HC2 2012 Prefix
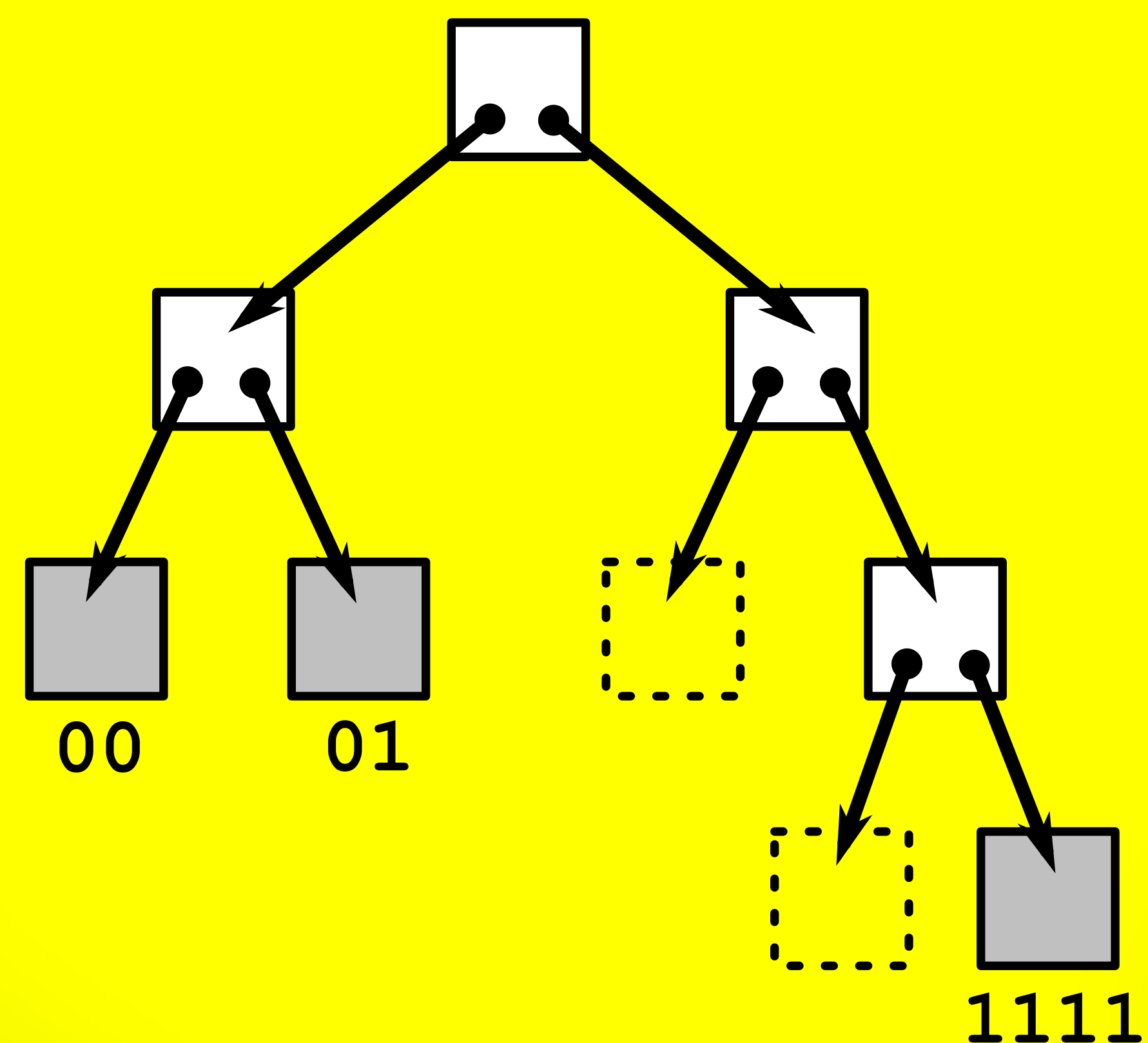
Given a set of binary codes, decide
(1) whether they are prefix-free
(2) whether the set is full,
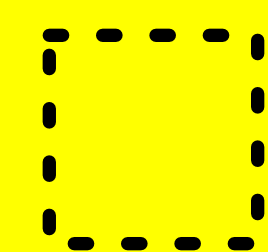(3) the minimum number of codes
    to make it full

(1) Easy subtask:
Enumerate each pair of codes,
and check whether one is
the prefix of the other.

For the medium and hard subtasks,
you need to build a binary tree
(or trie in this case):

(2) For the medium subtask,
you're asked whether
there are any free nodes:

(3) In the hard subtask,
you have to count them.