Q.1) Write a program to calculate the sum of two matrices each of order 3x3.

```
#include <stdio.h>
int main(int argc, char *argv[])
{
    int count = 0, k = 0, i = 0;
    int arr1[3][3];
    int arr2[3][3];
    int ans[3][3];

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("Enter value arr1[%d][%d]= ", i, j);
            scanf("%d", &arr1[i][j]);
        }
    }

    printf("\n\n");

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("Enter value arr2[%d][%d]= ", i, j);
            scanf("%d", &arr2[i][j]);
        }
    }
    printf("\n\nAnswer :-\n\n");

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            ans[i][j] = arr1[i][j] + arr2[i][j];
            printf("%d ", ans[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Q.2) Write a program to calculate the product of two matrices each of order 3x3.

```
#include <stdio.h>

int main(int argc, char *argv[])
{
    int count = 0, k = 0, i = 0;
    int arr1[3][3];
    int arr2[3][3];
    int ans[3][3];

    for (int i = 0; i < 3; i++)
    {
        for (int j = 0; j < 3; j++)
        {
            printf("Enter value arr1[%d][%d]= ", i, j);
            scanf("%d", &arr1[i][j]);
            ans[i][j] = 0;
        }
    }

    printf("\n\n");
```

```
for (int i = 0; i < 3; i++)
{
    for (int j = 0; j < 3; j++)
    {
        printf("Enter value arr2[%d][%d]= ", i, j);
        scanf("%d", &arr2[i][j]);
    }
}

printf("\n\nAnswer :-\n\n");

while (i < 3)
{
    for (int j = 0; j < 3; j++)
    {
        ans[i][k] = (arr1[i][j] * arr2[j][k]) + ans[i][k];
    }
    printf("%d ", ans[i][k]);

    if (count < 2)
    {
        k = k + 1;
```

```
            count = count + 1;
        }
        else
        {
            i = i + 1;
            k = 0;
            count = 0;
            printf("\n");
        }
    }

    return 0;
}
```

Q.3) Write a program in C to find the transpose of a given matrix.

```
#include<stdio.h>

int main()
{
    int row, col, i=0,j=0;

    printf("How many row = ");
    scanf("%d",&row);

    printf("How many column = ");
    scanf("%d",&col);

    int arr[row][col];
    int brr[col][row];

    for(int i = 0; i<row; i++)
    {
        for(int j = 0; j<col; j++)
        {
            printf("arr[%d][%d] = ", i, j);
        scanf("%d", &arr[i][j]);
     }
  }

printf("\n\ntranspose matrix :- \n\n");

while(j<col)
{
   brr[j][i] = arr[i][j];

   if(i < (row-1))
      i = i+1;
   else
   {
      i=0;
      j=j+1;
   }
}

for(int x=0; x<col; x++)
{
  for(int y = 0; y<row; y++)
     printf("%d ",brr[x][y]);
```

```
      printf("\n");
    }
}
```

Q.4) Write a program in C to find the sum of right diagonals of a matrix.

```
#include<stdio.h>

int main()
{
    int size, col, sum=0;

    printf("Enter size to create matrix = ");
    scanf("%d",&size);

    col=size - 1;

    int arr[size][size];

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
        }
    }

    for(int i = 0; i<size; i++)
    {
        sum = sum + arr[i][col-i];
    }

    printf("\n\nsum of right diagonal = %d", sum);
}
```

Q.5) Write a program in C to find the sum of left diagonals of a matrix.

```
#include<stdio.h>

int main()
{
    int size, col, sum=0;

    printf("Enter size to create matrix = ");
    scanf("%d",&size);

    int arr[size][size];

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
        }
    }
    for(int i = 0; i<size; i++)
    {
        sum = sum + arr[i][i];
    }

    printf("\n\nsum of left diagonal = %d", sum);
}
```

Q.6) Write a program in C to find the sum of rows and columns of a Matrix.

```
#include<stdio.h>

int main()
{
    int size, col, SoR=0, SoC=0;

    printf("Enter size to create matrix = ");
    scanf("%d",&size);

    int arr[size][size];

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
        }
    }
    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        SoR = SoR + arr[i][j];
    }

    printf("\n\n\nSum of row = %d", SoR);

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        SoC = SoC + arr[j][i];
    }
    printf("\n\n\nSum of column = %d", SoC);
}
```

Q.7) Write a program in C to print or display the lower triangular of a given matrix.

```
#include<stdio.h>

int main()
{
    int size, col, SoR=0, SoC=0;

    printf("Enter size to create matrix = ");
    scanf("%d",&size);

    int arr[size][size];

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
        }
    }
    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<=i; j++)
        {
            printf("%d",arr[i][j]);
        }
        printf("\n");
    }
}
```

Q.8) Write a program in C to print or display an upper triangular matrix.

```
#include<stdio.h>

int main()
{
    int size, col, SoR=0, SoC=0;

    printf("Enter size to create matrix = ");
    scanf("%d",&size);

    int arr[size][size];

    for(int i = 0; i<size; i++)
    {
        for(int j = 0; j<size; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
        }
    }
    for(int i = 0; i<size; i++)
    {
        for(int j = i; j<size; j++)
        {
            printf("%d",arr[i][j]);
        }
        printf("\n");
    }
}
```

Q.9) Write a program in C to accept a matrix and determine whether it is a sparse matrix.

```
#include<stdio.h>

int main()
{
    int row, col, count = 0;

    printf("Enter row = ");
    scanf("%d",&row);

    printf("\nEnter column = ");
    scanf("%d",&col);

    int arr[row][col];

    for(int i = 0; i<row; i++)
    {
        for(int j = 0; j<col; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
            if(arr[i][j] == 0)
            {
                count = count + 1 ;
            }
        }
    }

    if(count > (row*col)/2)
    {
        printf("\n\nthis is sparce matrix");
    }
    else
    {
        printf("\n\nthis is not a sparce matrix");
    }
}
```

Q.10) Write a program in C to find the row with maximum number of 1s.

```
#include<stdio.h>

int main()
{
    int row, col, count = 0, max =0;

    printf("Enter row = ");
    scanf("%d",&row);

    printf("\nEnter column = ");
    scanf("%d",&col);

    int arr[row][col];

    for(int i = 0; i<row; i++)
    {
        for(int j = 0; j<col; j++)
        {
            printf("arr[%d][%d] = ", i, j);
            scanf("%d", &arr[i][j]);
            if(arr[i][j] == 1)
            {
                count = count + 1 ;
            }
        }
        if(count > max)
        {
            max = i;
        }
        count = 0;
    }

    printf("\n\nrow with maximum number of 1s = %d", max);
}
```