

Safe Add function by checking integer overflow

When we implement add function by operator + in C++, sometimes we face over error - actually system does not show any error and that should be continuously increased, but there is a possibility to change into minus value suddenly.

You can see the same case when you compile and run by below code:

test.cpp

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

int main()
{
    int a;
    for(int b=0; b<10000000; b++) {
        cout << a << "\n";
        a+= 10000000;
    }
}
```

Below safe_add() function enables you to check overflow error:

safe_add.cpp

```
#define INT_MAX 2147483647
#define INT_MIN -2147483648

int safe_add(int &sum, int a, int b) {
    if (abs(a)>INT_MAX-abs(b)) {
        cout << "overflow : " << a << "+" << b << endl;
        return 0;
    }

    sum = a + b;

    return 1;
}
```

Time Complexity : O(1)
Space Complexity: O(1)