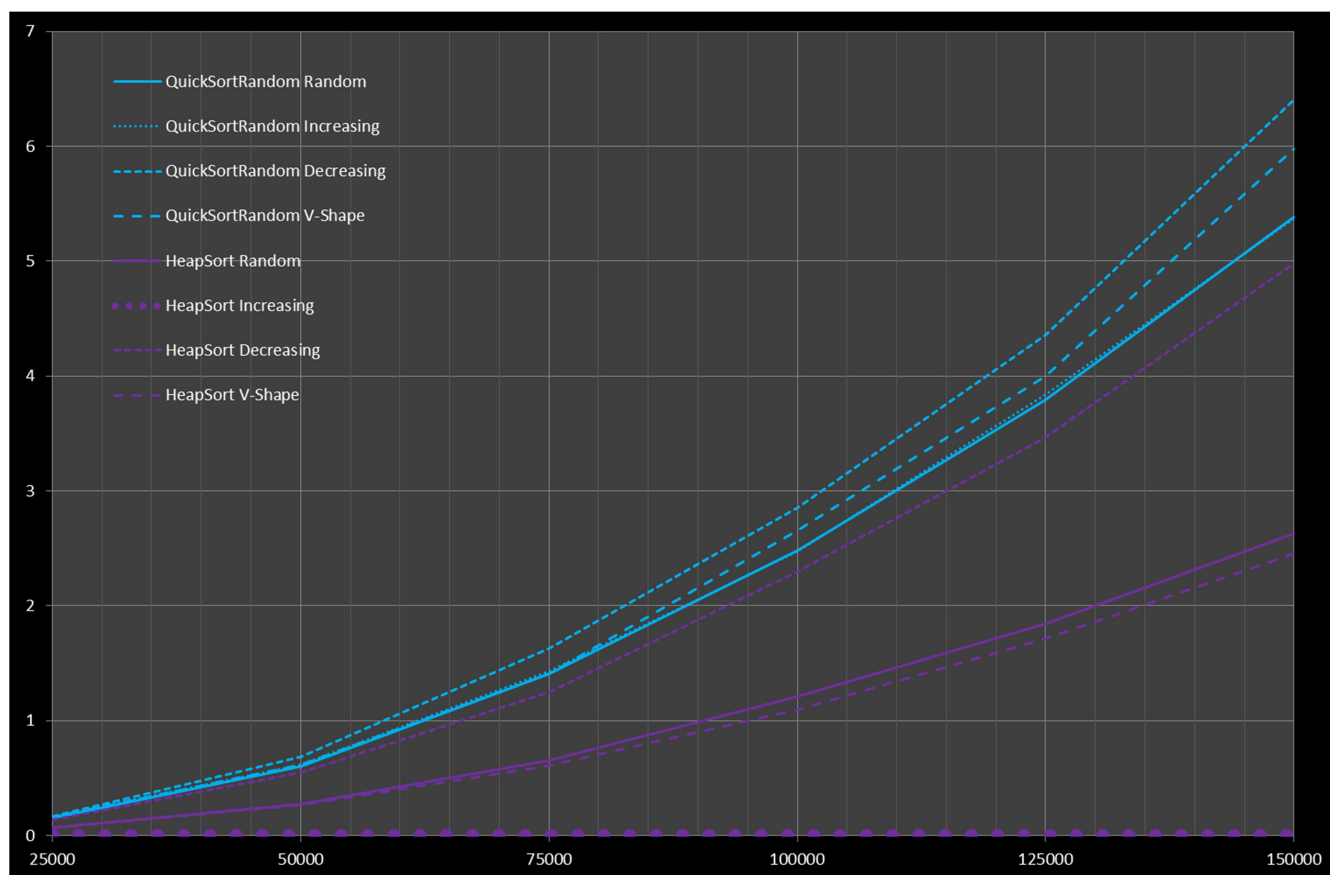
Próba nr 2, wielkości instancji: { 25000,50000,75000,100000,125000,150000 }

Uzyskane dane:

Nazwa algorytmu sortowania | Rodzaj wypełnienia danych | wielkość instancji | czas wykonania w s

QuickSortRandom Random	25000	0,154
QuickSortRandom Random	50000	0,604
QuickSortRandom Random	75000	1,408
QuickSortRandom Random	100000	2,486
QuickSortRandom Random	125000	3,794
QuickSortRandom Random	150000	5,386
QuickSortRandom Increasing	25000	0,166
QuickSortRandom Increasing	50000	0,621
QuickSortRandom Increasing	75000	1,435
QuickSortRandom Increasing	100000	2,477
QuickSortRandom Increasing	125000	3,836
QuickSortRandom Increasing	150000	5,369
QuickSortRandom Decreasing	25000	0,172
QuickSortRandom Decreasing	50000	0,686
QuickSortRandom Decreasing	75000	1,63
QuickSortRandom Decreasing	100000	2,852
QuickSortRandom Decreasing	125000	4,359
QuickSortRandom Decreasing	150000	6,4
QuickSortRandom V-Shape	25000	0,163
QuickSortRandom V-Shape	50000	0,615
QuickSortRandom V-Shape	75000	1,407
QuickSortRandom V-Shape	100000	2,659
QuickSortRandom V-Shape	125000	4,001
QuickSortRandom V-Shape	150000	5,977
HeapSort Random	25000	0,071
HeapSort Random	50000	0,273
HeapSort Random	75000	0,659
HeapSort Random	100000	1,211
HeapSort Random	125000	1,844
HeapSort Random	150000	2,626
HeapSort Increasing	25000	0
HeapSort Increasing	50000	0
HeapSort Increasing	75000	0
HeapSort Increasing	100000	0
HeapSort Increasing	125000	0
HeapSort Increasing	150000	0
HeapSort Decreasing	25000	0,134
HeapSort Decreasing	50000	0,549
HeapSort Decreasing	75000	1,251
HeapSort Decreasing	100000	2,301
HeapSort Decreasing	125000	3,463
HeapSort Decreasing	150000	4,98
HeapSort V-Shape	25000	0,066
HeapSort V-Shape	50000	0,269
HeapSort V-Shape	75000	0,611
HeapSort V-Shape	100000	1,098
HeapSort V-Shape	125000	1,712
HeapSort V-Shape	150000	2,452

Wykres w zależności od wielkości instancji:



Algorytm sortowania HeapSort dla danych już posortowanych nie wykonuje operacji zamiany elementu. Tylko porównuje kolejne pary elementów więc czas jego wykonywania nie zależy od wielkości instancji.