14-C4

排序

希尔排序：Pratt序列

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Pratt's Sequence, 1971

$$\mathcal{H}_{pratt} \;=\; \{\; 2^p \cdot 3^q \;\mid\; p, q \in \mathcal{N} \;\}$$

$$=\; \{\; 1,\; 2,\; 3,\; 4,\; 6,\; 8,\; 9,\; 12,\; 16,\; 18,\; 24,\; 27,\; 32,\; 36,\; \ldots \}$$

❖ **Note that**

     - adjacent items are NOT always relatively prime and

     - there are $\mathcal{O}(\log^2 n)$ **items no greater than** n

❖ **With** $\mathcal{H}_{\text{pratt}}$**,**

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

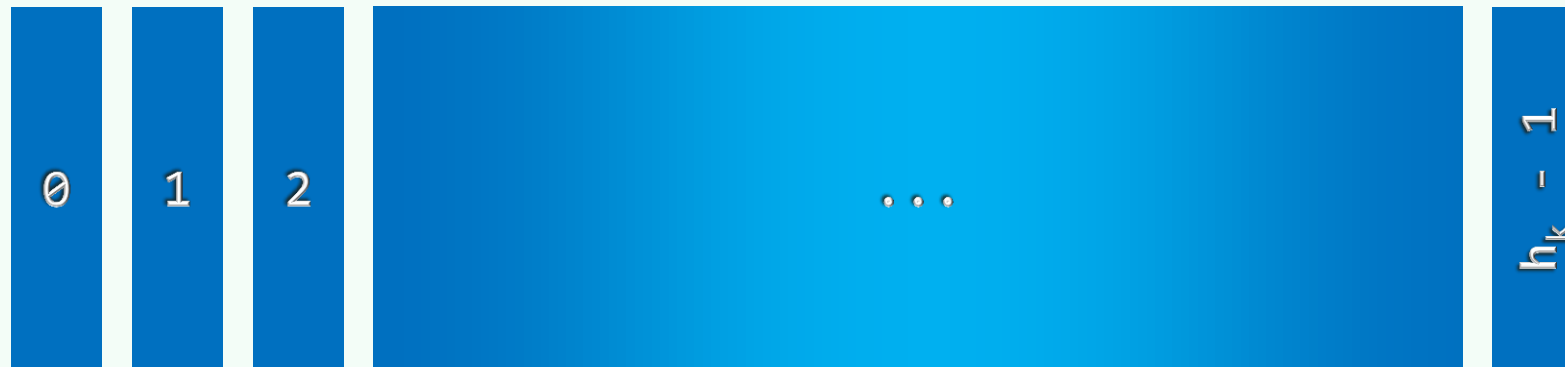# From (2,3)-ordered to 1-ordered

∵ x(2,3) = **1**

∴ To the right of each element in a (**2,3**)-ordered sequence,

only the **NEXT** element can be smaller

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

| 0 | 1 | 2 | ... | h_k - 1 |

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

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

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

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