

ASSIGNMENT NO.4

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A)

CODE:-

```
#include <iostream>

using namespace std;

struct Element {
    int row, col, val;
};

int main() {
    int students = 4, subjects = 4;
    int mat[4][4] = {
        {85, 0, 0, 0},
        {0, 0, 0, 0},
        {0, 0, 0, 92},
        {0, 0, 0, 0}
    };
    cout << "Original Matrix:\n";
    for (int i = 0; i < students; i++) {
        for (int j = 0; j < subjects; j++) {
            cout << mat[i][j] << " ";
        }
        cout << endl;
    }
    // Sparse Representation
    cout << "\nSparse Matrix Representation :\n";
}
```

```

for (int i = 0; i < students; i++) {
    for (int j = 0; j < subjects; j++) {
        if (mat[i][j] != 0) {
            cout << i << " " << j << " " << mat[i][j] << endl;
        }
    }
}

// Average per student
cout << "\nAverage per student:\n";
for (int i = 0; i < students; i++) {
    int sum = 0, count = 0;
    for (int j = 0; j < subjects; j++) {
        if (mat[i][j] != 0) {
            sum += mat[i][j];
            count++;
        }
    }
    if (count > 0)
        cout << "Student " << i+1 << " average = " << (sum / count) << endl;
    else
        cout << "Student " << i+1 << " has no grades\n";
}
}

// Average per subject
cout << "\nAverage per subject:\n";
for (int j = 0; j < subjects; j++) {
    int sum = 0, count = 0;
    for (int i = 0; i < students; i++) {
        if (mat[i][j] != 0) {
            sum += mat[i][j];
        }
    }
    cout << "Subject " << j << " average = " << (sum / count) << endl;
}

```

```

        count++;
    }

}

if (count > 0)
    cout << "Subject " << j+1 << " average = " << (sum / count) << endl;
else
    cout << "Subject " << j+1 << " has no grades\n";
}

return 0;
}

```

OUTPUT:-

Original Matrix:

```

85 0 0 0
0 0 0 0
0 0 0 92
0 0 0 0

```

Sparse Matrix Representation :

```

0 0 85
2 3 92

```

Average per student:

```

Student 1 average = 85
Student 2 has no grades
Student 3 average = 92
Student 4 has no grades

```

Average per subject:

```

Subject 1 average = 85
Subject 2 has no grades
Subject 3 has no grades
Subject 4 average = 92

```