

**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  $2 \leq i \leq l$ .