Dascha
Input File: Dascha.txt

Anthropologists speculate that residents of the planet Earth use a base 10 number system because they have 10 fingers. The planet Dascha is more diverse. Its residents have either 2, 3, 4, 5, 6, 7, 8, or 9 fingers. Therefore, we suspect that they use eight different number systems. Write a program to translate a positive base 10 number ($\leq 999,999,999$) into its n position base 2, 3, 4, 5, 6, 7, 8, and 9 representations. If the base 10 number cannot be represented in any of the Daschen bases using n positions, output the error message shown in the sample outputs below.

Inputs
The first line will contain the number of base 10 numbers, m, to be converted to the eight Daschen number systems. This will be followed by one line per base 10 number containing two integers. The first integer will be the base 10 number to be converted, and the second integer will be the number of positions, n, in the Daschen numbers.

Outputs
There will be m output groupings, each containing eight lines. The first line of a grouping will contain the base 2 equivalent of the given base 10 number followed by the base of the number system, the second line will contain the base 3 equivalent of the given base 10 number followed by the base of the number system, etc. Groupings will be separated by 1 blank line. Leading zeros must be included. In the event that the base 10 number cannot be represented using n positions, the exact error message shown below will be output in place of the Daschen number.

Sample inputs
2
134562 9
125 7

Sample output
can't be represented using 9 digits in base 2
can't be represented using 9 digits in base 3
200312202 base 4
013301222 base 5
002514550 base 6
001100211 base 7
000406642 base 8
000224523 base 9

1111101 base 2
0011122 base 3
0001331 base 4
0001000 base 5
0000325 base 6

0000236 base 7
0000175 base 8
0000148 base 9

Dictionary
Input File: Dictionary.txt

A dictionary stored in a disk file is compressed to save disk space. Because the words are alphabetized, often the first few letters of two adjacent words in the file are the same. When this is the case, the starting letters of the second word (in alphabetic order) are replaced with a single digit. The value of the digit is the number of letters in the word that are the same as the starting letters in the previous word. If two adjacent words do not share starting letters, no digit is used. Words can share up to nine starting letters.

Write a program to read in the compressed dictionary words from the file and output the correctly spelled words in the same order as they appear in the dictionary file.

Inputs
The first line will contain the number of lines of words in the dictionary. Each subsequent line will contain dictionary words separated by a space. Where appropriate the words will be compressed.

Outputs
There will be one output line per input line. Each line will contain the correct spelling of the dictionary words in the same order as they appear on the lines of the compressed dictionary file. The words on a line will be separated by a space.

Sample inputs
 2
abacus 3ndon 7ed 2normal 8ly 8ity
2solute 8ly admiral 7ty beginner

Sample output
abacus abandon abandoned abnormal abnormally abnormality
absolute absolutely admiral admiralty beginner

Pleasantville
Input File Pleasantville.txt

Each year on the fourth of July, the residents of Pleasantville conduct a treasure hunt with each homeowner providing a one word clue as to the location of the treasure. Beginning at house number 1, treasure hunters visit each of the town's houses once collecting a clue at each house. If the houses are visited in the correct order, the words form a sentence that describes the treasure and its location. Houses are numbered sequentially starting with 1.

All of the houses are at T intersections of three streets. As treasure hunters proceed down a street, they visit the house at the end of the street and collect that house's clue. Then, looking at the house, all the houses to the left are visited before the houses to the right are visited. For the houses shown below, the visitation order would be: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.
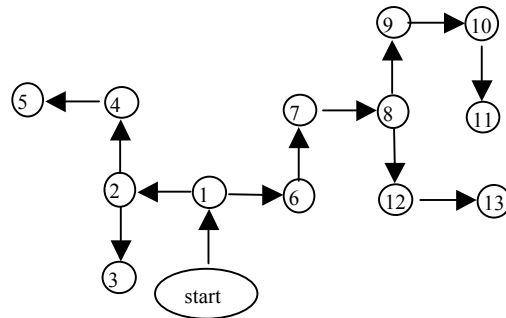
Write a program to collect the clues and output the sentence that locates the treasure.

Inputs
The first line of input will be the number of treasure hunts. This will be followed by one grouping of inputs for each hunt. The first line of a grouping will contain the number of houses visited during that hunt. This will be followed by one line per house (in house number order) giving the house number, the number of the house to its left, the number of the house to its right, and the clue given out at the house. If there is no house to the left or right of a house, the non-existent adjacent house will be numbered -1.

Outputs
The treasure hunt sentences, one line per sentence.

Sample input
```
2
13
1       4       10      The
2       7       -1      a
3       9       -1      oak
4       12      2       treasure
5       -1      11      Evie's
6       -1      8       the
```

7	-1	-1	bowl
8	-1	-1	old
9	-1	-1	tree
10	5	-1	of
11	13	3	soup
12	-1	-1	is
13	-1	6	under

7

1	3	-1	The
2	4	-1	found
3	5	-1	treasure
4	6	-1	inside
5	7	-1	is
6	-1	-1	oneself
7	2	-1	wisdom

Sample output

The treasure is a bowl of Evie's soup under the old oak tree
The treasure is wisdom found inside oneself

Twins
Input File: Twins.txt

Your twin cousins, Ryan and Dana, have been collecting baseball cards for years. The cards are numbered sequentially from 1 to n. One day, while examining the cards, Ryan dropped them and one of the cards fell through a crack in the floor. Ryan would like to replace the lost card and has sent you a list of the n-1 cards he has recovered. Your job is to determine the lost card number before Dana realizes it's missing.

Inputs
The first input line will contain the number of cases to process. This will be followed by one line per case that contains the number of baseball cards in the collection (which includes the lost card) followed by the card numbers of the cards that Ryan recovered. The numbers are separated by a space.

Outputs
There will be one line of output per case that gives the lost card number for that case.

Sample input
2
30 28 30 18 27 14 13 1 16 3 10 23 5 6 7 11 29 8 19 12 24 9 22 4 15 20 2 25 17 21
35 30 1 35 24 7 22 26 21 3 15 4 14 29 8 10 5 27 11 18 19 20 28 9 32 2 25 34 33 31 12 16 17 23 6

Sample Output
26
13

Your uncle Ted owns a very successful store, but he is not good in math. Ted is considering selling his entire inventory at a discount. Write a program to determine the sale price for three discount rates, and the amount of the discount. By the way, Uncle Ted is very finicky and wants to see the information formatted exactly to his specifications.

Inputs
The first line of input will contain the total value of the inventory, and the second line will contain the three discount rates Uncle Ted is considering.

Outputs
There will be three lines of output. The first line will begin with the words "Discount rate" followed by the discount percentages. The second line will begin with the words "Sale price" followed by the sale prices, and the third line will begin with the word "Discount" followed by the amount of the discounts. Please don't forget how finicky Uncle Ted is about the output format. The below sample output is in the format he demands.

Sample inputs
105434.78
10 20 25

Sample output

Discount rate	10%	20%	25%
Sale price	$94,891.30	$84,347.82	$79,076.08
Discount	$10,543.48	$21,086.96	$26,358.70

Billy, a hard working programmer likes to sleep late on Saturdays. However, the neighborhood children like to play tag on Saturday mornings, and the chant they use to select who is "it" always wakes him up. The selection process goes like this.

The children gather in a circle, with one of them designated the chanter. The chanter points to the child to her left and sings the first word of the chant, then points to the next child in clockwise order and sings the second word of the chant. The child being pointed to when the last word of the chat is sung is removed from the circle. This process is repeated, beginning with the child immediately after (in clockwise order) the eliminated child, until only one child is remaining. That child is "it".

Assuming there are n children in the circle assigned the numbers 1 to n in clockwise order (with the chanter designated 1) and that the chant contains m words, write a program the children can use to determine the order in which the children are eliminated and the child who is "it". Then Billy can get the rest he needs.

Inputs
The first line will contain the number of chants to be sung. This will be followed by one line per chant containing the number of children in the circle, n, and the number of words in the chant, m, separated by a space.

Outputs
There will be two lines of output per chant. The first line will contain the number of children followed by the number of words in the chant. This will be followed by a line containing the childrens' numbers in the order they are removed from the circle followed by the number of the child who is "it". All outputs on a line will be separated by a space.

Sample input
2
11 4
6 3

Sample Output
11 4
5 9 2 7 1 8 4 3 6 11 10
6 3
4 1 5 3 6 2