Assignment 4

Shri G.S Institute of Technology & Science

C Programming Lab

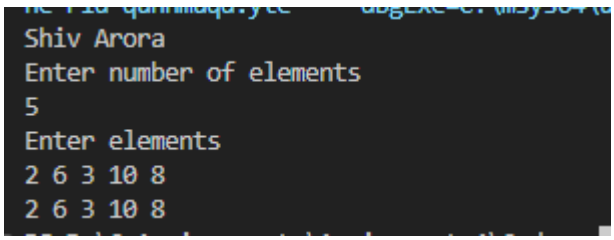
Assignment 4 – INDEX

Sr. No.	Program	P. No.	Remarks
1	Write a program to store n no of elements in an array and print them.	1	
2	Write a program in C to find the maximum and minimum elements in an array.	1-2	
3	Write a program in C to sort elements of an array in ascending order.	2-3	
4	Write a program in C to sort the elements of the array in descending order.	3-4	
5	Write a program in C to read n number of values in an array and display them in reverseorder.	4-5	
6	Write a program in C to insert the values in the array (sorted list).	5-6	
7	Write a program in C to insert values in the array (unsorted list).	6-7	
8	Write a program in C to find the sum of all elements of the array.	7	
9	Write a program in C to copy the elements of one array into another array.	9	
10	Write a program in C to merge two arrays of the same size sorted in descending order.	8-10	
11	Write a program in C to count the total number of duplicate elements in an array.	10-11	
12	Write a program in C to delete an element at a desired position from an array.	11-12	
13	Write a program in C to find the second largest element in an array.	12-13	
14	Write a program in C to find the second smallest element in an array.	13-14	
15	Write a program in C for a 2D array of size 2x2 and print the matrix.	14-15	
16	Write a program in C for adding two matrices of the same size.	15-16	

P1 Write a program to store n no of elements in an array and print them.

```
#include<stdio.h>
int main(){
 printf("Shiv Arora\n");
 int n;
 printf("Enter number of elements\n");
 scanf("%d", &n);
 int arr[n];
 printf("Enter elements\n");
 for(int i=0;i<n; i++){
    scanf("%d", &arr[i]);
 }
 for(int i=0;i<n; i++){
    printf("%d ", arr[i]);
 }
 return 0;
}
```

OUTPUT:



P2 Write a program in C to find the maximum and minimum elements in an array.

```
#include<stdio.h>
int main(){
   printf("Shiv Arora\n");
   int n;
   printf("Enter number of elements\n");
   scanf("%d", &n);
   int arr[n];
   printf("Enter elements\n");
   for(int i=0;i<n; i++){
```

```
        scanf("%d", &arr[i]);
    }
    int maxx = arr[0];
    int min = arr[0];
    for(int i=1;i<n; i++){
        if(arr[i] > maxx)
            maxx = arr[i];
        else if (arr[i]< min)
            min = arr[i];
    }
    printf("Maximum = %d, Minimum = %d", maxx, min);
    return 0;
}
```

OUTPUT:

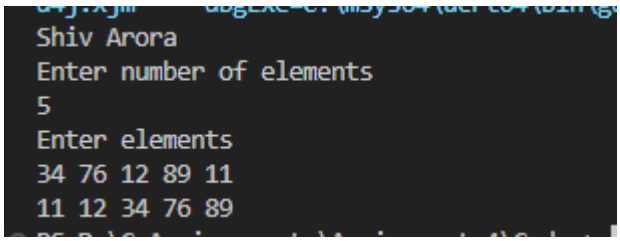
```
Shiv Arora
Enter number of elements
5
Enter elements
12 98 56 87 46
Maximum = 98, Minimum = 46
```

P3 Write a program in C to sort elements of an array in ascending order.

```
#include<stdio.h>
int main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n; i++){
        scanf("%d", &arr[i]);
    }
    for(int i=0; i<n; i++) {
        for(int j=i+1; j<n; j++) {
```

```
            if(arr[i]>arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }
    for(int i=0;i<n; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
```

OUTPUT:



P4 Write a program in C to sort the elements of the array in descending order.

```
#include<stdio.h>
int main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n; i++){
        scanf("%d", &arr[i]);
    }
    for(int i=0; i<n; i++)
    {
        for(int j=i+1; j<n; j++) {
```

```
            if(arr[i] < arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }
    for(int i=0;i<n; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
```

OUTPUT:

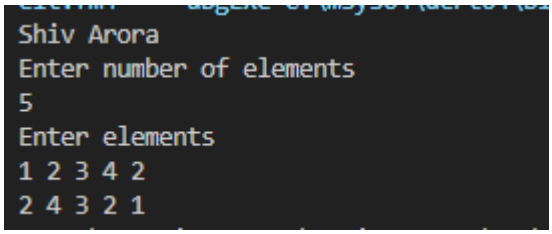
```
Shiv Arora
Enter number of elements
5
Enter elements
34 76 12 86 11
86 76 34 12 11
```

P5 Write a program in C to read n number of values in an array and display them in reverse order.

```
#include<stdio.h>
int main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n; i++){
        scanf("%d", &arr[i]);
    }
    for(int i=n-1;i>=0; i--){
        printf("%d ", arr[i]);
    }
```

```
    return 0;
}
```

OUTPUT:

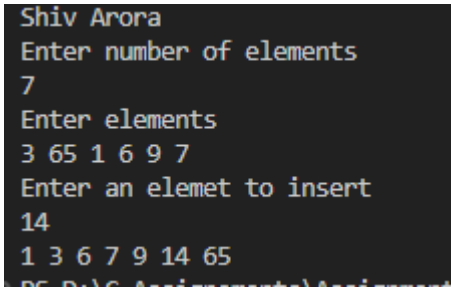


P6 Write a program in C to insert the values in the array (sorted list).

```
#include<stdio.h>
int main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n-1; i++){
        scanf("%d", &arr[i]);
    }
    int x;
    printf("Enter an elemet to insert\n");
    scanf("%d", &x);
    arr[n-1] = x;
    for(int i=0; i<n; i++){
        for(int j=i+1; j<n; j++) {
            if(arr[i]>arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }
```

```
    for(int i=0;i<n; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
```

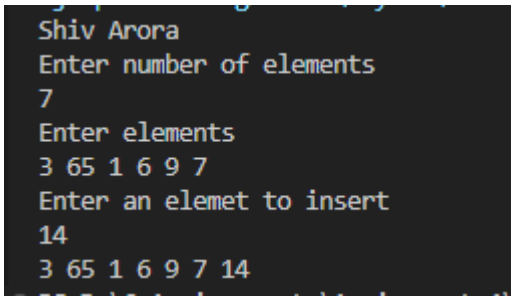
OUTPUT:



P7 Write a program in C to insert values in the array (unsorted list).

```
#include<stdio.h>
int main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n-1; i++){
        scanf("%d", &arr[i]);
    }
    int x;
    printf("Enter an elemet to insert\n");
    scanf("%d", &x);
    arr[n-1] = x;
    for(int i=0;i<n; i++){
        printf("%d ", arr[i]);
    }
    return 0;
}
```

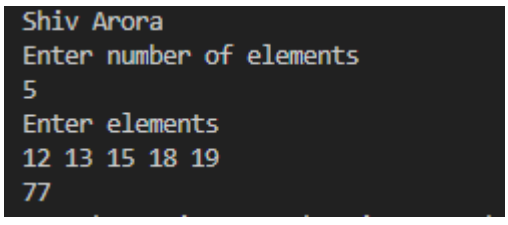
OUTPUT:



P8 Write a program in C to find the sum of all elements of the array.

```
#include<stdio.h>
int main(){
   printf("Shiv Arora\n");
   int n;
   printf("Enter number of elements\n");
   scanf("%d", &n);
   int arr[n];
   printf("Enter elements\n");
   for(int i=0;i<n; i++){
      scanf("%d", &arr[i]);
   }
   int sum = 0;
   for(int i=0;i<n; i++){
      sum += arr[i];
   }
   printf("%d", sum);
   return 0;
}
```

OUTPUT:

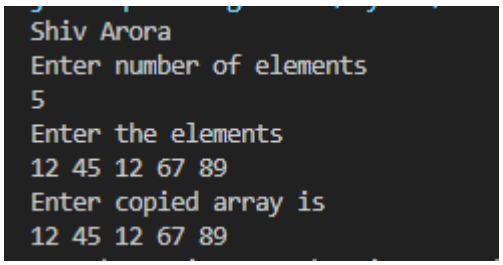


P9 Write a program in C to copy the elements of one array into another array.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int size;
   printf("Enter number of elements\n");
   scanf("%d", &size);
   printf("Enter the elements\n");
   int arr[size];
   for(int i=0;i<size; i++){
      scanf("%d", &arr[i]);
   }
   int destination[size];

   for (int i = 0; i < size; i++) {
      destination[i] = arr[i];
   }
   printf("Enter copied array is\n");
   for (int i = 0; i < size; i++) {
      printf("%d ", destination[i]);
   }
}
```

OUTPUT:



P10 Write a program in C to merge two arrays of the same size sorted in descending order.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int size;
```

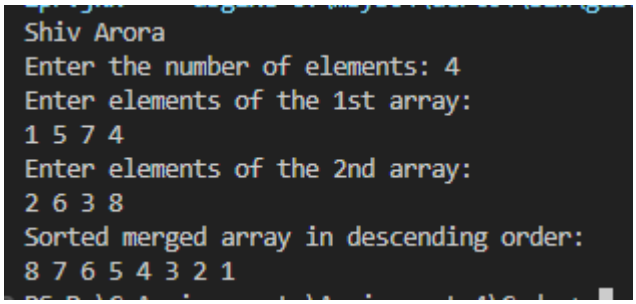
```
printf("Enter the number of elements: ");
scanf("%d", &size);

printf("Enter elements of the 1st array:\n");
int arr1[size];
for (int i = 0; i < size; i++) {
   scanf("%d", &arr1[i]);
}

printf("Enter elements of the 2nd array:\n");
int arr2[size];
for (int i = 0; i < size; i++) {
   scanf("%d", &arr2[i]);
}
int final[size * 2];
for (int i = 0; i < size; i++) {
   final[i] = arr1[i];
}
for (int i = 0; i < size; i++) {
   final[size + i] = arr2[i];
}
for (int i = 0; i < size * 2; i++) {
   for (int j = i + 1; j < size * 2; j++) {
      if (final[i] < final[j]) {
         int temp = final[i];
         final[i] = final[j];
         final[j] = temp;
      }
   }
}
printf("Sorted merged array in descending order:\n");
for (int i = 0; i < size * 2; i++) {
   printf("%d ", final[i]);
}
```

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

OUTPUT:



P11 Write a program in C to count the total number of duplicate elements in an array.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int size, count=0;
    printf("Enter number of elements\n");
    scanf("%d", &size);
    int arr[size], freq[size];
    printf("Enter the array\n");
    for(int i=0;i<size; i++){
        scanf("%d", &arr[i]);
        freq[i] = -1;
    }
     for (int i = 0; i < size; i++) {
        int duplicateCount = 1;
        for (int j = i + 1; j < size; j++) {
            if (arr[i] == arr[j]) {
                duplicateCount++;
                freq[j] = 0;
            }
        }
        if (freq[i] != 0) {
            freq[i] = duplicateCount;
        }
```

```
    }
    for (int i = 0; i < size; i++) {
        if (freq[i] > 1) {
            count++;
        }
    }
    printf("Total number of duplicate elements: %d\n", count);

}
```

OUTPUT:

```
Shiv Arora
Enter number of elements
7
Enter the array
11 14 11 15 17 15 19
Total number of duplicate elements: 2
```

P12 Write a program in C to delete an element at a desired position from an array.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int size, pos;
    printf("Enter number of elements\n");
    scanf("%d", &size);
    int arr[size];
    printf("Enter the array\n");
    for(int i=0;i<size; i++){
        scanf("%d", &arr[i]);
    }
    printf("Enter the position of the element to delete (1 to %d): ", size);
    scanf("%d", &pos);

    for (int i = pos - 1; i < size - 1; i++) {
        arr[i] = arr[i + 1];
    }
```

```
        size--;
        printf("Array after deletion:\n");
        for (int i = 0; i < size; i++) {
            printf("%d ", arr[i]);
        }
        printf("\n");
    }
```

OUTPUT:

```
Shiv Arora
Enter number of elements
5
Enter the array
1 5 6 7 4
Enter the position of the element to delete (1 to 5): 2
Array after deletion:
1 6 7 4
```

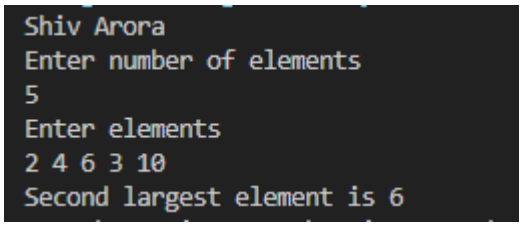
P13 Write a program in C to find the second largest element in an array.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n; i++){
        scanf("%d", &arr[i]);
    }

    for(int i=0; i<n; i++)
    {
        for(int j=i+1; j<n; j++) {
            if(arr[i] < arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
```

```
                arr[j] = temp;
            }
        }
    }
        printf("Second largest element is %d ", arr[1]);
}
```

OUTPUT:



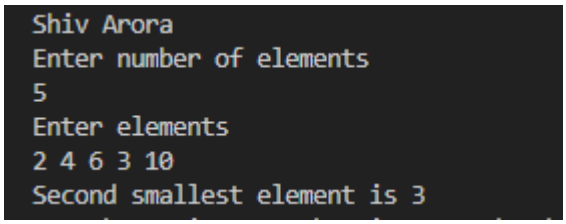
P14 Write a program in C to find the second smallest element in an array.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter number of elements\n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter elements\n");
    for(int i=0;i<n; i++){
        scanf("%d", &arr[i]);
    }

    for(int i=0; i<n; i++)
    {
        for(int j=i+1; j<n; j++) {
            if(arr[i]>arr[j]){
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
```

```
        }
    }
        printf("Second smallest element is %d ", arr[1]);
}
```

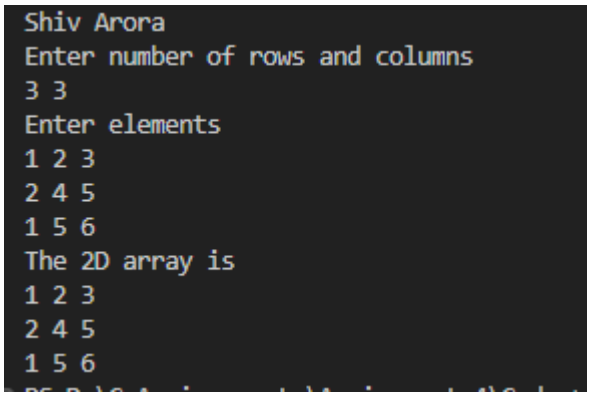
OUTPUT:



P15 Write a program in C for a 2D array of size 2x2 and print the matrix.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int r, c;
    printf("Enter number of rows and columns\n");
    scanf("%d %d", &r, &c);
    int arr[r][c];
    printf("Enter elements\n");
    for(int i=0;i<r; i++){
        for(int j=0;j<c; j++){
            scanf("%d", &arr[i][j]);
        }
    }
    printf("The 2D array is\n");
    for(int i=0;i<r; i++){
        for(int j=0;j<c; j++){
            printf("%d ", arr[i][j]);
        }
        printf("\n");
    }
}
```

OUTPUT:



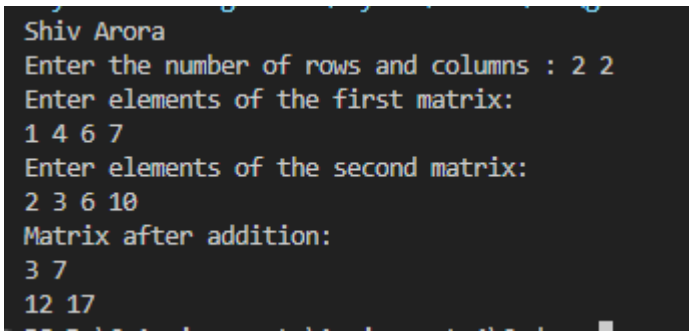
P16 Write a program in C for adding two matrices of the same size.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int r, c;
   printf("Enter the number of rows and columns : ");
   scanf("%d %d", &r, &c);

   int mat1[r][c], mat2[r][c], sum[r][c];
   printf("Enter elements of the first matrix:\n");
   for (int i = 0; i < r; i++) {
      for (int j = 0; j < c; j++) {
         scanf("%d", &mat1[i][j]);
      }
   }
   printf("Enter elements of the second matrix:\n");
   for (int i = 0; i < r; i++) {
      for (int j = 0; j < c; j++) {
         scanf("%d", &mat2[i][j]);
      }
   }
   printf("Matrix after addition:\n");
   for (int i = 0; i < r; i++) {
      for (int j = 0; j < c; j++) {
```

```
            sum[i][j] = printf("%d ", mat1[i][j] + mat2[i][j]);
        }
        printf("\n");
    }
}
```

OUTPUT:



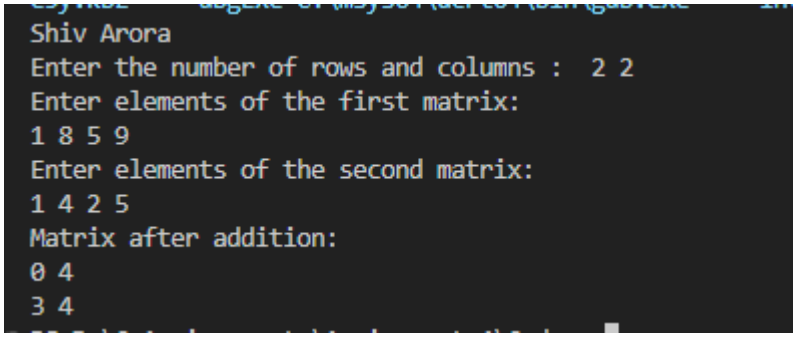
P17 Write a program in C for the subtraction of two matrices.

```
#include <stdio.h>
void main() {
    printf("Shiv Arora\n");
    int r, c;
    printf("Enter the number of rows and columns : ");
    scanf("%d %d", &r, &c);

    int mat1[r][c], mat2[r][c], sum[r][c];
    printf("Enter elements of the first matrix:\n");
    for (int i = 0; i < r; i++) {
        for (int j = 0; j < c; j++) {
            scanf("%d", &mat1[i][j]);
        }
    }
    printf("Enter elements of the second matrix:\n");
    for (int i = 0; i < r; i++) {
        for (int j = 0; j < c; j++) {
            scanf("%d", &mat2[i][j]);
        }
```

```
        }
        printf("Matrix after addition:\n");
        for (int i = 0; i < r; i++) {
            for (int j = 0; j < c; j++) {
                sum[i][j] = printf("%d ", mat1[i][j] - mat2[i][j]);
            }
            printf("\n");
        }
    }
```

OUTPUT:



P18 Write a program in C for the **multiplication of** two square matrices.

```
#include<stdio.h>
void main(){
    printf("Shiv Arora\n");
    int n;
    printf("Enter the matrix size :");
    scanf("%d", &n);
    int mat1[n][n], mat2[n][n];
    printf("Enter elements of the first matrix:\n");
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < n; j++) {
            scanf("%d", &mat1[i][j]);
        }
    }
    printf("Enter elements of the second matrix:\n");
    for (int i = 0; i < n; i++) {
```

```
            for (int j = 0; j < n; j++) {
                scanf("%d", &mat2[i][j]);
            }
        }
        int result[n][n];
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                result[i][j] = 0;
            }
        }
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                for (int k = 0; k < n; k++) {
                    result[i][j] += mat1[i][k] * mat2[k][j];
                }
            }
        }
        printf("Matrix after multiplication:\n");
        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                printf("%d ", result[i][j]);
            }
            printf("\n");
        }
    }
```

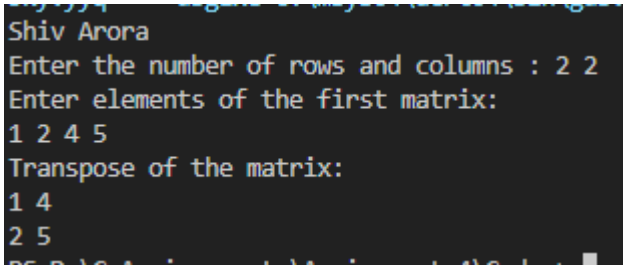
OUTPUT:

```
Shiv Arora
Enter the matrix size :3
Enter elements of the first matrix:
2 4 5 6 7 8 1 5 3
Enter elements of the second matrix:
1 2 6 1 4 7 4 8 9
Matrix after multiplication:
26 60 85
45 104 157
18 46 68
```

P19 Write a program in C to find the transpose of a given matrix.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int r, c;
   printf("Enter the number of rows and columns : ");
   scanf("%d %d", &r, &c);
   int mat[r][c], transpose[r][c];
   printf("Enter elements of the first matrix:\n");
   for (int i = 0; i < r; i++) {
      for (int j = 0; j < c; j++) {
         scanf("%d", &mat[i][j]);
      }
   }
    for (int i = 0; i < r; i++) {
      for (int j = 0; j < c; j++) {
         transpose[j][i] = mat[i][j];
      }
   }
   printf("Transpose of the matrix:\n");
   for (int i = 0; i < c; i++) {
      for (int j = 0; j < r; j++) {
         printf("%d ", transpose[i][j]);
      }
      printf("\n");
   }
}
```

OUTPUT:



P20 Write a program in C to find the sum of the right diagonals of a matrix.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int n, sum = 0;
   printf("Enter number of elements ");
   scanf("%d", &n);
   int mat[n][n];
   printf("Enter the elements of the matrix:\n");
   for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
         scanf("%d", &mat[i][j]);
      }
   }
   for (int i = 0; i < n; i++) {
      sum += mat[i][n - i - 1];
   }
   printf("Sum of the right diagonal elements: %d\n", sum);
}
```

OUTPUT:

```
Shiv Arora
Enter number of elements 3
Enter the elements of the matrix:
1 2 3 4 5 6 7 8 9
Sum of the right diagonal elements: 15
```

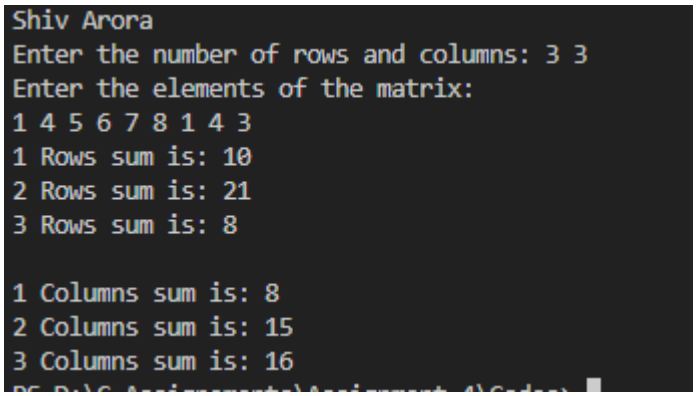
P21 Write a program in C to find the sum of rows and columns of a matrix.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int r, c;
   printf("Enter the number of rows and columns: ");
   scanf("%d %d", &r, &c);
   int matrix[r][c];
   int rowSum[r], colSum[c];
```

```
        for (int i = 0; i < r; i++) rowSum[i] = 0;
        for (int j = 0; j < c; j++) colSum[j] = 0;
        printf("Enter the elements of the matrix:\n");
        for (int i = 0; i < r; i++) {
            for (int j = 0; j < c; j++) {
                scanf("%d", &matrix[i][j]);
            }
        }
        for (int i = 0; i < r; i++) {
            for (int j = 0; j < c; j++) {
                rowSum[i] += matrix[i][j];
                colSum[j] += matrix[i][j];
            }
        }
        // Rows sums
        for (int i = 0; i < r; i++) {
            printf("%d Rows sum is: %d\n", i + 1, rowSum[i]);
        }

        printf("\n");
        // Column sums
        for (int i = 0; i < c; i++) {
            printf("%d Columns sum is: %d\n", i + 1, colSum[i]);
        }
    }
```

OUTPUT:

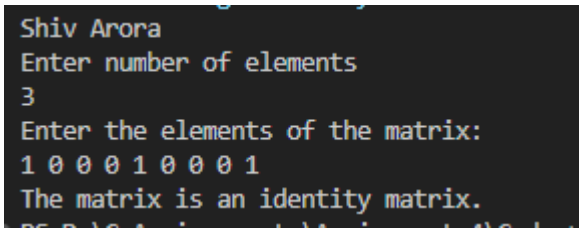


P22 Write a program in C to check whether a given matrix is an identity.

```
#include <stdio.h>
void main() {
   printf("Shiv Arora\n");
   int n, isIdentity = 1;
   printf("Enter number of elements\n");
   scanf("%d", &n);

   int mat[n][n];
   printf("Enter the elements of the matrix:\n");
   for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
         scanf("%d", &mat[i][j]);
      }
   }
   for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
         if (i == j && mat[i][j] != 1) {
            isIdentity = 0;
         } else if (i != j && mat[i][j] != 0) {
            isIdentity = 0;
         }
      }
   }
   if (isIdentity) {
      printf("The matrix is an identity matrix.\n");
   } else {
      printf("The matrix is NOT an identity matrix.\n");
   }
}
```

OUTPUT:


Shiv Arora
Enter number of elements
3
Enter the elements of the matrix:
1 0 0 0 1 0 0 0 1
The matrix is an identity matrix.

Shri G.S Institute of Technology & Science

C Programming Lab

Assignment 3 – INDEX