

Super Amoeba

Peter has an amoeba farm with pretty much unlimited amoebae. After years of research, Peter created a device to convert some amoebae to super amoebae. However, his device can only be used once. Every day, a super amoeba will split into M super amoebae ($2 \leq M \leq 100000$).

Now, Peter plan his amoeba selling business. Initially, Peter converts X amoebae to super amoebae ($X \geq 1$). Every day after the amoebae split, Peter will take Y super amoebae for sale ($Y \geq 1$). After N days, Peter want all of his amoebae to be completely sold out ($1 \leq N \leq 100000$). Since the energy needed to convert amoebae is quite massive, X must be as small as possible. Help peter plan his business!

Input

First line is T , number of test cases ($T \leq 100000$). Next T lines each contains M and N separated by space.

Output

For each case, output X and Y separated by space. Since X and Y can be very large, output them with modulo 1000000007.

Example

Input:

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1
4 3
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Output:

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21 64
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Explanation

Initially, Peter has 21 super amoebae.

After day 1, there are $4 \times 21 - 64 = 20$ super amoebae

After day 2, there are $4 \times 20 - 64 = 16$ super amoebae

After day 3, there are $4 \times 16 - 64 = 0$ super amoeba

All the super amoebae are sold out after the 3rd day just as planned.