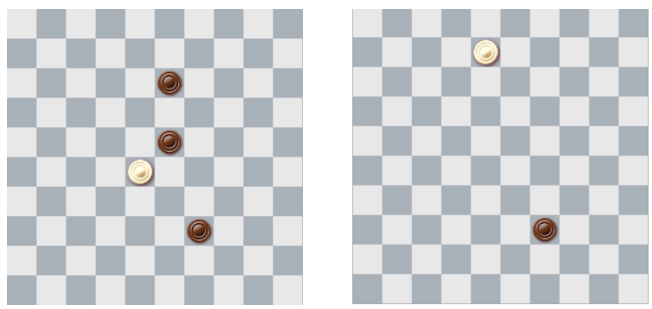
Problem A Draughts

Draughts (or *checkers*) is a game played by two opponents, on opposite sides of a 10×10 board. The board squares are painted black and white, as on a classic chessboard. One player controls the dark, and the other the light pieces. The pieces can only occupy the black squares. The players make their moves alternately, each moving one of his own pieces.

The most interesting type of move is *capturing*: if a diagonally adjacent square contains an opponent's piece, it may be captured (and removed from the game) by jumping over it to the unoccupied square immediately beyond it. It is allowed to make several consecutive captures in one move, if they are all made with a single piece. It is also legal to capture by either forward or backward jumps.



The board before and after a single move with two captures.

You are given a draughts position. It is the light player's turn. Compute the maximal possible number of dark pieces he can capture in his next move.

Input

The first line of input contains the number of test cases T. The descriptions of the test cases follow:

Each test case starts with an empty line. The following 10 lines of 10 characters each describe the board squares. The characters # and **.** denote empty black and white squares, **W** denotes a square with a light piece, **B** – a square with a dark piece.

Output

For each test case print a single line containing the maximal possible number of captures. If there is no legal move (for example, there are no light pieces on the board), simply output 0.

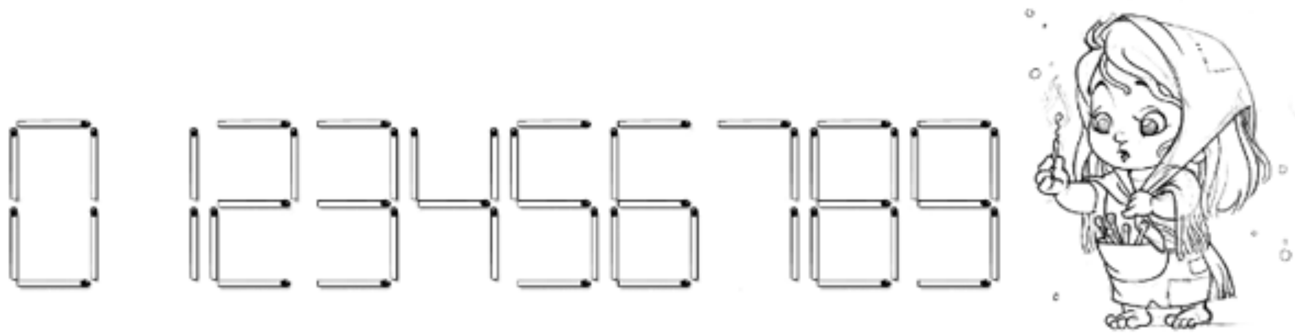
Example

For an example input	the correct answer is:
2 .#.#.#.#.# #.#.#.#.#. .#.#.B.#.# #.#.#.#.#. .#.#.B.#.# #.#.W.#.#. .#.#.#.#.# #.#.#.B.#. .#.#.#.#.# #.#.#.#.#. .#.#.#.#.# #.#.#.#.#. .#.#.B.#.# #.B.#.B.#. .#.#.B.#.# #.B.W.#.#. .#.B.B.#.# #.#.#.#.#. .#.B.B.#.# #.#.#.#.#.	2 4

B. The Little Match Girl

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Using at most 7 matchsticks, you can draw any of the 10 digits as in the following picture:



The picture shows how many sticks you need to draw each of the digits.
Zaytoonah has a number that consists of N digits. She wants to move some sticks (zero or more) to maximize the number. Note that she doesn't want to remove any of the sticks, she will only move them from one place to another within the N digits. She also doesn't want to add new digits as N is her lucky number.

Can you help Zaytoonah maximize her number?

Input

The first line of input contains a single integer T, the number of test cases.

Each test case contains a single integer N $(1 \le N \le 10^5)$, followed by a space, then N digits that represent the number Zaytoonah currently has.

Output

For each test case, print on a single line the maximum number Zaytoonah can get.

Example

input

```
3
1 3
3 512
3 079
```

output

```
5
977
997
```

Problem C: Chemist’s vows

Chemist Clara swore a solemn vow—from now on, she can only speak atomic element symbols. Of course, this limits her ability to talk. She can say, for example, “I Am CLaRa” (as I is the symbol of iodine, Am is americium, C is carbon and so on). She can also say “InTeRnAtIONAl”, but she has a lot of trouble with “collegiate”, “programming” and “contest”.

Given a word, determine whether Clara can speak it (i.e. if it is a concatenation of atomic symbols). Without your help, she might as well have taken silence vows!

You may identify upper- and lowercase letters, as Clara cannot speak uppercase anyway. In case you forgot the elements’ symbols, here is the complete periodic table [1]:

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	**	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn		Fl		Lv		

*	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
**	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Input

The first line of the input contains the number of test cases T. The descriptions of the test cases follow:

Each test case is a single lowercase word over the English alphabet. The length of the word is positive and does not exceed 50 000.

Output

Print the answers to the test cases in the order in which they appear in the input. For each test case print a single line containing the word **YES** if Clara can say the given word, and **NO** otherwise.

[1] There is a plain text version of the problem statement at the Satori web page, available when you click on the problem title. Just in case.

Example

Input	Output
4 international collegiate programming contest	YES NO NO NO

Problem D Crane

There are n crates waiting to be loaded onto a ship. The crates are numbered $1, 2, \ldots, n$, the numbers determining the order of loading. Unfortunately, someone messed up the transit and the crates are standing in a row in an arbitrary order. As there is only limited space in the dock area, you must sort the crates by swapping some of them.

You are given a crane that works in the following way: you select a connected interval of crates of even length. The crane then exchanges the first half of the interval with the second half. The order inside both halves remains unchanged. Determine the sequence of crane moves that reorders the crates properly.

The crane's software has a bug: the move counter is a 9-based (not 10-based, as you might think) integer with at most 6 digits. Therefore, the crane stops working (and has to be serviced) after $9^6 = 531441$ moves. Your solution must fit within this limit.

Input

The first line of input contains the number of test cases T. The descriptions of the test cases follow:

Each test case starts with an integer n, $1 \leqslant n \leqslant 10\,000$, denoting the number of crates. In the next line a permutation of numbers $\{1, 2, \ldots, n\}$ follows.

Output

For each test case print a single line containing m – the number of swaps – followed by m lines describing the swaps in the order in which they should be performed. A single swap is described by two numbers – the indices of the first and the last element in the interval to be exchanged. Do not follow the crane's strange software design – use standard decimal numeral system.

Example

For an example input	a possible correct answer is:
2 6 5 4 6 3 2 1 5 1 2 3 4 5	5 1 2 4 5 5 6 4 5 1 6 0

Problem E Darts

Consider a game in which darts are thrown at a board. The board is formed by 10 circles with radii 20, 40, 60, 80, 100, 120, 140, 160, 180, and 200 (measured in millimeters), centered at the origin. Each throw is evaluated depending on where the dart hits the board. The score is p points ($p \in \{1, 2, \ldots, 10\}$) if the smallest circle enclosing or passing through the hit point is the one with radius $20 \cdot (11 - p)$. No points are awarded for a throw that misses the largest circle. Your task is to compute the total score of a series of n throws.

Input

The first line of the input contains the number of test cases T. The descriptions of the test cases follow:

Each test case starts with a line containing the number of throws n ($1 \leqslant n \leqslant 10^6$). Each of the next n lines contains two integers x and y ($-200 \leqslant x, y \leqslant 200$) separated by a space—the coordinates of the point hit by a throw.

Output

Print the answers to the test cases in the order in which they appear in the input. For each test case print a single line containing one integer—the sum of the scores of all n throws.

Example

Input	Output
1 5 32 -39 71 89 -60 80 0 0 196 89	29