

Testing Bishoy Abdelamlik's program.

QS: outside-in partition, random pivot, cutoff=50:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 1 random pivot partition, cutoff=50:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 2 random pivot partition, cutoff=50:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: outside-in partition, 1st pivot, cutoff=50:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 1st pivot, cutoff=50:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: outside-in partition, random pivot, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 1 random pivot partition, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 2 random pivot partition, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: outside-in partition, 1st pivot, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

QS: left-to-right, 1st pivot, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

Almost QS: outside-in partition, random pivot, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

Almost QS: left-to-right, 1 random pivot partition, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

Almost QS: left-to-right, 2 random pivot partition, cutoff=2:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

HeapSort: top-down build heap:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

HeapSort: bottom-up build heap:

26.25.24.23.22.21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4.3.2.1.0.

Bigger, QS: outside-in partition, random pivot, cutoff=50:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.

16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, 1 random pivot partition, cutoff=50:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.

16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, 2 random pivot partition, cutoff=50:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.

16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: outside-in partition, 1st pivot, cutoff=50:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, lf pivot, cutoff=50:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: outside-in partition, random pivot, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, 1 random pivot partition, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, 2 random pivot partition, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: outside-in partition, lf pivot, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, QS: left-to-right, lf pivot, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, Almost QS: outside-in partition, random pivot, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, Almost QS: left-to-right, 1 random pivot partition, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, Almost QS: left-to-right, 2 random pivot partition, cutoff=2:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, HeapSort: top-down build heap:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Bigger, HeapSort: bottom-up build heap:

100.631.1162.1693.2224.2755.3286.3817.4348.4879.5410.5941.6472.7003.7534.8065.8596.

9127.9658.10189.10720.11251.11782.12313.12844.13375.13906.14437.14968.15499.16030.
16561.17092.17623.18154.18685.19216.19747. done.

Testing Bishoy Abdelamlik's sorts on a huge array.

Java's QuickSort on random data runs in 3.822 seconds.

Java's QuickSort on the test sets runs in 1.028 seconds.

Bishoy Abdelamlik's QS: outside-in partition, random pivot, cutoff=50
on all random values runs in 3.793 seconds. Java Ratio = 0.99
on the test sets runs in 1.483 seconds. Java Ratio = 1.44

Bishoy Abdelamlik's QS: left-to-right, 1 random pivot partition, cutoff=50
on all random values runs in 4.604 seconds. Java Ratio = 1.20
on the test sets runs in 2.322 seconds. Java Ratio = 2.25

Bishoy Abdelamlik's QS: left-to-right, 2 random pivot partition, cutoff=50
on all random values runs in 5.331 seconds. Java Ratio = 1.39
on the test sets runs in 2.985 seconds. Java Ratio = 2.90

Bishoy Abdelamlik's QS: outside-in partition, 1f pivot, cutoff=50
on all random values runs in 3.752 seconds. Java Ratio = 0.98

Bishoy Abdelamlik's QS: left-to-right, 1f pivot, cutoff=50
on all random values runs in 4.769 seconds. Java Ratio = 1.24

Bishoy Abdelamlik's QS: outside-in partition, random pivot, cutoff=2
on all random values runs in 5.164 seconds. Java Ratio = 1.35
on the test sets runs in 2.630 seconds. Java Ratio = 2.55

Bishoy Abdelamlik's QS: left-to-right, 1 random pivot partition, cutoff=2
on all random values runs in 5.657 seconds. Java Ratio = 1.48
on the test sets runs in 3.576 seconds. Java Ratio = 3.47

Bishoy Abdelamlik's QS: left-to-right, 2 random pivot partition, cutoff=2
on all random values runs in 6.148 seconds. Java Ratio = 1.60
on the test sets runs in 4.385 seconds. Java Ratio = 4.26

Bishoy Abdelamlik's QS: outside-in partition, 1st pivot, cutoff=2
on all random values runs in 4.743 seconds. Java Ratio = 1.24

Bishoy Abdelamlik's QS: left-to-right, 1st pivot, cutoff=2
on all random values runs in 5.534 seconds. Java Ratio = 1.44

Bishoy Abdelamlik's Almost QS: outside-in partition, random pivot, cutoff=2
on all random values runs in 4.954 seconds. Java Ratio = 1.29
on the test sets runs in 2.634 seconds. Java Ratio = 2.56

Bishoy Abdelamlik's Almost QS: left-to-right, 1 random pivot partition, cutoff=2
on all random values runs in 6.129 seconds. Java Ratio = 1.60
on the test sets runs in 3.630 seconds. Java Ratio = 3.53

Bishoy Abdelamlik's Almost QS: left-to-right, 2 random pivot partition, cutoff=2
on all random values runs in 6.030 seconds. Java Ratio = 1.57
on the test sets runs in 4.017 seconds. Java Ratio = 3.90

Bishoy Abdelamlik's HeapSort: top-down build heap
on all random values runs in 13.937 seconds. Java Ratio = 3.64
on the test sets runs in 7.440 seconds. Java Ratio = 7.23

Bishoy Abdelamlik's HeapSort: bottom-up build heap
on all random values runs in 12.262 seconds. Java Ratio = 3.20
on the test sets runs in 5.860 seconds. Java Ratio = 5.70

Done testing Bishoy Abdelamlik methods.