Problem E - Apple Growing

Daniel bought some magic apple tree growing powder and he's applying it on some of his apple trees. His apple trees are in fact binary trees, where each leaf produces a certain amount of nutrients.

You can think of the branches as edges of the tree. These branches limit the maximum amount of nutrients that can flow to the root of the tree. Daniel can use his magic apple tree growing powder to increase the thickness of an edge or the nutrient production of a leaf node. Initially each branch has a weight of 1 and if you apply g units of growth powder, then it can transport $(1 + g)^2$ nutrients. Increasing the nutrient production on a leaf with initial value a_k with s units of the apple grow increases the nutrient production to $a_k + s$.

Notice that when edges meet, the total nutrient flow is the sum of nutrients flowing along the incoming edges towards the root.

Help Daniel figure out the best way to grow his trees with his magic powder by maximizing the amount of nutrients the tree can transport to the root.

Input

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

Each test case begins with three space seperated integer ℓ ($1 \leq \ell \leq 55$) denoting the number of leaves in the tree, m ($0 \leq m \leq 110$) the number of branches in the tree, and x ($1 \leq x \leq 2500$) the amount of apple tree growing growth powder Daniel has. On the next line is a single line with ℓ integers $a_0, a_1, ..., a_{\ell-1}$ ($0 \leq a_i \leq 10000$) denoting the amount of nutreients that each leaf produces. This is followed by m lines with two integers a b ($0 \leq a, b \leq 110$) denoting that there is an edge between the a and b.

Note that a node with label i is a leaf if $0 \leq i < 55$ and produces a_i nutrients. The node labeled 55 is the root of the graph. All other vertices are internal vertices of the tree.

It is guarenteed that the tree is a perfect binary tree and that a node labeled with 55 is in the graph.

Output

For each test case ouput a single integer on its own line denoting the maximum amount of nutrients that can flow to the root of the tree.

Sample Input

```
2
2 2 0
100 100
55 0
55 1
2 2 50
100 100
55 0
55 1
```

Sample Output

```
2
230
```