DMOPC '14 Exam Time P3 - Chemistry Homework

Time limit: 1.0s **Memory limit:** 128M

One day your chemistry teacher is very angry at you since you didn't do any of the assigned homework questions — but don't worry, it's not that you're a bad student, it's because she told you that doing homework is dangerous and since you spend all your time programming you were unable to understand her sarcasm.

As punishment, she gives you a stack of structural diagrams of various hydrocarbons. Your task is to calculate the total **bond energy** of all the hydrocarbons. She then decides that you should draw them as well, and so she gives you only a list of the bonds between all the atoms of all of the molecules, in no particular order. In addition to the total **bond energy**, you should also determine the **number and type of atoms** in the compound.

However, you quickly realize that by simply entering the given data you can determine the total **bond energy** and the **number of atoms** by writing a program that calculates it for you using the data below.

> Average bond energies (kJ/mol):
>
> C-H 413
>
> C-C 346
>
> C=C 615

Since all the compounds are hydrocarbons, the only atoms you should worry about are hydrogen and carbon. You also know that a hydrogen atom makes **exactly one** bond while a carbon atom makes **exactly four** bonds and you notice that there are **only single and double bonds** between the carbon atoms in the diagrams. If an atom has **too many** or **not enough** bonds it means that the compound cannot exist and so you should output `Impossible`.

Note: `Impossible` test cases are guaranteed to have another error other than carbon atoms having too many bonds. Assume there will be at least one Carbon and one Hydrogen.

Input Specification

The first line of input will consist of n $(1 \leq n \leq 1\,000)$, the number of atoms in the compound.

The second line of input will consist of m $(1 \leq m \leq 1\,000)$, the number of bonds in the compound.

The next m lines will consist of two integers, a and b $(1 \leq a < b \leq n)$, which represent the bond between two atoms.

Output Specification

There should be two lines of output.

The first line should contain the value of the total bond energy.

The second line should contain the number of atoms in the following format: `CxHy`, where x and y $(x, y \geq 1)$ are the number of carbon and hydrogen atoms respectively. If x or y are equal to one, omit the value; for example, `C1H4`

should be `CH4`.

Sample Input

```
5
4
1 2
1 3
1 4
1 5
```

Sample Output

```
1652
CH4
```