Problem B - First Incident

The financial trouble of the merchant guilds did not arise for no good reason. As alluded to in Assignment 1 Problem G, the economy of Eftal has been deteriorating. Not surprisingly, as one of the guilds that borrowed heavily, the Maximum Wolf Trade Syndicate (MWTS) has been in a tight financial situation for a while.

Just why did MWTS borrow so heavily? Certainly as one of the most powerful guilds, the decision makers were not stupid. In fact, the suspicions of the Guardians of Eftal (A1 Problem G) were not entirely baseless. While a full network of tunnels would have been prohibitively costly, MWTS stood to gain enormous cost advantage from surreptitiously constructing a key part of the network for smuggling illegal magical items.

MWTS has constructed a sequence of $n-1$ tunnels connecting n key warehouses together in a linear chain. The warehouses are heavily fortified, but the tunnels, while deep underground, are not manned.

Since the tunnels are sufficiently deep and its coordinates are magically obfuscated, the only weapon that can effectively target and destroy them are Magical Detonation Devices (MDD's, an illegal magical item manufactured by the MWTS). It is known that one MDD can destroy one segment of the tunnel.

Just as they thought they were safe, they received some terrible news! A terrorist organization has stolen exactly m MDD's and is planning to wreck havoc! Protection must be deployed quickly!

Each warehouse has been assigned a Strategic Value, and the Strategic Value of the entire tunnel is the sum of the product of the Strategic Value of each pair of warehouses that are connected. For example, in the following tunnel network, the Strategic Value is $1 \cdot 5 + 1 \cdot 6 + 1 \cdot 2 + 5 \cdot 6 + 5 \cdot 2 + 6 \cdot 2 = 65$.

Figure 1: A example of a tunnel network. With one MDD, the enemy would achieve the most damage by destroying the middle tunnel (red).

If the middle tunnel is destroyed, the Strategic Value reduces to $1 \cdot 5 + 6 \cdot 2 = 17$, but if the left tunnel is destroyed, the Strategic Value reduces to $5 \cdot 6 + 5 \cdot 2 + 6 \cdot 2 = 52$. The enemy would prefer the middle tunnel.

MWTS has asked you to help answer a very important question: what is the worse case scenario of an enemy attack? In other words, what's the minimum Strategic Value that an enemy can achieve with m MDD's?

Input

The first line contains a single integer, T, denoting the number of test cases.

Each test cases starts with a line of two integers, n and m ($1 \leq n \leq 1000, 0 \leq m < n$), representing the number of warehouses and the number of MDD's the enemy has, followed by a line with n integers between 1 and 6 describing the Strategic Value of each warehouse in sequence.

Output

For each test case, output the minimum achievable Strategic Value in a single line.

Sample Input

```
3
4 1
1 5 6 2
4 2
1 5 6 2
20 5
1 6 5 4 3 5 6 5 2 5 2 1 2 3 4 5 1 2 2 2
```

Sample Output

```
17
5
230
```

Sample Input Explanation

In the first sample test case, we have one MDD, so the optimal way is to use it to destroy the tunnel between the second and third warehouses. The remaining sets of connected warehouses have strategic values (1, 5) and (6, 2) so the strategic value is then $1 \cdot 5 + 6 \cdot 2 = 17$.

In the second sample test case, we have two MDDs, so the optimal choice is to destroy the tunnel between warehouse 2 and 3, and the link between warehouse 3 and 4. The only remaining connected set of more than one warehouse is warehouse 1 and 2, so the strategic value is $1 \cdot 5 = 5$.

In the third sample test case, the optimal way is to destroy the tunnels between the warehouse pairs 3-4, 6-7, 8-9, 11-12, 15-16. The remaining connected sets of warehouses have strategic values $(1, 6, 5)$, $(4, 3, 5)$, $(6, 5)$, $(2, 5, 2)$, $(1, 2, 3, 4)$, $(5, 1, 2, 2, 2)$. The total strategic value is then $41 + 47 + 30 + 24 + 35 + 53 = 230$.