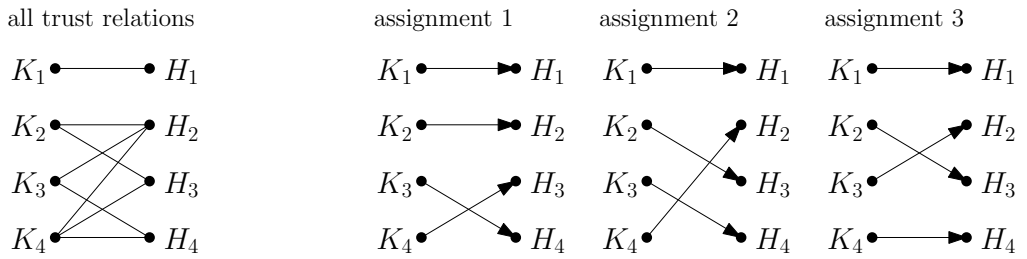
J — Justice for All

Ardenia is going to war! The famous and prestigious Ardenia's military unit consisting of 200 knights and 200 horses started to prepare for battles. During the preparation, k knights and k horses are chosen (the remaining ones simply stay at their barracks) and a special kind of mutual *trust* relation is established between certain knights and certain horses. In such case, we simply say that knight A *trusts* horse B (and vice versa). One horse can trust arbitrarily many knights and one knight can trust arbitrarily many horses.

For a given team of k knights and k horses, the trust relations between them determines the number of battles they are willing to fight. For each battle, each knight chooses a single horse he or she trusts: this creates an *assignment*. An example of 4 knights (K_1, K_2, K_3 and K_4) and 4 horses (H_1, H_2, H_3 and H_4) with trust relations is depicted below. There are 3 possible different assignments.



The assignments for two different battles have to be different (the knights would get bored otherwise) and all possible assignments have to be tried out (the knights are curious enough to test them all). They are pretty good at their fighting skills, which means that no knight or horse will be harmed during the making of the war.

Your mages predicted that the war would consist of n battles. Your task is to choose k knights and k horses and establish trust relations between them, so that they are prepared for exactly n battles.

Multiple Test Cases

The input contains several test cases. The first line of the input contains a positive integer $Z \leq 100$, denoting the number of test cases. Then Z test cases follow, each conforming to the format described in section *Single Instance Input*. For each test case, your program has to write an output conforming to the format described in section *Single Instance Output*.

Single Instance Input

The input instance is one line containing the number of battles, $n \in [1, 10^6]$.

Single Instance Output

The first line of the output should contain a single positive integer $k \leq 200$. Each of the next k lines should consist of k binary digits (`0` or `1`, without spaces between them), where `1` in the j-th column of the i-th line means that knight i trusts horse j (and vice versa). The number of possible battles these knights and horses are prepared for should be exactly n.

Example

Input	Output
3 1 3 4	1 1 4 1000 0110 0101 0111 4 1100 1100 0011 0011