One Theorem, One Year

A number is **Almost-K-Prime** if it has exactly **K** prime numbers (not necessarily distinct) in its prime factorization. For example, 12 = 2 * 2 * 3 is an Almost-3-Prime and 32 = 2 * 2 * 2 * 2 * 2 is an Almost-5-Prime number. A number **X** is called **Almost-K-First-P-Prime** if it satisfies the following criterions:

1. X is an Almost-K-Prime and
2. X has **all and only** the first P (P ≤ K) primes in its prime factorization.

For example, if K=3 and P=2, the numbers 18 = 2 * 3 * 3 and 12 = 2 * 2 * 3 satisfy the above criterions. And 630 = 2 * 3 * 3 * 5 * 7 is an example of Almost-5-First-4-Prime.

For a given K and P, your task is to calculate the summation of **Φ(X)** for all integers X such that X is an Almost-K-First-P-Prime.

In mathematics **Φ(X)** means the number of relatively prime numbers with respect to X which are smaller than X. Two numbers are relatively prime if their GCD (Greatest Common Divisor) is 1. For example, Φ(12) = 4, because the numbers that are relatively prime to 12 are: 1, 5, 7, 11.

Input

Input starts with an integer **T (≤ 10000)**, denoting the number of test cases.

Each case starts with a line containing two integers **K (1 ≤ K ≤ 500)** and **P (1 ≤ P ≤ K)**.

Output

For each case, print the case number and the result modulo **1000000007**.

Example

Input:

```
3
3 2
5 4
99 45
```

Output:

```
Case 1: 10
Case 2: 816
Case 3: 49939643
```