```cpp
//sparse matrix
#include <iostream>
using namespace std;
struct sparse{
	int row;
	int col;
	int value;
};


int main()
{	int r,c,i,j,count;
	count=0;
	int k=1;


	cout<<"Enter r: "<<endl;
	cin>>r;
	cout<<"Enter c: "<<endl;
	cin>>c;
	int arr[r][c];

	//input the matrix
	for(i=0;i<r;i++)
	{	for(j=0;j<c;j++)
		{	cout<<"Enter element arr["<<i<<"]["<<j<<"] of matrix: "<<endl;
			cin>>arr[i][j];
			if(arr[i][j]!=0)
				count++;

		}

	}
	cout<<"The Matrix is:\n\n";

	//print the 2d matrix
	for(i=0;i<r;i++)
	{	for(j=0;j<c;j++)
		{
			cout<<arr[i][j]<<"\t";

		}
		cout<<"\n";
	}
	cout<<"\n";

	//making the sparse matrix
	struct sparse s[count+1];
	s[0].row=r;
	s[0].col=c;
	s[0].value=count;

	for(i=0;i<r;i++)
	{	for(j=0;j<c;j++)
		{	if(arr[i][j]!=0){
				s[k].row=i;
				s[k].col=j;
				s[k].value=arr[i][j];
				k++;

			}
		}
```

```
        //making the sparse matrix
        struct sparse s[count+1];
        s[0].row=r;
        s[0].col=c;
        s[0].value=count;

        for(i=0;i<r;i++)
        {       for(j=0;j<c;j++)
                {       if(arr[i][j]!=0){
                                s[k].row=i;
                                s[k].col=j;
                                s[k].value=arr[i][j];
                                k++;

                        }
                }

        }
        //Displaying sparse matrix
        cout<<"Sparse Matrix is: \n";
        for(i=0;i<(count+1);i++){
                cout<<s[i].row<<" ";
                cout<<s[i].col<<" ";
                cout<<s[i].value<<" ";
                cout<<"\n";
        }

        //Reconstructing matrix using Sparse matrix
        int reconstruct[r][c];
        for(i=0;i<r;i++)
        {       for(j=0;j<c;j++)
                {       reconstruct[i][j]=0;
                }
        }
        for(i=1;i<(count+1);i++){
                reconstruct[s[i].row][s[i].col]=s[i].value;
        }
        //Displaying the reconstructed matrix

        cout<<"\n";
        for(i=0;i<r;i++)
        {       for(j=0;j<c;j++)
                        cout<<reconstruct[i][j]<<"\t";
                cout<<"\n";
        }
}
```

```
dse100@telnet:~/week2$ ./a.out
Enter r:
3
Enter c:
3
Enter element arr[0][0] of matrix:
1
Enter element arr[0][1] of matrix:
2
Enter element arr[0][2] of matrix:
0
Enter element arr[1][0] of matrix:
0
Enter element arr[1][1] of matrix:
0
Enter element arr[1][2] of matrix:
6
Enter element arr[2][0] of matrix:
5
Enter element arr[2][1] of matrix:
8
Enter element arr[2][2] of matrix:
0
The Matrix is:

1       2       0
0       0       6
5       8       0

Sparse Matrix is:
3 3 5
0 0 1
0 1 2
1 2 6
2 0 5
2 1 8

1       2       0
0       0       6
5       8       0
```