

Practice Mode

Contest scoreboard | Sign in

Qualification Round 2016

A. Counting Sheep

B. Revenge of the Pancakes

C. Coin Jam

D. Fractiles

Contest Analysis

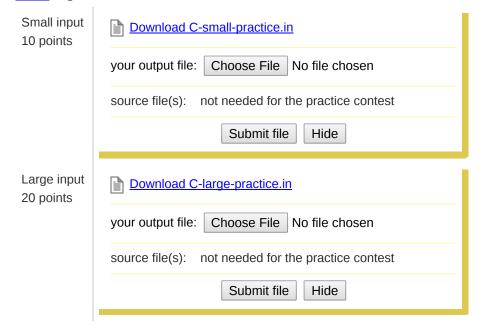
Questions asked 1

Submissions Counting Sheep 7pt Not attempted 26558/29356 users correct (90%) Not attempted 8pt 25729/26216 users correct (98%) Revenge of the Pancakes 10pt Not attempted 22527/23686 users correct (95%) 10pt | Not attempted 21383/22147 users correct (97%) Coin Jam Not attempted 10pt 13361/15342 users correct (87%) 20pt Not attempted **6297/9111 users** correct (69%)Fractiles Not attempted 10pt 8250/9708 users correct (85%)Not attempted 25pt 2356/4955 users correct (48%)

Top Scores	
Lewin	100
Endagorion	100
xiaowuc1	100
xyz111	100
HellKitsune123	100
h4tguy	100
ivan.popelyshev	100
burunduk3	100
Nicolas16	100
ctunoku	100

Problem C. Coin Jam

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the <u>Quick-Start Guide</u> to get started.



Problem

A *jamcoin* is a string of $N \ge 2$ digits with the following properties:

- Every digit is either 0 or 1.
- The first digit is 1 and the last digit is 1.
- If you interpret the string in any base between 2 and 10, inclusive, the resulting number is not prime.

Not every string of 0s and 1s is a jamcoin. For example, 101 is not a jamcoin; its interpretation in base 2 is 5, which is prime. But the string 1001 is a jamcoin: in bases 2 through 10, its interpretation is 9, 28, 65, 126, 217, 344, 513, 730, and 1001, respectively, and none of those is prime.

We hear that there may be communities that use jamcoins as a form of currency. When sending someone a jamcoin, it is polite to prove that the jamcoin is legitimate by including a nontrivial divisor of that jamcoin's interpretation in each base from 2 to 10. (A nontrivial divisor for a positive integer K is some positive integer other than 1 or K that evenly divides K.) For convenience, these divisors must be expressed in base 10.

For example, for the jamcoin 1001 mentioned above, a possible set of nontrivial divisors for the base 2 through 10 interpretations of the jamcoin would be: 3, 7, 5, 6, 31, 8, 27, 5, and 77, respectively.

Can you produce ${\bf J}$ different jamcoins of length ${\bf N}$, along with proof that they are legitimate?

Input

The first line of the input gives the number of test cases, ${\bf T}.~{\bf T}$ test cases follow; each consists of one line with two integers ${\bf N}$ and ${\bf J}.$

Output

For each test case, output J+1 lines. The first line must consist of only Case #x:, where x is the test case number (starting from 1). Each of the last J lines must consist of a jamcoin of length N followed by nine integers. The i-th of those nine integers (counting

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starting from 1) must be a nontrivial divisor of the jamcoin when the jamcoin is interpreted in base i+1.

All of these jamcoins must be different. You cannot submit the same jamcoin in two different lines, even if you use a different set of divisors each time.

Limits

T = 1. (There will be only one test case.) It is guaranteed that at least J distinct jamcoins of length N exist.

Small dataset

N = 16. **J** = 50.

Large dataset

N = 32. J = 500.

Note that, unusually for a Code Jam problem, you already know the exact contents of each input file. For example, the Small dataset's input file will always be exactly these two lines:

1 16 50

So, you can consider doing some computation before actually downloading an input file and starting the clock.

Sample

In this sample case, we have used very small values of $\bf N$ and $\bf J$ for ease of explanation. Note that this sample case would not appear in either the Small or Large datasets.

This is only one of multiple valid solutions. Other sets of jamcoins could have been used, and there are many other possible sets of nontrivial base 10 divisors. Some notes:

- 110111 could not have been included in the output because, for example, it is 337 if interpreted in base 3 (1*243 + 1*81 + 0*27 + 1*9 + 1*3 + 1*1), and 337 is prime.
- 010101 could not have been included in the output even though 10101 is a jamcoin, because jamcoins begin with 1.
- 101010 could not have been included in the output, because jamcoins end with 1.
- 110011 is another jamcoin that could have also been used in the output, but could
 not have been added to the end of this output, since the output must contain
 exactly J examples.
- For the first jamcoin in the sample output, the first number after 100011 could not have been either 1 or 35, because those are trivial divisors of 35 (100011 in base 2).

5/16/2016

