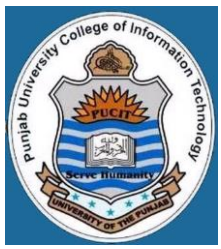

PROBLEM SET

Third Junior

Programming Competition Fall 2017

Computer Society New Campus

Punjab University

Problem A
Middle Divisor

An integer may have zero, one or multiple divisors excluding 1 and integer itself. In case integer I **(2≤ I ≤5000)** has multiple divisors you have to find middle of them, if I has only one divisor that is automatically middle divisor. In case I is prime and has no divisor print 1. If count of divisors is even, there will be 2 middle values, you have to pick first middle. For example, in case of 12, we have 2, 3, 4 & 6 as divisors; where 3 & 4 are in middle. In this case we will pick 3.

Input

The input file "in1.txt" consists of N sets of integers. The first line is the number of **integers N (1≤ N ≤5000)**. After that **N** integers are given in N lines**.**

Output

For each integer print middle divisor or 1, if there is no divisor other than 1 and itself.

Sample Input
3
12
72
47
Sample Output:
3
8
1

Problem B

Finest Division

For a quiz competition, Mr. Smart want to divide class into two groups such that each group has minimal difference between of collective IQ. Each student has some IQ level where IQ **(0≤ IQ ≤100)**. Mr. Smart also want to keep students in their sequence, therefore, he has to find some specific point where he can divide class into two groups such that all students on left side of point will be in first group and all students in right side of group will be in second group. You have to find the point starting from 1. For example, if the IQ of class is 5,5,7,9,9,4,9,4,6, 9 the finest division will be at 5^{th} position. Where students 1 to 5 will be in first group with collective IQ 35 and students from 6 to 10 will be in second group with collective IQ 32.

Input

The input file "in2.txt" consists of C list of classes. The first line is the number of **integers C (1≤ C ≤50)**. After that **C** lines have C lists of class IQ started with number of students in class**.** Next each line starts from **N (3≤ N ≤50)** followed by N IQs.

Output

For each list of class IQs print number of students in first group.

Sample Input
2
10 5 5 7 9 9 4 9 4 6
8 8 7 7 4 2 4 4 6
Sample Output:
5
3

Problem C

Prime Powers

Mr. Researcher is badly stuck in his research. Somehow he wants to do some observation by representing integers as sum of prime powers like $8=2^3$ where 2 is a prime number. For each integer, prime numbers are started from 2 to onwards and power of prime is considered if its value is equal or most closer to the integer. In next prime number the remaining value of integer is considered. In some cases there may be some number left which is not expressible in any prime power. That number is added at the end. Therefore, $50=2^5+3^2+5^1+4$

Input

The input file "in3.txt" consists of **N** no of integers. The first line is the number **N (1≤ N ≤5000)**. After that **N** lines have one integer **I** only **(2≤ I ≤5000)**.

Output

For each integer output in one line all prime numbers and their powers & finally write the remaining number if any.

Sample Input

3
50
100
150

Sample Output:

2 5 3 2 5 1 4
2 6 3 3 5 1 4
2 7 3 2 5 1 7 1 1

Problem D
Maximum Fruit Collection

Mr. Fruit is fruit lover. He is left in garden, where plants are planted in grid that is form of rows & columns with equal distance between plants in each direction. Now Mr. Fruit is allowed to collect fruit from each tree on any path starting from lower left corner to upper right corner, he can only move either right or upward according to the grid. See the example grid of 4x4, where 0 on lower left corner is starting point and 0 on upper right corner is ending point. Here Mr. Fruit can collect maximum 30 fruits, if he walks on the bottom line and then in the right most lane upwards.

3	9	7	0
3	1	5	6
4	5	1	4
0	6	6	8

Input

The input file "in4.txt" consists of N Gardens and their plants. The first line is the number of **gardens N (1≤ N ≤50)**. After that there are details of each garden in next N lines. In each line of garden detail there is rows and columns R **(1≤ R ≤10)** and C **(1≤ C ≤10)** followed by **R x C** integers **I (1≤ I ≤9)**. R & C may be different.

Output

For each garden print maximum fruits on any path.

Sample Input

2

4 4 3 9 7 0 3 1 5 6 4 5 1 4 0 6 6 8

6 6 6 3 3 8 4 0 8 3 2 8 9 6 9 1 1 4 8 9 8 1 4 6 3 5 8 5 4 9 2 7 0 3 7 6 5 2

Sample Output:

30

61

Problem E
Largest Number

Find the Largest number with given number of digits and sum of digits. For example sum is 9 & digits are 2. The largest possible number is 90.

Input

The input file "in5.txt" consists of N test cases. The first line is the number of **test cases N (1≤ N ≤50)**. After that, there are N cases in next N lines. Each line of test case has sum and no of digits.

Output

For each test case, write largest number possible with given sum & digits.

Sample Input

2
9 2
20 3

Sample Output:

90
992

Problem E
Largest Number

Find the Largest number with given number of digits and sum of digits. For example sum is 9 & digits are 2. The largest possible number is 90.

Input

The input file "in5.txt" consists of N test cases. The first line is the number of **test cases N (1≤ N ≤50)**. After that, there are N cases in next N lines. Each line of test case has sum and no of digits.

Output

For each test case, write largest number possible with given sum & digits.

Sample Input

2
9 2
20 3

Sample Output:

90
992