Run-length strings

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References and Reading

[1] Sections 4.4-4.5 of: Navarro, Gonzalo. Compact data structures: A practical approach. Cambridge University Press, 2016.

Exercises

1 Run-length strings Assume we have available a data structure of $m \log \sigma(1 + o(1))$ bits of space solving `access`, `rank`, and `select` queries on a string $S' \in [0, \sigma - 1]^m$ in $O(\log \sigma)$ time (we will see how to do this in section 6.2). Let $S \in [0, \sigma - 1]^n$ be a string with r equal-letter runs. For example:

$$\mathrm{S} = \mathrm{aaaaaaaaabbbbaaaaaaaaaacc}$$

has $r = 4$ equal-letter runs. Propose a data structure taking $O(r)$ words of space that supports efficient `access`, `rank`, and `select` queries on S.