

排序

希尔排序: Pratt序列

14-C4

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Pratt's Sequence, 1971

$$\begin{aligned}\mathcal{H}_{pratt} &= \{ 2^p \cdot 3^q \mid p, q \in \mathcal{N} \} \\ &= \{ 1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 27, 32, 36, \dots \}\end{aligned}$$

❖ Note that

- adjacent items are **NOT** always relatively prime and
- there are $\mathcal{O}(\log^2 n)$ items no greater than n

❖ With \mathcal{H}_{pratt} ,

Shellsort sorts a sequence of length n in $\mathcal{O}(n \cdot \log^2 n)$ time ...

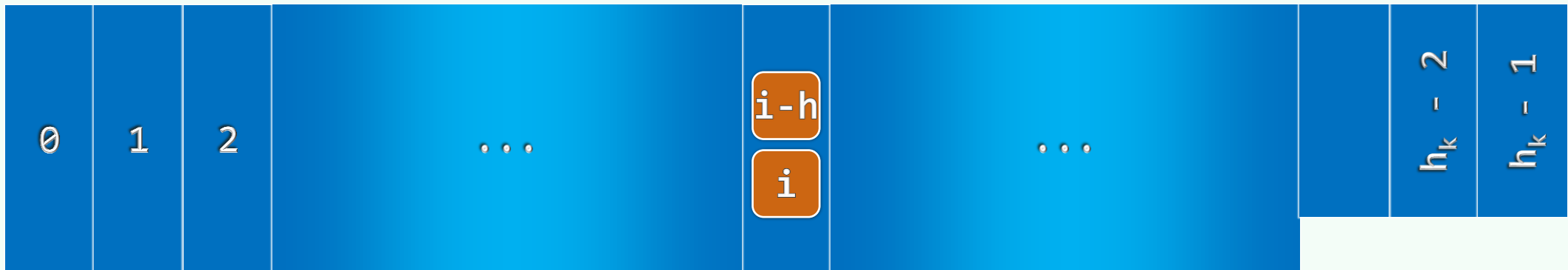
From (2,3)-ordered to 1-ordered

$$\because x(\textcolor{red}{2}, \textcolor{red}{3}) = 2 \cdot 3 - 2 - 3 = \textcolor{red}{1}$$

\therefore To the **LEFT** of each element in a (2,3)-ordered sequence,

only the **NEXT** element can be smaller

\therefore It costs $\mathcal{O}(n)$ time to sort such a sequence



From $(2 \cdot h_k, 3 \cdot h_k)$ -ordered to h_k -ordered

❖ Divide S into h_k subsequences, each of which is $(2, 3)$ -ordered

\therefore it costs altogether $\mathcal{O}(n)$ time to sort them resp.

❖ \therefore there are altogether $\mathcal{O}(\log^2 n)$ iterations

\therefore we need $\mathcal{O}(n \cdot \log^2 n)$ time

