(a) AVL: +1 +2
+7 7, 7 7 ⇒ 2 2, 1 1 7 7
 1 1 7 8
2 3 7 8

+4
2 2
1 1
7 1
6 6
8 8

(b) Red-Black. 0: Red
7, 7, 7, 1 ⇒ 2, 2, 2, 1
1 1 7 7
1 1 7 8
1 1 7 8
6 6 8

(c) Splay
7, 7, 1, 7, 2 8
1 7 1 7 8
2 2 7 7
2 2 8 8
6 6 6 8
4 4 4 8
(d) Heapsort

In the construction of the max-heap:

\[ \begin{array}{c}
7 \\
1 \\
3
\end{array} \quad \Rightarrow \quad \begin{array}{c}
7 \\
5 \\
1
\end{array} \]

Swap \((1,3)\)

\[ \begin{array}{c}
7 \\
1 \\
6 \\
3
\end{array} \quad \Rightarrow \quad \begin{array}{c}
7 \\
3 \\
6 \\
1
\end{array} \]

In the first remove Max:

Swap \((0,3)\)

\[ \begin{array}{c}
1367
\end{array} \quad \Rightarrow \quad \begin{array}{c}
6317
\end{array} \]

Swap \((0,2)\)

In the second remove Max:

Swap \((0,2)\)

\[ \begin{array}{c}
1367
\end{array} \quad \Rightarrow \quad \begin{array}{c}
6317
\end{array} \]

Swap \((0,1)\)

In the third remove Max:

Swap \((0,1)\)

Quick sort:

on \([0..3]\): 7 is the pivot and one swap.

on \([6..2]\): \[7163\] \quad \Rightarrow \quad \[3167\]

on \([0..2]\): 3 is the pivot and one swap

\[ \begin{array}{c}
3167
\end{array} \quad \Rightarrow \quad \begin{array}{c}
1367
\end{array} \]