MFG Assignment No: 02

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/*Write a program to implement principle of Inclusion and
Exclusion for finding student participation in Sports Club and Music Club in a university survey.The university has 200 students, and the data collected from the survey is as follows:
● 120 students are members of the Sports Club.
● 90 students are members of the Music Club.
● 50 students are members of both the Sports Club and the Music Club.
Using the Inclusion-Exclusion Principle, Perform following tasks :
● The total number of students who are members of at least one of the clubs (either Sports Club, Music Club, or both).
● The number of students who are only members of the Sports Club.
● The number of students who are only members of the Music Club.
● The number of students who are members of neither of the two clubs.*/

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

int main() {
    // Given data
    int totalStudents = 200;
    int sportsClub = 120;
    int musicClub = 90;
    int bothClubs = 50;

    cout << "=== UNIVERSITY CLUB SURVEY ANALYSIS ===" << endl;
    cout << "\nGiven Data:" << endl;
    cout << "Total students in university: " << totalStudents << endl;
    cout << "Students in Sports Club: " << sportsClub << endl;
    cout << "Students in Music Club: " << musicClub << endl;
    cout << "Students in both clubs: " << bothClubs << endl;
```

```
    // Using Inclusion-Exclusion Principle
    cout << "\n=== RESULTS USING INCLUSION-EXCLUSION PRINCIPLE ===" <<
endl;

    // 1. Students in at least one club (A ∪ B) = A + B - A∩B
    int atLeastOneClub = sportsClub + musicClub - bothClubs;
    cout << "1. Students in at least one club: " << atLeastOneClub << endl;

    // 2. Students only in Sports Club (A - B) = A - A∩B
    int onlySports = sportsClub - bothClubs;
    cout << "2. Students only in Sports Club: " << onlySports << endl;

    // 3. Students only in Music Club (B - A) = B - A∩B
    int onlyMusic = musicClub - bothClubs;
    cout << "3. Students only in Music Club: " << onlyMusic << endl;

    // 4. Students in neither club = Total - (A ∪ B)
    int neitherClub = totalStudents - atLeastOneClub;
    cout << "4. Students in neither club: " << neitherClub << endl;
    return 0;
}
```

Output:

```
=== UNIVERSITY CLUB SURVEY ANALYSIS ===

Given Data:
Total students in university: 200
Students in Sports Club: 120
Students in Music Club: 90
Students in both clubs: 50

=== RESULTS USING INCLUSION-EXCLUSION PRINCIPLE ===
1. Students in at least one club: 160
2. Students only in Sports Club: 70
3. Students only in Music Club: 40
4. Students in neither club: 40
```