Statement Submissions Questions

Fortunately, in the Alpha universe there are some wormholes which shorten the distances by acting as tunnels connecting Earth to different planets. To travel from Earth to a distant planet which is X googolplex meters away, you would need to take the wormhole Y to shorten the distance. In this universe, the time t, in seconds, spent in the wormhole is given by the formula $t = (X^{\text{googolplex}+T})$ mod 10^Y where T is the time of the day (the time in seconds after 12:00 UTC).

For example, if a planet is 5 googolplex meters away and is using wormhole 2, then the time spent in wormhole is given by $t = (5^{\text{googolplex}+T})$ mod 10^2 seconds at the time of day T. Output the minimum time spent in the wormhole by determining the optimal time of day T.

For example, at time of the day $T = 10$, the time spent in the wormhole is $(5^{googolplex+10})$ mod 10^2 . T can vary from 0 to 86399.

Standard input

The first line contains an integer N, the number of test cases.

Each of the next N lines contains two integers X and Y.

Standard output

Output a single integer for each test case denoting the minimum time spent in the wormhole.

Constraints and notes

- $1 \leq N \leq 20$
- $1 \leq X \leq 10^8$
- $1 \leq Y \leq 9$
- $0 \leq T \leq 86399$

Input	Output	Explanation
1 2 4	16	There is 1 test case. The distant planet is 2 googolplex meters away and the wormhole used to travel is 4. Hence, the distance is ($2^{googolplex+T}$) mod 10^4. The minimum time is 16 seconds when time of day $T = 4$.
3 5 1 100 3 3 5	5 0 1	There are 3 test cases. The expected outputs are `5` , `0` , and `1` .

WORKSPACE / SUBMIT