Stiff ODEs

Input file:	standard input
Output file:	standard output
Time limit:	10 seconds
Memory limit:	512 megabytes

The simplest example of oscillating chemical system is the Oregonator[1], which consists of the following reactions:

$$\frac{dX}{dt} = k_1 AY - k_2 XY + k_3 AX - 2k_4 X^2$$

$$\frac{dY}{dt} = -k_1 AY - k_2 XY + k_5 BZ$$

$$\frac{dZ}{dt} = 2k_3 AX - k_5 BZ$$

$$\frac{dP}{dt} = k_1 AY + 2k_2 XY + k_4 X^2$$

$$\frac{dA}{dt} = -k_1 AY - k_3 AX + k_4 X^2$$

$$\frac{dB}{dt} = -k_5 BZ$$

Classically, X is $HBrO_2$, Y is Br^-, Z is $Ce(IV)$, A is BrO_3^-, B is $CH_2(COOH)_2$, and P is either $HOBr$ or $BrCH(COOH)_2$. But that does not matter to you.

The reaction rates will always be within order of magnitude from their respective values in the example input file.

Input

The first line contains a single integer number $T = 1...1000$ – how long we will run our virtual reactor.

The second line contains six floating-point values – the initial concentrations of X, Y, Z, A, B, and P.

The third line contains five floating-point values – the reaction rate constants $k_1,...,k_5$.

Output

The output should contains six floating-point values – the final concentrations of X, Y, Z, A, B, and P. Required precision is 10^{-6}

[1] http://www.scholarpedia.org/article/Oregonator