Basic Blooms

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

In a hidden realm where numbers dance and bases intertwine, there exists a garden of exquisite beauty known as the Number Garden. Within its vibrant meadows, a unique species of flowers flourishes—the Basic Bloom.

Each Basic Bloom flower contains some petals. Basic Blooms are unique because their number of petals can be expressed as a sequence of a single digit **one or more times**, in **at least one base** between 2 and 16 (inclusive). Digits beyond 9 are represented in lexicographic order of the English alphabet. Specifically, 10 is represented as `a`, 11 as `b`, 12 as `c` and so on.

For example:

- a flower with 14 petals is a Basic Bloom because 14 can be represented as 22 in base 6 or `e` in base 15.
- a flower with 10 petals is a Basic Bloom because 10 can be represented as 11 in base 9.
- a flower with 931 petals is a Basic Bloom because 931 can be represented as 777 in base 11.
- a flower with 1570 petals is a Basic Bloom because 1570 can be represented as `aaa` in base 12.

Notably, and for each positive integer x that can be expressed as a single digit in at least one base between 2 and 16, there is at least one Basic Bloom with x petals. Also, no two Basic Blooms have the same number of petals.

The Guardians of the Garden, seeking to share the wonders of this numerical symphony, have issued a challenge to code wizards across the realms. They seek those who can harness the power of algorithms and traverse the Garden's mathematical pathways.

The challenge is as follows: Arrange all the Basic Bloom flowers in increasing order of number of petals. Given k_1 and k_2, find the **sum of the number of petals** from the k_1th flower to the k_2th flower modulo 998244353.

In other words, let p_i denote the number of petals in the ith flower. Find the sum of p_i for i from k_1 to k_2 modulo 998244353.

Input

The first line of of the input contains an integer t denoting the number of test cases.

Each test case is a single line containing two space-separated integers k_1 and k_2.

- $1 \leq t \leq 10^6$
- $1 \leq k_1 \leq k_2 \leq 10^6$

Output

For each test case, print a single line containing the answer as described in the statement.

Example

standard input	standard output
3 1 2 1 10 15 2000	3 55 736374621

Note

The first few Basic Blooms have the following number of petals:

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20,
21, 22, 24, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 39, 40, 42, 43,
44, 45, 48, 50, 51, 52, 54, 55, 56, 57, 60, 62, 63, 64, 65, 66, 68,
70, 72, 73, 75, 77, 78, 80, 84, 85, 86, 88, 90, 91, 93, 96, 98, 99,
...]
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