Assignment - 16

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

```
#include<stdio.h>

int main()
{
   int m1[3][3],m2[3][3],add[3][3],i,j;
   printf("Enter first matrix  9 elements\n");
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
         scanf("%d",&m1[i][j]);
      }
   }
   printf("Enter second matrix  9 elements\n");
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
         scanf("%d",&m2[i][j]);
      }
   }
   printf("Resultant matrix :\n");
   for(i=0;i<3;i++)
   {
      for(j=0;j<3;j++)
      {
         add[i][j]=m1[i][j]+m2[i][j];
         printf("%d ",add[i][j]);
      }
      printf("\n");
   }
   return 0;
}
```

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

```
#include<stdio.h>

int main()
{
   int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;

   printf("enter the number of row=");
   scanf("%d",&r);
   printf("enter the number of column=");
   scanf("%d",&c);
   printf("enter the first matrix element=\n");
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
         scanf("%d",&a[i][j]);
      }
   }

   printf("enter the second matrix element=\n");
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
         scanf("%d",&b[i][j]);
      }
   }

   printf("multiply of the matrix=\n");
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
         mul[i][j]=0;
```

```
            for(k=0;k<c;k++)
            {
                mul[i][j]+=a[i][k]*b[k][j];
            }
        }
    }

    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            printf("%d\t",mul[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

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

```
                #include <stdio.h>

int main()
{
   int m, n, i, j, matrix[10][10], transpose[10][10];
   printf("Enter rows and columns :\n");
   scanf("%d%d", &m, &n);
   printf("Enter elements of the matrix\n");
   for (i= 0; i < m; i++)
      for (j = 0; j < n; j++)
         scanf("%d", &matrix[i][j]);
   for (i = 0;i < m;i++)
      for (j = 0; j < n; j++)

         transpose[j][i] = matrix[i][j];
   printf("Transpose of the matrix:\n");
   for (i = 0; i< n; i++) {
```

```
      for (j = 0; j < m; j++)
         printf("%d\t", transpose[i][j]);
      printf("\n");
   }
   return 0;
}
```

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

```
                #include <stdio.h>

void main()
{
    int i,j,arr1[50][50],sum=0,n;

    printf("Enter the size of the matrix : ");
    scanf("%d", &n);
          printf("Enter the elements matrix :\n");
       for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                    scanf("%d",&arr1[i][j]);
                            if (i==j) sum= sum+arr1[i][j];
            }
        }


           printf("The matrix is :\n");
           for(i=0;i<n;i++)
           {
             for(j=0;j<n ;j++)
               printf("%d ",arr1[i][j]);
              printf("\n");
           }

       printf("Sum of right Diagonal elements is :%d\n",sum);
```

```
    return 0;
}
```

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

```
                #include <stdio.h>

int main()
{
    int i,j,arr1[50][50],sum=0,n,m=0;
          printf("Enter the Size of matrix : ");
     scanf("%d", &n);
     m=n;
          printf("Enter the elements in matrix :\n");
       for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                    scanf("%d",&arr1[i][j]);
            }
        }
           printf("The matrix is :\n");
           for(i=0;i<n;i++)
           {
             for(j=0;j<n ;j++)
               printf("%d ",arr1[i][j]);
              printf("\n");
           }

           for(i=0;i<n;i++)
           {
           m=m-1;
             for(j=0;j<n ;j++)
            {
              if (j==m)
                {
                  sum= sum+arr1[i][j];
```

```
            }

         }
        }
  printf("Sum of left Diagonal elements is :%d\n",sum);
    return 0;
}
```

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

```
                #include <stdio.h>

int main()
{
    int i,j,k,arr1[10][10],rowsum[10],colomnsum[10],n;

    printf("Enter the Size of matrix : ");
    scanf("%d", &n);
        printf("Enter the elements of matrix :\n");
     for(i=0;i<n;i++)
      {
         for(j=0;j<n;j++)
         {
                 scanf("%d",&arr1[i][j]);
         }
      }
        printf("The matrix is :\n");
        for(i=0;i<n;i++)
        {
          for(j=0;j<n ;j++)
            printf("%d ",arr1[i][j]);
           printf("\n");
        }

    for(i=0;i<n;i++)
    {
         rowsum[i]=0;
```

```
        for(j=0;j<n;j++)
        rowsum[i]=rowsum[i]+arr1[i][j];
    }

     for(i=0;i<n;i++)
     {
          colomnsum[i]=0;
          for(j=0;j<n;j++)
                colomnsum[i]=colomnsum[i]+arr1[j][i];
     }

     printf("sum of rows and columns of the matrix is :\n");
     for(i=0;i<n;i++)
     {
           for(j=0;j<n;j++)
              printf("%d ",arr1[i][j]);
           printf("%d ",rowsum[i]);
           printf("\n");
      }
      printf("\n");
            for(j=0;j<n;j++)
           {
                printf("%d ",colomnsum[j]);
           }
          printf("\n\n");
   return 0;
 }
```

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

```
                #include <stdio.h>

int main()
{
  int arr1[10][10],i,j,n;
  float d=0;
```

```
    printf("Enter the Size of matrix : ");
     scanf("%d", &n);
          printf("Enter the elements in matrix :\n");
       for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                scanf("%d",&arr1[i][j]);
            }
        }
           printf("The matrix is :\n");
           for(i=0;i<n;i++)
           {
             for(j=0;j<n ;j++)
               printf("%d ",arr1[i][j]);
              printf("\n");
           }

   printf("\nLower triangular matrix\n");
   for(i=0;i<n;i++){
      printf("\n");
      for(j=0;j<n;j++)
           if(i<=j)
             printf("%d ",arr1[i][j]);
           else
             printf("%d ",0);
  }
       printf("\n\n");
       return 0;
}
```

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

```
                #include <stdio.h>

int main()
{
```

```
  int arr1[10][10],i,j,n;
  float d=0;

    printf("Enter the Size of matrix : ");
    scanf("%d", &n);
    printf("Enter the elements in matrix :\n");
       for(i=0;i<n;i++)
        {
            for(j=0;j<n;j++)
            {
                    scanf("%d",&arr1[i][j]);
            }
        }
           printf("The matrix is :\n");
           for(i=0;i<n;i++)
           {
             for(j=0;j<n ;j++)
               printf("%d ",arr1[i][j]);
              printf("\n");
           }

   printf("\nUpper triangular matrix\n");
   for(i=0;i<n;i++)
     {
      printf("\n");
      for(j=0;j<n;j++)
           if(i>=j)
             printf("%d ",arr1[i][j]);
           else
             printf("%d ",0);
  }
       printf("\n\n");
    return 0;
}
```

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

```
#include <stdio.h>

int main()
{
        int arr1[10][10];
        int i,j,r,c;
        int d=0;

    printf("Enter the number of rows : ");
    scanf("%d", &r);
    printf("Enter the number of colomn : ");
    scanf("%d", &c);
        printf("Enter the elements of matrix :\n");
     for(i=0;i<r;i++)
      {
         for(j=0;j<c;j++)
         {
                scanf("%d",&arr1[i][j]);
            if (arr1[i][j]==0)
                        {
                                d++;
                        }
         }
      }
      for(i=0;i<r;i++)
      {
         for(j=0;j<c;j++)
         {
            printf("%d ",arr1[i][j]);
         }
         printf("\n");
      }
        if (d>((r*c)/2))
        {
```

```
            printf ("The given matrix is sparse matrix. \n");
        }
        else
            printf ("The given matrix is not a sparse matrix.\n");

        printf ("There are %d number of zeros in the matrix.\n\n",d);
        return 0;
}
```

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

```
            #include <stdio.h>

int main()
{
   int mat[4][4] = {{0, 0, 0, 1},
            {0, 1, 1, 1},
            {1, 1, 1, 1},
            {0, 0, 0, 0}};

  int max_count=0, index=-1;

  for(int i=0; i<4; i++)
   {
    int count = 0;
    for(int j=0; j<4; j++)
    {
        if(mat[i][j]==1)
          count++;

    }
    if(count>max_count)
    {
      max_count = count;
      index = i;
    }
  }
```

```
    printf("Index of row with maximum 1s is %d", index);
     return 0;
}
```