**Group 1**

**Problem 1:** The number, 197, is called a circular prime because all rotations of the digits: 197, 971, and 719, are themselves prime. There are thirteen such primes below 100: 2, 3, 5, 7, 11, 13, 17, 31, 37, 71, 73, 79, and 97. How many circular primes are there below one million?

**Problem 2:** You are playing a game on your cellphone. You are given an array of length n, indexed from 0 to n−1. Each element of the array is either 0 or 1. You can only move to an index which contains 0. At first you are at the 0th position. In each move you can do one of the following things:

* Walk one step forward or backward.
* Make a jump of exactly length m forward.

That means you can move from position x to x+1, x−1 or x+m in one move. The new position must contain 0. Also you can move to any position greater than n-1.

You can't move backward from position 0. *If you move to any position greater than*n−1*, you win the game.* Given the array and the length of the jump, you need to determine if it's possible to win the game or not.

**Input Format**

In the first line there will be an integer T denoting the number of test cases. Each test case will consist of two lines. The first line will contain two integers, n and m. On the second line there will be n space-sperated integers, each of which is either 0 or 1.

*Constraints:*

1<=T<=5000  
2≤n≤100  
0≤m≤100  
The first integer of the array is always 0.

**Output Format**

For each case output "YES" if it's possible to win the game, output "NO" otherwise.\

**Sample Input**

3

5 3

0 0 0 0 0

6 5

0 0 0 1 1 1

6 3

0 0 1 1 1 0

**Sample Output**

YES

YES

NO

**Group 2**

**Problem 1:** If the numbers 1 to 5 are written out in words: one, two, three, four, five, then there are 3 + 3 + 5 + 4 + 4 = 19 letters used in total.

If all the numbers from 1 to 1000 (one thousand) inclusive were written out in words, how many letters would be used?

**NOTE:** Do not count spaces or hyphens. For example, 342 (three hundred and forty-two) contains 23 letters and 115 (one hundred and fifteen) contains 20 letters. The use of "and" when writing out numbers is in compliance with British usage.

**Problem 2:** Write a class called *myRegex* which will contain a string pattern. You need to write a regular expression and assign it to the pattern such that it can be used to validate an IP address. Use the following definition of an IP address:

IP address is a string in the form "A.B.C.D", where the value of A, B, C, and D may range from 0 to 255. Leading zeros are allowed. The length of A, B, C, or D can't be greater than 3.

Some valid IP address:

000.12.12.034

121.234.12.12

23.45.12.56

Some invalid IP address:

000.12.234.23.23

666.666.23.23

.213.123.23.32

23.45.22.32.

I.Am.not.an.ip

**Group 3**

**Problem 1:** Using names.txt, a 46K text file containing over five-thousand first names, begin by sorting it into alphabetical order. Then working out the alphabetical value for each name, multiply this value by its alphabetical position in the list to obtain a name score.

For example, when the list is sorted into alphabetical order, COLIN, which is worth 3 + 15 + 12 + 9 + 14 = 53, is the 938th name in the list. So, COLIN would obtain a score of 938 × 53 = 49714.

What is the total of all the name scores in the file?

**Problem 2:** You are given n real numbers, sort them in descending order! Read data from *System.in*.

**Input Format**

The first line will consist an integer n, each of the next n lines will contain a real number. nwill be at most 200. The numbers can have at most 300 digits!

**Output Format**

Print the numbers in descending orders, one number in each line.

**Sample Input**

5

-100

50

0

56.6

90

**Sample Output**

90

56.6

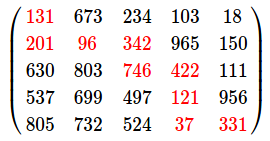
50

0

-100

**Group 4**

**Problem 1:** In the 5 by 5 matrix below, the minimal path sum from the top left to the bottom right, by only moving to the right and down, is indicated in bold red and is equal to 2427.



Find the minimal path sum, in matrix.txt, a 31K text file containing a 80 by 80 matrix, from the top left to the bottom right by only moving right and down.

**Problem 2:** Develop a java program using multithreading in which each thread reads the data from a text file and display the data of each file on Console alternatively such that one line from first input file is printed and then one line from another input file is printed and so on.