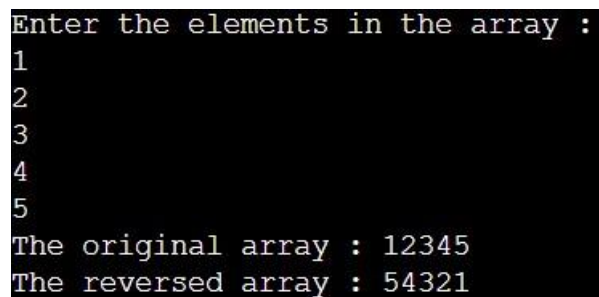# Lab – 5

1. Write a C program to store 5 values in an array, reverse the array and store value in another array. Print the reversed array.

```c
#include <stdio.h>

int main()
{
    int arr1[5], arr2[5], i;
    printf("Enter the elements in the array :\n");
    for(i=0; i<5; i++){
        scanf("%d", &arr1[i]);
    }
    printf("The original array : ");
    for(i=0; i<5; i++){
    printf("%d", arr1[i]);
    }
    for(i=0; i<5; i++){
        arr2[i]=arr1[4-i];
    }
    printf("\n");
    printf("The reversed array : ");
    for(i=0; i<5; i++){
    printf("%d", arr2[i]);
    }
    return 0;
}
```
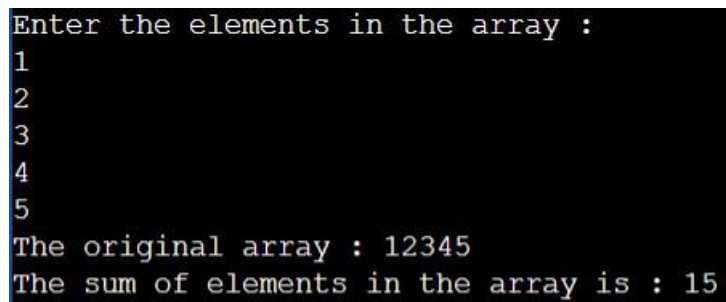
```
Enter the elements in the array :
1
2
3
4
5
The original array : 12345
The reversed array : 54321
```

2. Write a program in C to find the sum of all elements of the array.

```c
#include <stdio.h>

int main()
{
    int arr[5], i, sum=0;
    printf("Enter the elements in the array :\n");
    for(i=0; i<5; i++){
        scanf("%d", &arr[i]);
    }
    printf("The original array : ");
    for(i=0; i<5; i++){
    printf("%d", arr[i]);
    }
    printf("\n");
    printf("The sum of elements in the array is : ");
    for(i=0; i<5; i++){
    sum += arr[i];
    }
    printf("%d", sum);
    return 0;
}
```

```
Enter the elements in the array :
1
2
3
4
5
The original array : 12345
The sum of elements in the array is : 15
```

3. Write a program in C to count a total number of duplicate elements in an array.
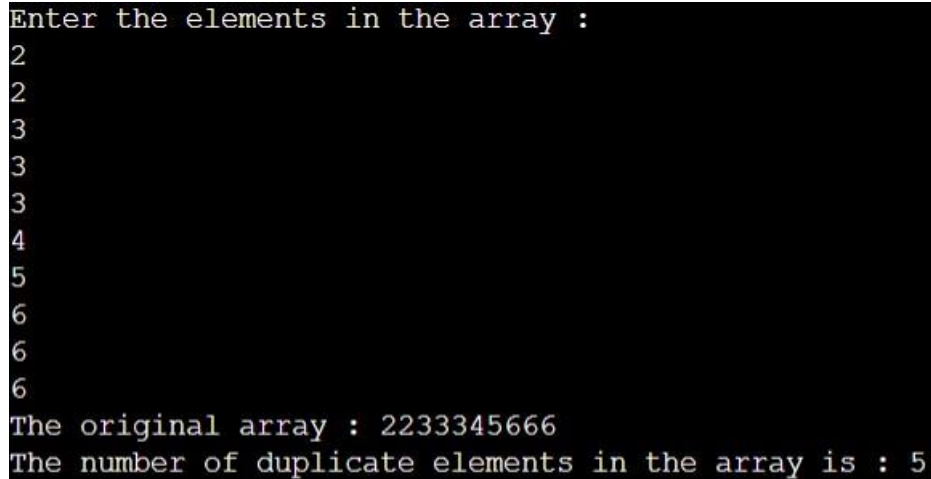
```c
#include <stdio.h>

int main()
{
    int arr[10], i, j, count=0;
    printf("Enter the elements in the array :\n");
    for(i=0; i<10; i++){
```

```c
        scanf("%d", &arr[i]);
    }
    printf("The original array : ");
    for(i=0; i<10; i++){
    printf("%d", arr[i]);
    }
    printf("\n");
    printf("The number of duplicate elements in the array is : ");
    for(i=0; i<10; i++){
        for(j=i+1; j<10; j++){
            if (arr[i] == arr[j]){
            count += 1;
            break;
            }
        }
    }
    printf("%d", count);
    return 0;
}
```

```
Enter the elements in the array :
2
2
3
3
3
4
5
6
6
6
The original array : 2233345666
The number of duplicate elements in the array is : 5
```

4. Write a program in C to arrange array in ascending order.

```c
#include <stdio.h>

int main()
{
    int arr[10], i, j, min;
    printf("Enter the elements in the array:\n");
    for(i=0; i<10; i++){
```
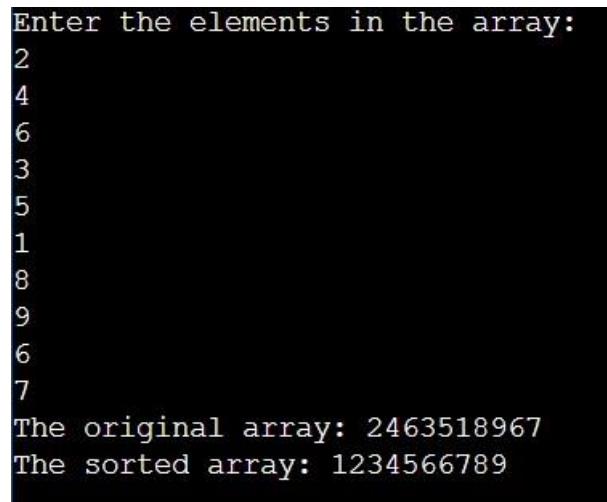
```c
        scanf("%d", &arr[i]);
    }
    printf("The original array: ");
    for(i=0; i<10; i++){
    printf("%d", arr[i]);
    }
    for(i=1; i<=10; i++){
        min = arr[i];
        j = i-1;
        while (j >= 0 && arr[j] > min)
        {
            arr[j + 1] = arr[j];
            j = j - 1;
        }
        arr[j + 1] = min;
    }
    printf("\nThe sorted array: ");
    for(i=0; i<10; i++){
    printf("%d", arr[i]);
    }
    return 0;
}
```

```
Enter the elements in the array:
2
4
6
3
5
1
8
9
6
7
The original array: 2463518967
The sorted array: 1234566789
```

5. Write a program in C for addition of two Matrices of same size.

```c
#include <stdio.h>

int main()
{
```

```c
int r1, c1, r2, c2, i, j;

printf("Enter the number of rows in the first matrix: ");
scanf("%d", &r1);
printf("Enter the number of columns in the first matrix: ");
scanf("%d", &c1);

int m1[r1][c1];
printf("\nEnter the elements in the first matrix :\n");
for(i=0; i<r1; i++){
    for(j=0; j<c1; j++)
        scanf("%d", &m1[i][j]);
}

printf("\nEnter the number of rows in the second matrix: ");
scanf("%d", &r2);
printf("Enter the number of columns in the second matrix: ");
scanf("%d", &c2);

if ( (r1 == r2) && (c1 == c2) ){
    int m2[r2][c2];
printf("\nEnter the elements in the second matrix :\n");
for(i=0; i<r2; i++){
    for(j=0; j<c2; j++)
        scanf("%d", &m2[i][j]);
}

printf("\nThe first matrix :\n");
for(i=0; i<r1; i++){
    for(j=0; j<c1; j++)
        printf("%d\t", m1[i][j]);
        printf("\n");
}

printf("\nThe second matrix :\n");
for(i=0; i<r2; i++){
    for(j=0; j<c2; j++)
        printf("%d\t", m2[i][j]);
        printf("\n");
}
```

```c
    printf("\nThe sum of the matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", m1[i][j]+m2[i][j]);
            printf("\n");
    }
    }

    else
    printf ("Matrices with entered orders can't be added with each other.");

    return 0;
}
```

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
2
3
4

Enter the number of rows in the second matrix: 2
Enter the number of columns in the second matrix: 2

Enter the elements in the second matrix :
1
2
3
4

The first matrix :
1       2
3       4

The second matrix :
1       2
3       4

The sum of the matrix :
2       4
6       8
```

6. Write a program in C for multiplication of two square Matrices.

```c
#include<stdio.h>

int main()
{
    int r1, c1, r2, c2, i, j, k, sum=0;

    printf("Enter the number of rows in the first matrix: ");
    scanf("%d", &r1);
    printf("Enter the number of columns in the first matrix: ");
    scanf("%d", &c1);

    int m1[r1][c1];
    printf("\nEnter the elements in the first matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            scanf("%d", &m1[i][j]);
    }

    printf("\nEnter the number of rows in the second matrix: ");
    scanf("%d", &r2);
    printf("Enter the number of columns in the second matrix: ");
    scanf("%d", &c2);

    int m2[r2][c2];
    int multiplication[r1][c2];
    (c1 != r2)?
        (printf("Matrices with entered orders can't be multiplied with each other.\n")):

    (
    {
    printf("\nEnter the elements in the second matrix :\n");
    for(i=0; i<r2; i++){
        for(j=0; j<c2; j++)
            scanf("%d", &m2[i][j]);
    }
    printf("\nThe first matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", m1[i][j]);
```

```c
        printf("\n");
    }
    printf("\nThe second matrix :\n");
    for(i=0; i<r2; i++){
        for(j=0; j<c2; j++)
            printf("%d\t", m2[i][j]);
            printf("\n");
    }

    for(i=0; i<r2; i++){
        for(j=0; j<c1; j++){
            for(k=0; k<c2; k++){
                sum = sum + m1[i][k]*m2[k][j];
            }
            multiplication[i][j] = sum;
            sum = 0;
        }
    }
    printf("\nThe multiplication of the two matrices :\n");
    for ( i = 0 ; i < r1 ; i++ ){
        for ( j = 0 ; j < c2 ; j++ )
            printf("%d\t", multiplication[i][j]);
            printf("\n");
    }
    }
    );
    return 0;
}
```

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
2
3
4

Enter the number of rows in the second matrix: 2
Enter the number of columns in the second matrix: 2

Enter the elements in the second matrix :
1
2
3
4

The first matrix :
1        2
3        4

The second matrix :
1        2
3        4

The multiplication of the two matrices :
7        10
15       22
```

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


```c
#include <stdio.h>

int main()
{
    int r, c, i, j;

    printf("Enter the number of rows in the first matrix: ");
    scanf("%d", &r);
    printf("Enter the number of columns in the first matrix: ");
    scanf("%d", &c);

    int m1[r][c];
    printf("\nEnter the elements in the first matrix :\n");
```

```c
    for(i=0; i<r; i++){
        for(j=0; j<c; j++)
            scanf("%d", &m1[i][j]);
    }

    int m2[c][r];
    for(i=0; i<c; i++){
        for(j=0; j<r; j++)
            m2[i][j]=m1[j][i];
    }

    printf("\nThe matrix :\n");
    for(i=0; i<r; i++){
        for(j=0; j<c; j++)
            printf("%d\t", m1[i][j]);
            printf("\n");
    }

    printf("\nThe transpose of the matrix :\n");
    for(i=0; i<c; i++){
        for(j=0; j<r; j++)
            printf("%d\t", m2[i][j]);
            printf("\n");
    }
    return 0;
}
```

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
2
3
4

The matrix :
1       2
3       4

The transpose of the matrix :
1       3
2       4
```

8. Write a function in C which will take array as an argument and return sum of all elements of that array.

```c
#include <stdio.h>

int sum (int a[], int n){
        int i,sum=0;
    for(i=0; i<n; i++)
        sum+=a[i];
        return sum;
}
int main()
{
    int len, i, result;

    printf("Enter the length of the array: ");
    scanf("%d", &len);

    int arr[len];
    printf("Enter the elements in the array :\n");
    for(i=0; i<len; i++)
        scanf("%d", &arr[i]);

    printf("\nThe array : ");
    for(i=0; i<len; i++)
        printf("%d ", arr[i]);

    result = sum(arr,len);
    printf("\nSum of elements in the array is = %d",result);
    return 0;

}
```

```
Enter the length of the array: 5
Enter the elements in the array :
1
2
3
4
5

The array : 12345
Sum of elements in the array is = 15
```

9. Write a function in C which will take a 3x3 matric as argument and print determinant of that matrix.

```c
#include <stdio.h>

void det(int a[3][3]){
    int determinant;
    determinant = a[0][0] * ((a[1][1]*a[2][2]) - (a[2][1]*a[1][2])) -a[0][1] * (a[1][0]*
a[2][2] - a[2][0] * a[1][2]) + a[0][2] * (a[1][0] * a[2][1] - a[2][0] * a[1][1]);
    printf("\nThe determinant of the matrix : %d", determinant);

}

int main()
{
    int i, j, m1[3][3];

    printf("\nEnter the elements in the first matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            scanf("%d", &m1[i][j]);
    }

    printf("\nThe matrix :\n");
    for(i=0; i<3; i++){
        for(j=0; j<3; j++)
            printf("%d\t", m1[i][j]);
            printf("\n");
    }

    det(m1);
```
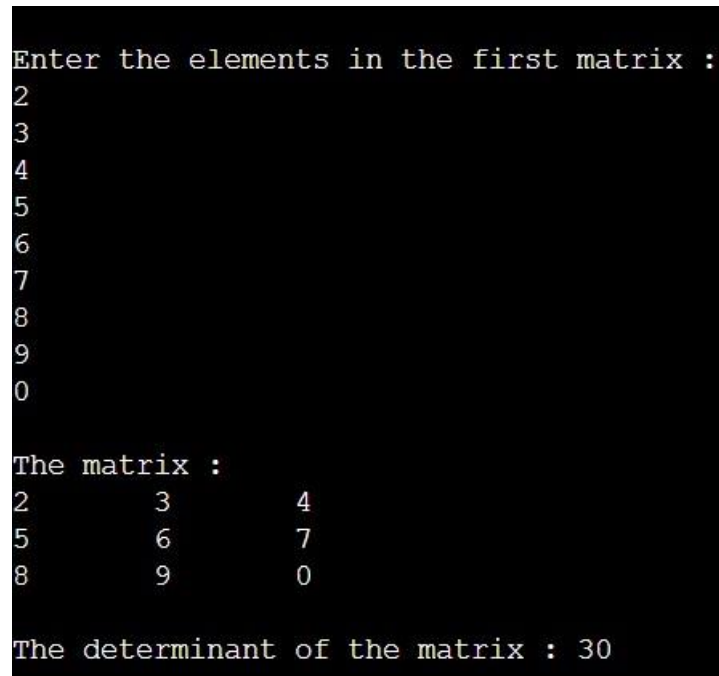
```
    return 0;
}
```

```
Enter the elements in the first matrix :
2
3
4
5
6
7
8
9
0

The matrix :
2          3          4
5          6          7
8          9          0

The determinant of the matrix : 30
```

10. Write a function in C which will take 2 2-D matrices as argument ad print sum of those two matrices.

```
#include <stdio.h>

void sum(int r1, int c1, int r2, int c2, int arr1[r1][c1], int arr2[r2][c2]){
    int i,j;
    printf("\nThe sum of the matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", arr1[i][j]+arr2[i][j]);
            printf("\n");
    }

}

int main()
{
    int r1, c1, r2, c2, i, j;

    printf("Enter the number of rows in the first matrix: ");
    scanf("%d", &r1);
    printf("Enter the number of columns in the first matrix: ");
```

```c
    scanf("%d", &c1);

    int m1[r1][c1];
    printf("\nEnter the elements in the first matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            scanf("%d", &m1[i][j]);
    }

    printf("\nEnter the number of rows in the second matrix: ");
    scanf("%d", &r2);
    printf("Enter the number of columns in the second matrix: ");
    scanf("%d", &c2);

    if ( (r1 == r2) && (c1 == c2) ){

    int m2[r2][c2];
    printf("\nEnter the elements in the second matrix :\n");
    for(i=0; i<r2; i++){
        for(j=0; j<c2; j++)
            scanf("%d", &m2[i][j]);
    }

    printf("\nThe first matrix :\n");
    for(i=0; i<r1; i++){
        for(j=0; j<c1; j++)
            printf("%d\t", m1[i][j]);
            printf("\n");
    }

    printf("\nThe second matrix :\n");
    for(i=0; i<r2; i++){
        for(j=0; j<c2; j++)
            printf("%d\t", m2[i][j]);
            printf("\n");
    }
    sum(r1,c1,r2,c2,m1,m2);
    }

    else
    printf ("Matrices with entered orders can't be added with each other.");

    return 0;
```

}

```
Enter the number of rows in the first matrix: 2
Enter the number of columns in the first matrix: 2

Enter the elements in the first matrix :
1
1
1
1

Enter the number of rows in the second matrix: 2
Enter the number of columns in the second matrix: 2

Enter the elements in the second matrix :
4
4
4
4

The first matrix :
1       1
1       1

The second matrix :
4       4
4       4

The sum of the matrix :
5       5
5       5
```