

Submissions

Dice Straight

10pt Not attempted
23/24 users correct (96%)

15pt Not attempted
18/21 users correct (86%)

Operation

10pt Not attempted
15/17 users correct (88%)

20pt Not attempted
12/12 users correct (100%)

Spanning Planning

30pt Not attempted
13/16 users correct (81%)

Omnircumnavigation

15pt Not attempted
16/20 users correct (80%)

20pt Not attempted
6/12 users correct (50%)

Stack Management

10pt Not attempted
15/16 users correct (94%)

30pt Not attempted
0/1 users correct (0%)

Teleporters

10pt Not attempted
6/8 users correct (75%)

30pt Not attempted

Top Scores

Gennady.Korotkevich	120
zemen	110
vepifanov	110
SnapDragon	110
eatmore	100
apiapiapiad	95
simonlindholm	95
Zlobober	90
Endagorion	85
kevinsogo	80

Problem C. Spanning Planning

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input
30 points

Solve C-small

Problem

A *spanning tree* of an undirected graph with N nodes is a tree with $N-1$ edges that uses only edges from N and includes all nodes in N .

Please construct a graph with at least 2 nodes, and no more than 22 nodes, such that the graph has *exactly* K different spanning trees. (Two spanning trees are considered different if and only if the sets of edges that they use are different.) The graph must have at most one edge per pair of nodes, and must not contain a loop (an edge from a node to itself).

It is guaranteed that at least one such graph exists for every K within the limits below.

Solving this problem

This problem has only 1 Small dataset and no Large dataset. You will be able to retry the dataset (with a time penalty).

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each consists of one line with an integer K : the desired number of spanning trees.

Output

For each test case, first output one line containing Case $\#x$: y , where x is the test case number (starting from 1), and y is the number of nodes in your graph. (y must be between 2 and 22, inclusive.) Then, output y more lines. The i -th of these lines represents the i -th node in the graph, and must contain exactly y characters. The j -th character on the i -th line should be 1 if the i -th node and the j -th node are connected with an edge, and 0 otherwise. Note that this matrix will be symmetric and it will have all 0s along its main diagonal.

If multiple answers are possible, you may output any of them. Note that we guarantee that at least one valid answer exists for every K within the limits below.

Limits

$1 \leq T \leq 300$.

Small dataset

$3 \leq K \leq 10000$.

Sample

Input	Output
2	Case #1: 3
3	011
8	101
	110
	Case #2: 4
	0111
	1001
	1001
	1110

In Case #1, the graph is a triangle, and removing any one edge creates a different spanning tree.

In Case #2, the available edges in our solution tree are 1-2, 1-3, 1-4, 2-4, and 3-4. The eight different spanning trees are defined by these sets of edges:

- 1-2, 1-3, 1-4
- 1-2, 1-3, 2-4
- 1-2, 1-3, 3-4
- 1-2, 1-4, 3-4

- 1-2, 2-4, 3-4
- 1-3, 1-4, 2-4
- 1-3, 2-4, 3-4
- 1-4, 2-4, 3-4

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