

Tutorial 10: CS21003 Algorithms I

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1. Give a linear-time algorithm to determine whether a text T is a cyclic rotation of another string T' . For example, “arc” and “car” are cyclic rotations of each other.
2. Given an undirected graph $\mathcal{G} = (\mathcal{V}, \mathcal{E})$, build a data structure so that we can efficiently answer if two given vertices are in the same connected components.
3. For a string y and integer $i > 0$, let y^i denote the string we obtain by concatenating y i times. For a string x , we define its repetition factor $\rho(x)$ to be the smallest integer $i > 0$ such that $x = y^i$ for some string y . Give an efficient algorithm that takes as input a pattern $P[1, \dots, m]$ and computes the value $\rho(P[1, \dots, i])$ for $i = 1, 2, \dots, m$. What is the running time of your algorithm?