1. In a city there are *n* bus drivers. Also there are *n* morning bus routes and *n* afternoon bus routes with various lengths. Each driver is assigned one morning route and one evening route. For any driver, if his total route length for a day exceeds *d*, he has to be paid overtime for every hour after the first *d* hours at a flat *r* dollar / hour. Your task is to assign one morning route and one evening route to each bus driver so that the total overtime amount that the authority has to pay is minimized.

Input
The first line of each test case has three integers *n*, *d* and *r*, as described above. In the second line, there are *n* space separated integers which are the lengths of the morning routes given in meters. Similarly the third line has n space separated integers denoting the evening route lengths. The lengths are positive integers less than or equal to 10000. The end of input is denoted by a case with three 0's.

Output
For each test case, print the minimum possible overtime amount that the authority must pay.

Constraints
• $1 \le n \le 100$
• $1 \le d \le 10000$
• $1 \le r \le 5$

Sample Input
2 20 5
10 15
10 15
2 20 5
10 10
10 10
0 0 0

Sample Output
50
0

1

2. Most recent researches on Neuroanatomy have permitted us of identifying a series of large electric signal transmission route connecting different areas of the brain. Even more, it has been found that if one slept area *X* of the brain is directly connected to at least three awake areas for a year, the *X* area will wake up. There is evidence of when an area *X* of the brain wakes up, it remains awake. Let *A*, *B*, *C*, . . . the different areas of the brain and let's imagine a brain with some initially slept areas, interconnected one another. If three of these areas wake up by direct stimulation according to the previous researches, how many years will all the slept areas take to wake up?

Input

The input file contains several test cases, each of them as described below. There is a blank line between two consecutive inputs.
-   The first line of the input is an integer, $3 \leq N \leq 26$, that indicates the number of slept areas.
-   The second line of the input is an integer $M \geq 0$, that indicates the number of connections (if A is connected to B, then B is connected to A, but it counts only once).
-   The third line consists of three characters that indicate which areas have wake up by direct stimulation.
-   The remaining M lines consist of two characters each one, that indicate the different connections between areas of the brain, one line per connection.

Output

The output is only one line with one of the following text messages:
`THIS BRAIN NEVER WAKES UP'
`WAKE UP IN, *n*, YEARS', where *n* is the number of the years all the brain has taken to wake up.

Sample Input
6
11
HAB
AB
AC
AH
BD
BC
BF
CD
CF
CH
DF
FH

Sample Output
WAKE UP IN, 3, YEARS