Binary Input and Output

Your task is to compute natural logarithm for real parameter **X** with absolute or relative error less than 10^{-12}.

Input

Array of doubles in binary format (use fread in C/C++)

$10^{-12} \leq$ **X** $\leq 10^{12}$. There will be up to 1,000,000 numbers in array.

Output

Array of doubles in binary format (use fwrite in C/C++)

For each number in input you should output the corresponding answer.

Example

Input:
1
10

Output:
0
2.30258509299404568401799145468441

Note: Sample input and output are readable for your convenience!!!

Arrays in memory and in input are byte-to-byte identical.

To read double a use fread(&a, sizeof(a), 1, stdin) instead of scanf("%lf", &a) until the end of file.

To write double a use fwrite(&a, sizeof(a), 1, stdout) instead of printf("%lf\n", a).