```cpp
//diagonal matrix
#include <iostream>
using namespace std;

int main()
{	int r,c,i,j,count;
	count=0;
	int oned[50];
	int k=0;


	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++)
		{	if(i==j){
				cout<<"Enter element arr["<<i<<"]["<<j<<"] of matrix: "<<endl;
				cin>>arr[i][j];
			}
			else
				arr[i][j]=0;

		}

	}
	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<<"The following Matrix can be mapped to a 1D array as follows: \n\n";
	//Map 2d array to 1d array
	for(i=0;i<r;i++)
	{	for(j=0;j<c;j++)
		{	if(arr[i][j]!=0){

				oned[k]=arr[i][j];
				k++;

			}
		}

	}
	//Display 2d array
	for(i=0;i<k;i++)
		cout<<oned[i]<<"\t";
	int m,n,index;

	//Retrieving the elements
```

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  //Display 2d array
  for(i=0;i<k;i++)
          cout<<oned[i]<<"\t";
  int m,n,index;

  //Retrieving the elements
  cout<<"\nEnter the rowno and colno of the element you want to retrive: " ;
  cin>>m>>n;
  index=m;
  cout<<"\nThe element "<<arr[m][n]<<" is present in location "<<index<<endl;
```

```
Enter r:
3
Enter c:
3
Enter element arr[0][0] of matrix:
1
Enter element arr[1][1] of matrix:
2
Enter element arr[2][2] of matrix:
3
The Matrix is:

1       0       0
0       2       0
0       0       3
The following Matrix can be mapped to a 1D array as follows:

1       2       3
Enter the rowno and colno of the element you want to retrive: 1 1

The element 2 is present in location 1
```