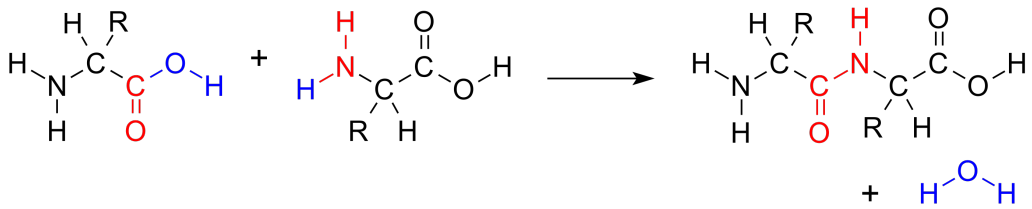
Amino Acids

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

There are 20 kinds of common amino acids in the natural world. In this problem, we only consider 10 of them: Alanine, Asparagine, Aspartate, Cysteine, Glutamine, Glutamate, Glycine, Methionine, Serine and Threonine.

By condensation reaction, n ($n \geq 2$) amino acids can be linked by $n-1$ peptide bonds into a peptide chain and produce $n-1$ water molecules at the same time. Recall that each water molecule has a molecular mass of 18.



Idealized scheme showing condensation of two amino acids to give a peptide bond.

Given a set of different amino acids and a number N, you are asked to print the **structural formula** of all possible peptide chains, with a molecular mass not greater than N, which can be formed by the given amino acids. Chains are considered different if the permutations of amino acids of the chain is different.

Here are the **structural formula** of the 10 amino acids and the peptide bond.

```
Ala:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
    H
```

```
Asp:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
  O=C-O-H
```

```
Asn:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
  O=C-N-H
      |
      H
```

```
Cys:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-S-H
    |
    H
```

```
Gly:
  H H O
  | | ||
H-N-C-C-O-H
    |
    H
```

```
Ser:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-O-H
    |
    H
```

```
Met:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
  H-C-H
    |
    S
    |
  H-C-H
    |
    H
```

```
Thr:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-O-H
    |
  H-C-H
    |
    H
```

```
Gln:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
  H-C-H
    |
  O=C-N-H
      |
      H
```

```
Glu:
  H H O
  | | ||
H-N-C-C-O-H
    |
  H-C-H
    |
  H-C-H
    |
  O=C-O-H
```

```
Peptide bond:
 O   H
 ||  |
-C---N-
```

See below for molecular mass of amino acids.

Amino acid	3-letter symbol	Molecular mass
Alanine	Ala	89
Asparagine	Asn	132
Aspartate	Asp	133
Cysteine	Cys	121
Glutamine	Gln	146
Glutamate	Glu	147
Glycine	Gly	75
Methionine	Met	149
Serine	Ser	105
Threonine	Thr	119

Input

The first line contains two integers M and N ($1 \leq M \leq 10$, $1 \leq N \leq 450$), denoting the number of amino acids and the molecular mass upper bound.

The second line contains M strings, each consisting of 3 letters denoting a kind of amino acid.

Output

In the first line, print a single integer denoting the number of possible peptide chains.

Then print the **structural formula** of every possible peptide chain by the lexicographical order of their 3-letter sequences, separated by a blank line in between.

Example

standard input	standard output

2 150
Ala Gly
	3
	  H H O H H O
	  | | || | | ||
	H-N-C-C---N-C-C-O-H
	  | |
	  H-C-H H
	  |
	  H
	
	  H H O H H O
	  | | || | | ||
	H-N-C-C---N-C-C-O-H
	  | |
	  H H-C-H
	  |
	  H
	
	  H H O H H O
	  | | || | | ||
	H-N-C-C---N-C-C-O-H
	  | |
	  H H