



## 3199 – Specialized Four–Digit Numbers

North America – Pacific Northwest – 2004/2005

Find and list all numbers in decimal notation that have the property that the sum of its digits equals the sum of its digits when represented in hexadecimal (base 16) notation and also equals the sum of its digits when represented in duodecimal (base 12) notation.

For example, the number 2991 has the sum of (decimal) digits  $2 + 9 + 9 + 1 = 21$ . Since  $2991 = 1 \cdot 1728 + 8 \cdot 144 + 9 \cdot 12 + 3$ , its duodecimal representation is  $1893_{12}$ , and these digits also sum up to 21. But in hexadecimal 2991 is  $BAF_{16}$ , and  $11 + 10 + 15 = 36$ , so 2991 should be rejected by your program.

The next number (2992), however, has digits that sum to 22 in all three representations (including  $BB0_{16}$ ), so 2992 should be on the listed output. (We don't want decimal numbers with fewer than four digits – excluding leading zeroes – so that 2992 is the first correct answer.)

### Input

The input from file will contain several possible cases. Each test case consists of a line containing a pair of positive integers, separated by a space. Input will terminate with `0 0' in a line by itself. This line should not be processed.

### Output

For each input case, your output is to be all the numbers between the couple of integers (both included), that satisfy the requirements (in strictly increasing order), each on a separate line with no leading or trailing blanks, ending with a new–line character. Separate the output for consecutive cases by a single blank line.

### Sample Input

```
2991 3000
0 0
```

### Sample Output

```
2992
2993
2994
2995
2996
2997
2998
2999
```

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