

Hexadecimal Confusion

Problem ID: hexadecimalconfusion
Time limit: 1 second

Addison Hex is an aspiring athlete training for the next mental Olympics. The event Addison wants to compete in is Fast Hexadecimal Addition, but only the top 16 people will make it to the finals. That means a lot of practice from now on!

In Fast Hexadecimal Addition, contestants are shown very quickly a sequence of hexadecimal numbers (up to 4 digits each) and they must correctly give the sum of these numbers at the end in hexadecimal. No numbers will have leading zeros, and the integer 0 will be represented by exactly one 0.

Addison does not have any sponsorship deals, so she is stuck with an old LCD display that will flash the numbers quickly for her to add. Unfortunately, in the standard 7-segment displays, the digits 8 and B look the same. Also, the digits 0 and D look the same. Thankfully all other digits are unambiguous. Instead of finding the exact sum, she will practice by finding both the maximum possible sum and the minimum possible sum based on what she sees. While Addison may see numbers with leading zeros as she tries to record the numbers as quickly as she can, she also knows that the original numbers have no leading zeros and will take that into account in her calculations.

As a reminder, the digits 'A', 'B', ..., 'F' in hexadecimal have equivalent decimal values of 10, 11, ..., 15, respectively.



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Input

The first line contains a positive integer N ($1 \leq N \leq 1000$), which is the number of integers that Addison sees. Each of the next N lines contains a nonnegative integer in hexadecimal, with up to 4 digits. Each digit is one of the decimal digits or an uppercase letter 'A', 'B', 'C', 'D', 'E', 'F'. Each number is recorded based on what Addison sees.

Output

On the first line, output the maximum possible sum in hexadecimal. On the second line, output the minimum possible sum in hexadecimal. There should be no leading zeros in the output, and the integer 0 should be represented by exactly one 0.

Sample Input 1

```
2
ABCD
1038
```

Sample Output 1

```
C908
B8F8
```

Sample Input 2

```
10
1111
2222
3333
4444
5555
6666
7777
9999
1234
2345
```

Sample Output 2

```
2ACEE
2ACEE
```

Sample Input 3

10
1234
8008
6348
2008
ABCD
EFAB
2147
3728
30DB
BDBD

Sample Output 3

450B7
3B6EB

Sample Input 4

4
0012
D012
ABCD
0

Sample Output 4

265FE
248E4