

1. String matching: an example

- (a) Build a finite automata to search for the string “bababoon”.
- (b) Use the automata from part (a) to build the prefix function for Knuth-Morris-Pratt.
- (c) Use the automata or the prefix function to search for “bababoon” in the string “babybaboon-buysbananasforotherbabybababoons”.

2. Cooking Schedule Strikes Back

You live in a cooperative apartment with n other people. The co-op needs to schedule cooks for the next $5n$ days, so that each person cooks five days and each day there is one cook. In addition, each member of the co-op has a list of days they are available to cook (and is unavailable to cook on the other days).

Because of your success at headbanging last week, the co-op again asks you to compose a cooking schedule. Unfortunately, you realize that no such schedule is possible. Give a schedule for the cooking so that no one has to cook on more than 2 days that they claim to be unavailable.

3. String matching on Trees

You are given a rooted tree T (not necessarily binary), in which each node has a character. You are also given a pattern $P = p_1p_2 \cdots p_l$. Search for the string as a subtree. In other words, search for a subtree in which p_i is on a child of the node containing p_{i-1} for each $2 \leq i \leq l$.