字符串匹配

胡船长
初航我带你，远航靠自己

一、单模匹配问题

1. 易学易懂：Brute Force 算法
2. 高效方便：Sunday 算法
3. 经典回顾：Boyer Moore 算法
4. 变化多端：KMP 算法

二、多模匹配问题

1. 基于哈希：Rabin-Karp 算法
2. 初探 NFA：Shift-and/or 算法
3. 神兵利器：Trie 字典树
4. 飞升蜕变：AC 自动机

三、字符串匹配-课后实战题

1. HZOJ-278：循环的字符串
2. HZOJ-279：项链的主人
3. HZOJ-281：前缀统计
4. HZOJ-282：最大异或对
5. HZOJ-283：拨号
6. P3370：【模板】字符串哈希
7. P5410：【模板】扩展 KMP
8. P1470：最长前缀
9. P8306：【模板】字典树
10. P2292：L 语言

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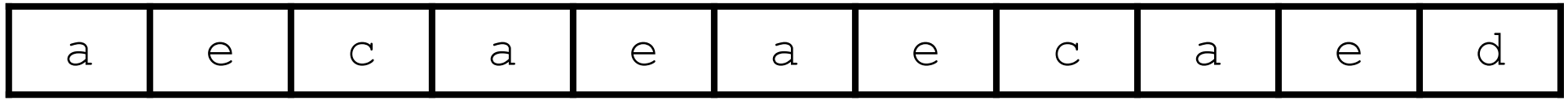
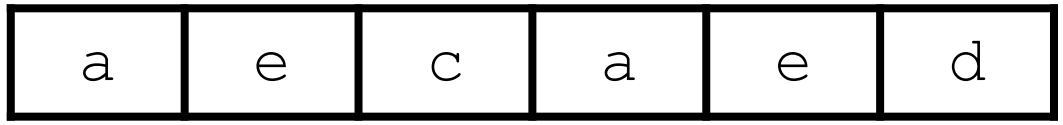
暴力匹配

母串 S



模式串 T



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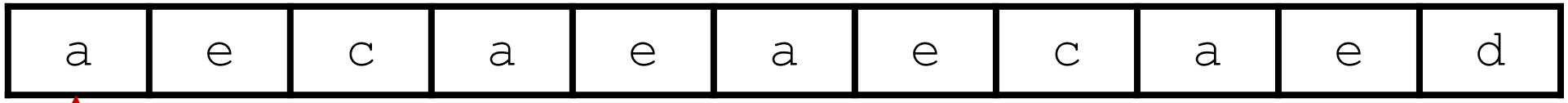

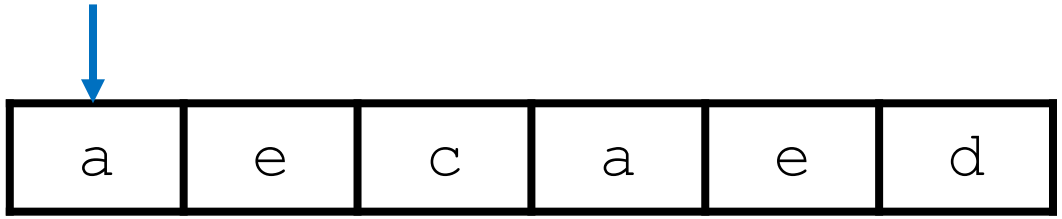

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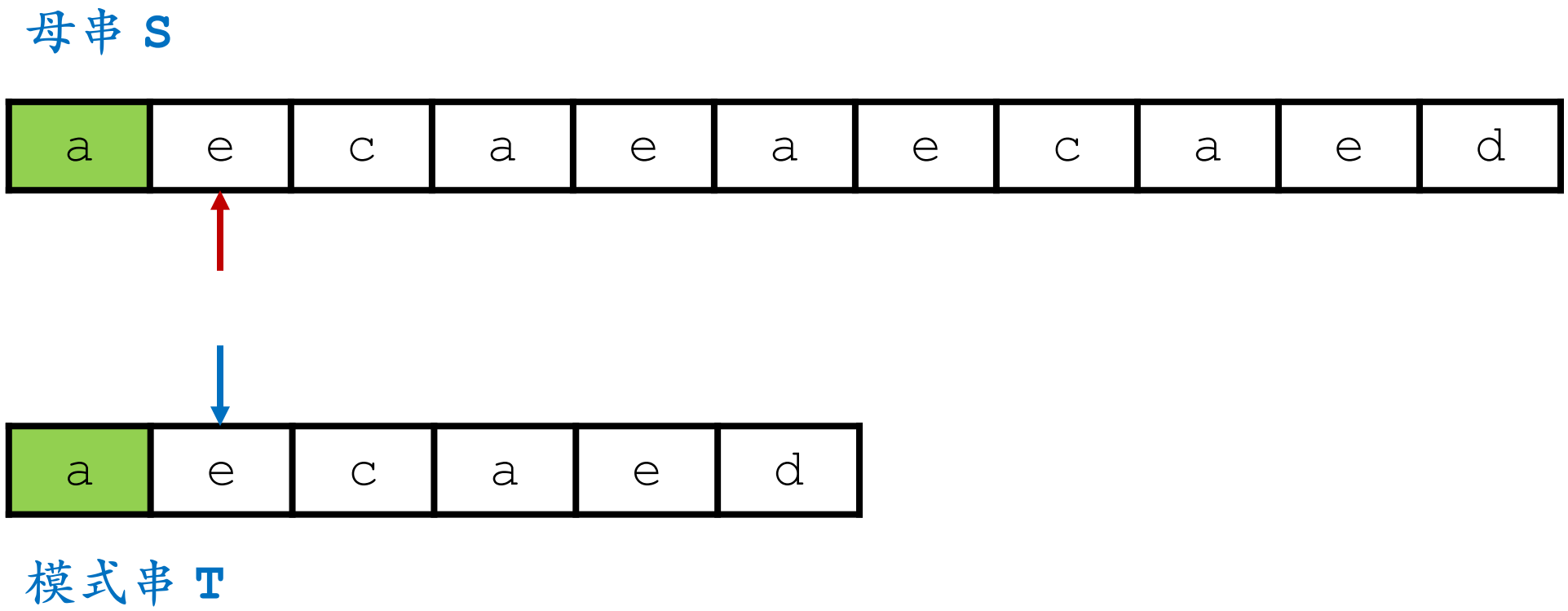

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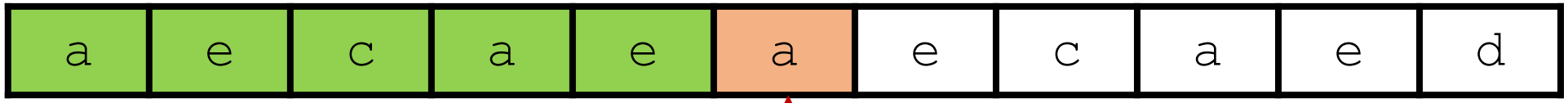

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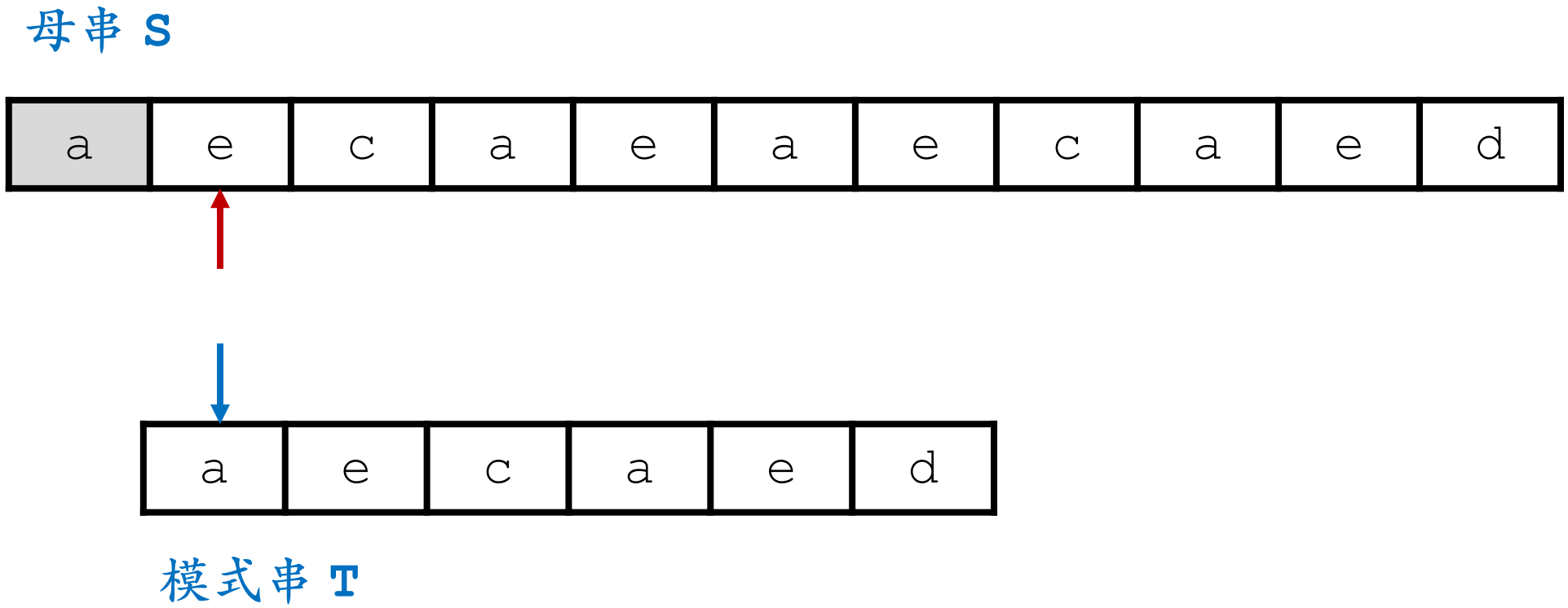

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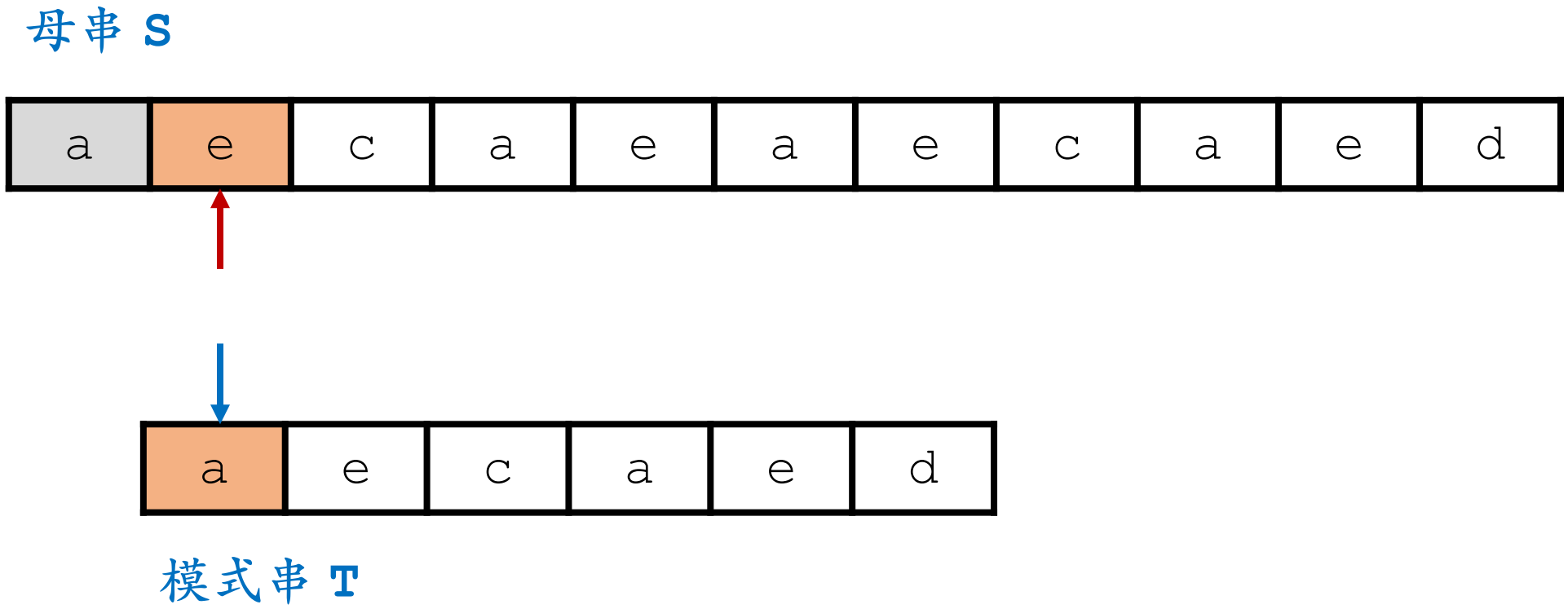

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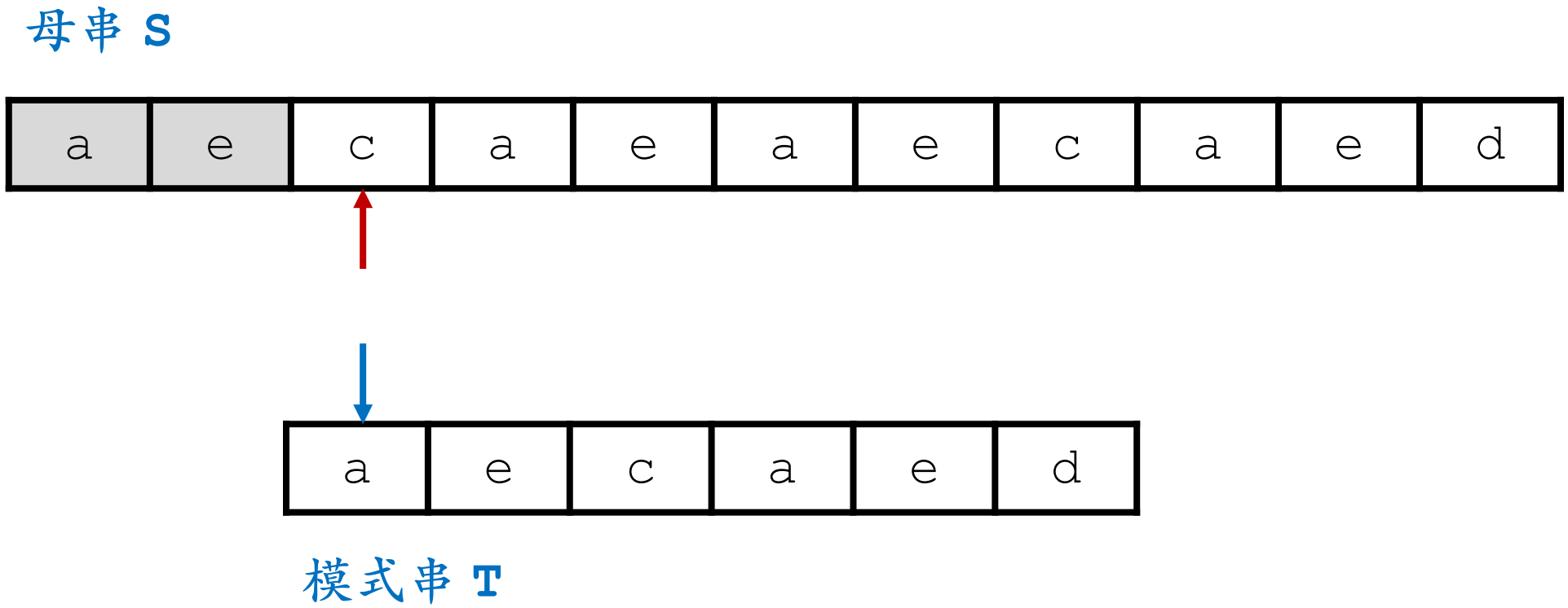

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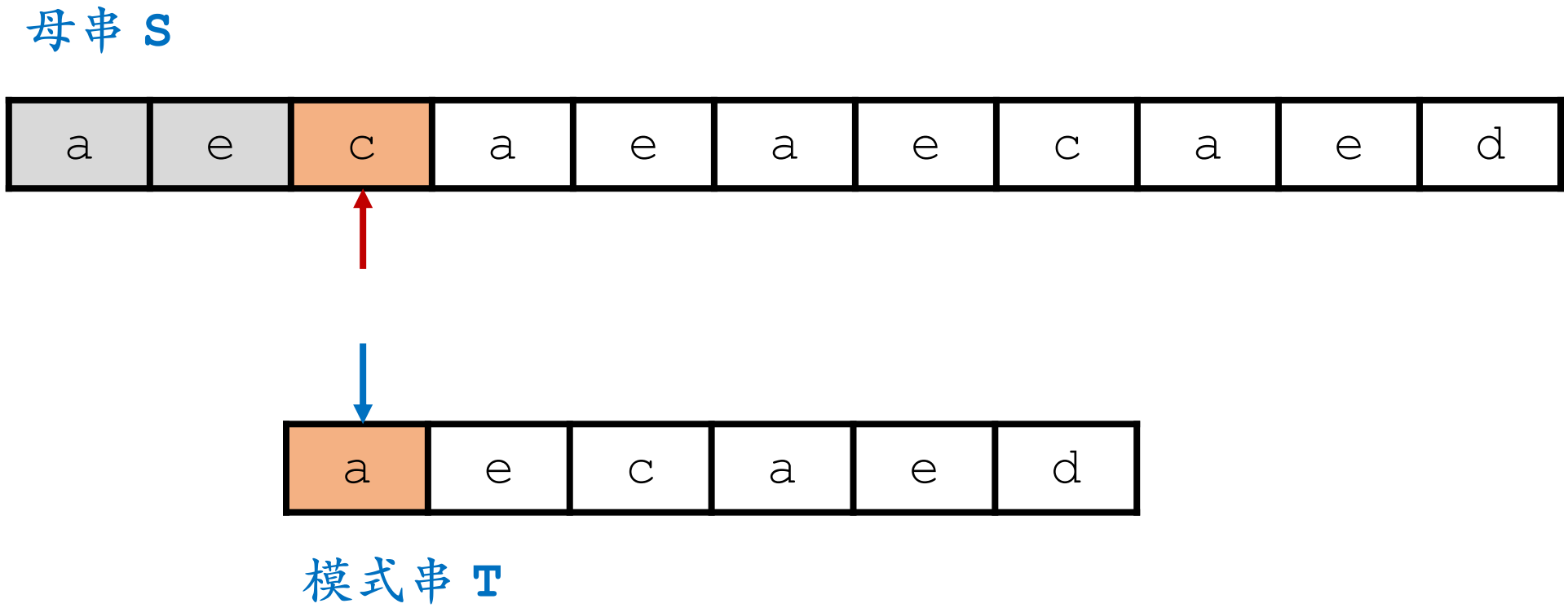

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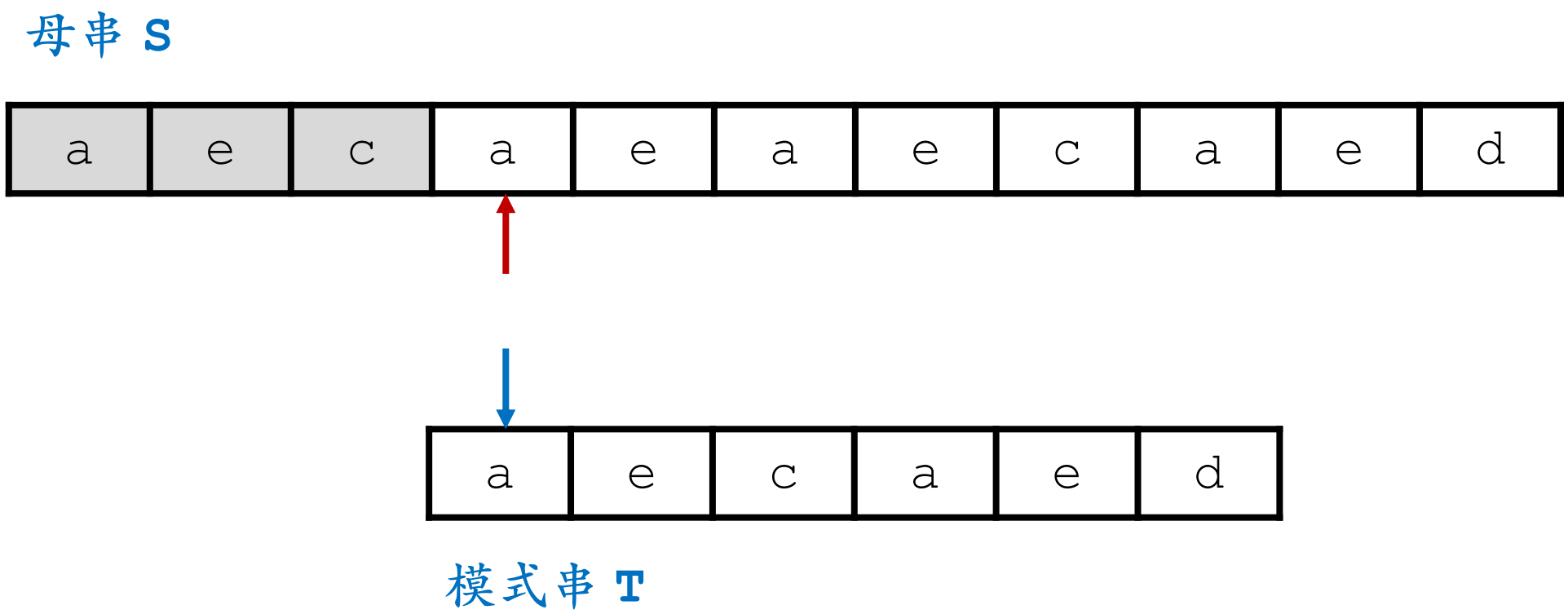

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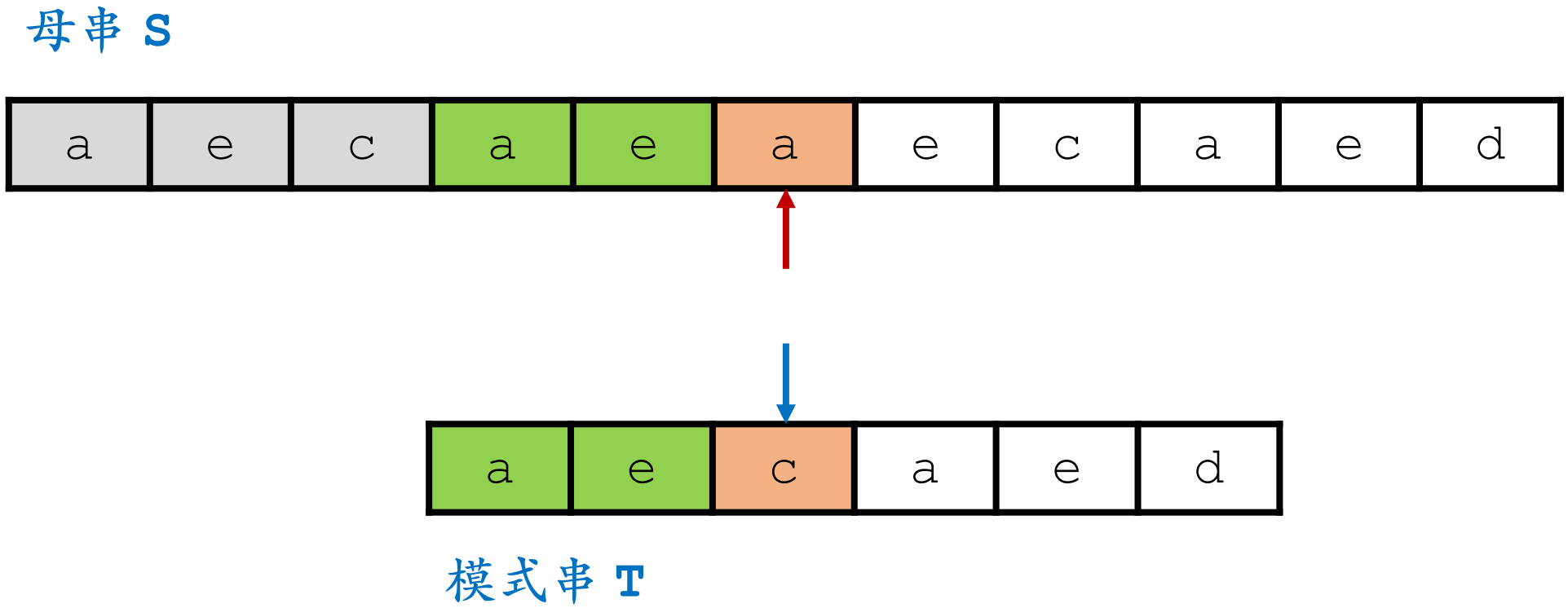

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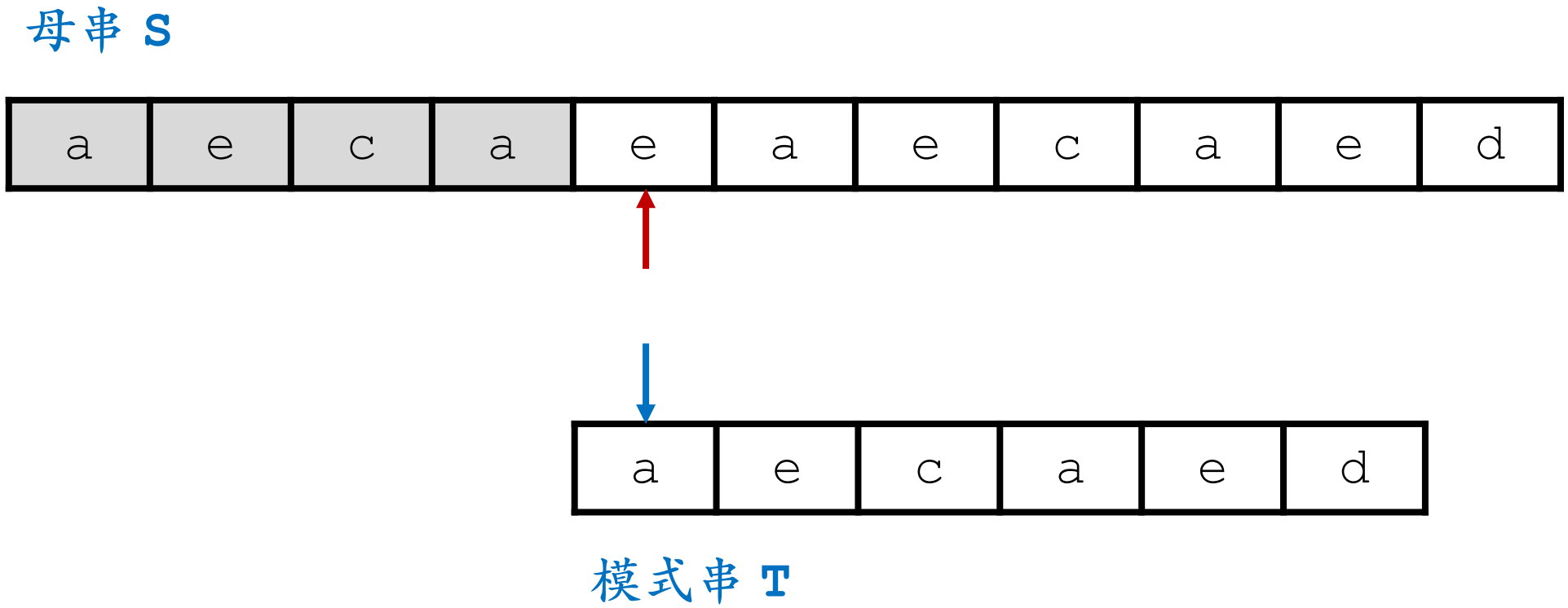

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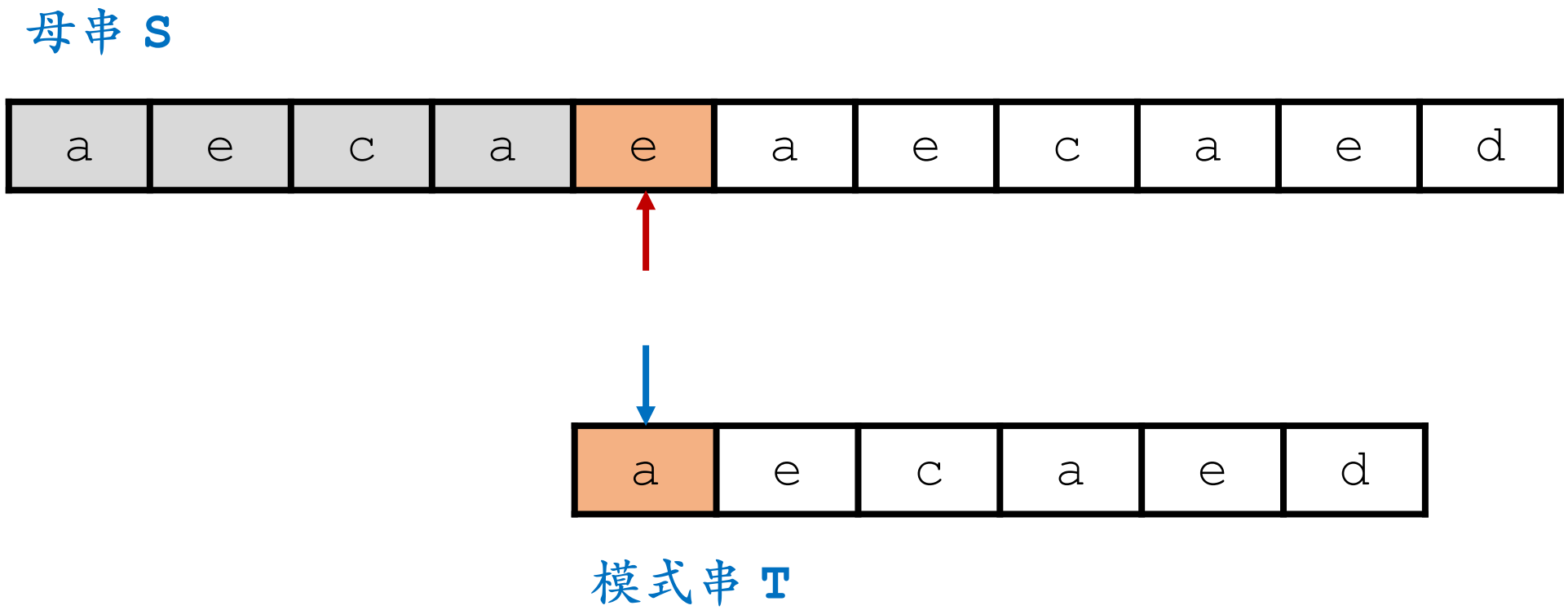

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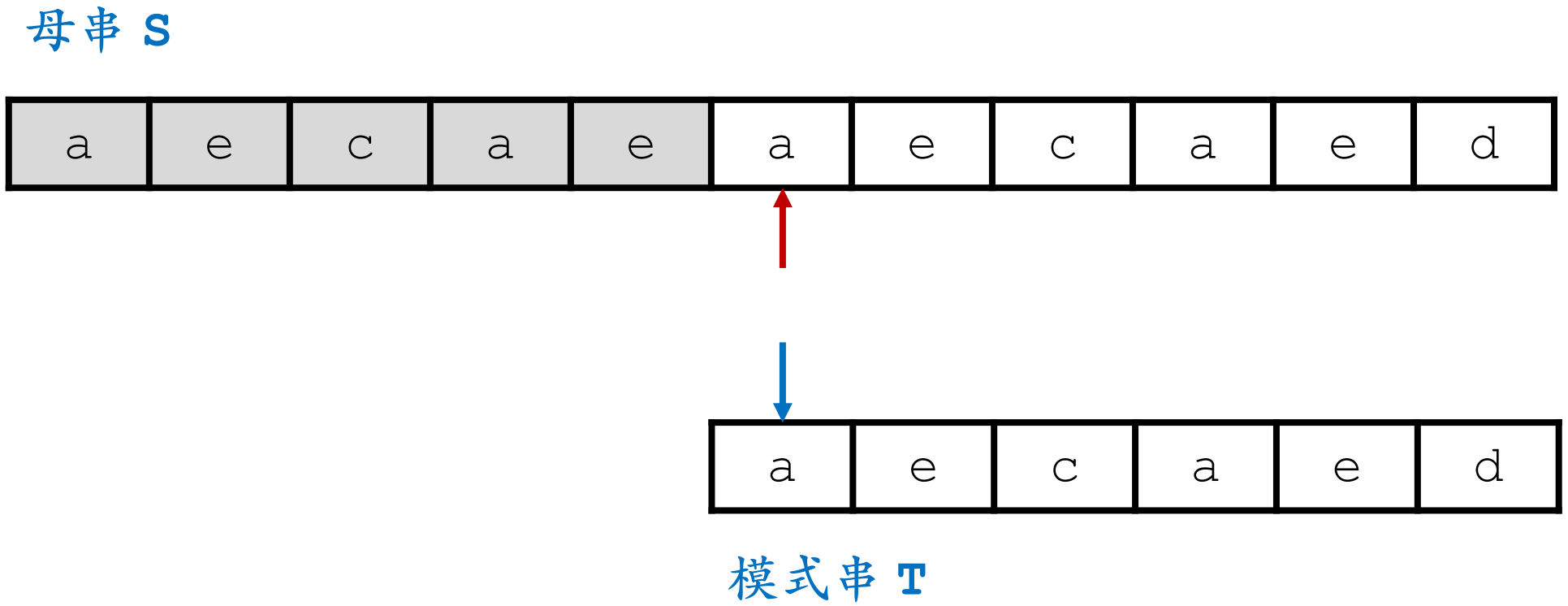

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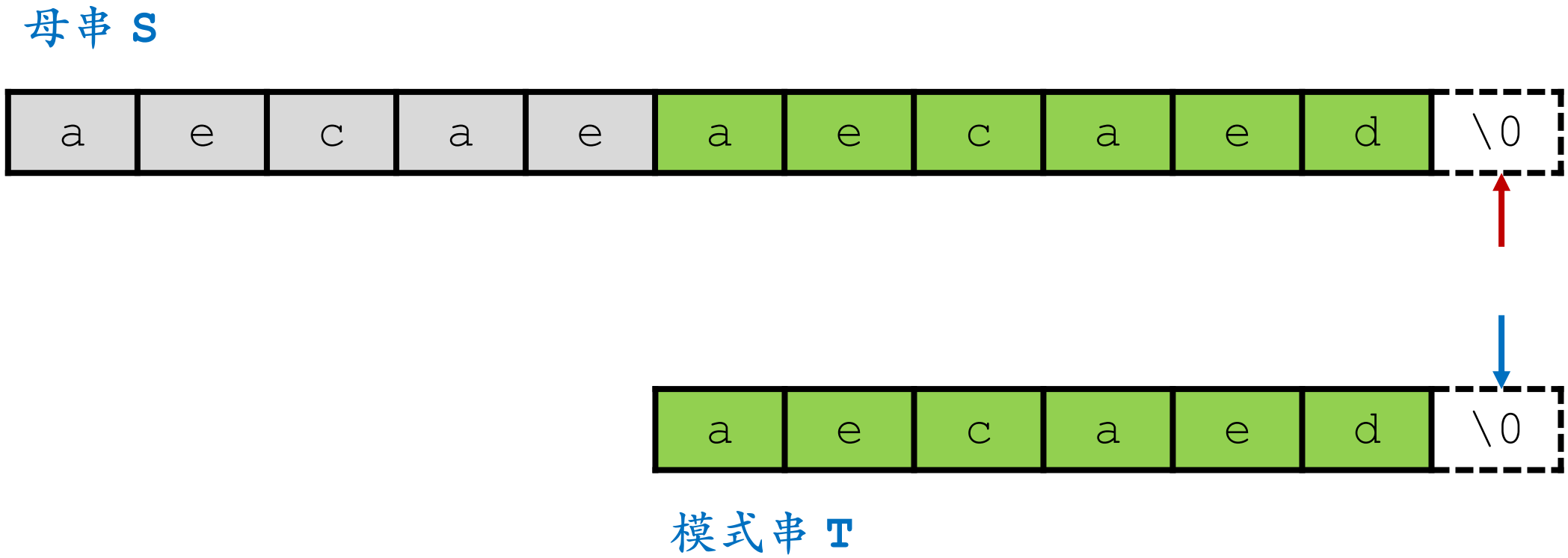

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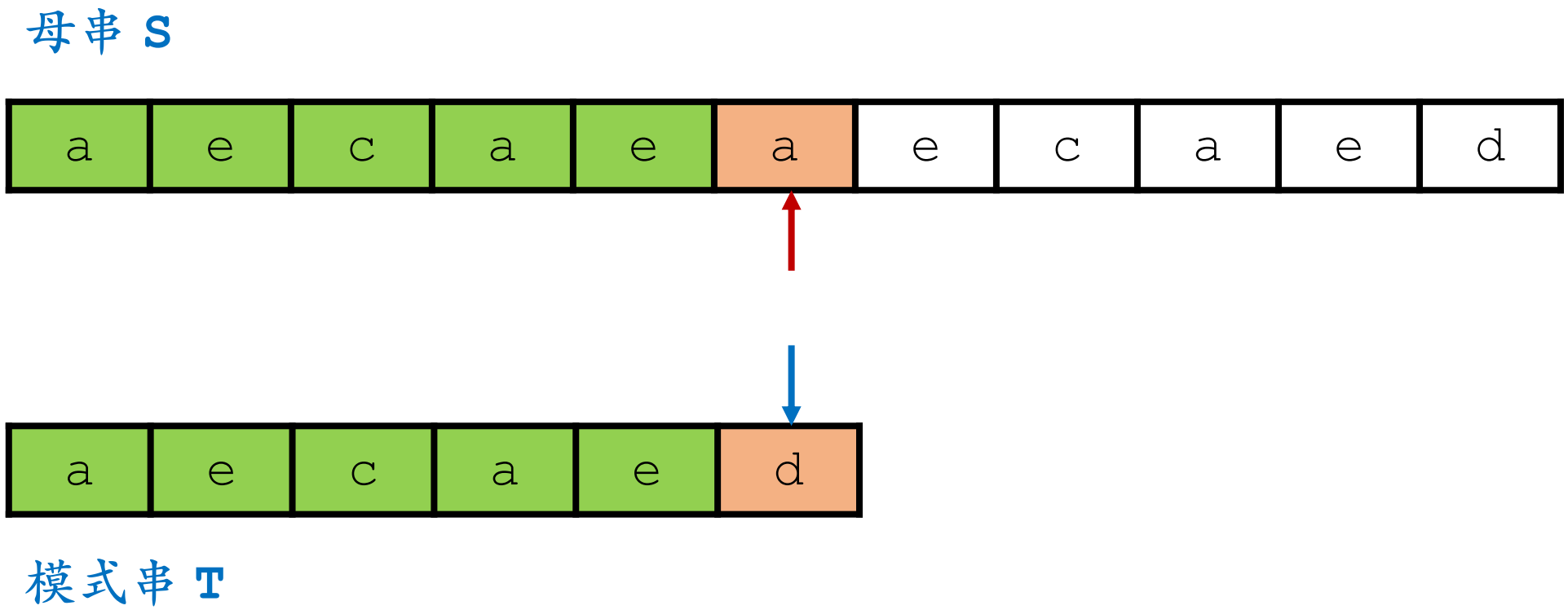
Sunday 算法



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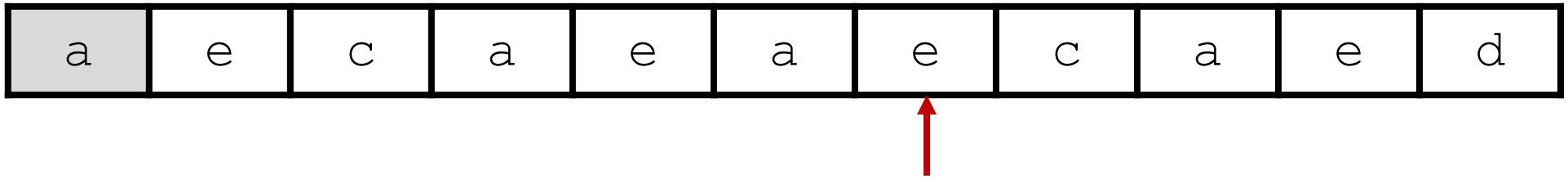

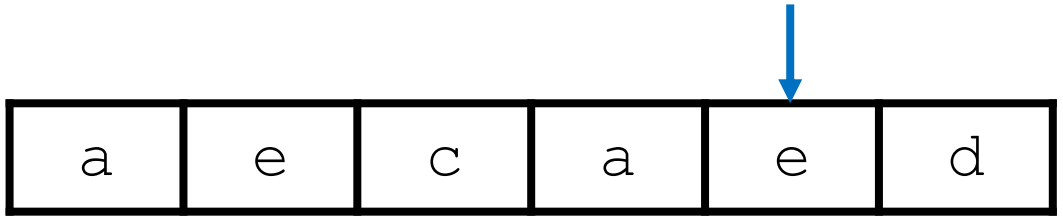

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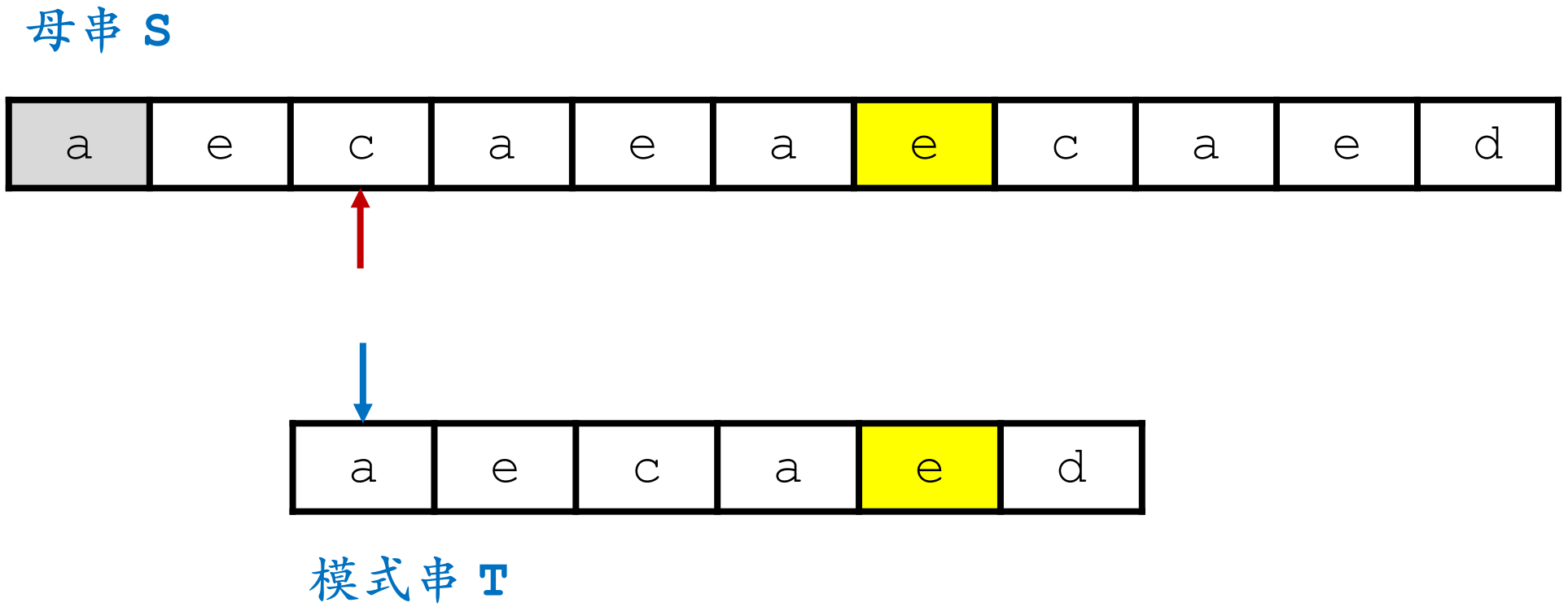

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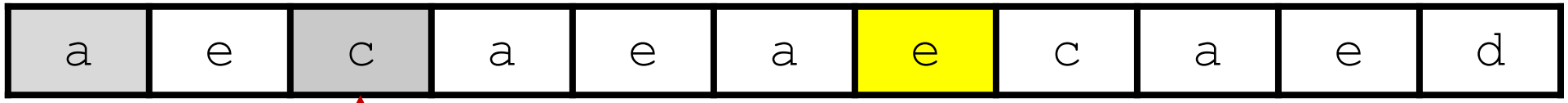

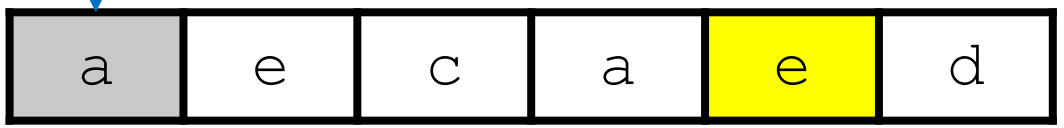

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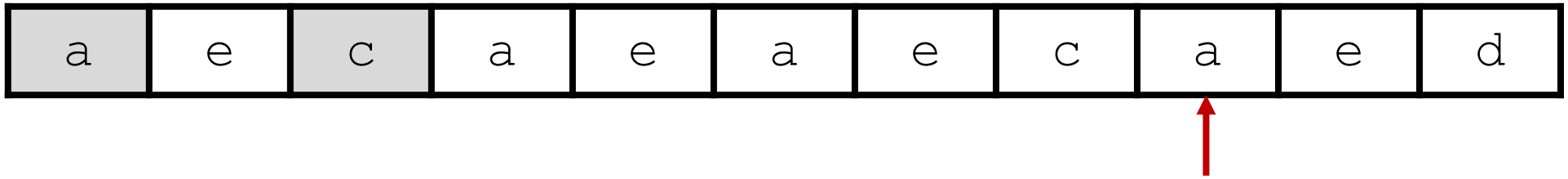

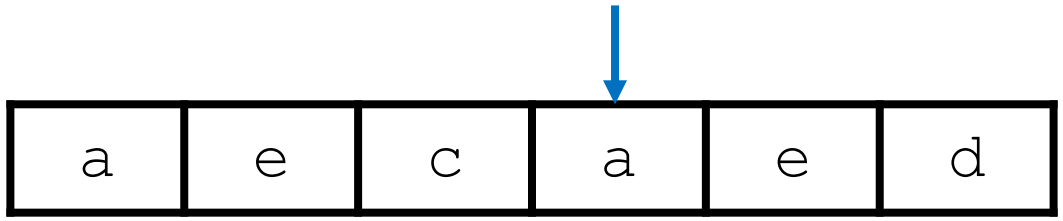

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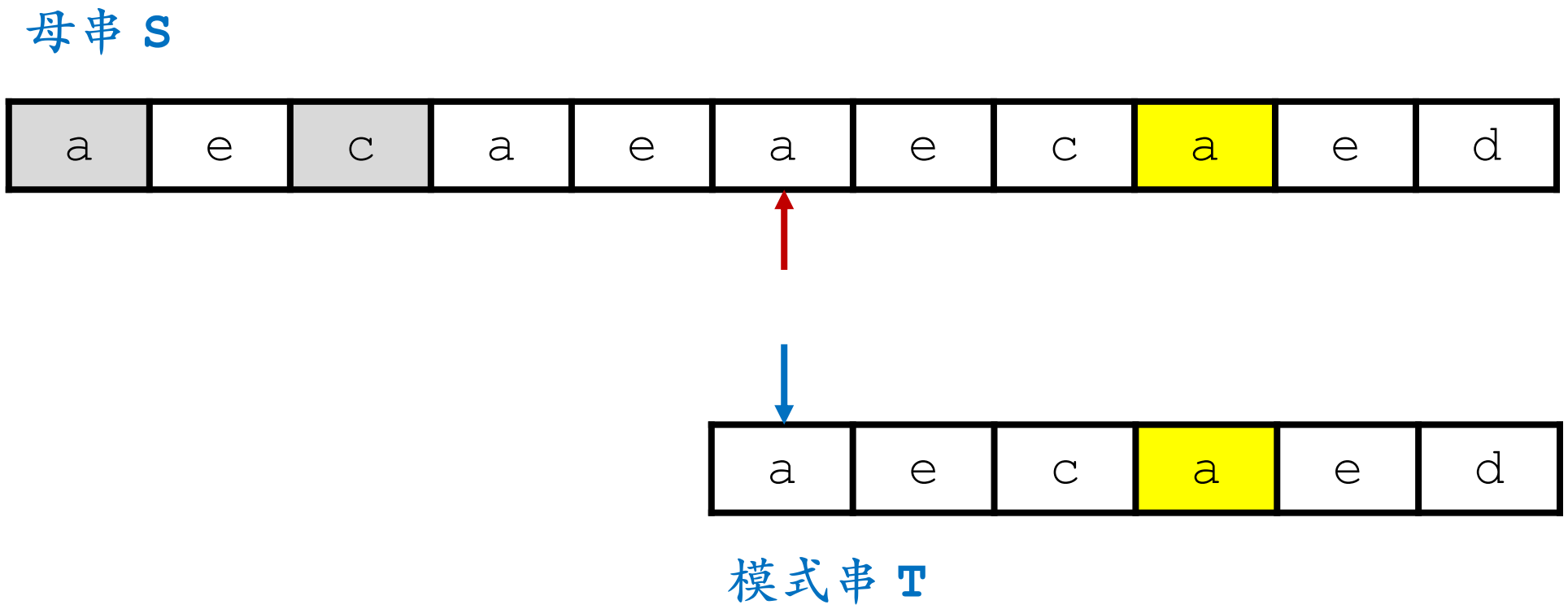

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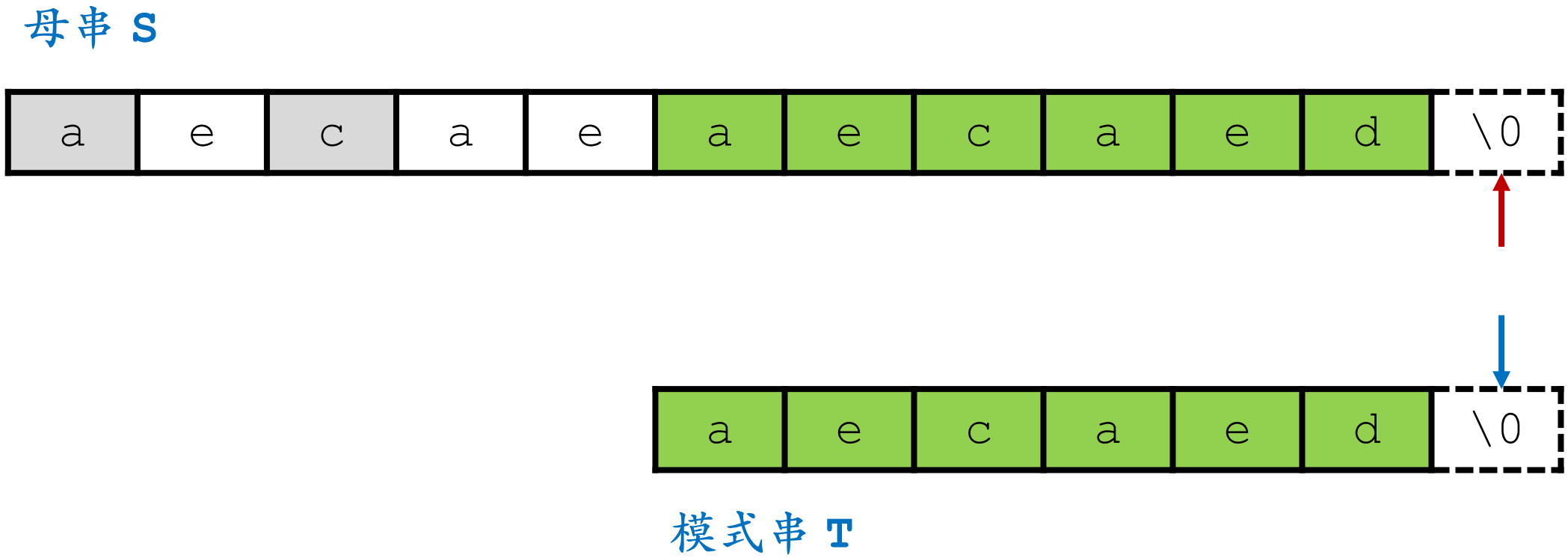

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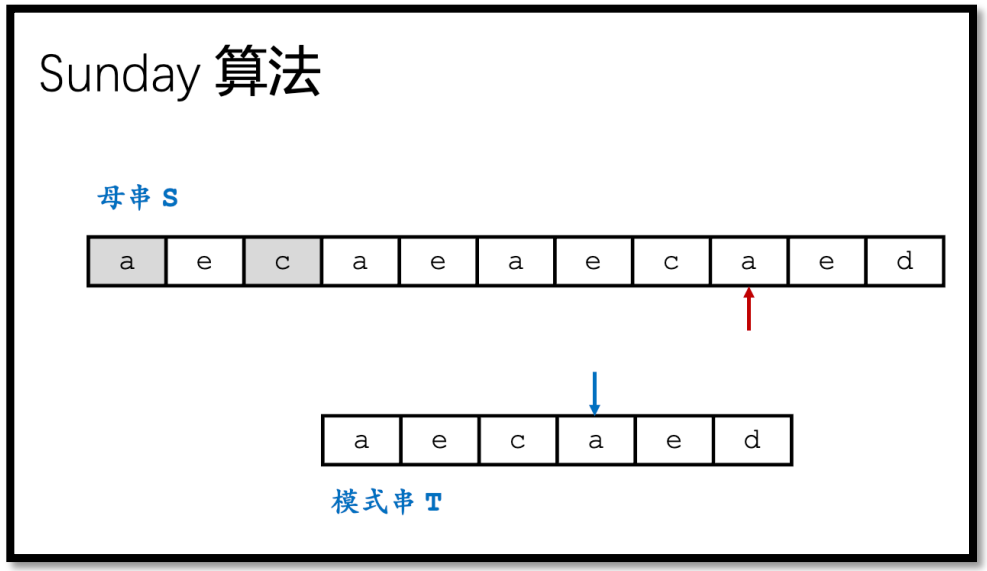
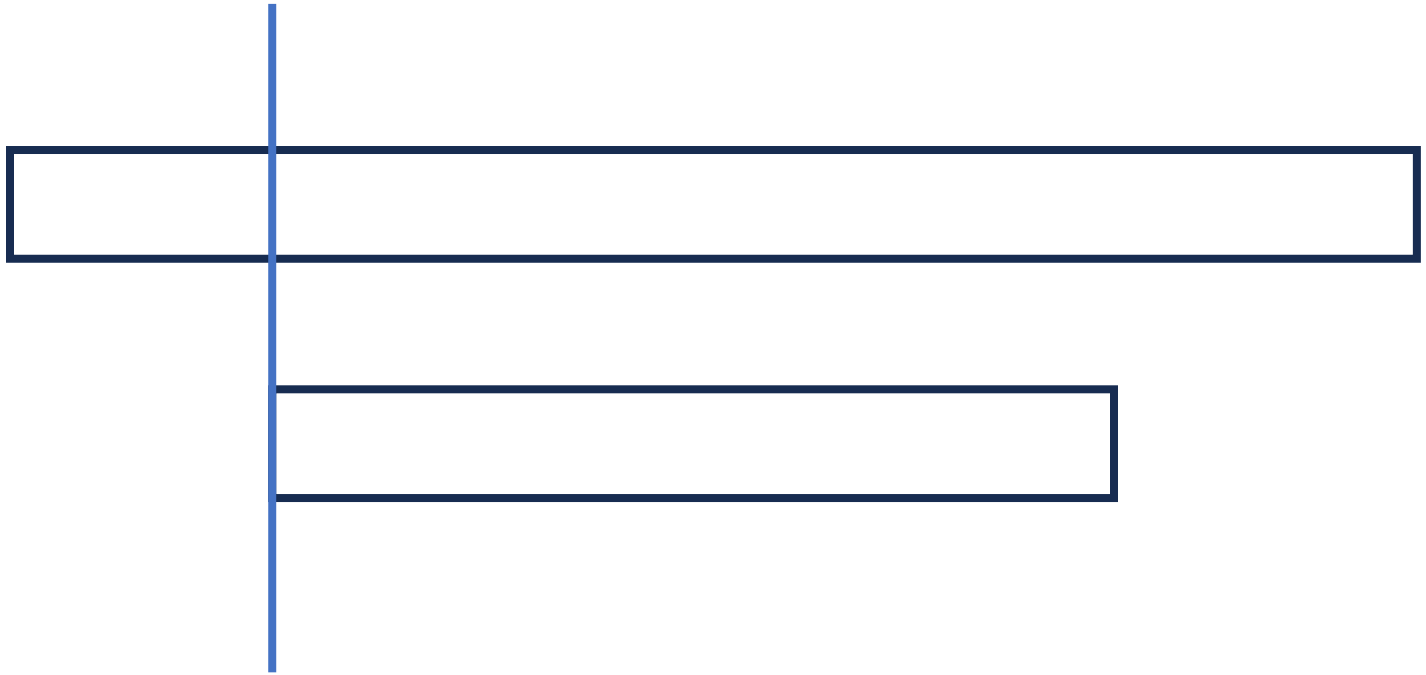
Boyer Moore 算法

理解 BM 算法的核心法门：

1. 失配时，模式串尽可能向后移动最大长度
2. 移动的长度取决于2条规则中的较大值
3. 规则1：坏字符规则 delta1
4. 规则2：好后缀规则 delta2



Boyer Moore 算法-匹配方向



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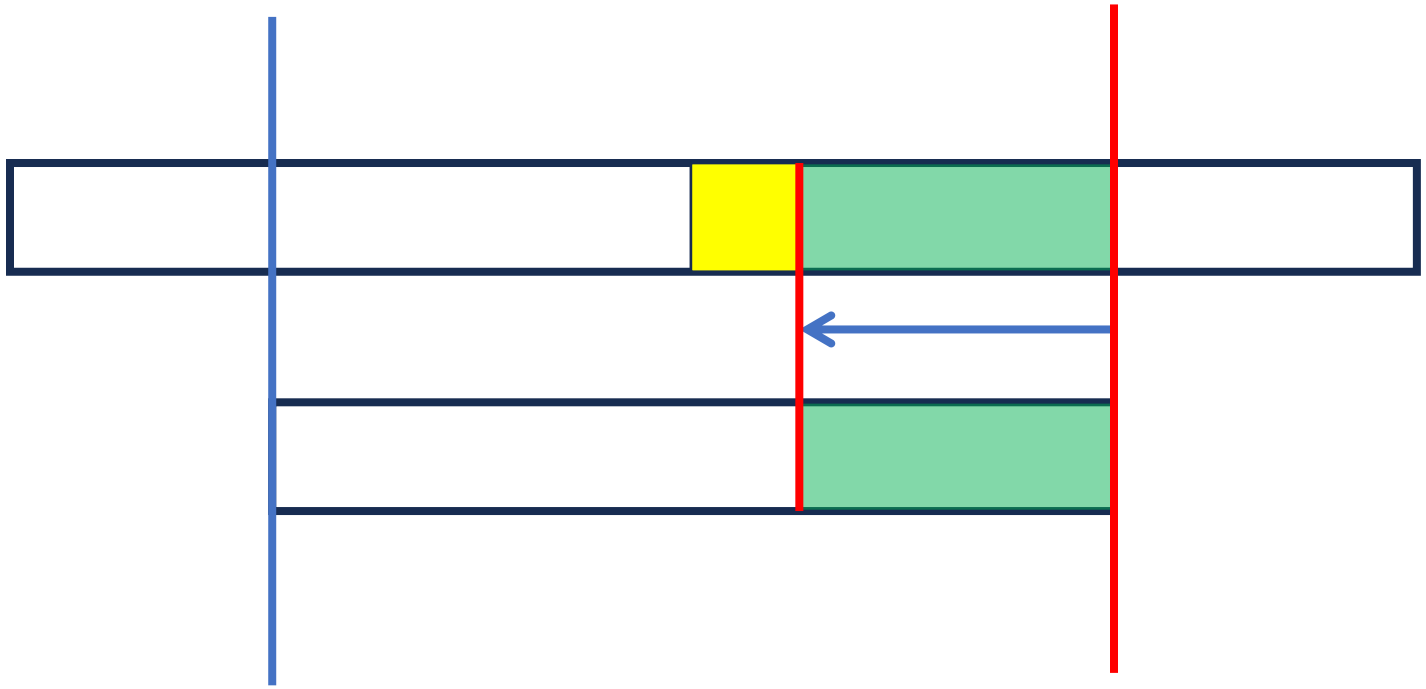
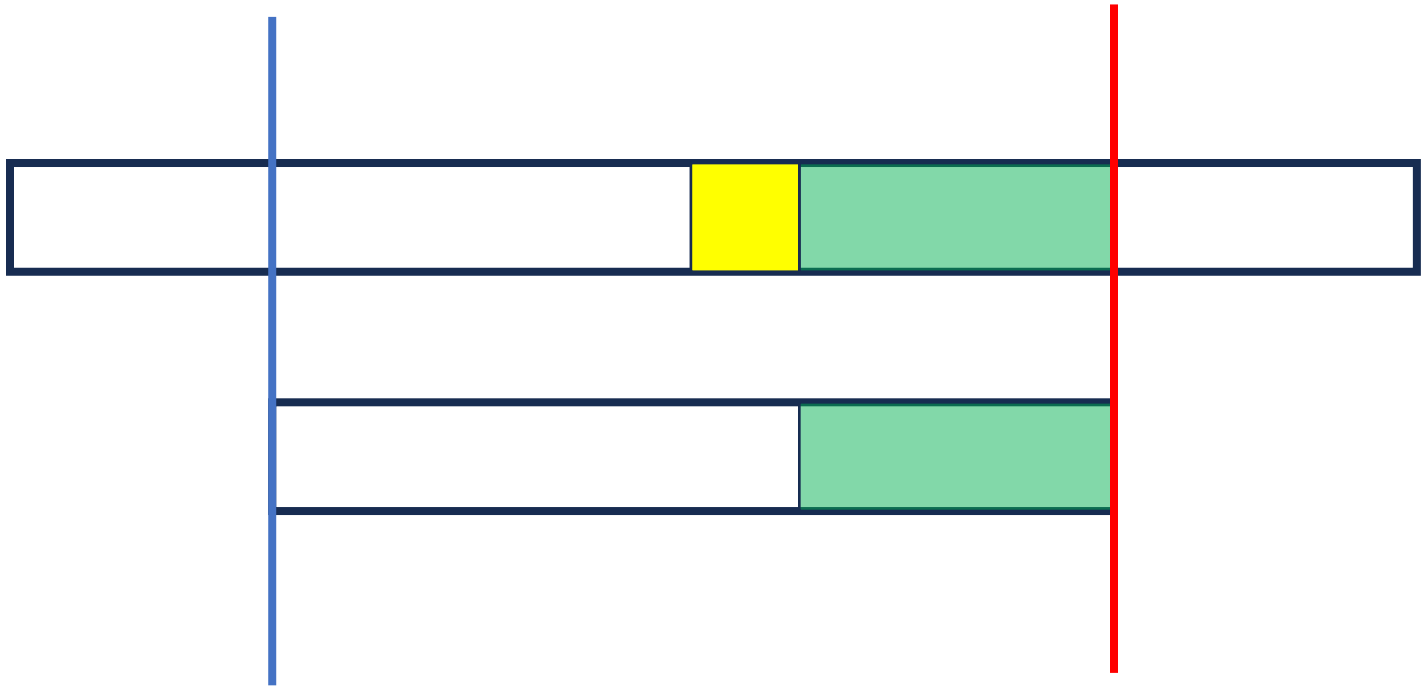


Boyer Moore 算法-坏字符规则



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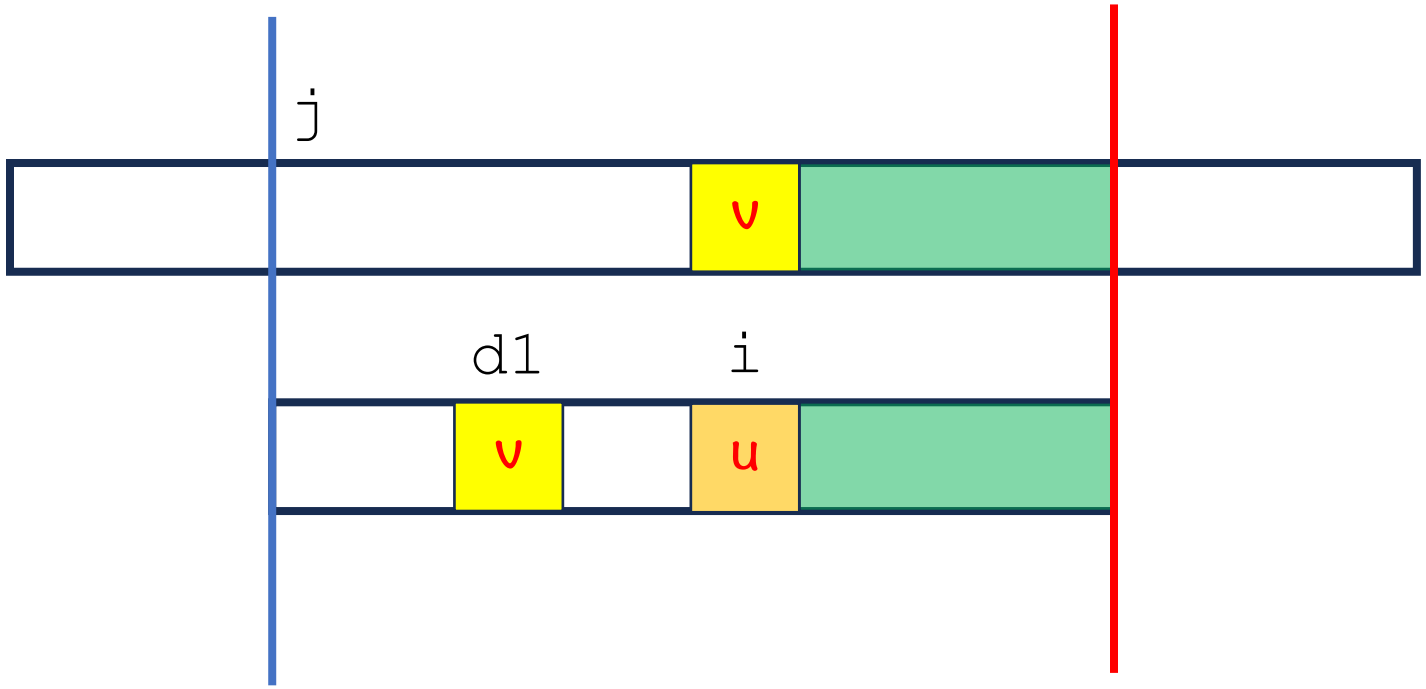

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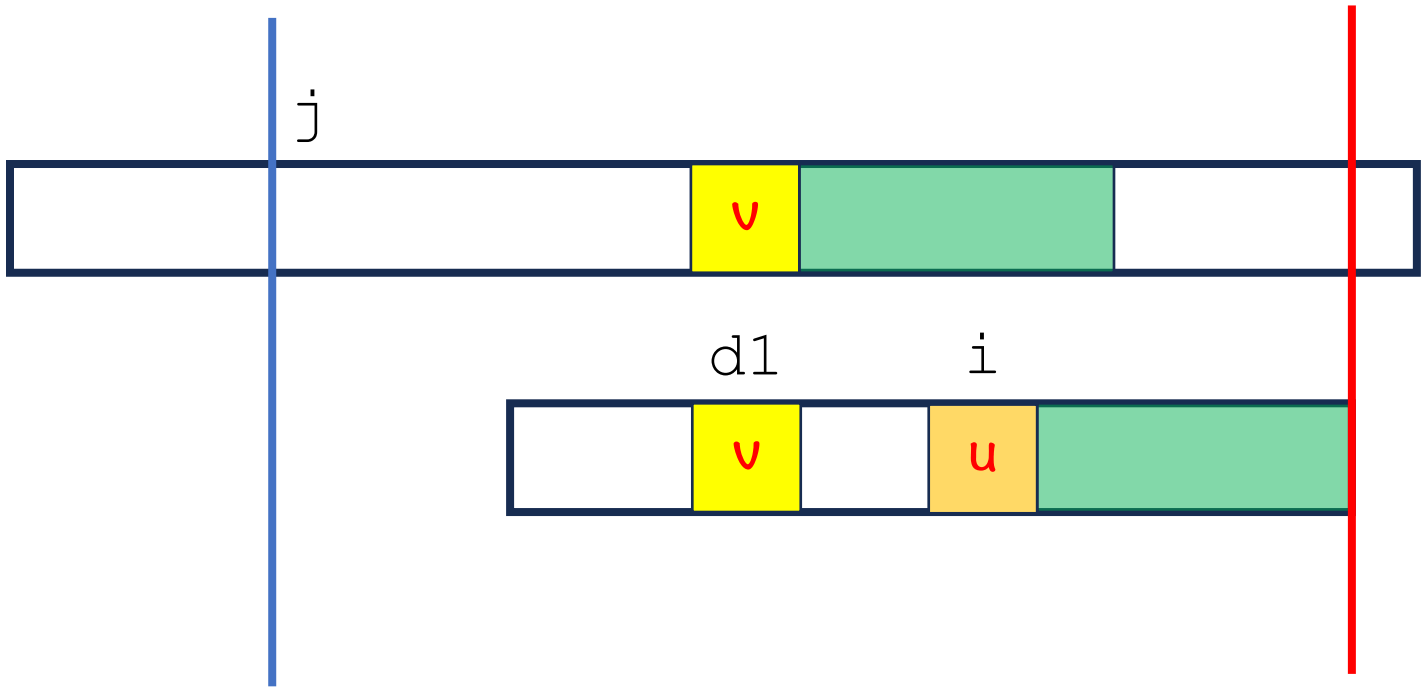

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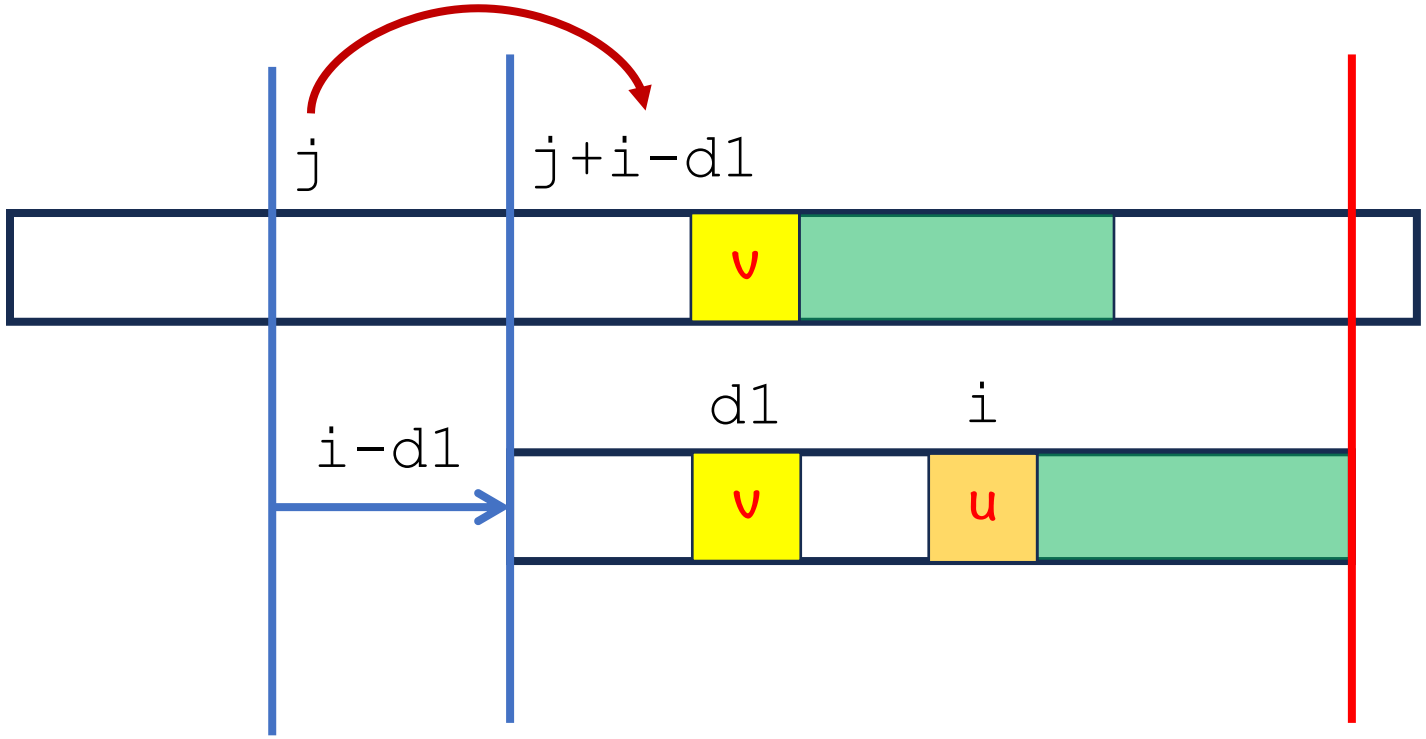

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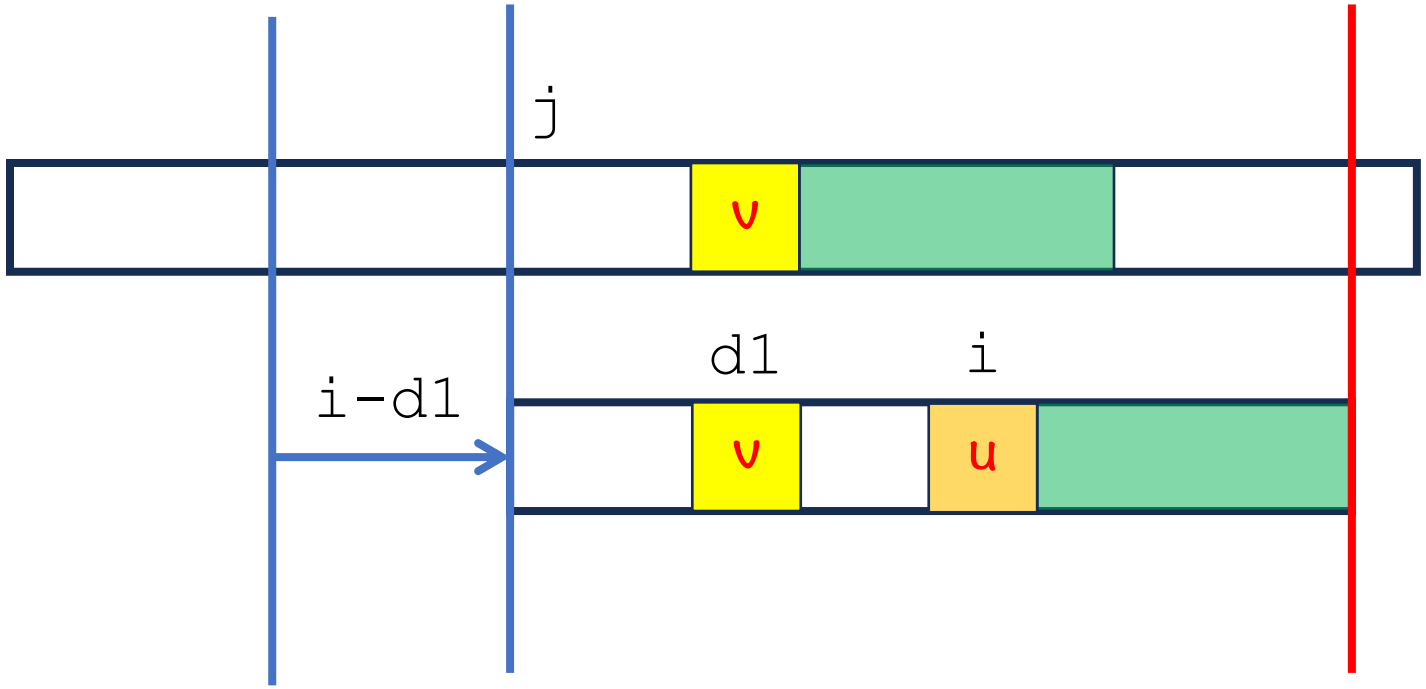

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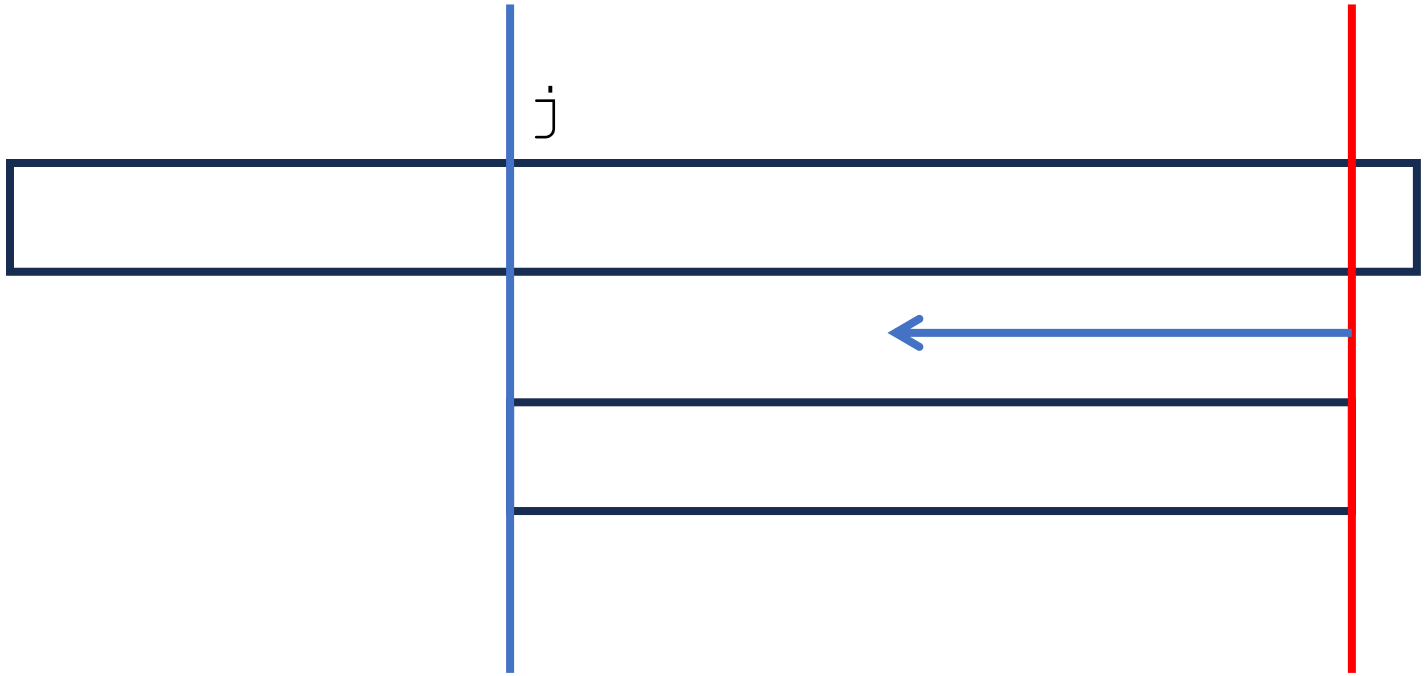
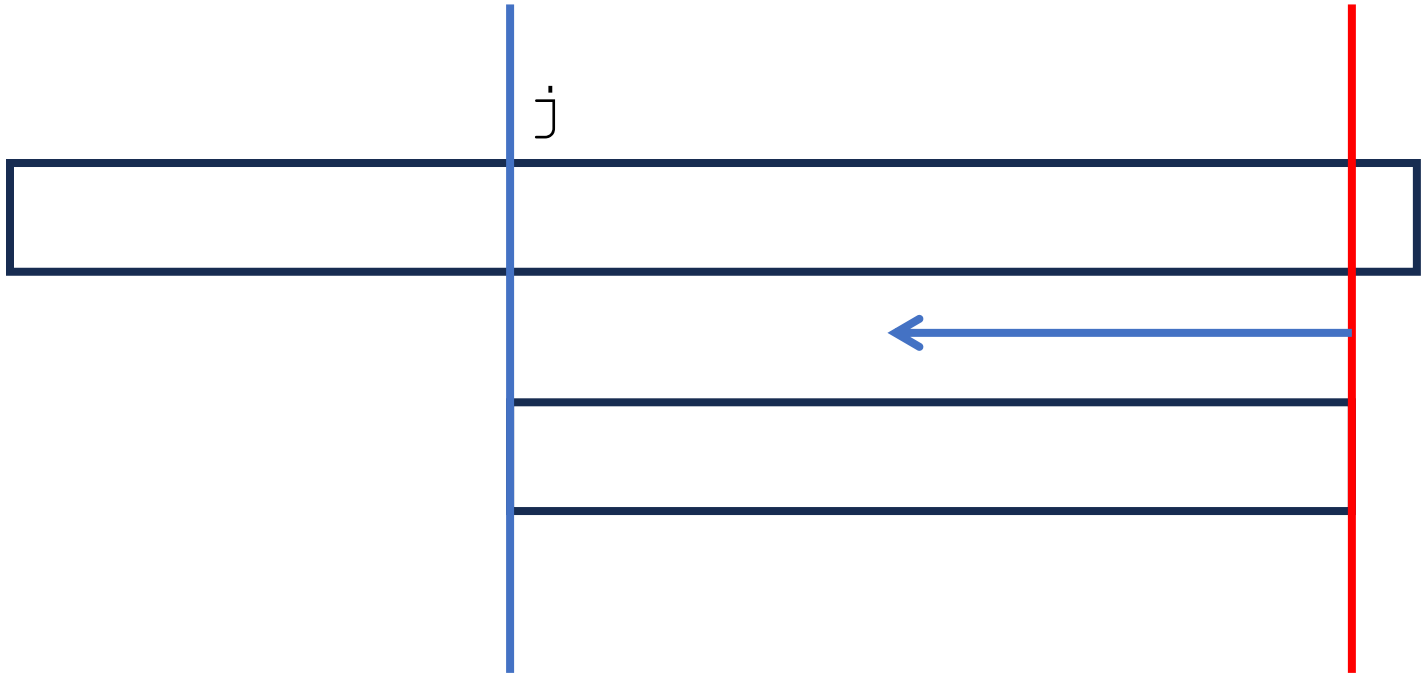


坏字符规则-回退BUG



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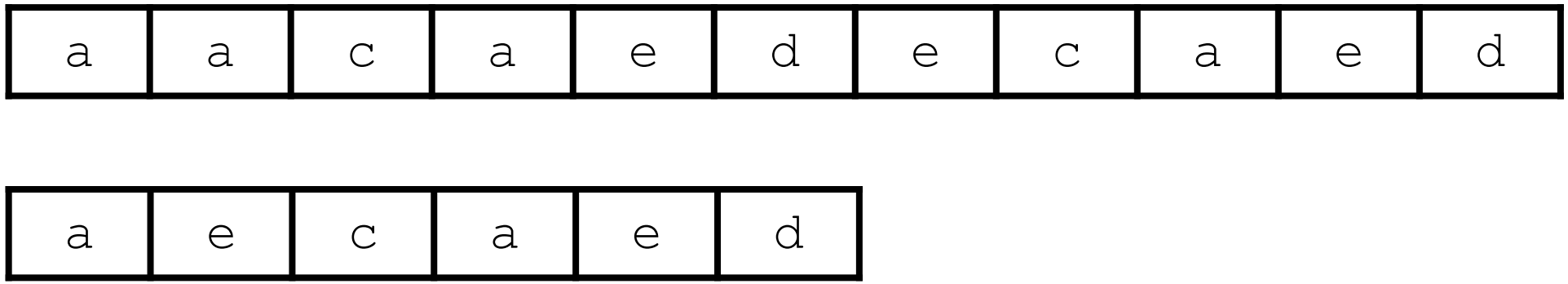

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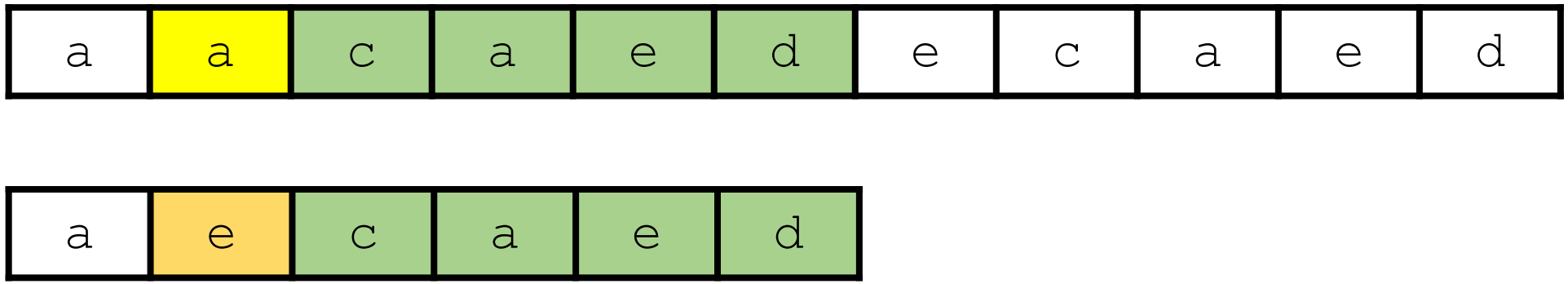

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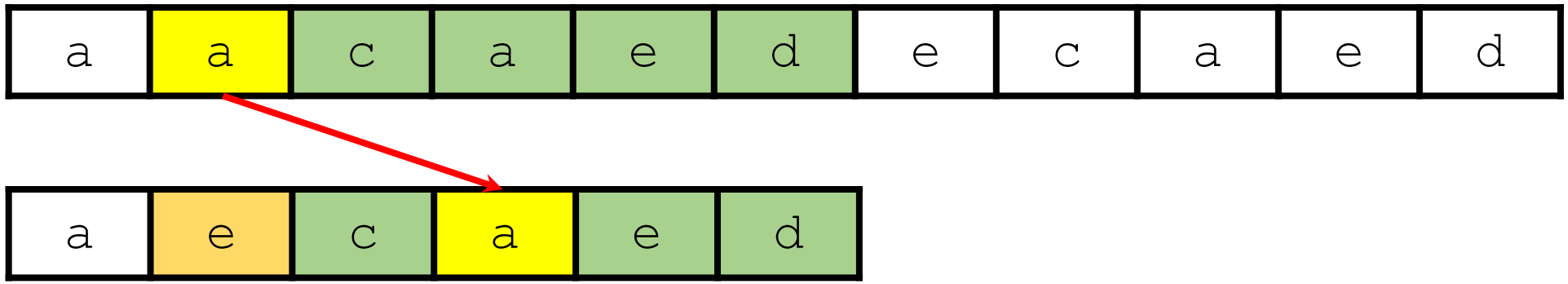

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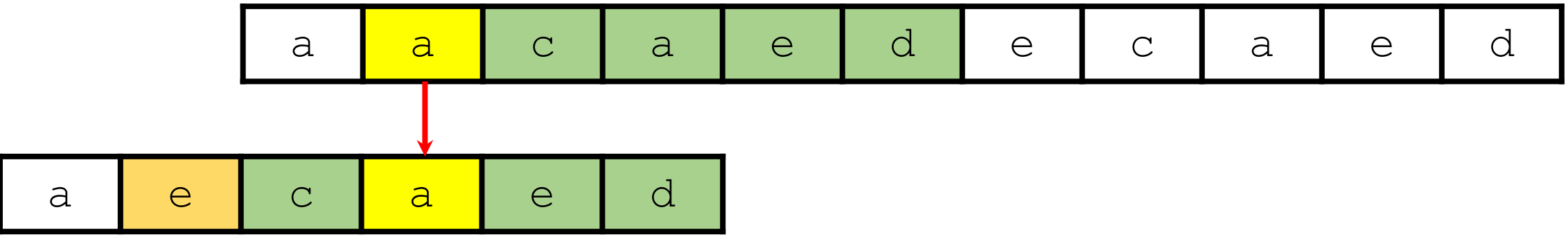
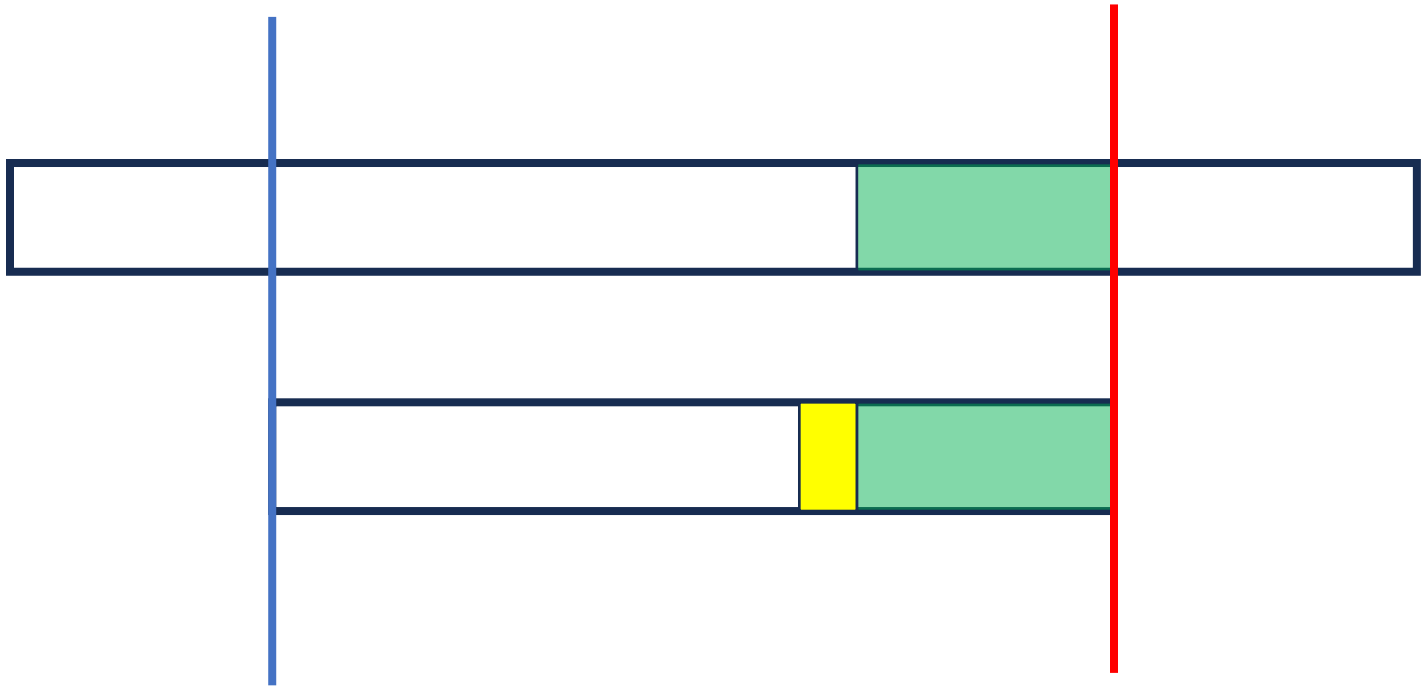


Boyer Moore 算法-好后缀规则



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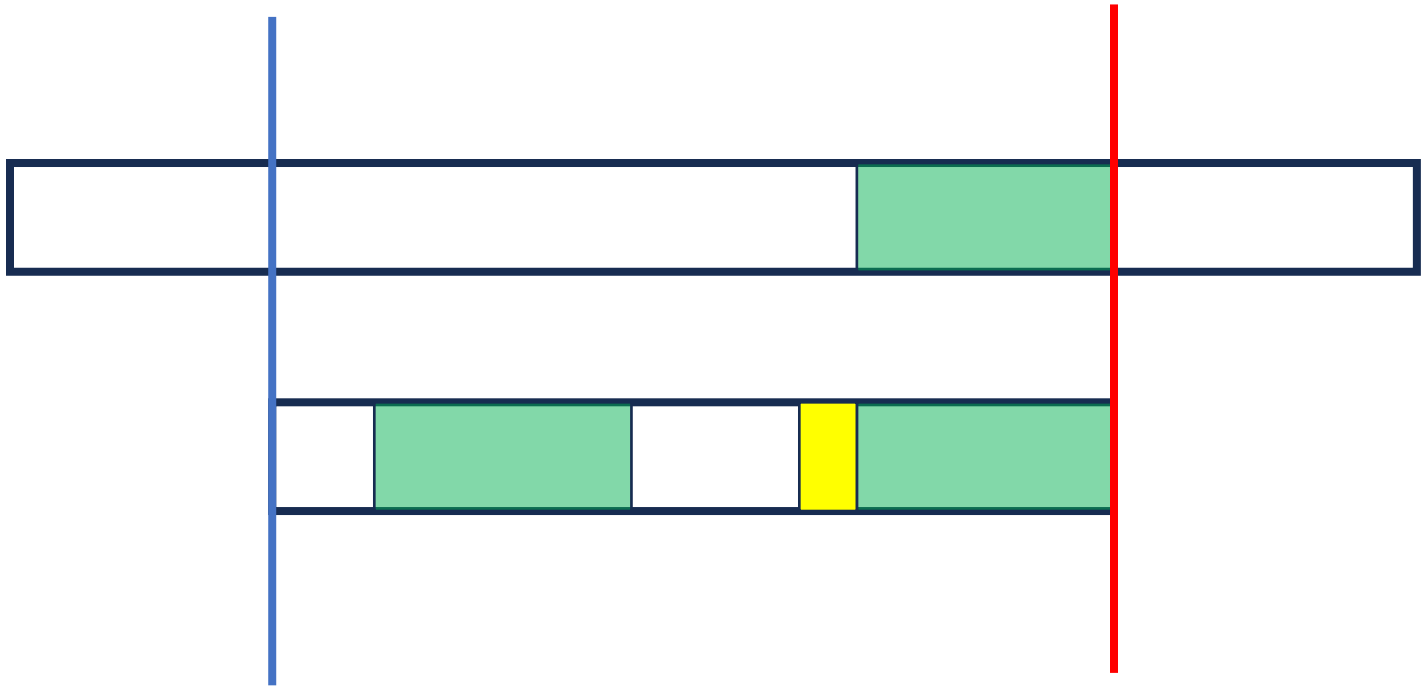

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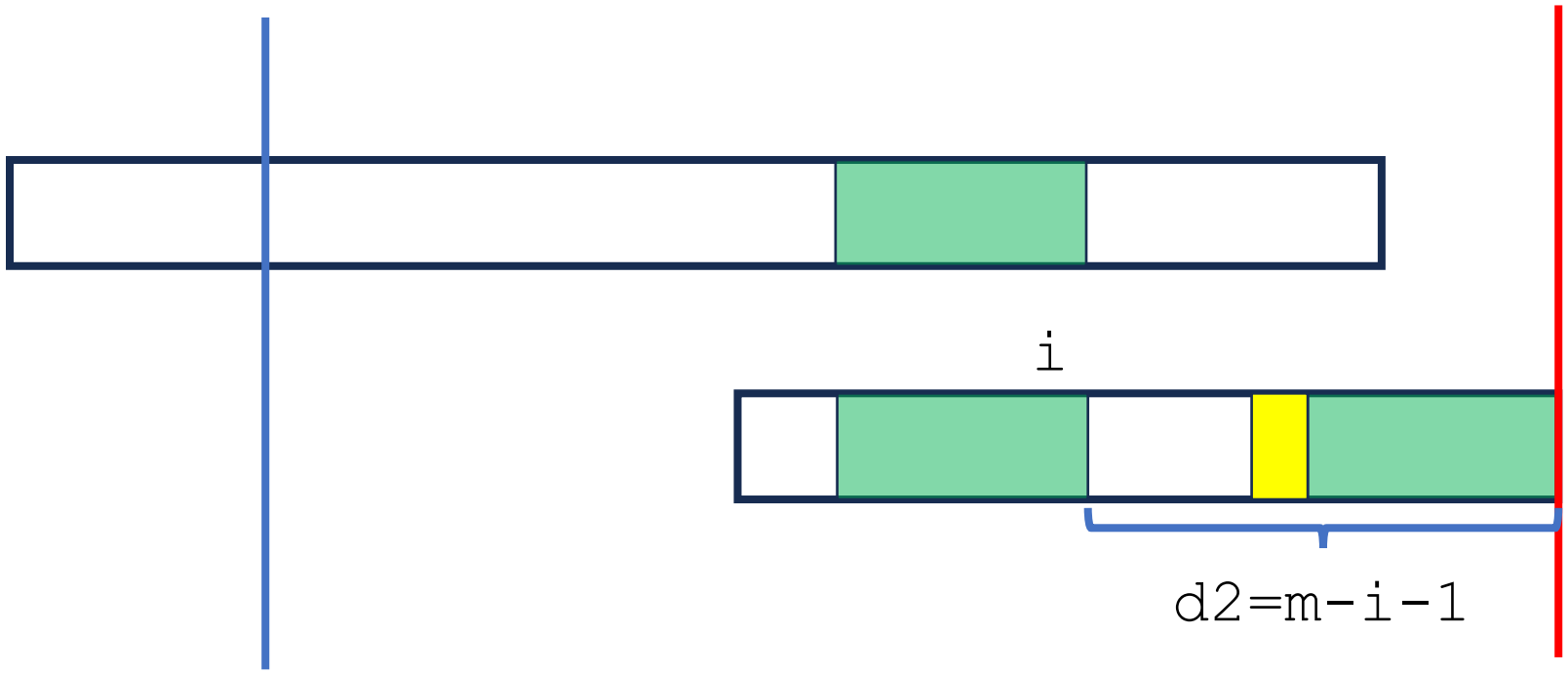

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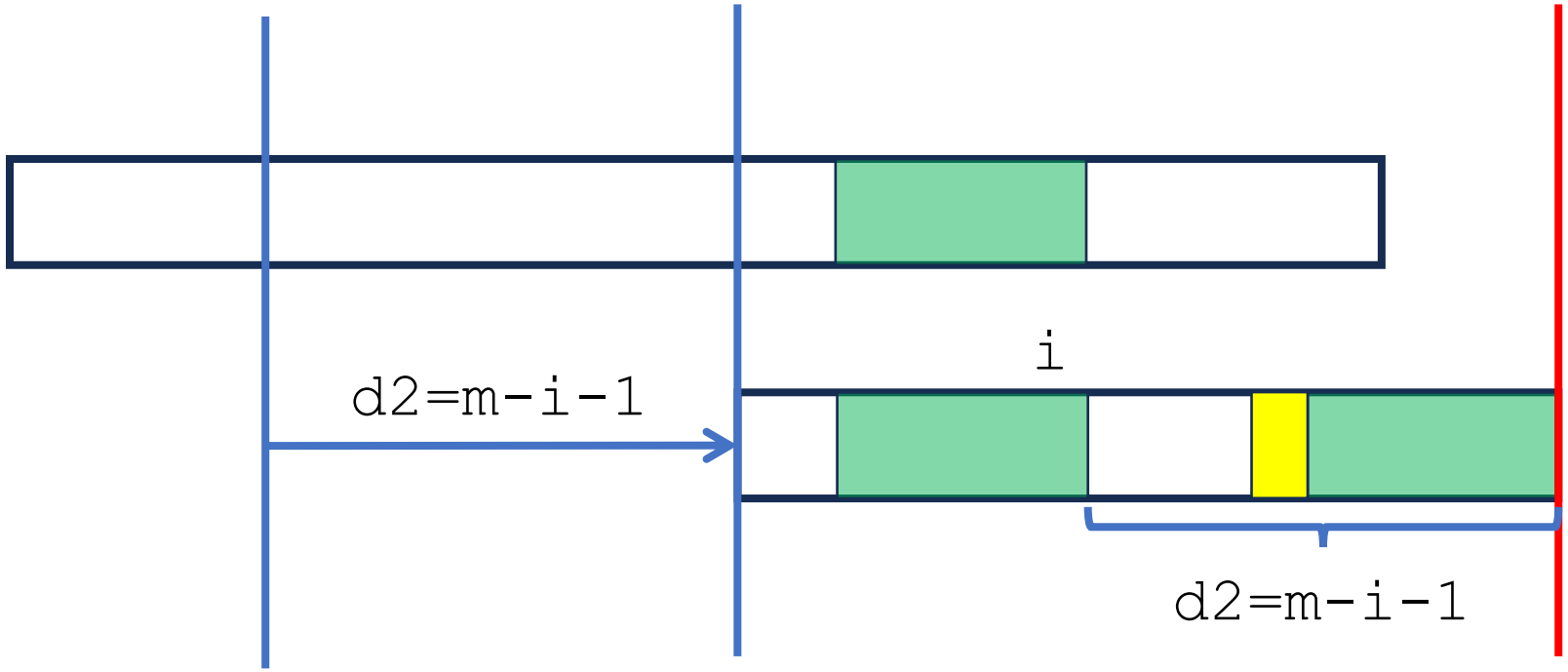
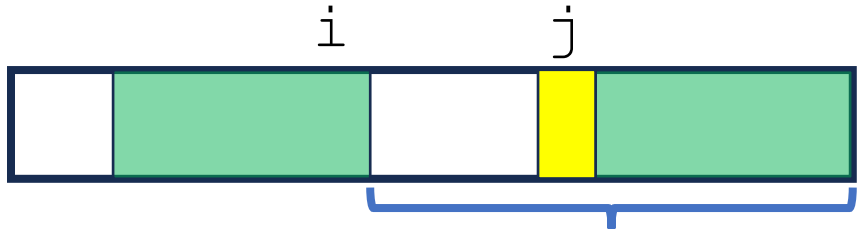


好后缀规则-情况1

情况1：

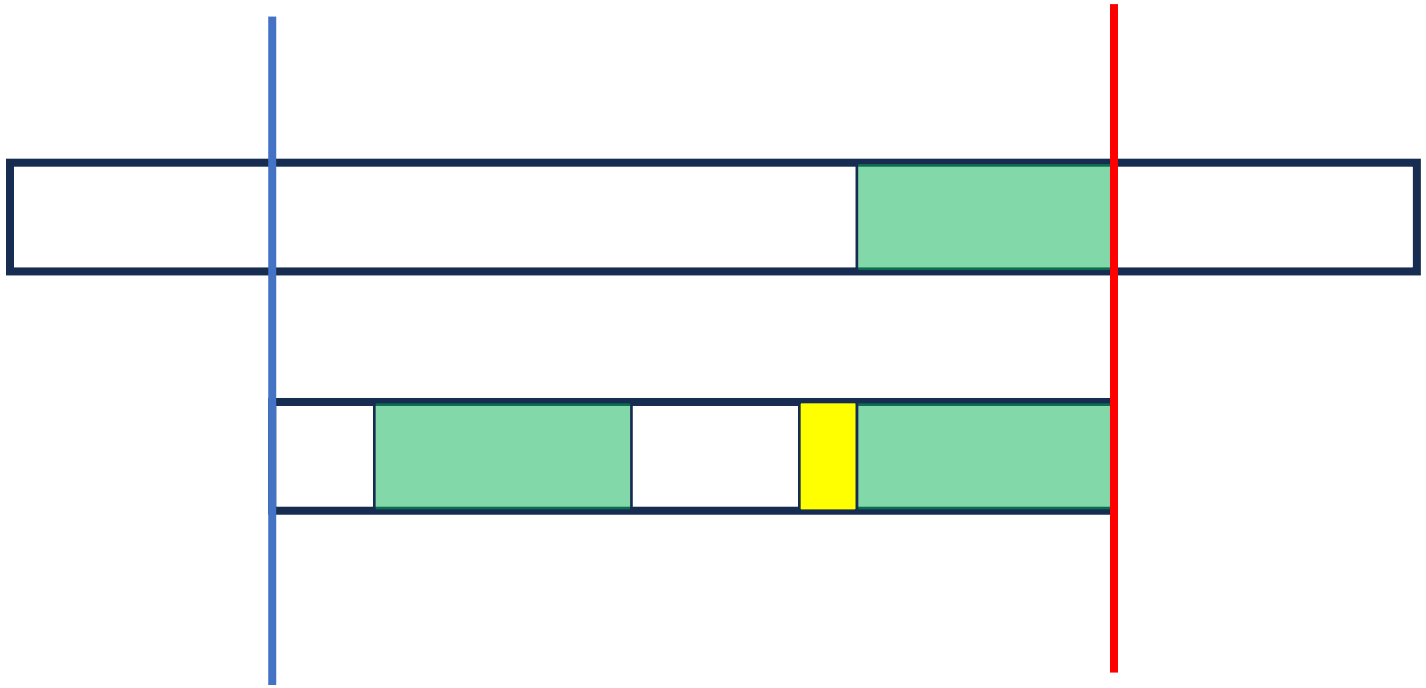
1. 在 j 位置前，能找到完整的后缀

2. 移动距离记录在 delta2[j] 中



delta2[j]=d2=m-i-1

好后缀规则-情况2



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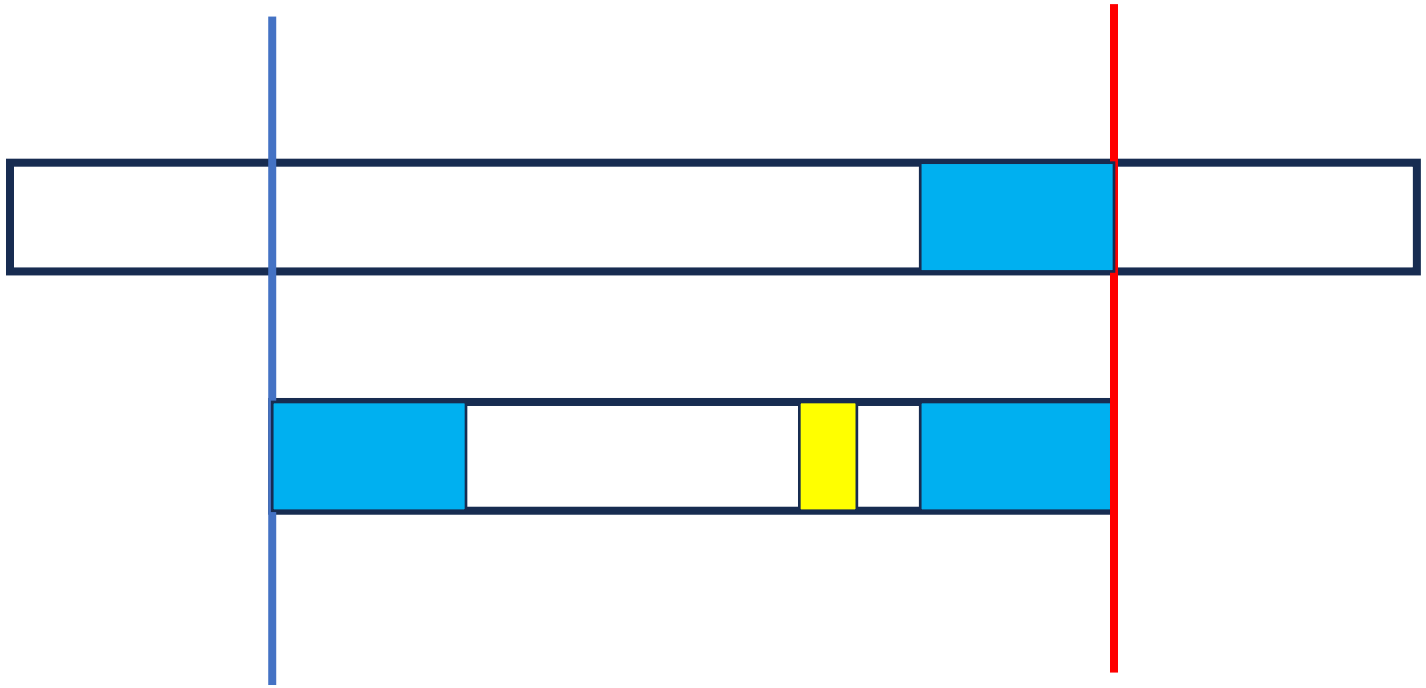

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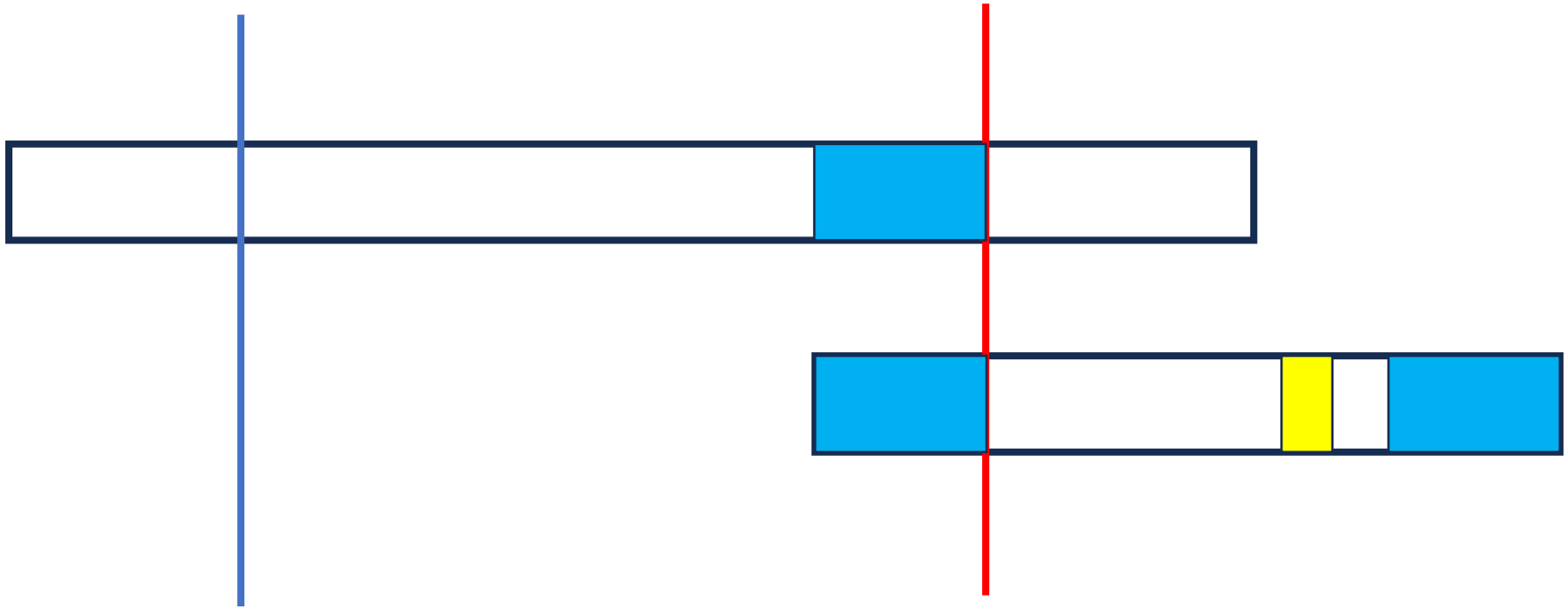

好后缀规则-情况2

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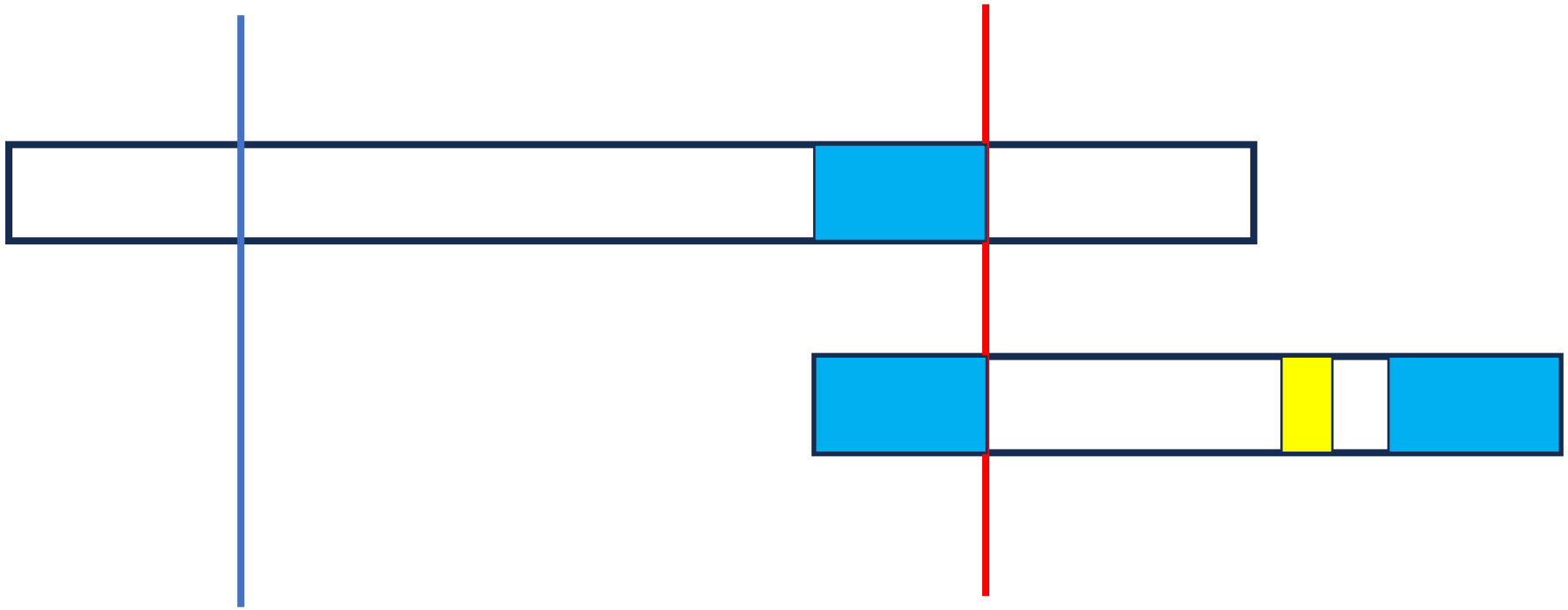

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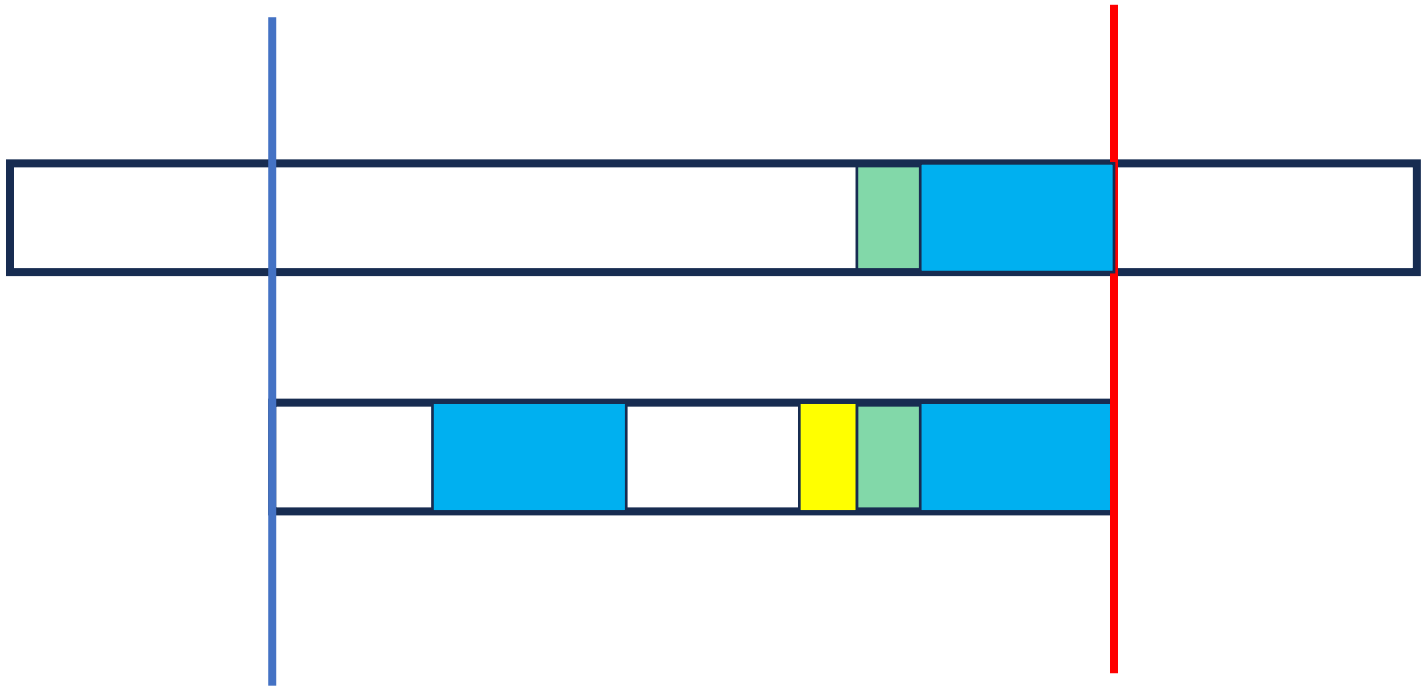

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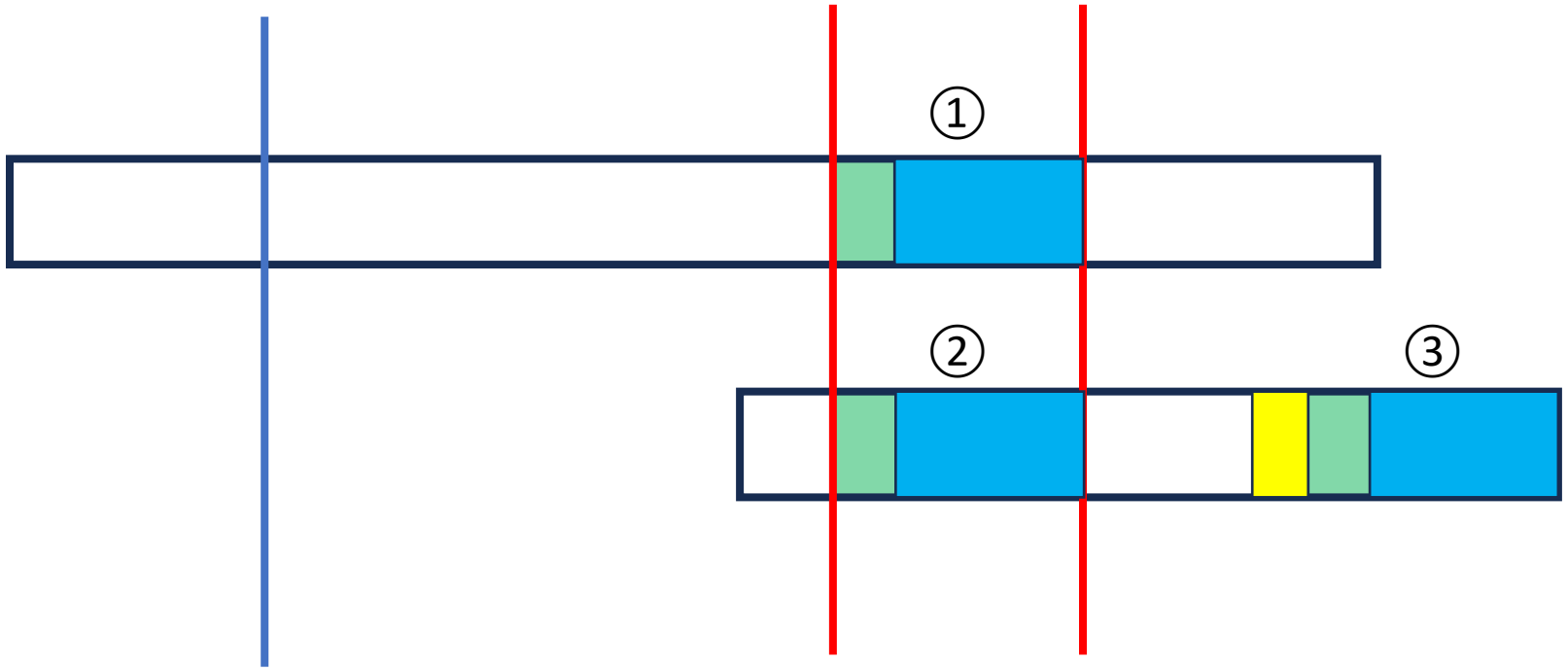
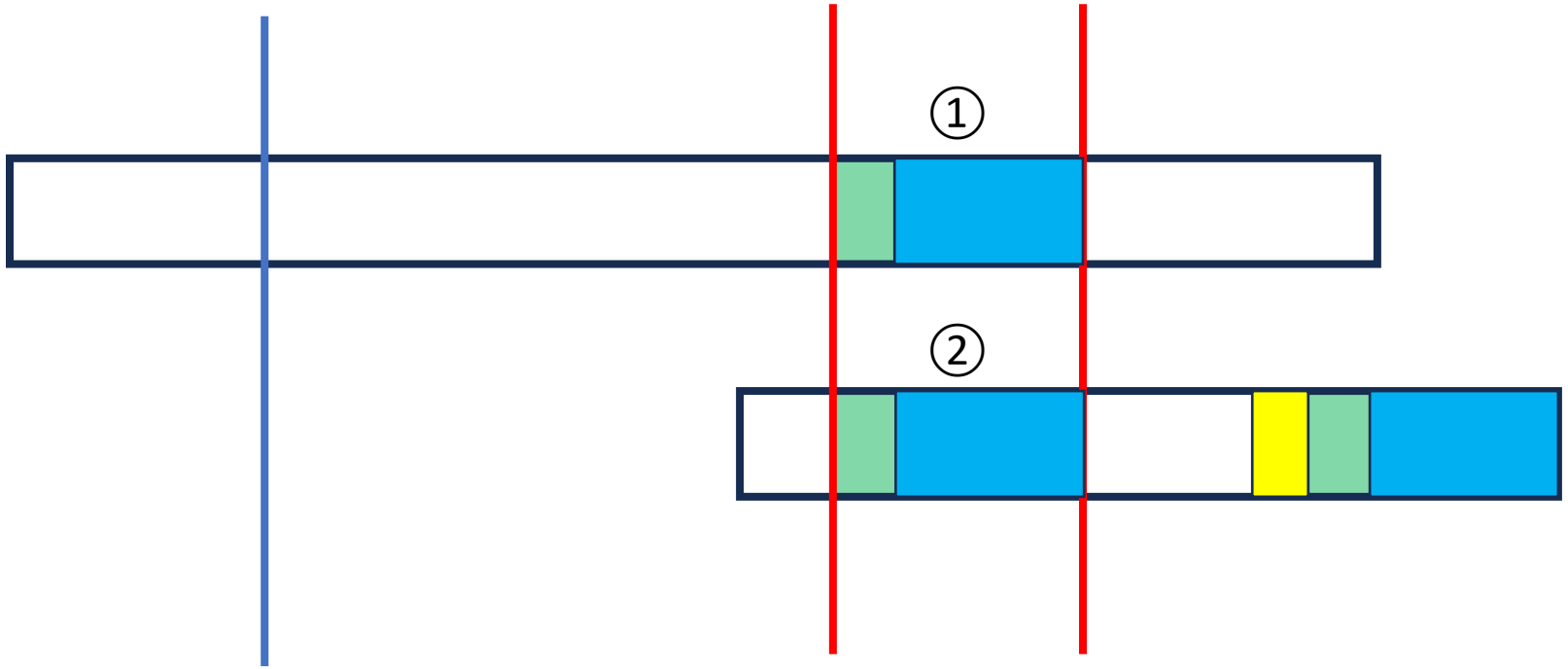
问题：蓝色部分后缀的起始位置，一定是从模式串的开头匹配的么？



好后缀规则-情况2

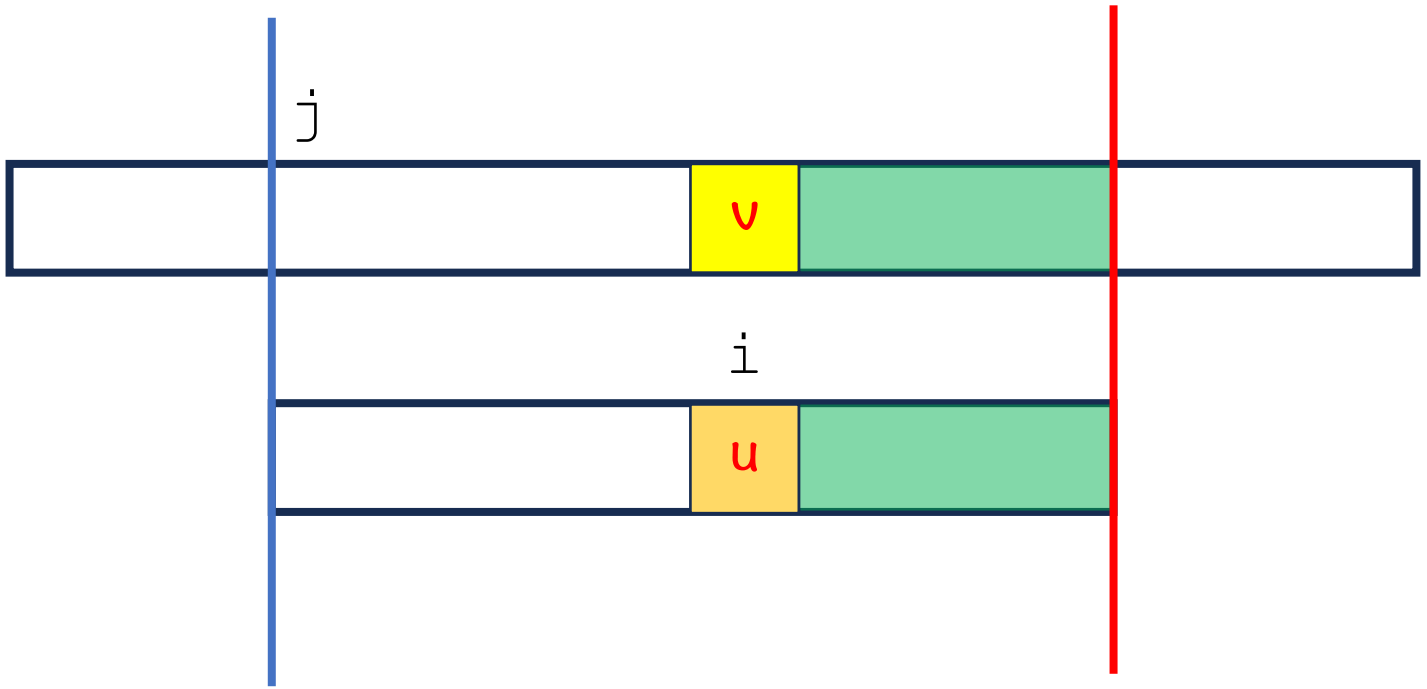
核心目标：移动以后，能匹配成功

1. 当初能找到完整的后缀匹配
2. 蓝色部分不是最长的后缀匹配



Boyer Moore 算法-总结

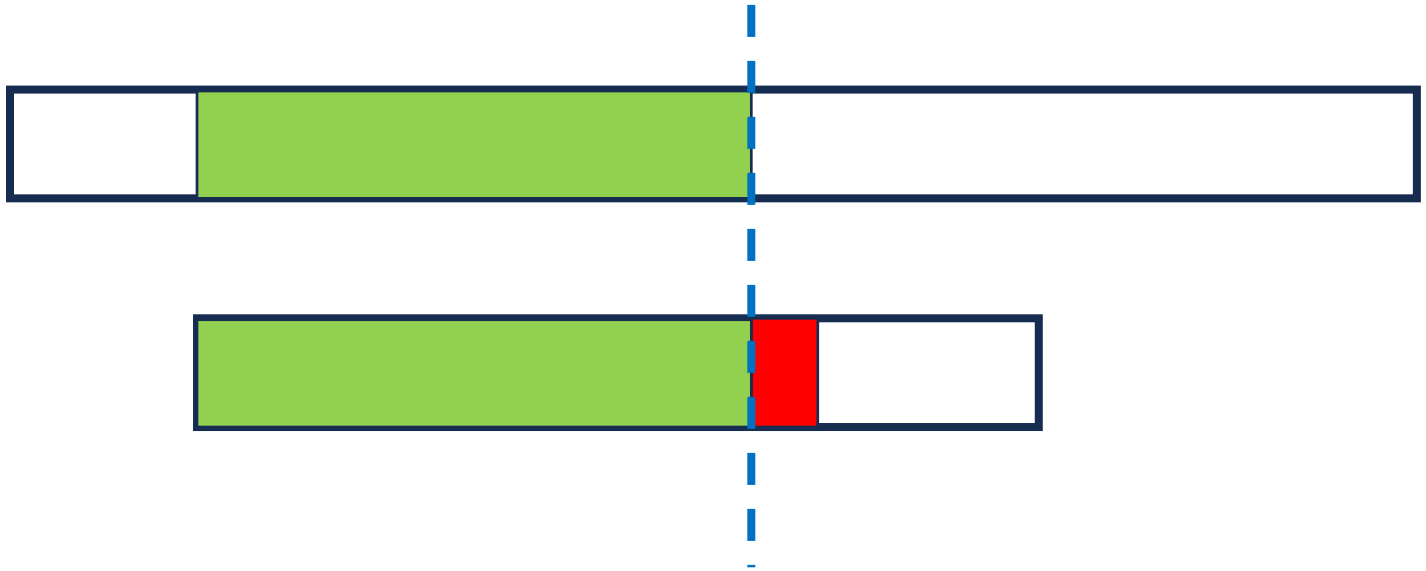
1. 通过字符 v，得到 delta1[v]
2. 通过位置 i，得到 delta2[i]
3. j += max(i-delta1[v], delta2[i])



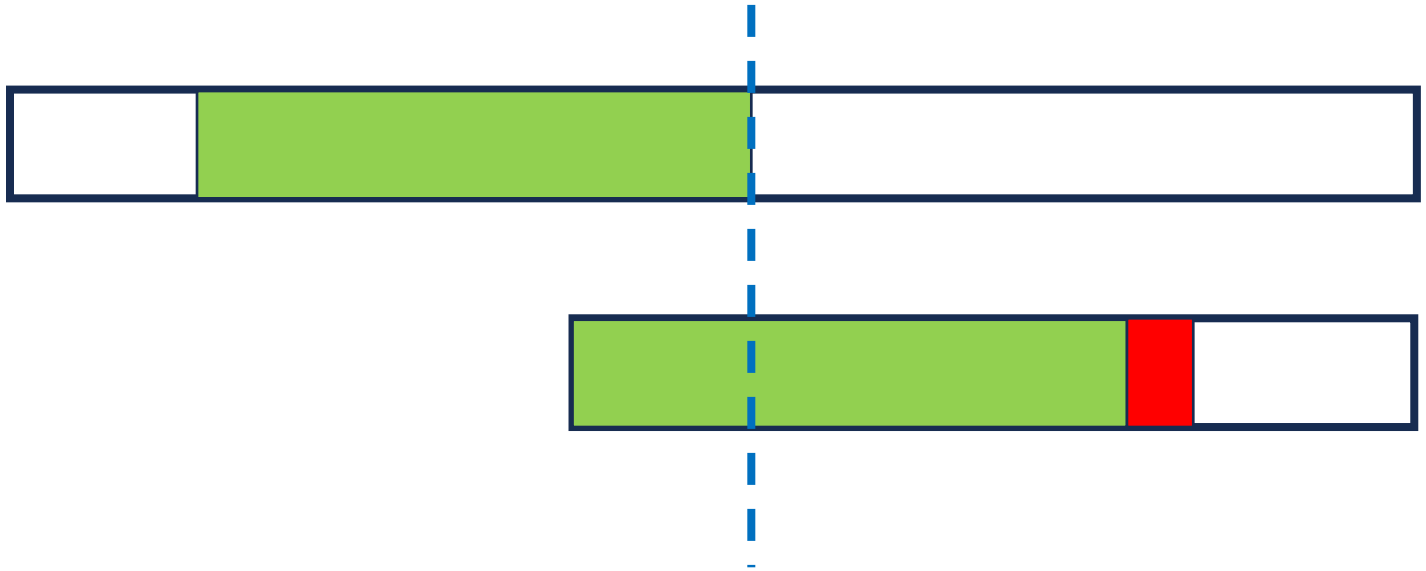
一、单模匹配问题

1. 易学易懂：Brute Force 算法
2. 高效方便：Sunday 算法
3. 经典回顾：Boyer Moore 算法
4. **变化多端：KMP 算法**

KMP 算法



KMP 算法



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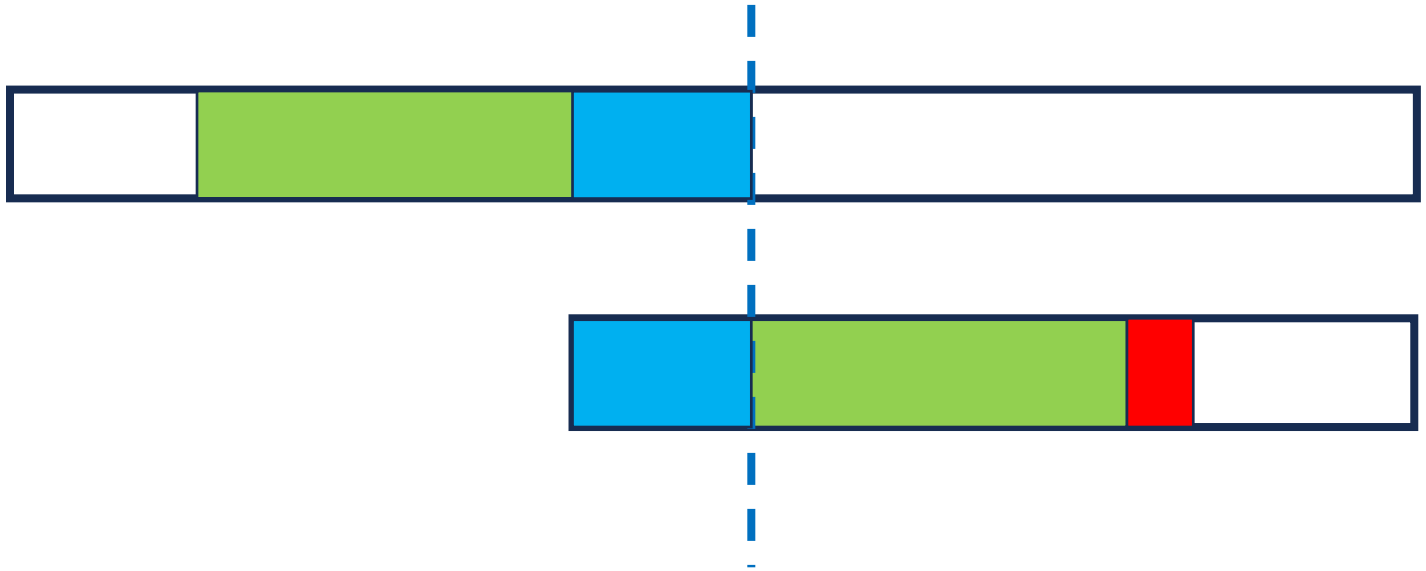
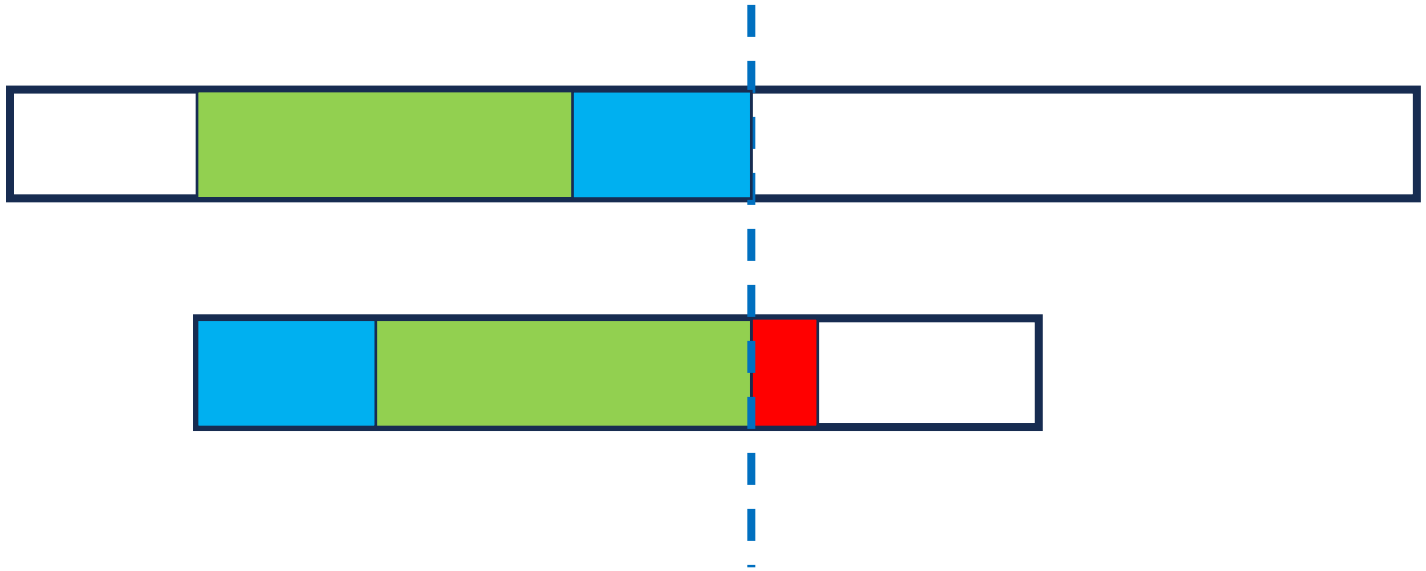


KMP 算法



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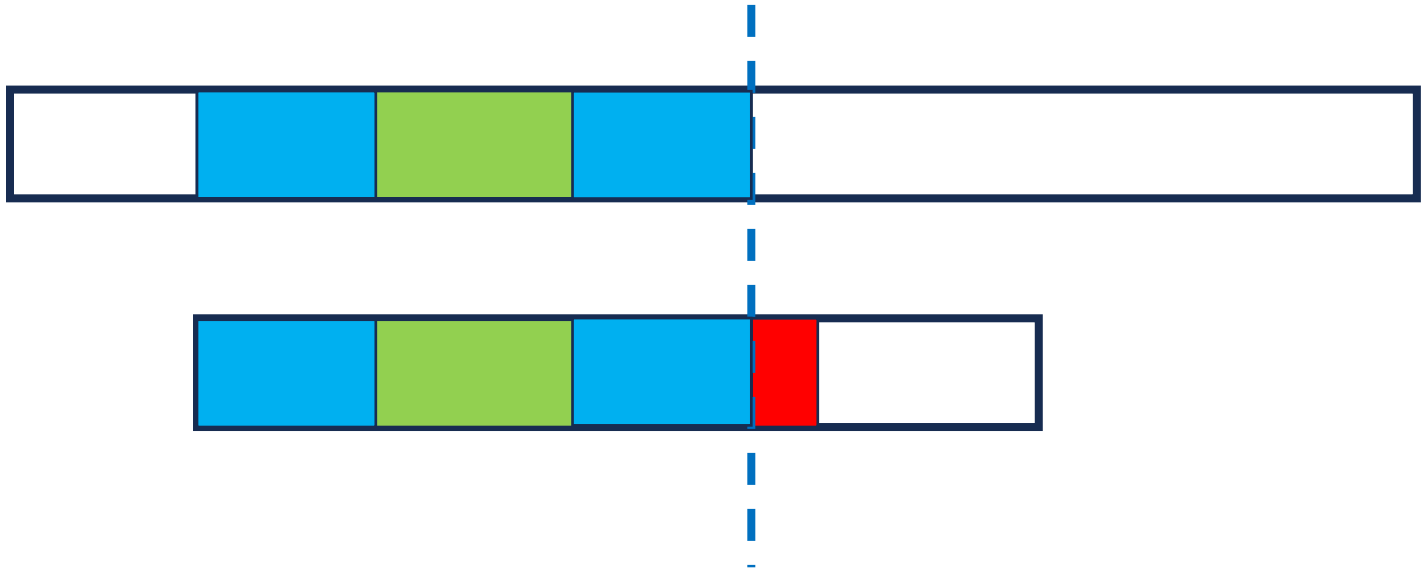

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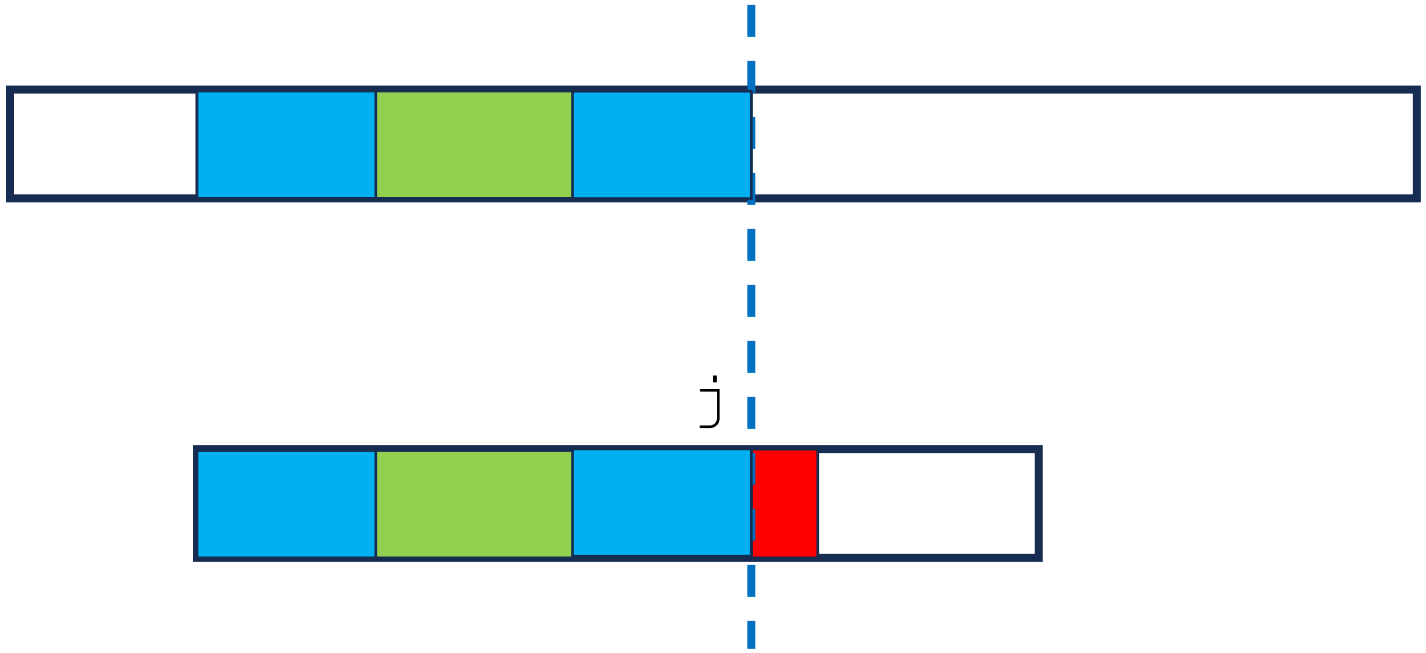

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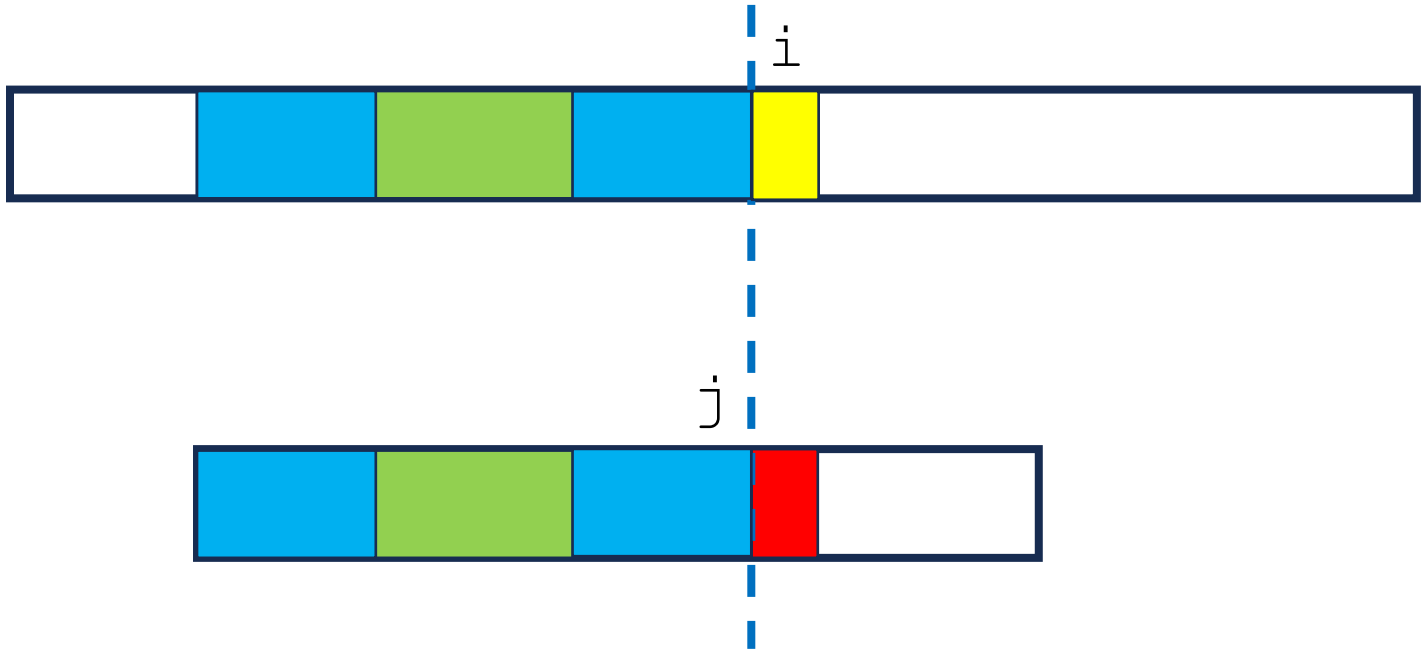

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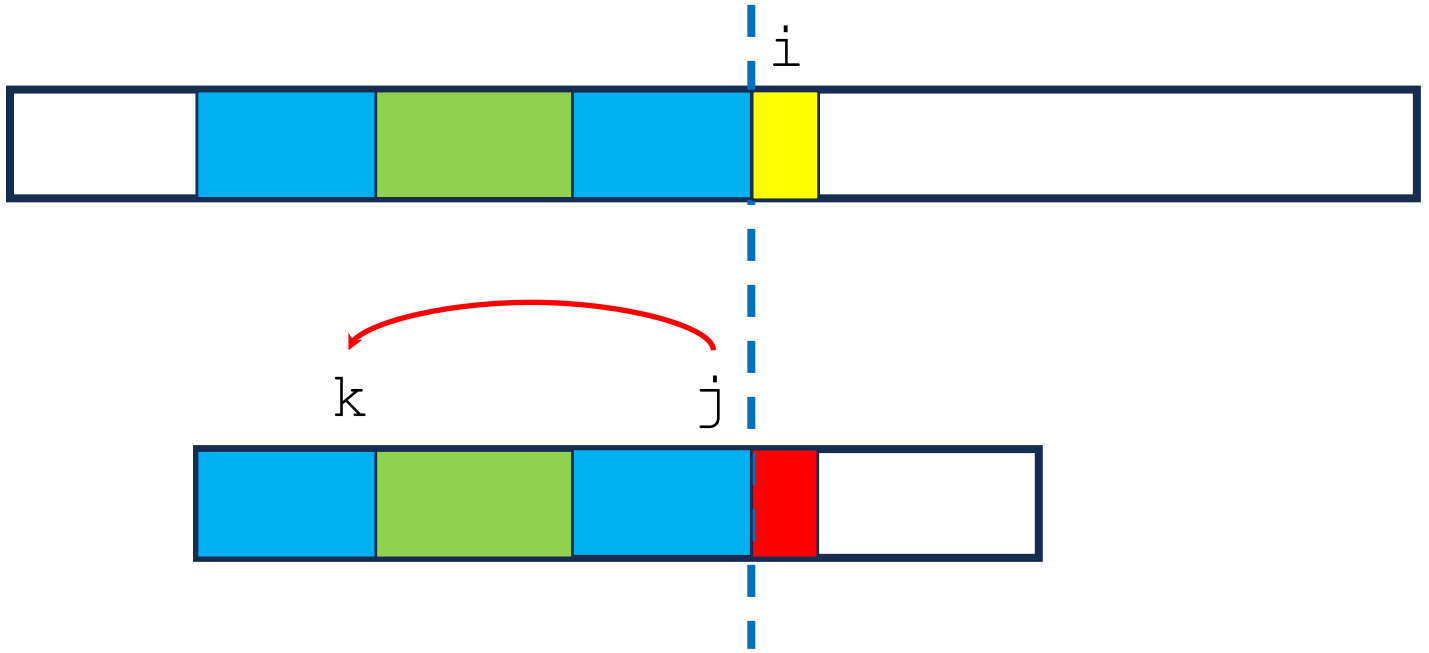

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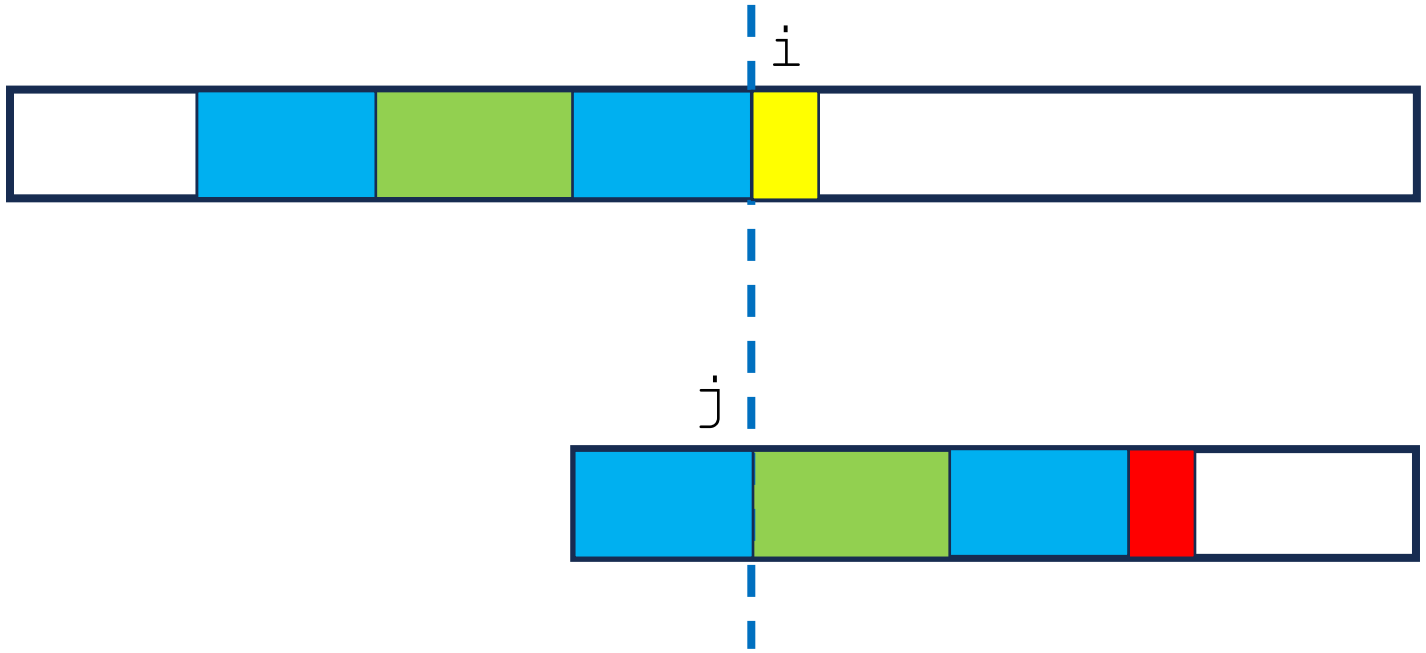

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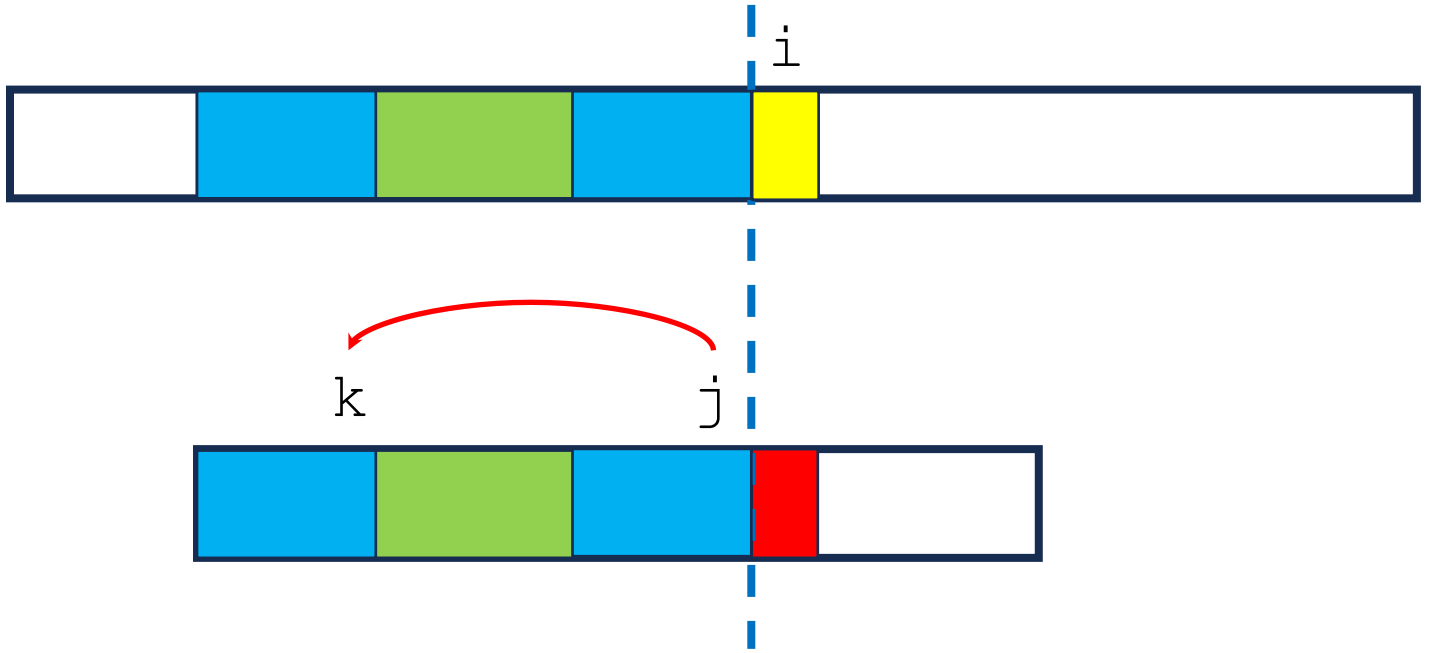
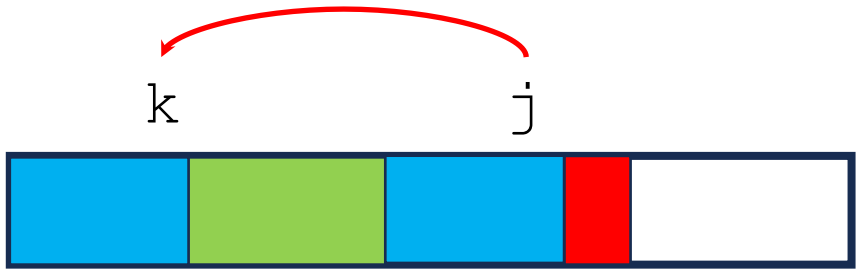


KMP 算法-next数组

1. 最长前缀信息存储在 next 数组中，next[j] = k
2. next[j] 的值可以通过之前的 next 值求得



KMP 算法-next数组

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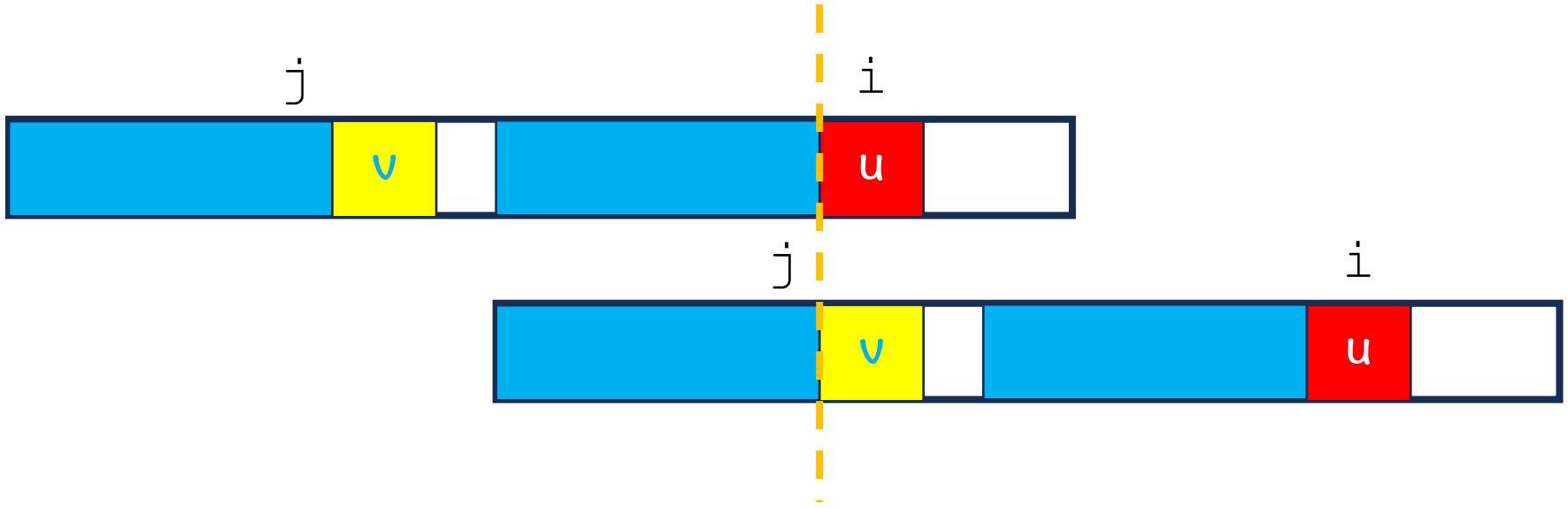

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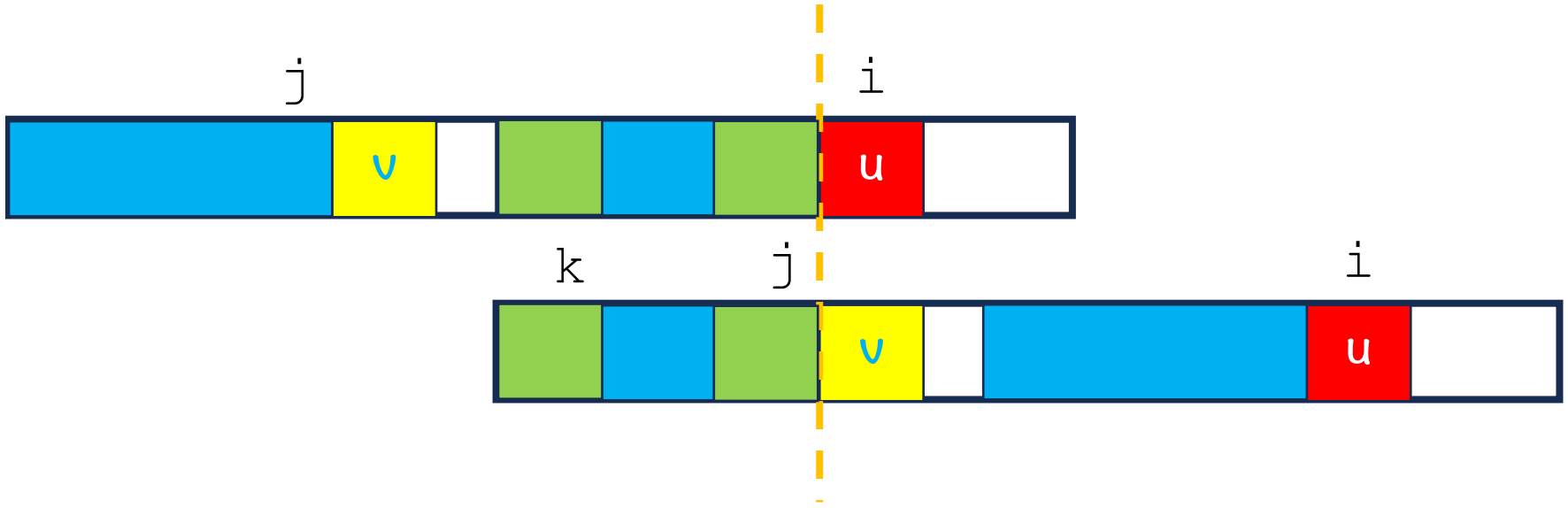

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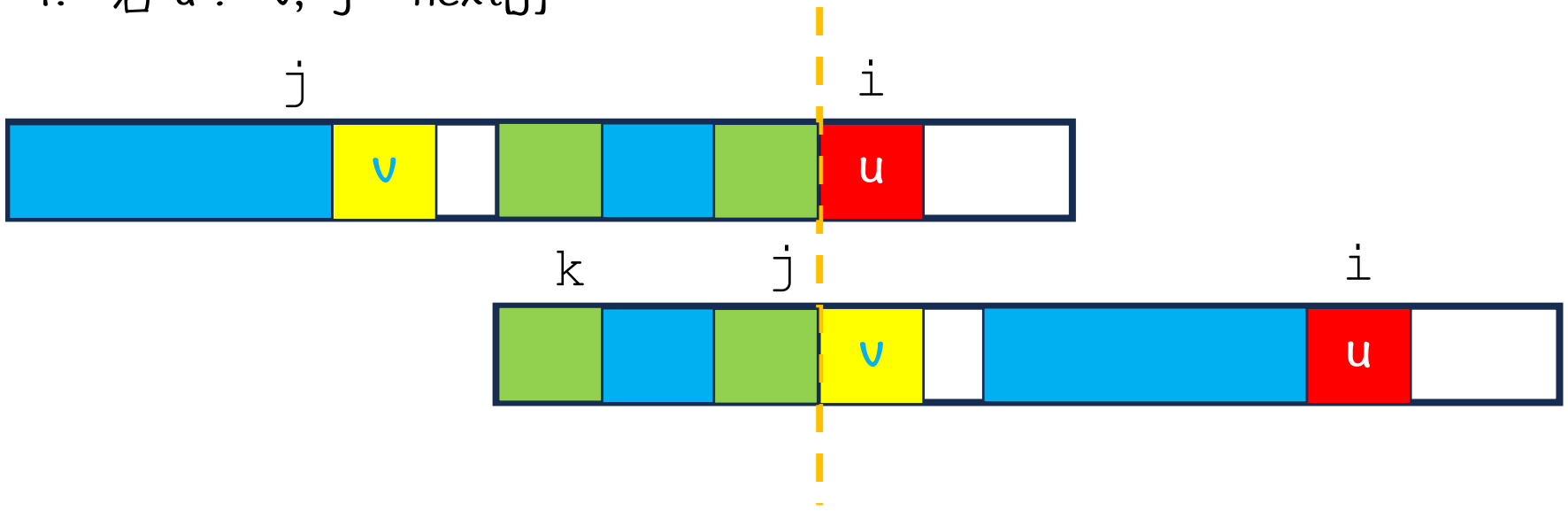

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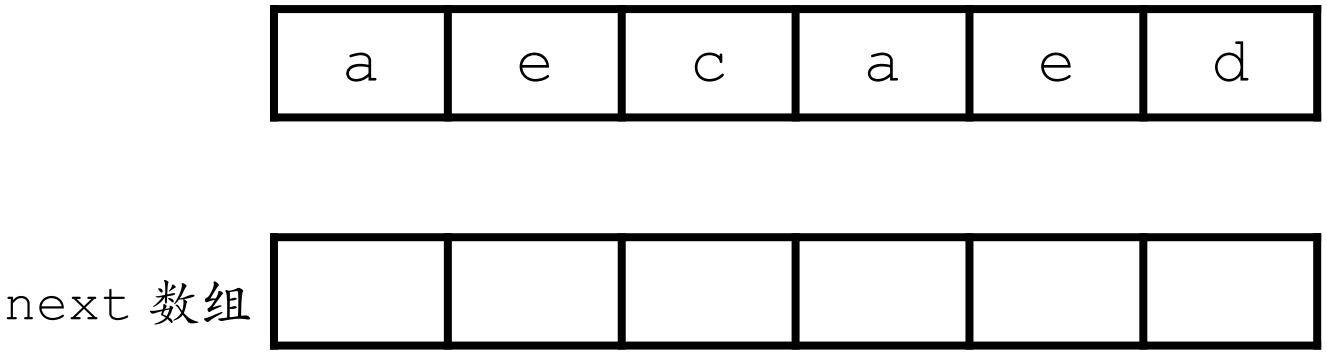
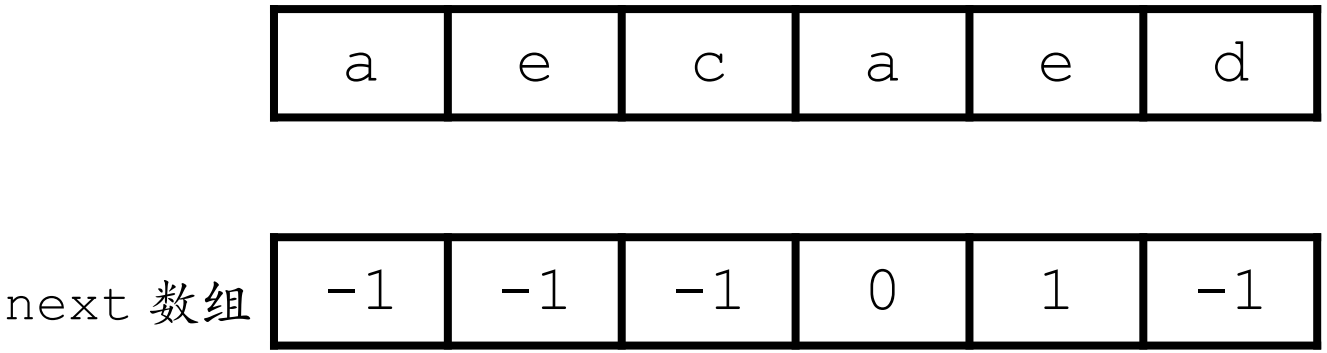
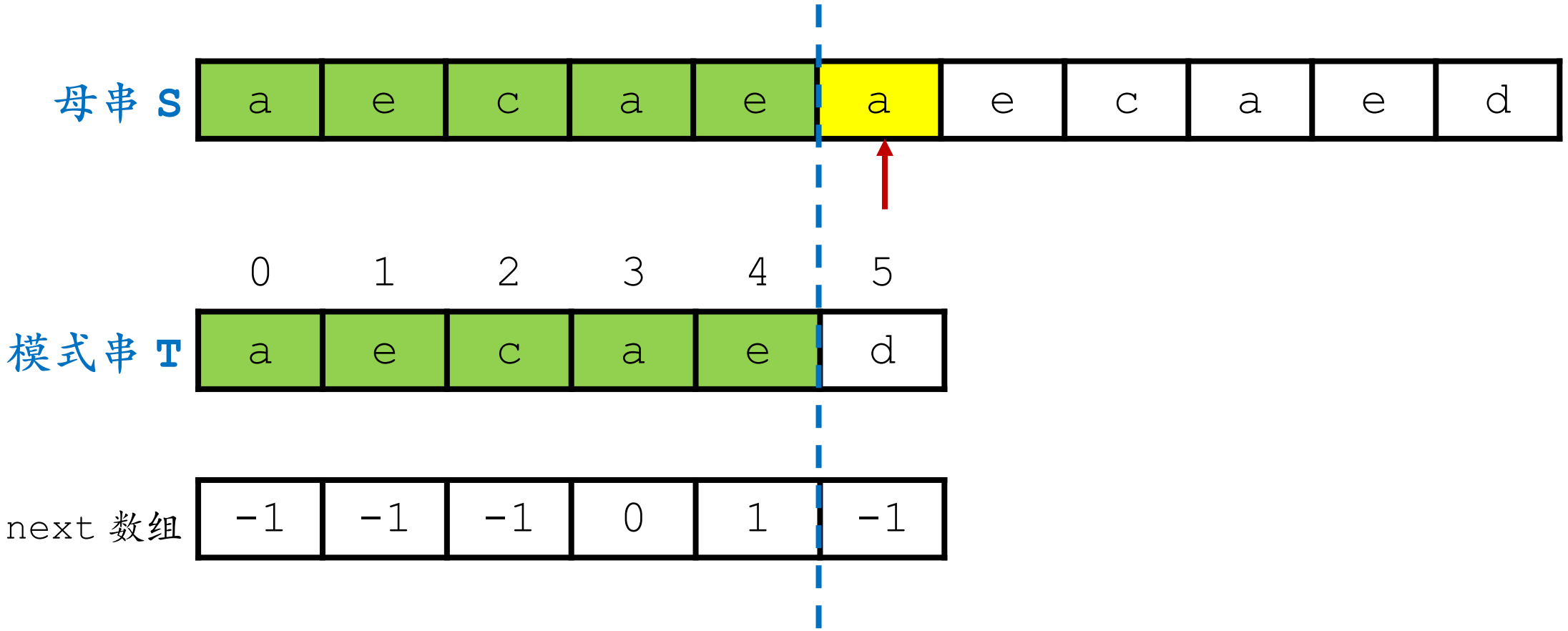


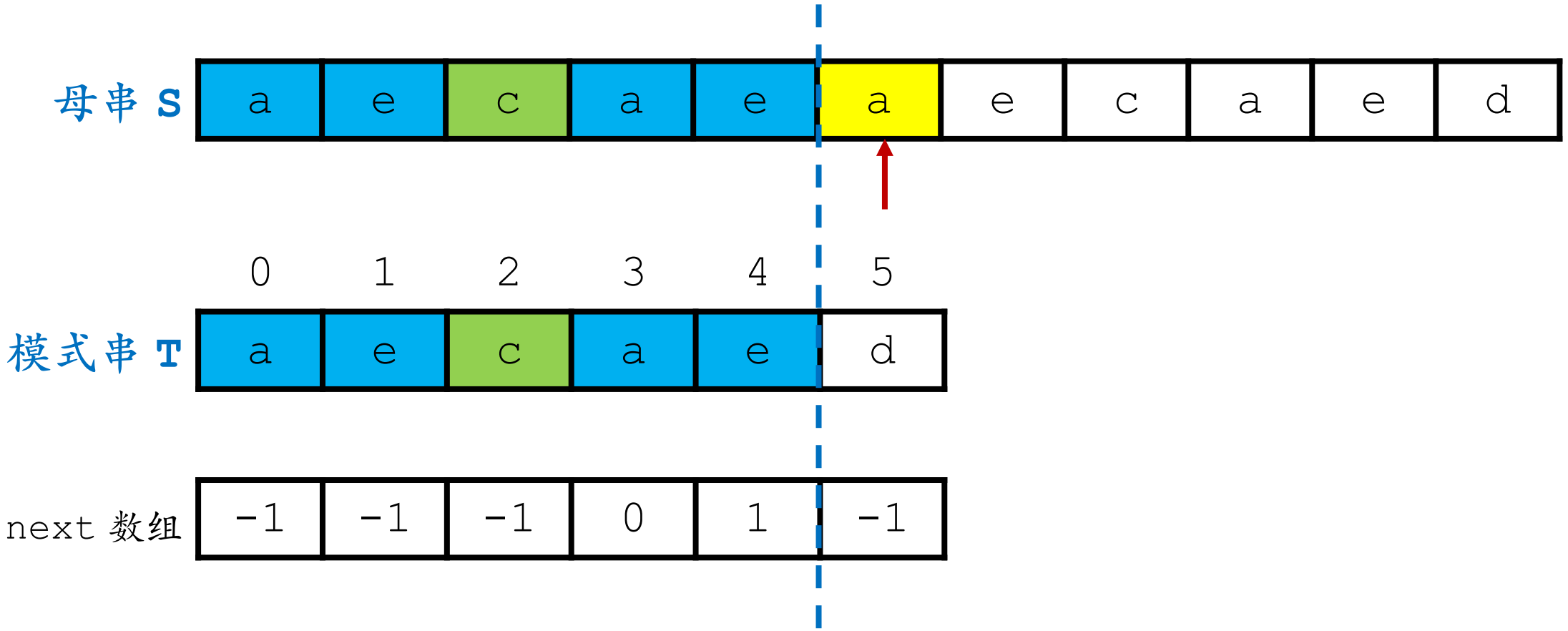
KMP 算法-next数组



KMP 算法-next数组



KMP 算法-next数组



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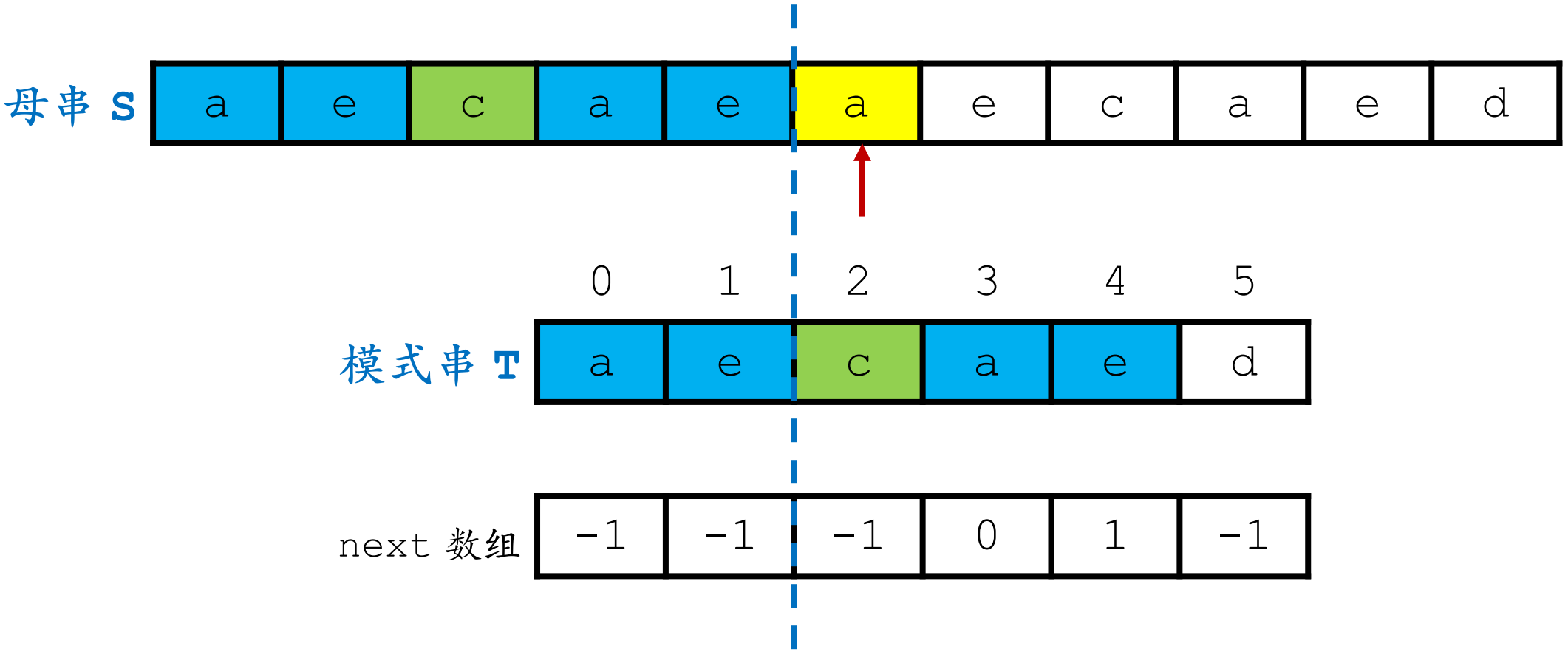
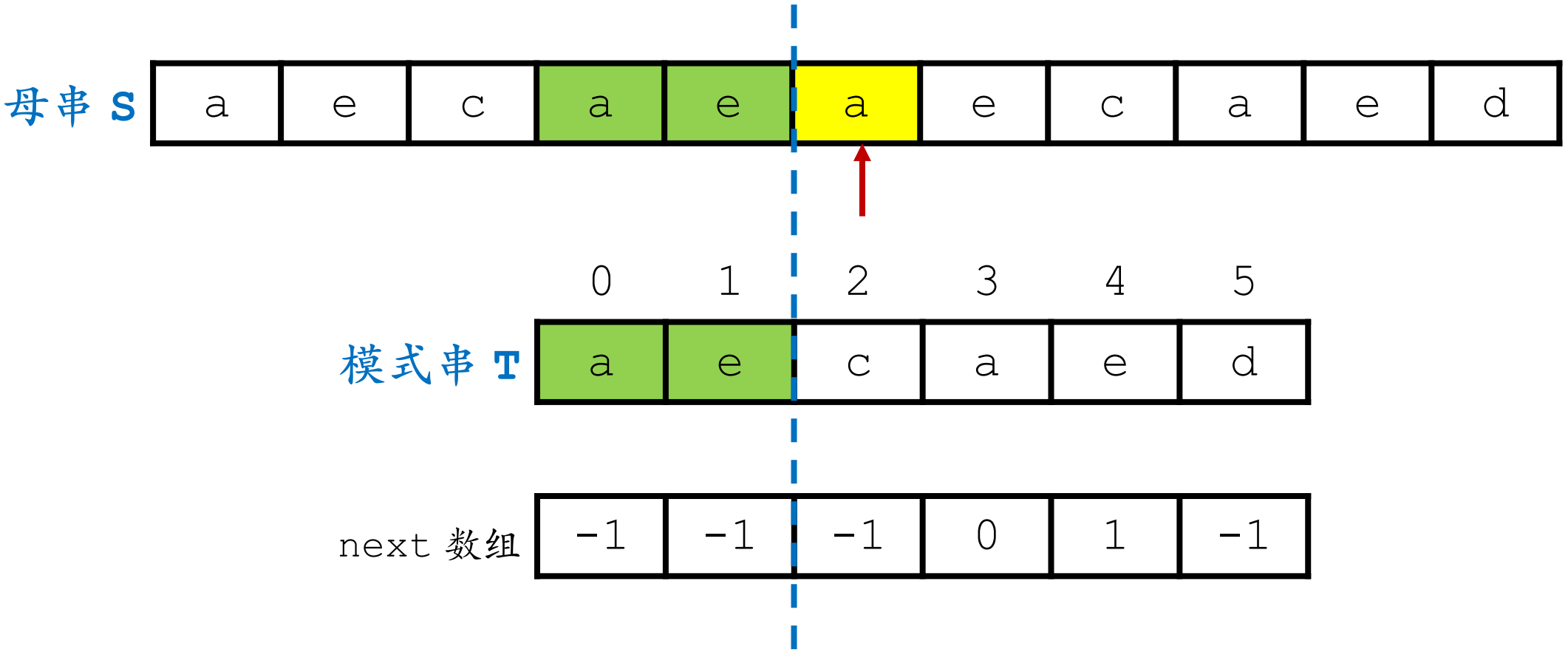
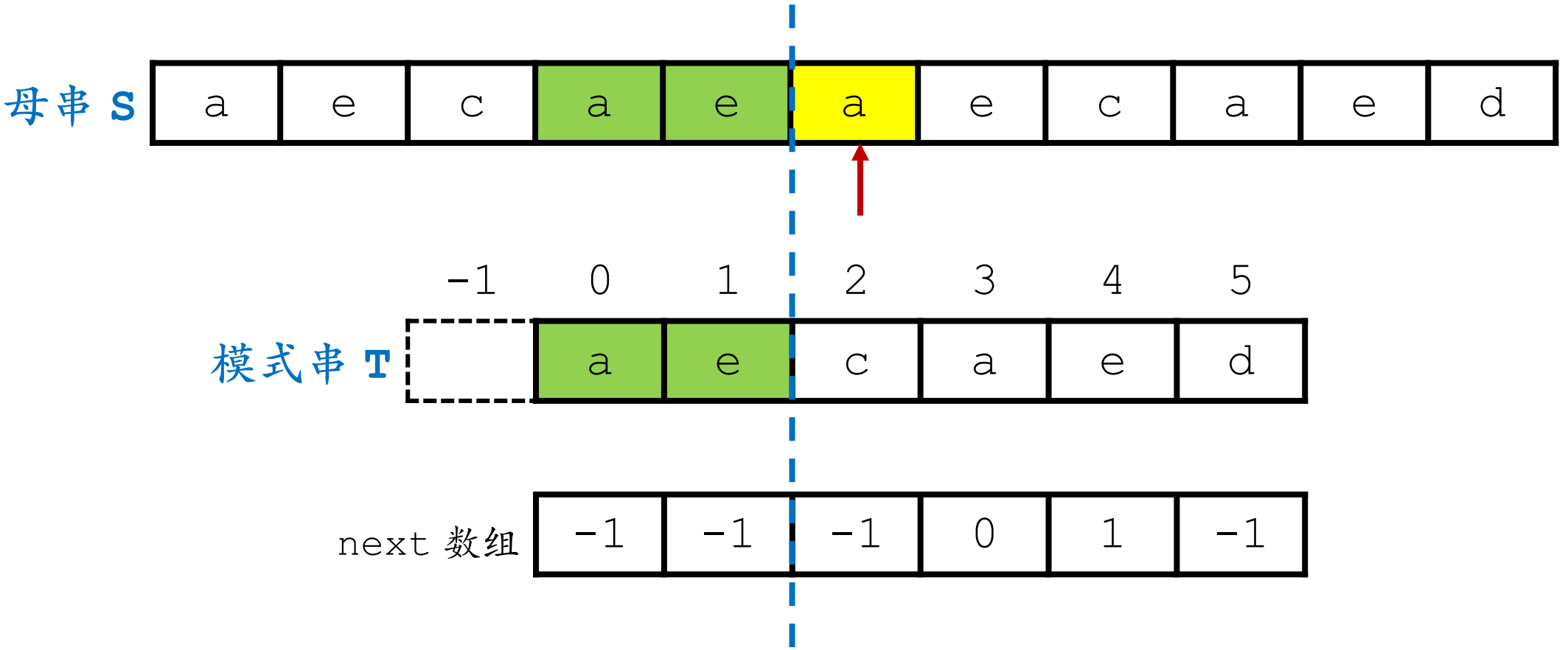


KMP 算法-next数组



KMP 算法-next数组



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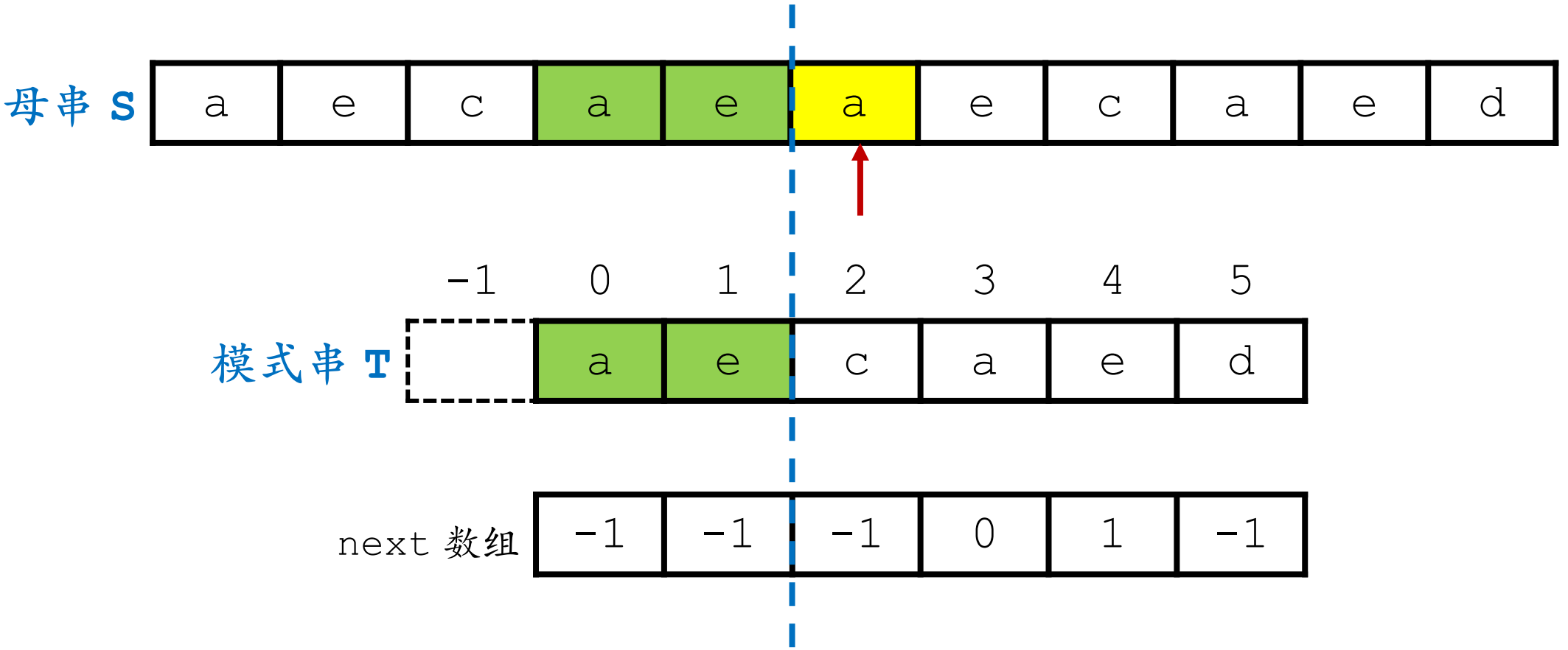

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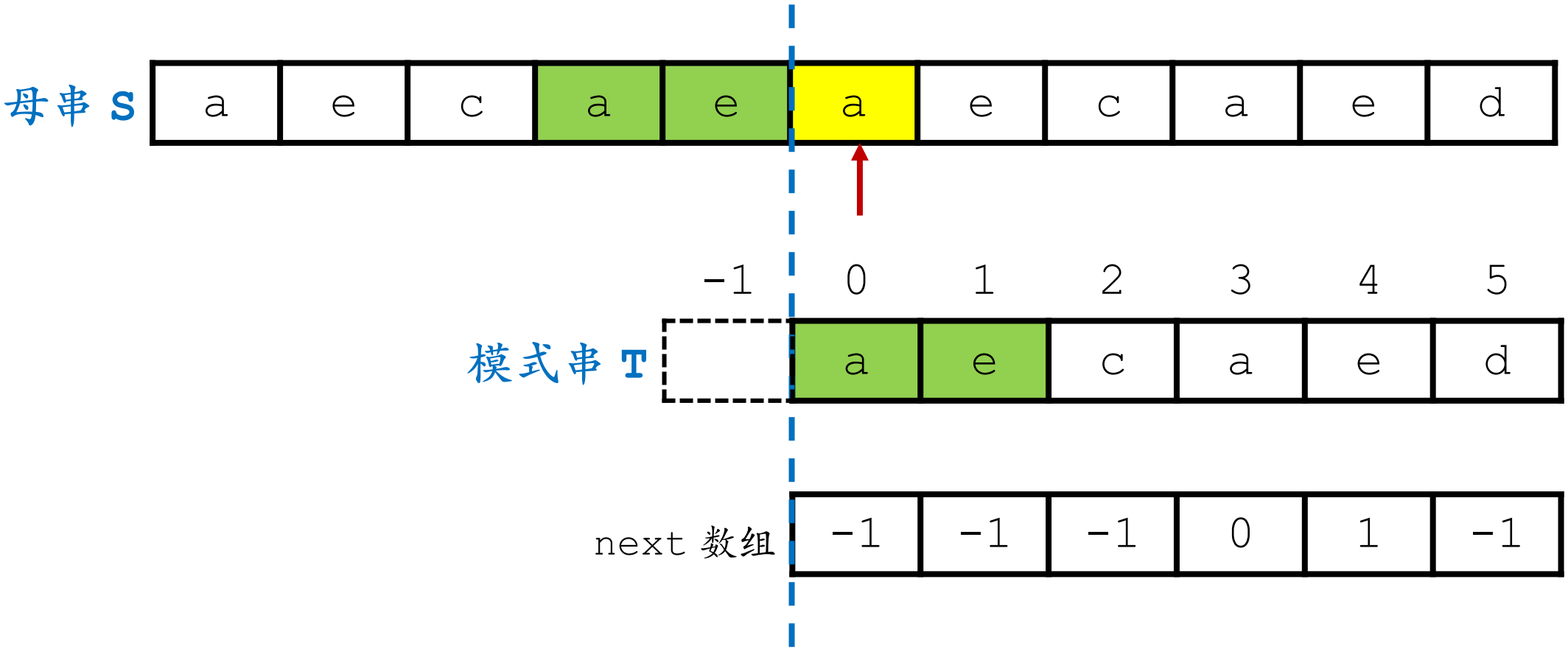

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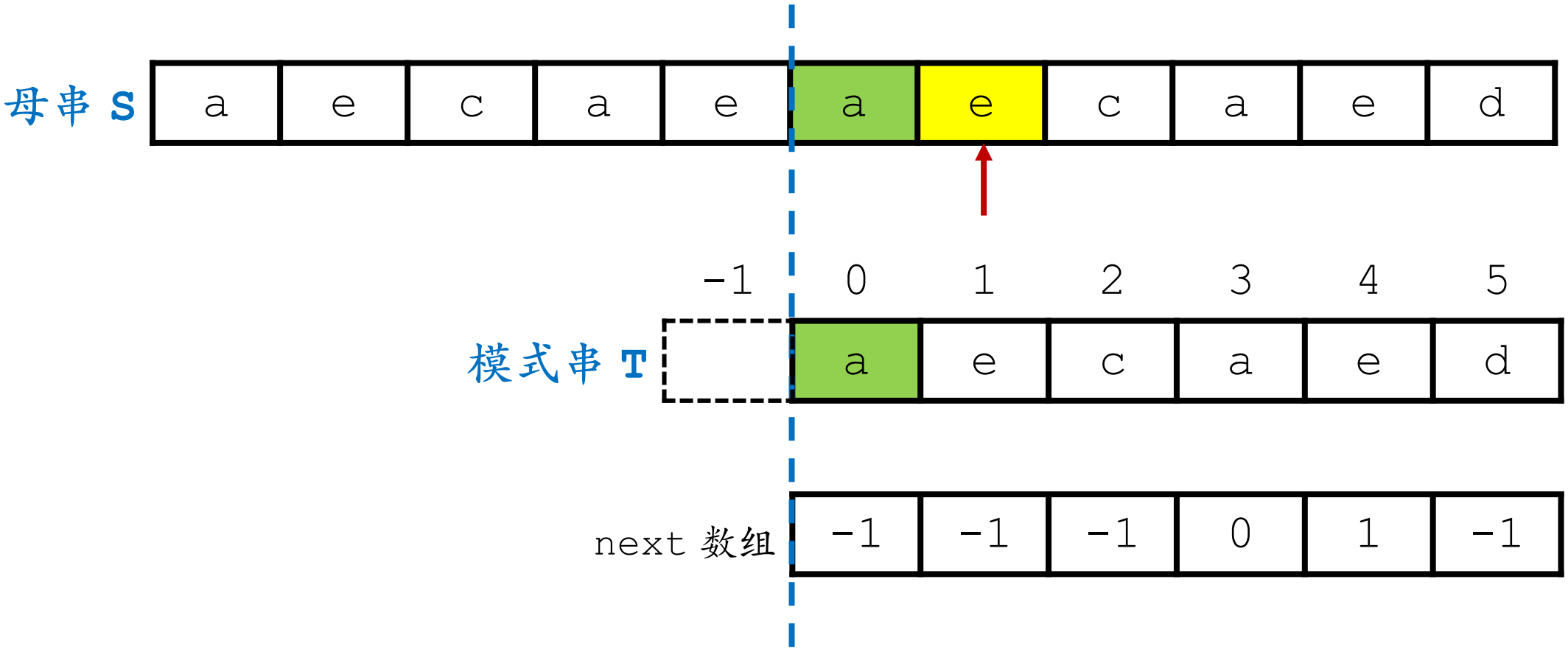

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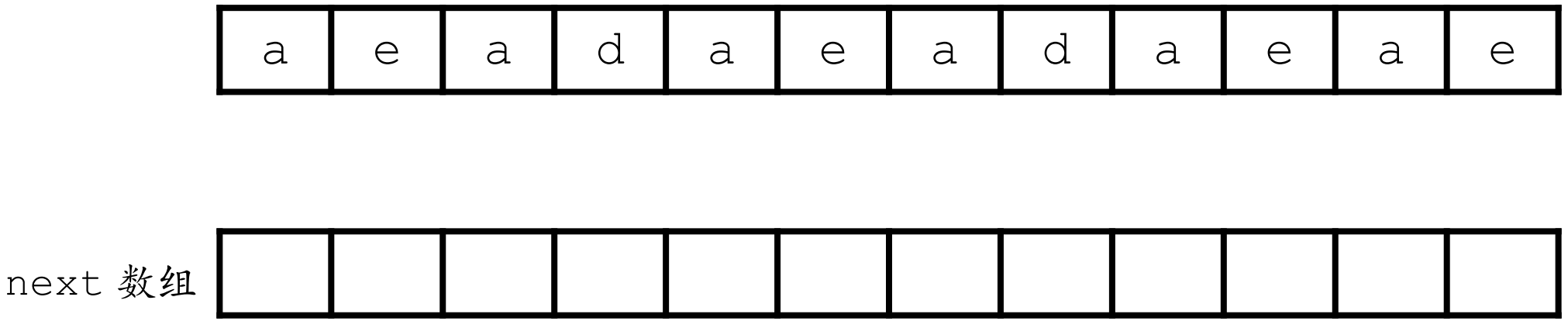

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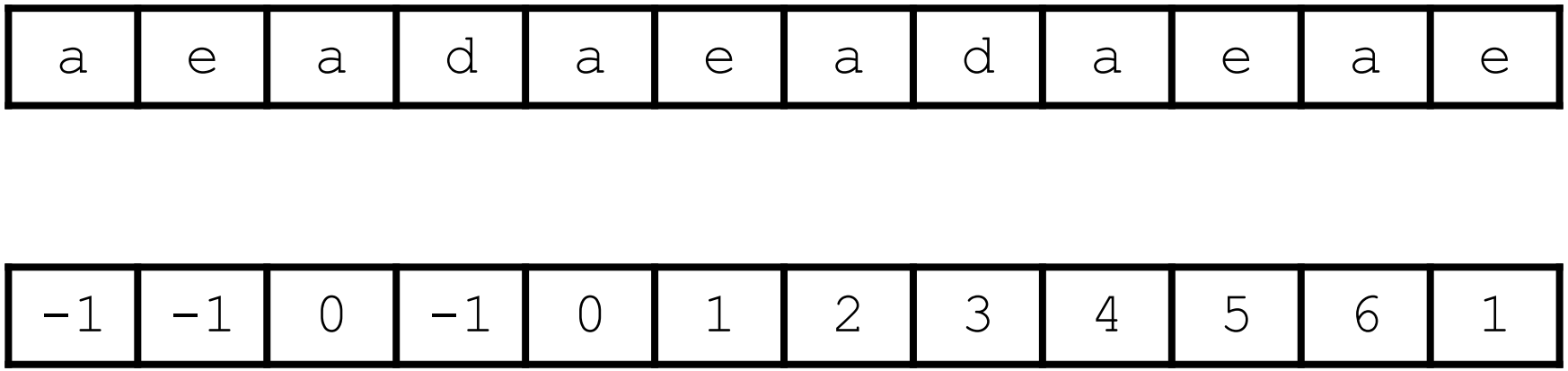

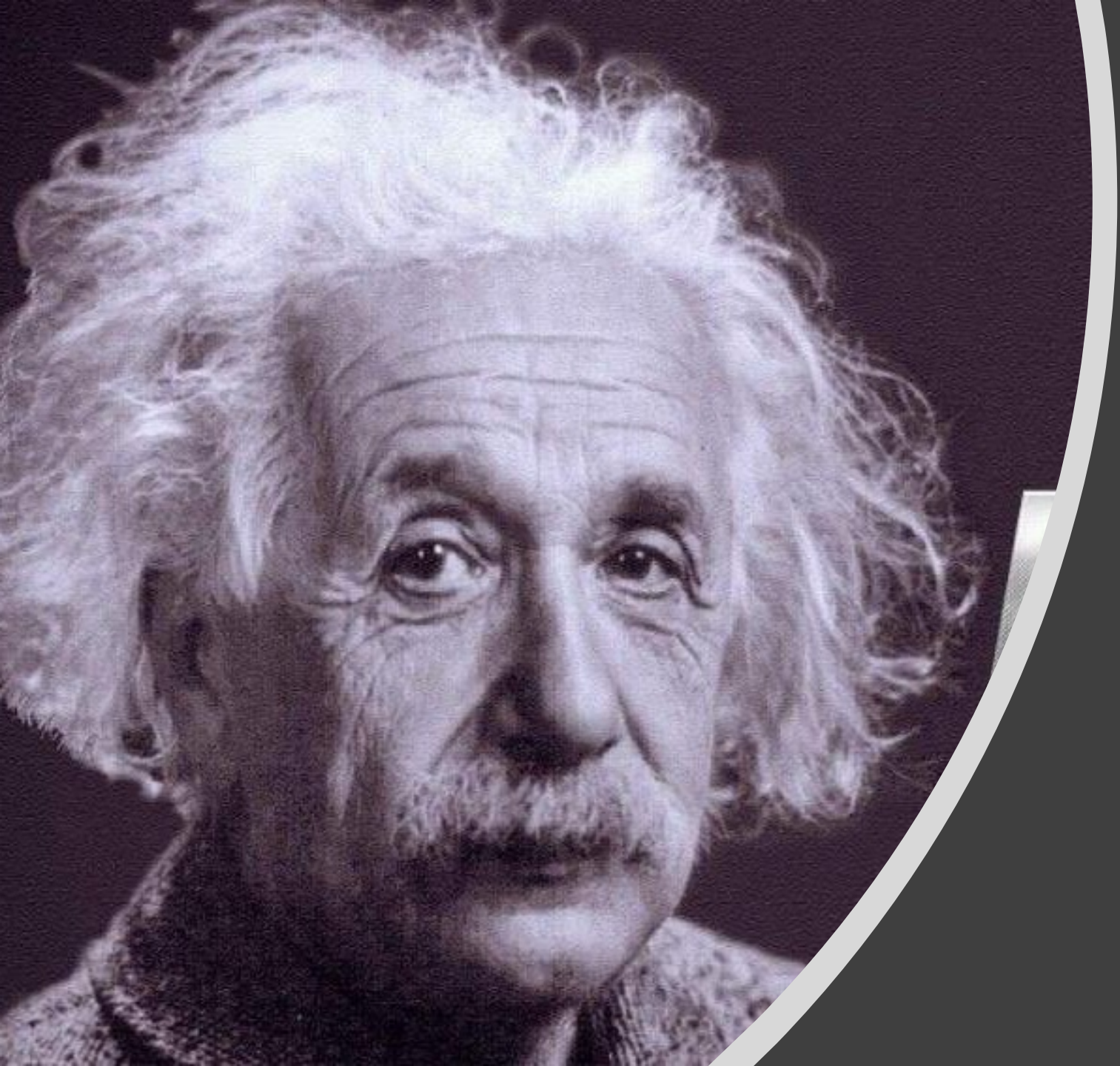

为什么
会出一样的题目？

《船说：算法与数据结构》
第15章-字符串匹配