Malaysia's Independence Day – also known as Hari Merdeka – is celebrated each year on 31 August to commemorate the independence of Federation of Malaya from British colonial rule in 1957. During the whole month of August, many Malaysians express their patriotisms and loves toward their country by raising Malaysian flag on their home's balcony and on any vehicles they have (baby stroller included). This independence day celebration is usually incomplete without shouting "Merdeka!" seven times.

For the next year Independence Day celebration, IIUM plans to put up a long banner around IIUM's main campus. The committees want to write meaningful and motivating words in this banner to inspire students (and possibly professors too). To make things interesting, they agree that all words should be written without spaces in one single line. Moreover, they also agree that words are allowed to overlap each other. For example, "WORDER" contains the words: "WORD" and "ORDER". For ease of explanation, let say whatever is written on the banner as text.

The committees have compiled a list of words and assigned each word with a score which will be counted as the text's score for every occurrence of such word in the text. For example, if the value of WORD is 5 and ORDER is 8, then the text WORDER has a score of $5 + 8 = 13$; WORDWORDER has a score of $5 + 5 + 8 = 18$ (notice that WORD occurs twice in this example).

Aside from words, the committees also want each character in the text to appear as fancy as possible, thus, each written character will be specially handcrafted. Of course this cause another problem: handcrafting each character requires additional cost and obviously the committees' budget is limited.

Your task in this problem is to help the committees to determine what text should be written on the banner such that its score is as high as possible while the cost of writing such text is within the given budget. To make things easier, you only need output the score.

Input

The first line contains an integer T ($T \le 30$) denoting the number of cases. Each case begins with three integers in a single line: N ($1 < N \le 26$), M ($1 \le M \le 100$) and B ($10 \le B \le 200$) denoting the number of characters, the number of words, and the committees' budget. The next N following lines each contain one character H_i (A-Z) and one integer C_i ($1 \le C_i \le 3$) which represent the cost of writing one character H_i in the text. You may assume H_i are unique for all $i = 1..N$. The following M lines each contain one word W_i ($1 \le |W_i| \le 100$) and one integer S_i ($1 \le S_i \le 100$) denoting the score of such word. Assume all characters in the given set of words exists among H_i.

Output

For each case, output 'Case #X: Y' (without quotes) in a line where X is the case number, starting from 1, followed by a single space, and Y is the highest possible score which can be obtained in the corresponding case.

Note: Explanation for 1st sample input

The text with highest score is `AAAAA`. There are 4 occurrences of `AA` and 3 occurrences of `AAA`, which makes the score to be $4 * 10 + 3 * 30 = 130$. Writing `AAAAA` requires 5 `A` each costs 2, thus the total cost is 10.

Sample Input

```
2
3 3 10
A 2
B 2
C 3
AA 10
AAA 30
ABC 60
14 8 200
M 2
I 3
R 2
A 1
O 2
E 2
C 2
L 2
F 1
V 2
Y 3
H 1
U 2
N 2
MIRACLE 100
FLUFFY 40
LOVE 100
IVY 10
VEN 30
AYE 20
HOE 10
EURO 80
```

Sample Output

```
Case #1: 130
Case #2: 2600
```