## Sum of polynomials                                    P70952_en

Here we consider sums of polynomials with integer coefficients. For instance, the sum of $12 + 2x - 15x^2 + 4x^3$ and $-1 - 3x + 15x^2 - 2x^4$ is $11 - x + 4x^3 - 2x^4$.

We represent the polynomials with vectors of pairs, with the coefficient and the exponent of a monomial, whenever the coefficient is not zero. The vector is sorted in increasing order by the exponents.

For instance, the polynomial $12 + 2x - 15x^2 + 4x^3$ corresponds to the vector

| 0 | 1 | 2 | 3 |
|:---:|:---:|:---:|:---:|
| $12:0$ | $2:1$ | $-15:2$ | $4:3$ |

and the polynomial $666x - x^{79} + 12x^{191}$ corresponds to the vector

| 0 | 1 | 2 |
|:---:|:---:|:---:|
| $666:1$ | $-1:79$ | $12:191$ |

The following declarations allow us to define polynomials as described:

```
struct Pair {
    int coef;                    // coefficient
    int expo;                    // exponent
};

typedef vector<Pair> Polynomial;        // sorted by exponent
```

Using these definitions, implement the function

```
Polynomial sum(const Polynomial& p, const Polynomial& q);
```

that returns the sum of two given polynomials $p$ and $q$.

### Observation

The main program is already implemented: do not modify it. First, it reads a number $t$. Afterwards, it reads $t$ pairs of polynomials, adds them up and prints the result.

```cpp
#include <iostream>
#include <vector>
using namespace std;


struct Pair {
    int coef;
    int expo;
};


typedef vector<Pair> Polynomial;


Polynomial sum(const Polynomial& p, const Polynomial& q) {
}


void read(Polynomial& p) {
    int n;
    cin >> n;
    p = Polynomial(n);
    char c;
    for (int i = 0; i < n; ++i) cin >> p[i].coef >> c >> p[i].expo;
}


void print(const Polynomial& p) {
    int n = p.size();
    cout << n;
    for (int i = 0; i < n; ++i) cout << " " << p[i].coef << ":" << p[i].expo;
    cout << endl;
}


int main() {
    int t;
    cin >> t;
    for (int i = 0; i < t; ++i) {
        Polynomial p, q;
        read(p);
        read(q);
        Polynomial r = sum(p, q);
        print(r);
    }
}
```

## Sample input

```
10

4 12:0 2:1 -15:2 4:3
4 -1:0 -3:1 15:2 -2:4

4 3:1 8:4 -3:7 5:8
4 3:1 8:4 -3:7 5:8

3 4:0 8:5 6:6
2 3:0 -6:6

2 3:0 -6:6
3 4:0 8:5 6:6

3 2:3 3:18 5:21
3 2:3 -3:18 -5:21

1 1:1000000000
1 1000000000:1

0
0

1 999:666
0

0
1 999:666

1 -999:666
1 999:666
```

## Sample output

```
4 11:0 -1:1 4:3 -2:4
4 6:1 16:4 -6:7 10:8
2 7:0 8:5
2 7:0 8:5
1 4:3
2 1000000000:1 1:1000000000
0
1 999:666
1 999:666
0
```

## Problem information

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