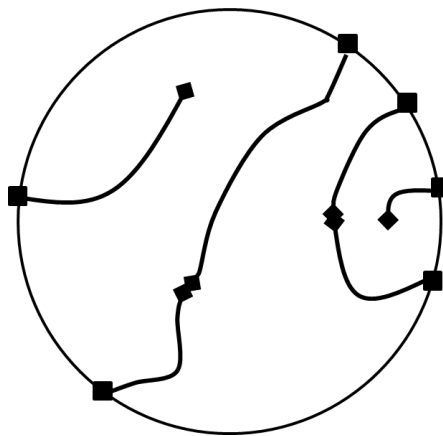


Snake Generator

A master physicist who is also famous for his inventions with electricity recently studied biology and made a huge discovery. He found out that an enormous amount of electricity is generated when two snakes meet. So, this physicist/engineer/biologist built a generator like the following. A circular area is built with N starting points at the edges of this area. At each starting point one male or female snake will start moving around. If two snakes meet by their heads then electricity is generated. One interesting fact is that only a male snake and a female snake ever meet. That is, other ways of snakes meeting, like 3 snakes, male and male snakes, female and female snakes, and such will never happen. Another interesting fact is that when two snakes meet and electricity is generated, they stay connected forever. The snakes are infinitely long in any practical sense and no snake will ever go over another snake. So, the two snakes that have not met another snake in the picture below will never meet one.



The snakes are numbered from 1 to N and they are initially located at the starting points in that order. The i -th snake has energy factor $P(i)$, and when the i -th and the j -th snake meet the amount of electricity generated will be $P(i)*P(j)$. Of course, one of them is male and another is female.

Write a program, given the number N of snakes and the energy factor and gender of each snake, to calculate the maximum possible amount of energy generated.

[Input]

The first line of input file contains the number T of test cases. ($T \leq 300$) The first line of each test case contains the number N of snakes. ($1 \leq N \leq 2,000$) The next line contains the energy factor of the snakes, that is, the i -th value is $P(i)$. Any given $P(i)$ is of integer type and the value is between 1 and 1,000, inclusive. The next line contains the genders of the snakes, that is, if the i -th value is 0 then the i -th snake is male and if the i -th value is 1 then the i -th snake is female.

The input is given in 4 sets as follows.

- Set 1: $2 \leq N \leq 16$ and exactly 2 of the snakes are female.
- Set 2: $1 \leq N \leq 16$
- Set 3: $1 \leq N \leq 200$ and there are at most 50 female snakes.
- Set 4: $1 \leq N \leq 2,000$ and there are at most 50 female snakes.

[Output]

For each test case, print the maximum possible amount of electricity generated.

[I/O Example]

Input

```
1
4
1 8 2 9
1 0 1 0
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Output

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26
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