1298 – 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-Pime**.

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**.

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**.

Sample Input	Output for Sample Input
3 3 2 5 4 99 45	Case 1: 10 Case 2: 816 Case 3: 49939643

Note

1. 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.
2. For the first case, **K = 3** and **P = 2** we have only two such numbers which are **Almost-3-First-2-Prime**, 18=2*3*3 and 12=2*2*3. The result is therefore, **Φ(12) + Φ(18) = 10**.