

Round B APAC Test

- [A. Password Attacker](#)
- [B. New Years Eve](#)
- [C. Card Game](#)
- D. Parentheses Order**

Questions asked 1

Submissions

Password Attacker

8pt	Not attempted 736/1999 users correct (37%)
13pt	Not attempted 352/627 users correct (56%)

New Years Eve

11pt	Not attempted 142/438 users correct (32%)
12pt	Not attempted 116/138 users correct (84%)

Card Game

9pt	Not attempted 750/1147 users correct (65%)
17pt	Not attempted 70/529 users correct (13%)

Parentheses Order

10pt	Not attempted 679/996 users correct (68%)
20pt	Not attempted 59/411 users correct (14%)

Top Scores

Kriiii	100
flashmt	100
adurysk	100
pulkitg10	100
cxlove321	100
Prowindy	100
ariselpy	100
Sakib	100
atony	100
kellynq	100

Problem D. Parentheses Order

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 [Quick-Start Guide](#) to get started.

Small input
10 points

Solve D-small

Large input
20 points

Solve D-large

Problem

An **n** parentheses sequence consists of **n** "("s and **n** ")"s.

A valid parentheses sequence is defined as the following:

You can find a way to repeat erasing adjacent pair of parentheses "()" until it becomes empty.

For example, "()" is a valid parentheses, you can erase the pair on the 2nd and 3rd position and it becomes "", then you can make it empty. ")()(" is not a valid parentheses, after you erase the pair on the 2nd and 3rd position, it becomes ")(" and you cannot erase any more.

Now, we have all valid **n** parentheses sequences. Find the **k**-th smallest sequence in lexicographical order.

For example, here are all valid 3 parentheses sequences in lexicographical order:

((()))
(() ())
(()) ()
() (())
() () ()

Input

The first line of the input gives the number of test cases, **T**. **T** lines follow. Each line represents a test case consisting of 2 integers, **n** and **k**.

Output

For each test case, output one line containing "Case #x: y", where x is the test case number (starting from 1) and y is the **k**-th smallest parentheses sequence in all valid **n** parentheses sequences. Output "Doesn't Exist!" when there are less than **k** different **n** parentheses sequences.

Limits

1 ≤ **T** ≤ 100.

Small dataset

1 ≤ **n** ≤ 10.
1 ≤ **k** ≤ 100000.

Large dataset

1 ≤ **n** ≤ 100.
1 ≤ **k** ≤ 10¹⁸.

Sample

Input	Output
3	Case #1: ()()
2 2	Case #2: ()(())
3 4	Case #3: Doesn't Exist!
3 6	

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