Problem H

Harvest Season

Windarik owns a large apple farm, and there are M ripe apples ready to be picked in his farm. Windarik's farm can be represented in a Cartesian plane where each apple is located at $(x_j,\ y_j)$ coordinate. To help him in harvesting, Windarik has bought N apple-picker machines, which can be used to automatically pick any specified apples (programmed). Each machine can also be moved.

To pick an apple at $(x_a,\ y_a)$, a machine at $(x_b,\ y_b)$ requires an energy of:

$$(|x_a - x_b| + |y_a - y_b|) * B$$

To move a machine from $(x_c,\ y_c)$ to $(x_d,\ y_d)$, it requires an energy of:

$$(|x_c - x_d| + |y_c - y_d|) * A$$

Unfortunately, due some technical difficulties, each machine can only be placed and moved along x-axis (y = 0). Initially, each machine is located at $(x_i,\ 0)$.

Each machine can be programmed to pick a certain number of apples. However, it comes with a fatal drawback. Once the machine is started, it cannot be stopped (or moved) until it finished picking all the programmed apples, and once it stopped, it cannot be used for another 6 months, which means it will miss the entire harvest season.

Windarik needs to minimize the total required energy to harvest all the apples, after all, more energy means higher cost, and it's bad for business. Help Windarik to determine the minimum total energy required to harvest all the apples.

For example, let there be 2 apple-picker machines at (2, 0) and (7, 0), and 4 apples at (3, 4), (5, 2), (6, 3), and (6, 7) as depicted in Figure 1. Let A be 1 and B be 100, then the minimum total energy can be obtained by moving machine at (2, 0) to (3, 0) and machine at (7, 0) to (6, 0) as shown in Figure 2.

- Move a machine from (2, 0) to (3, 0): (|2 – 3| + |0 – 0|) * 1 = 1.
- Move a machine from (7, 0) to (6, 0): (|7 – 6| + |0 – 0|) * 1 = 1.
- Apple at (3, 4) picked by machine at (3, 0): (|3 – 3| + |4 – 0|) * 100 = 400.
- Apple at (5, 2) picked by machine at (6, 0): (|5 – 6| + |2 – 0|) * 100 = 300.
- Apple at (6, 3) picked by machine at (6, 0): (|6 – 6| + |3 – 0|) * 100 = 300.
- Apple at (6, 7) picked by machine at (6, 0): (|6 – 6| + |7 – 0|) * 100 = 700.

The total required energy is: 1 + 1 + 400 + 300 + 300 + 700 = 1702.

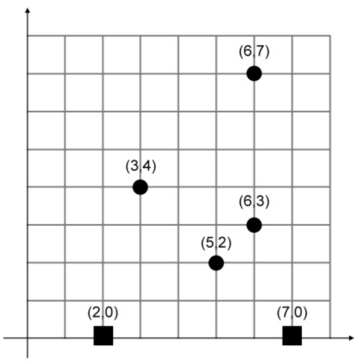

Figure 1.

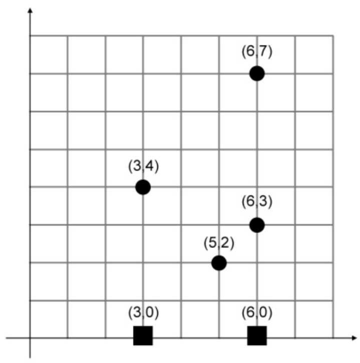

Figure 2.

Input

The first line of input contains an integer T ($T \leq 100$) denoting the number of cases. Each case begins with four integers: N ($1 \leq N \leq 100$), M ($1 \leq M \leq 500$), A ($1 \leq A \leq 10^6$), B ($1 \leq B \leq 10^6$) in a line, denoting the number of machines, the number of apples, the constant multiplier for moving a machine, and the constant multiplier for picking an apple, respectively. The following line contains N integers x_i ($0 \leq x_i \leq 10^6$) separated by single space, representing the initial x-position of each machine. The next M lines each contain two integers x_j and y_j ($0 \leq x_j, y_j \leq 10^6$) representing the position of an apple.

Output

For each case, output "`Case #X: Y`" (without quotes) in a line where `X` is the case number (starts from 1), and `Y` is the minimum total energy required to harvest all the apples.

Sample Input	Output for Sample Input
4 2 4 1 100 2 7 3 4 5 2 6 3 6 7 2 4 100 1 2 7 3 4 5 2 6 3 6 7 3 3 2 2 1 4 10 4 5 8 2 9 6 4 1 15 30 2 15 10 40 12 3	Case #1: 1702 Case #2: 21 Case #3: 30 Case #4: 120

Explanation for 2nd sample case

The position of all apples and machines are equivalent to those in 1st sample case; however, in this case, the constant multiplier for moving a machine is 100, while the constant multiplier for picking an apple is 1. In this case, it's much better not to move the machines and pick all the apples from machine which require the least energy.