# GLA UNIVERSITY, MATHURA


## *C-PROGRAMMING LANGUAGE (WEEK QUESTIONS)*

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***CLASS:*** AY-2

***CLASS ROLL NO:*** 51

***SUBJECT:*** COMPUTER LAB FILE

***SUBMITTED TO:*** GURPREET KAUR MAM

## ***WEEK – 5 Questions:***

**Q-1.** **Write a program to print the following patterns:**

**a.**

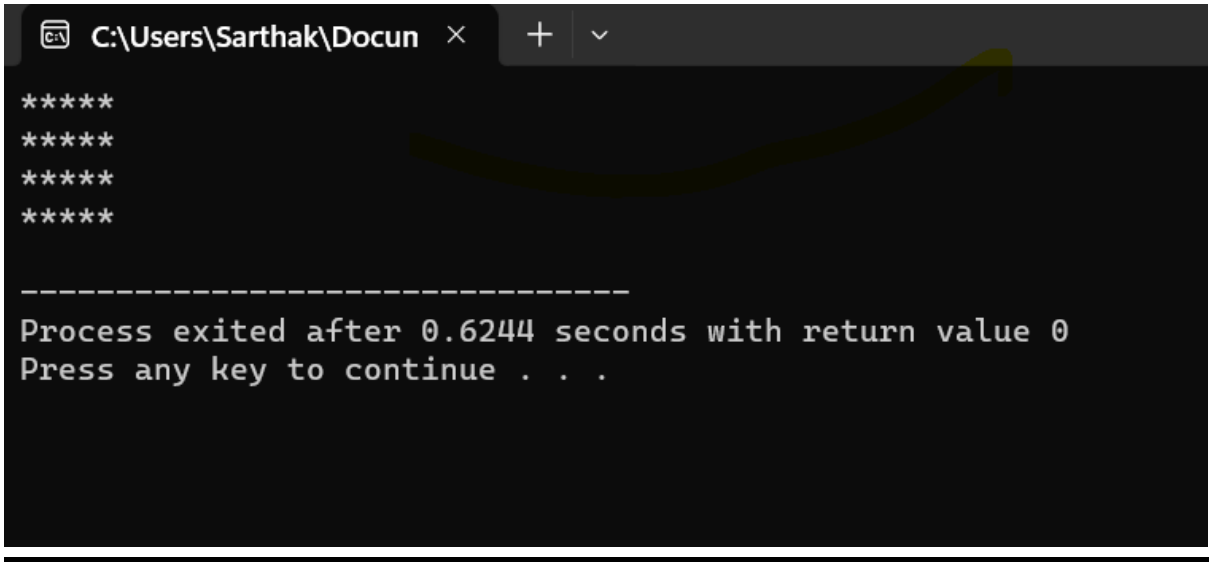
```
*****
*****
*****
*****
```

**Ans.**

```
#include<stdio.h>
int main() {
    for(int i=1;i<=4;i++)
{
        for(int j=1;j<=5;j++)
{
        printf("*");
        }
      printf("\n");
```

```
}
    return 0;
}
```

**Output:**

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**b.** *

**

***

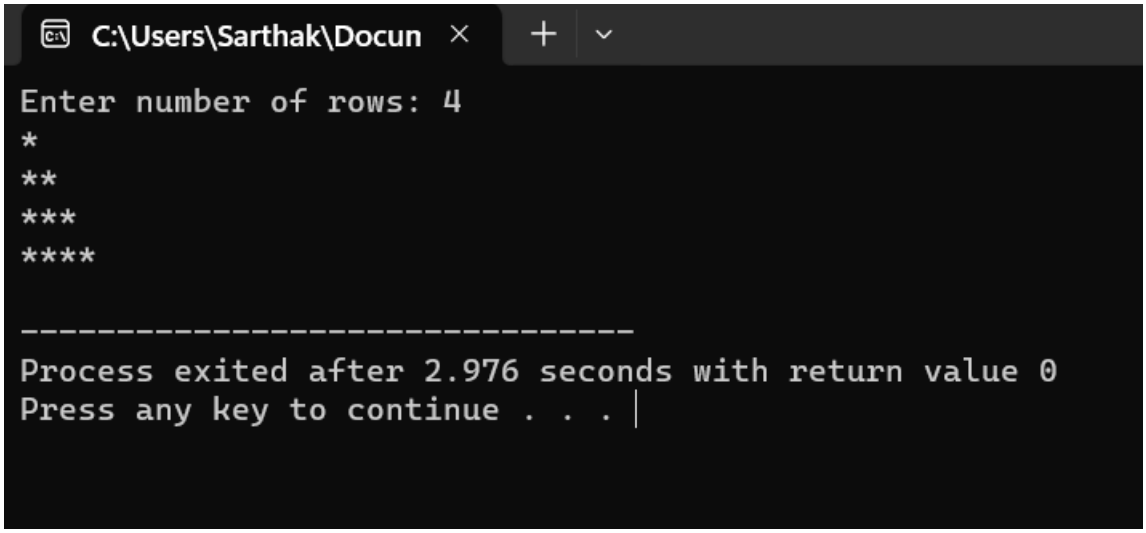
****

**Ans.** #include<stdio.h>

int main() {

```
    int n;
    printf("Enter number of rows: ");
    scanf("%d", &n);
    for(int i=1;i<=n;i++){
        for(int j=1;j<=i;j++)
    {
    printf("*");
}
printf("\n");
    }
    return 0;
}
```

**Output:**

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**c.** **54321**

**5432**

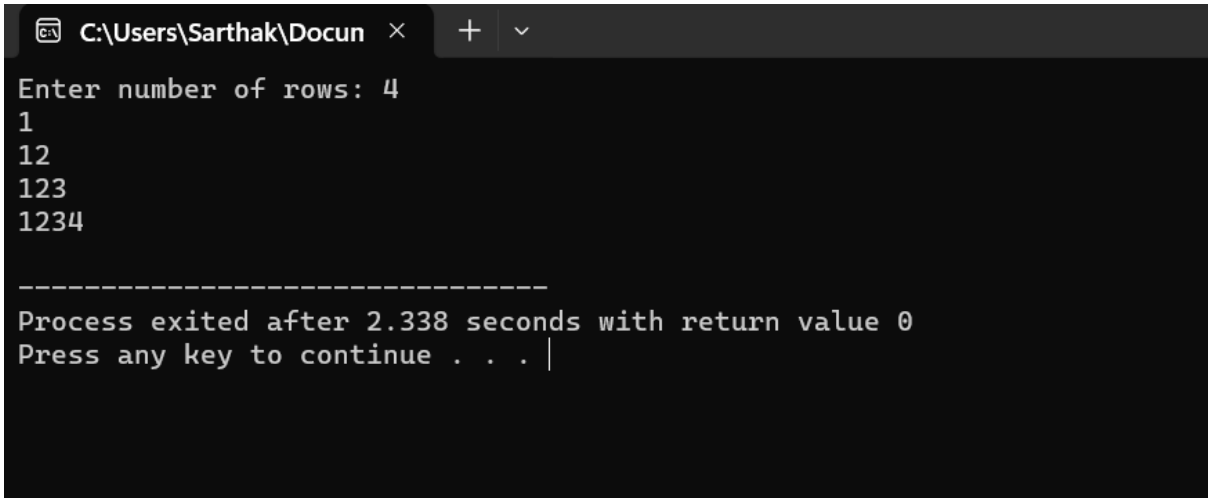
**543**

**54**

**5**

**Ans.**

**Output:**



**d.**

**1**

**22**

**333**

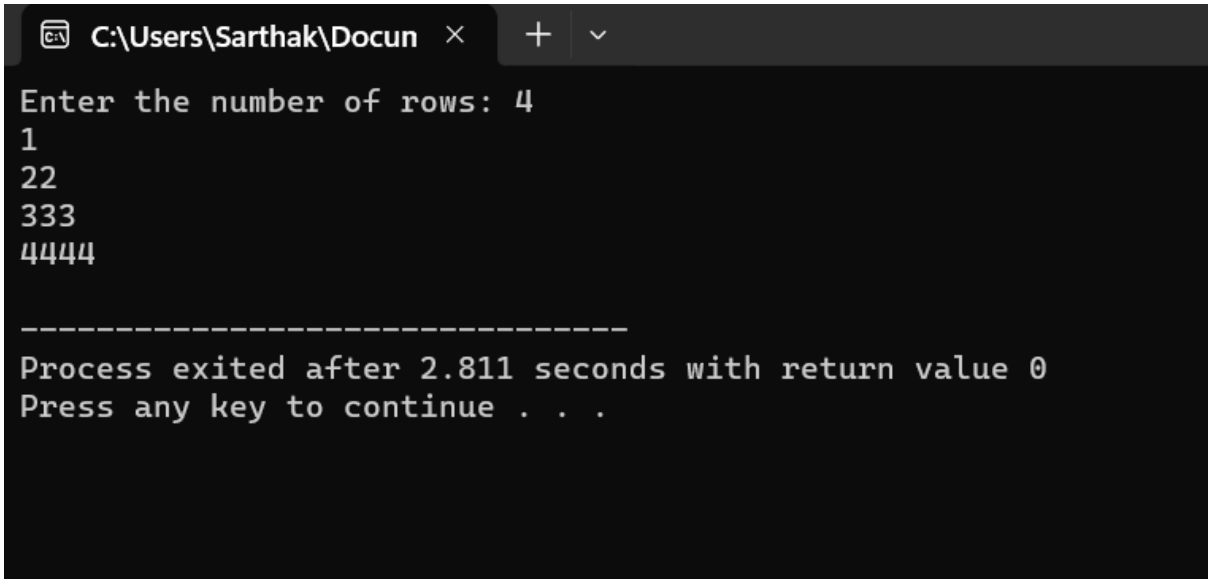
**4444**

**Ans.** #include <stdio.h>

```
int main()
 { int n, i, j;
 printf("Enter the number of rows: ");
 scanf("%d", &n);
 for(i = 1; i <= n; i++)
 {
 for(j = 1; j <= i; j++)
 {
 printf("%d", i);
```

```
 }
 printf("\n");
 }
 return 0;
 }
```

**Output:**




**e.**

**54321**

**5432**

**543**

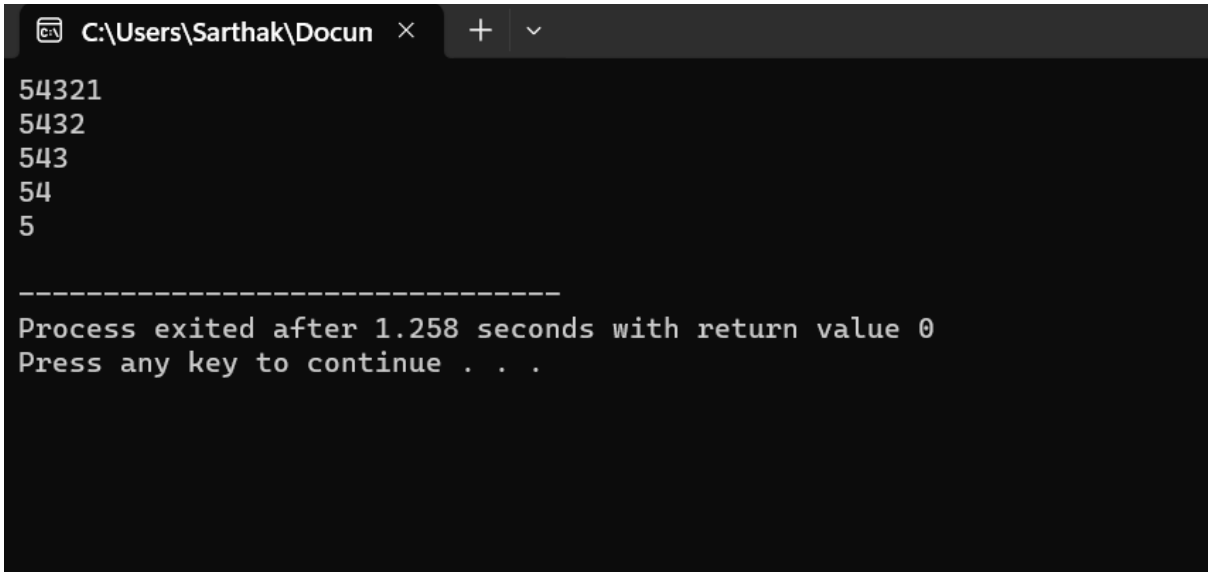
**54**

**5**

**Ans.**

```
#include <stdio.h>
int main() {
    int rows = 5;
    for (int i = 1; i <= rows; i++) {
        for (int j = rows; j >= i; j--) {
            printf("%d", j);
        }
        printf("\n");
    }
    return 0;
}
```

**Output:**




f.

**A**

**AB**

**ABC**

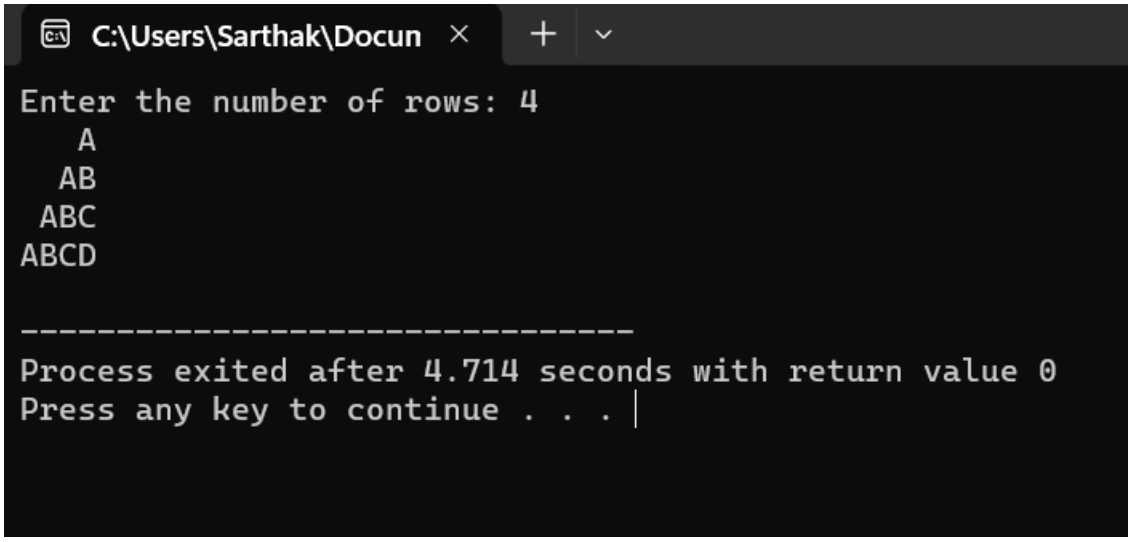
**ABCD**

**Ans.** #include <stdio.h>

```
int main() {
    int i, j;
   int n;
   printf("Enter the number of rows: ");
```

```
    scanf("%d", &n);
    for (i = 1; i <= n; i++) {
        for (j = 1; j <= n - i; j++) {
            printf(" ");
        }
        for (j = 1; j <= i; j++) {
            printf("%c", 'A' + j - 1);
        }
        printf("\n");
    }
    return 0;
}
```

**Output:**

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# ***Week-6 Questions:***

## ***Q-1.*** **Write a menu driven program to insert and delete elements of kth position to an array of size N.**

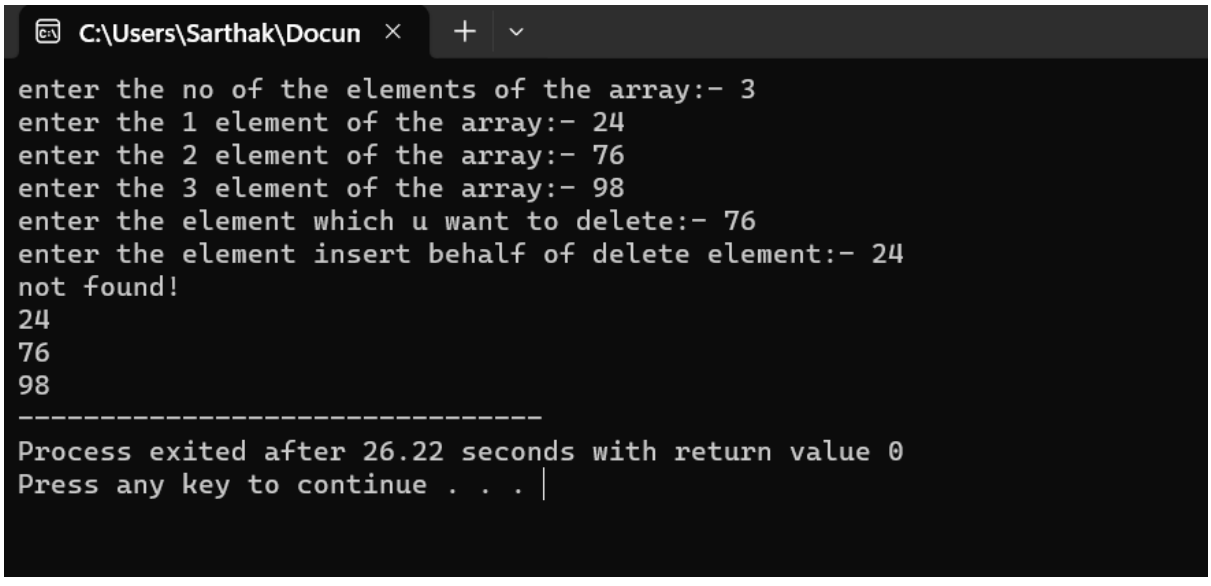
## **Ans-1.**

```
#include <stdio.h>
int main ()
{
int a;
printf("enter the no of the elements of the array:- ");
scanf("%d",&a);
int n[a];
for(int i=0;i<a;i++)
```

```
{
printf("enter the %d element of the array:- ",i+1);
scanf("%d",&n[i]);
}
int k;
printf("enter the element which u want to delete:- ");
scanf("%d",&k);
int g;
printf("enter the element insert behalf of delete element:- ");
scanf("%d",&g);
for(int i=0;i<a;i++)
{
if(n[i]==k)
{
n[i]=g;
}
else
{
printf("not found!");
```

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

# Output*:*

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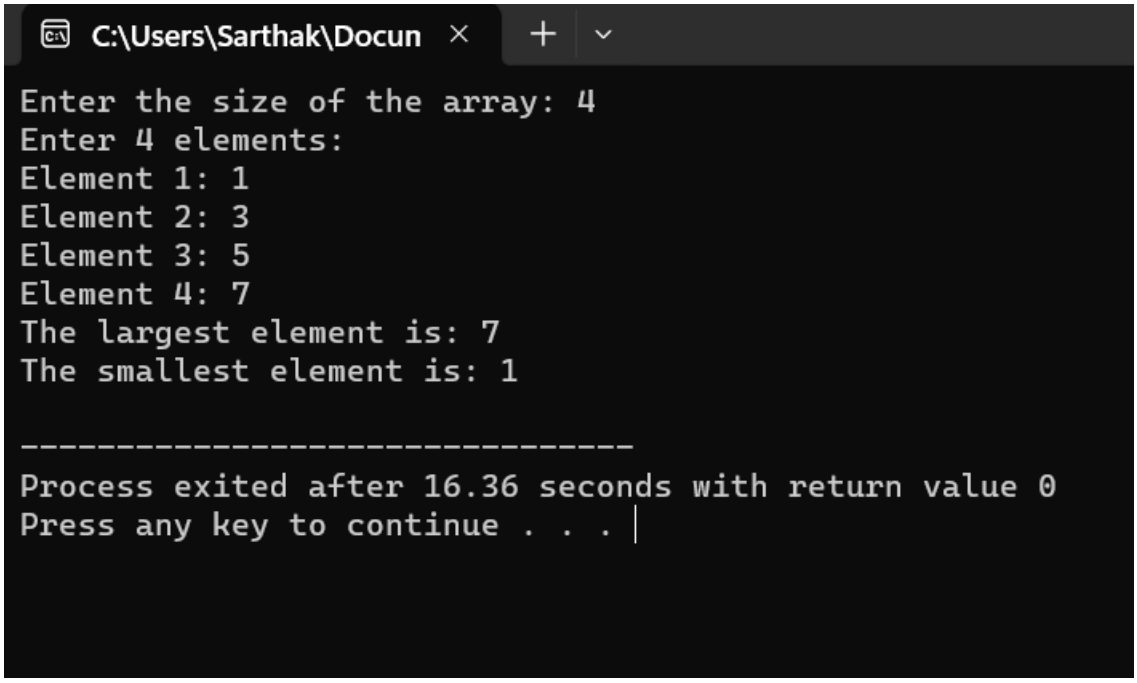
## *Q-2.* Write the program to print the biggest and smallest element in an array.

## Ans-2.

```
#include <stdio.h>
int main() {
int size;
// Get the size of the array
printf("Enter the size of the array: ");
scanf("%d", &size);
// Check for invalid input
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
// Create an array of integers
int arr[size];
// Get elements from the user
printf("Enter %d elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &arr[i]);
}
```

```
// Initialize variables for the largest and smallest elements
int largest = arr[0];
int smallest = arr[0];
// Find the largest and smallest elements
for (int i = 1; i < size; i++) {
if (arr[i] > largest) {
largest = arr[i];
}
if (arr[i] < smallest) {
smallest = arr[i];
}
}
// Print the results
printf("The largest element is: %d\n", largest);
printf("The smallest element is: %d\n", smallest);
return 0;
}
```

# Output:



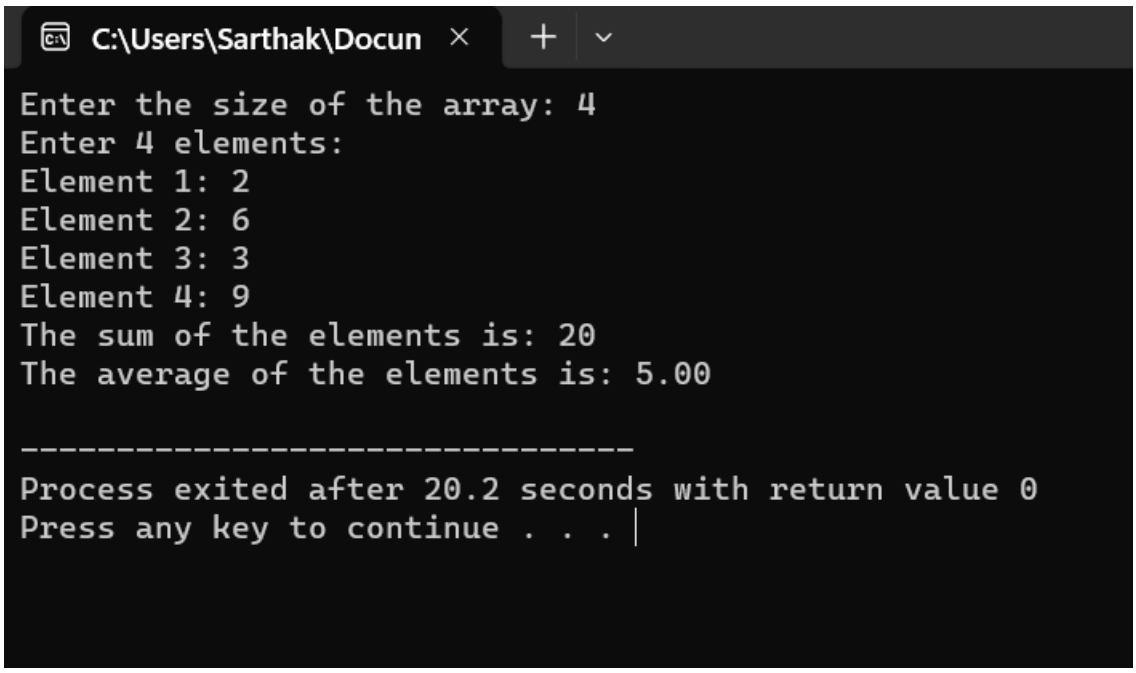

## *Q-3.* Write the program to print the sum and average of an array.

## Ans-3.

```
#include <stdio.h>
int main() {
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
```

```
}
int arr[size];
printf("Enter %d elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &arr[i]);
}
int sum = 0;
for (int i = 0; i < size; i++) {
sum += arr[i];
}
float average = (float)sum / size;
printf("The sum of the elements is: %d\n", sum);
printf("The average of the elements is: %.2f\n",
average);
return 0;
}
```

# Output:

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## *Q-4.* Write the program to sort an array using bubble sort.

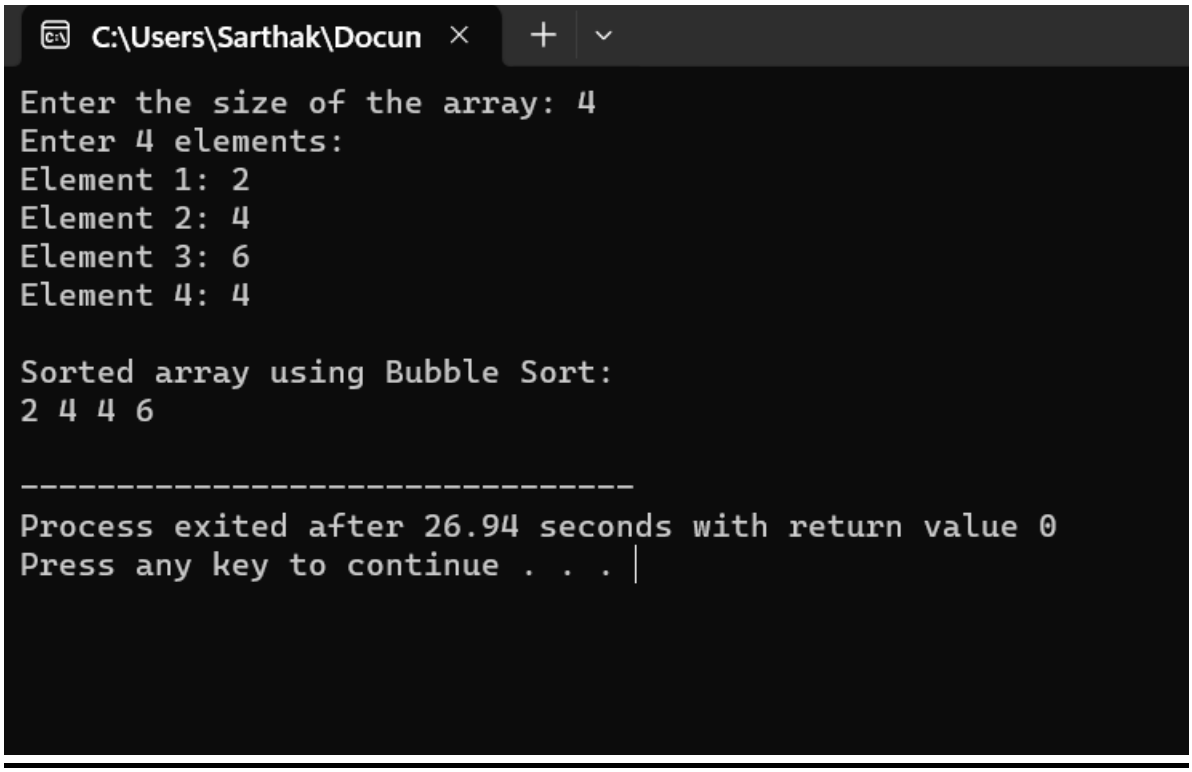
## Ans-4.

```
#include <stdio.h>

void swap(int *a, int *b) {

int temp = *a;

*a = *b;

*b = temp;

}

void bubbleSort(int arr[], int size) {
```

```
for (int i = 0; i < size - 1; i++) {
for (int j = 0; j < size - i - 1; j++) {
if (arr[j] > arr[j + 1]) {
swap(&arr[j], &arr[j + 1]);
}
}
}
}
int main() {
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
int arr[size];
printf("Enter %d elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
```

```
scanf("%d", &arr[i]);
}
bubbleSort(arr, size);
printf("\nSorted array using Bubble Sort:\n");
for (int i = 0; i < size; i++) {
printf("%d ", arr[i]);
}
printf("\n");
return 0;
}
```

# Output:



## *Q-5.* Write the program to search an element using linear search as well as binary search.

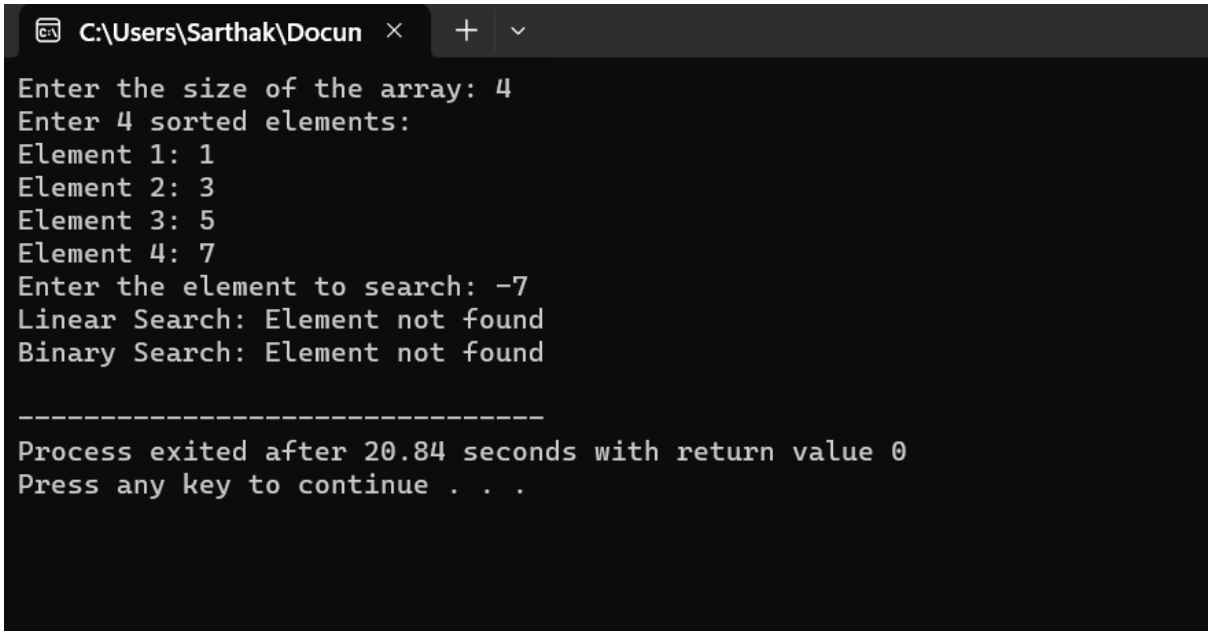
## Ans.

```
#include <stdio.h>
int linearSearch(int arr[], int size, int key) {
for (int i = 0; i < size; i++) {
if (arr[i] == key) {
return i;
}
}
return -1;
}
int binarySearch(int arr[], int size, int key) {
int low = 0, high = size - 1;
while (low <= high) {
int mid = low + (high - low) / 2;
if (arr[mid] == key) {
return mid;
```

```
} else if (arr[mid] < key) {
low = mid + 1;
} else {
high = mid - 1;
}
}
return -1;
}
int main() {
int size, key;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
int arr[size];
printf("Enter %d sorted elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
```

```
scanf("%d", &arr[i]);
}
printf("Enter the element to search: ");
scanf("%d", &key);
int linearIndex = linearSearch(arr, size, key);
if (linearIndex != -1) {
printf("Linear Search: Element found at index %d\n", linearIndex);
} else {
printf("Linear Search: Element not found\n");
}
int binaryIndex = binarySearch(arr, size, key);
if (binaryIndex != -1) {
printf("Binary Search: Element found at index %d\n", binaryIndex);
} else {
printf("Binary Search: Element not found\n");
}
return 0;
}
```

# Output:

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## Q-6. Take an array of 20 integer inputs from user and print the following:

## a. number of positive numbers

## b. number of negative numbers

## c. number of odd numbers

## d. number of even numbers

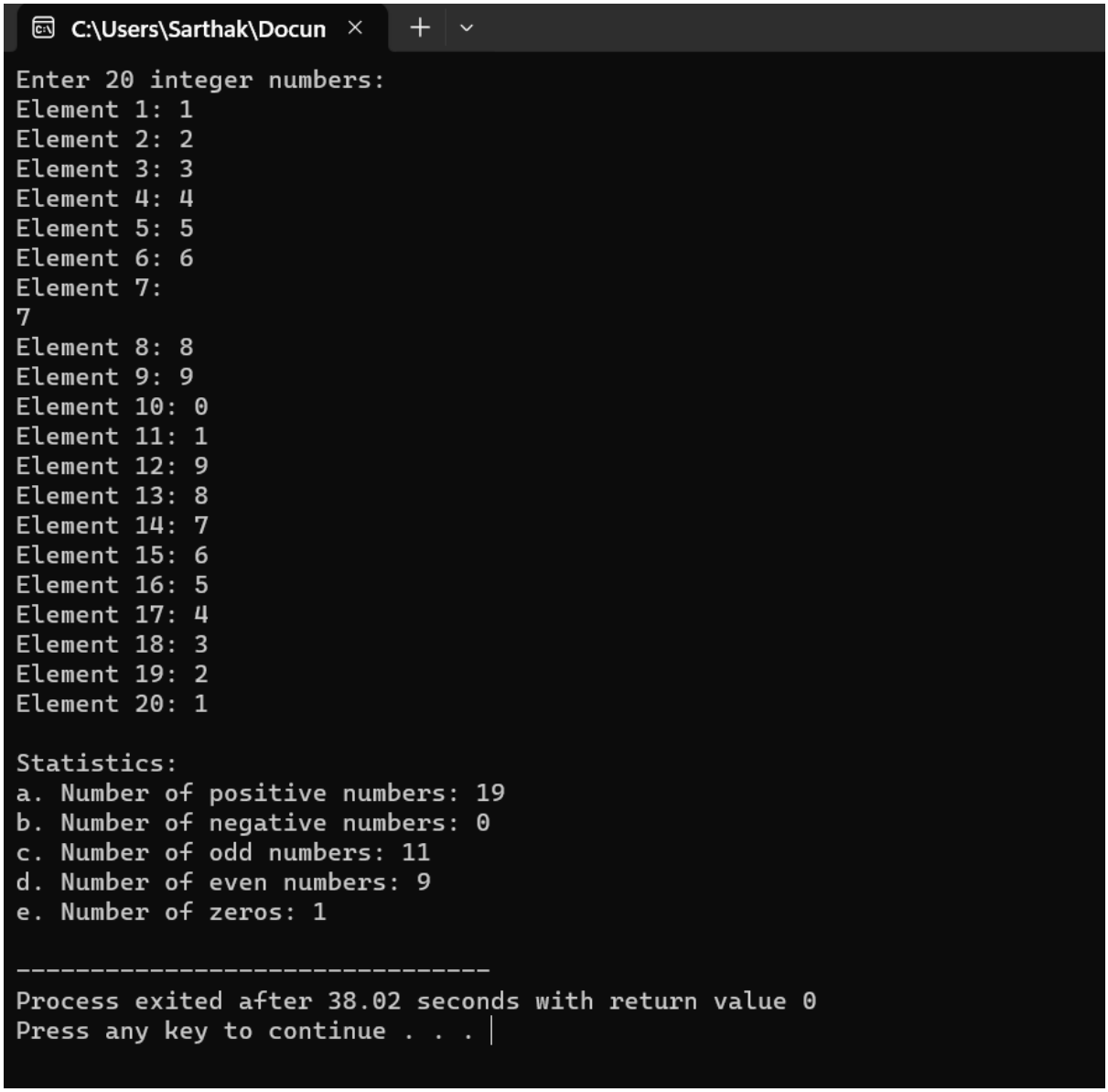
## e. number of 0.

## Ans.

```
#include <stdio.h>
```

```
int main() {
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
int arr[size];
printf("Enter %d elements for the array:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &(*(arr + i)));
}
printf("\nArray elements using pointers:\n");
for (int i = 0; i < size; i++) {
printf("%d ", *(arr + i));
}
return 0;
}
```

# Output:

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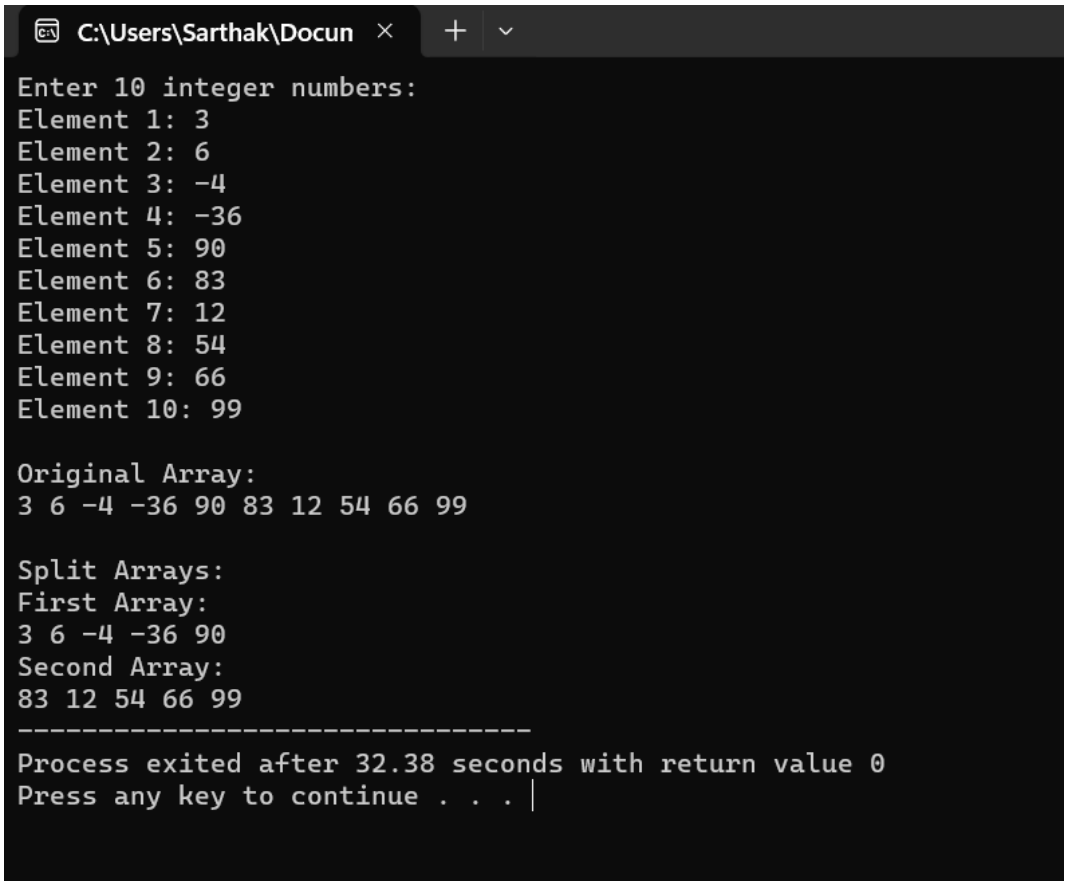
## *Q-7.* Take an array of 10 elements. Split it into middle and store the elements in two different arrays.

## Ans.

```
#include <stdio.h>
int main() {
const int size = 10;
int originalArray[size];
int firstArray[size / 2], secondArray[size / 2];
printf("Enter %d integer numbers:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &originalArray[i]);
}
for (int i = 0; i < size / 2; i++) {
firstArray[i] = originalArray[i];
secondArray[i] = originalArray[size / 2 + i];
}
printf("\nOriginal Array:\n");
for (int i = 0; i < size; i++) {
printf("%d ", originalArray[i]);
}
printf("\n\nSplit Arrays:\n");
printf("First Array:\n");
```

```
for (int i = 0; i < size / 2; i++) {
printf("%d ", firstArray[i]);
}
printf("\nSecond Array:\n");
for (int i = 0; i < size / 2; i++) {
printf("%d ", secondArray[i]);
}
return 0;
}
```

# Output:



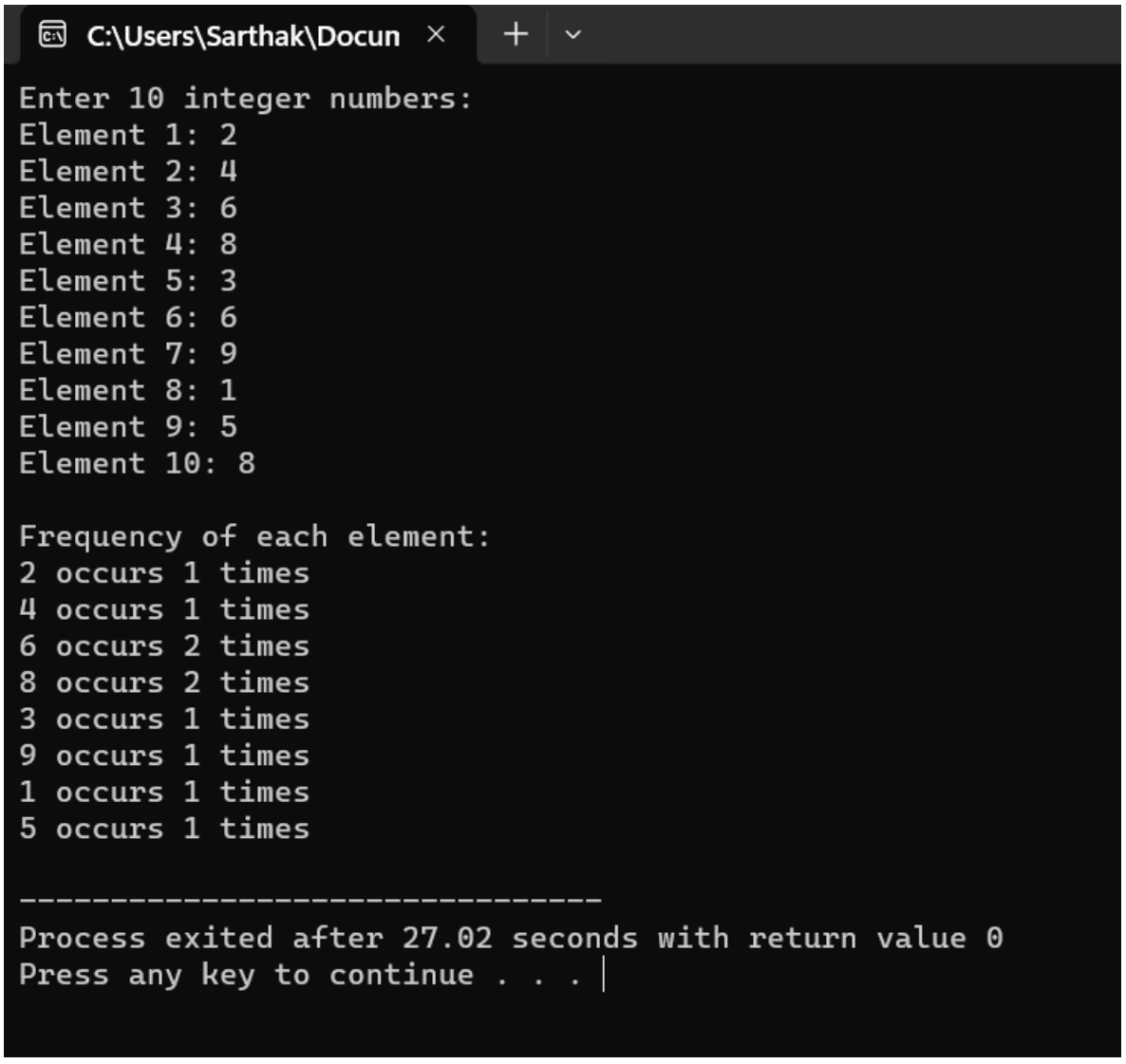
## *Q-8.* Write the program to count frequency of each element in an array.

## Ans.

```
#include <stdio.h>
void toggleChars(char str[])
{
for (int i = 0; str[i] != '\0'; i++) {
if (str[i] >= 'A' && str[i] <= 'Z')
str[i] = str[i] + 'a' - 'A';
else if (str[i] >= 'a' && str[i] <= 'z')
str[i] = str[i] + 'A' - 'a';
}
}
// Driver code
int main()
{
char str[] = "GeKf@rGeek$";
toggleChars(str);
printf("String after toggle \n");
```

```
printf("%s\n", str);

return 0;

}
```

# Output:



# ***Week-7 Questions:***

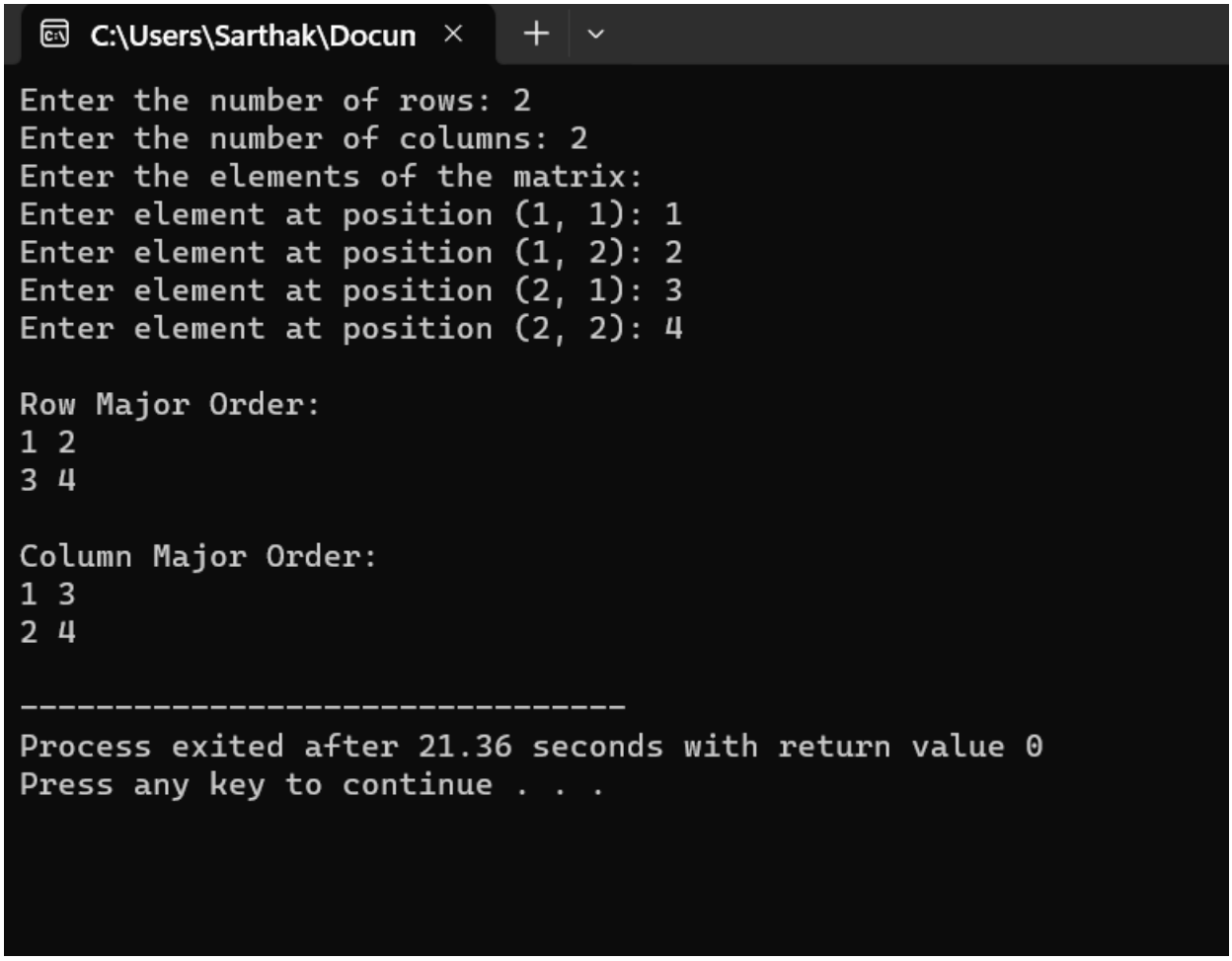
## ***Q-1.*** **Write the program to print row major and column major matrix.**

**Ans.**

```
#include <stdio.h>
int main() {
    int rows, cols;
    printf("Enter the number of rows: ");
    scanf("%d", &rows);
    printf("Enter the number of columns: ");
    scanf("%d", &cols);
    int matrix[rows][cols];
    printf("Enter the elements of the matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("Enter element at position (%d, %d): ", i +
1, j + 1);
            scanf("%d", &matrix[i][j]);
        }
    }
```

```
    printf("\nRow Major Order:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("%d ", matrix[i][j]);
        }
        printf("\n");
    }
    printf("\nColumn Major Order:\n");
    for (int j = 0; j < cols; j++) {
        for (int i = 0; i < rows; i++) {
            printf("%d ", matrix[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

## Output:




## ***Q-2.*** Write the program to print sum of a whole matrix:

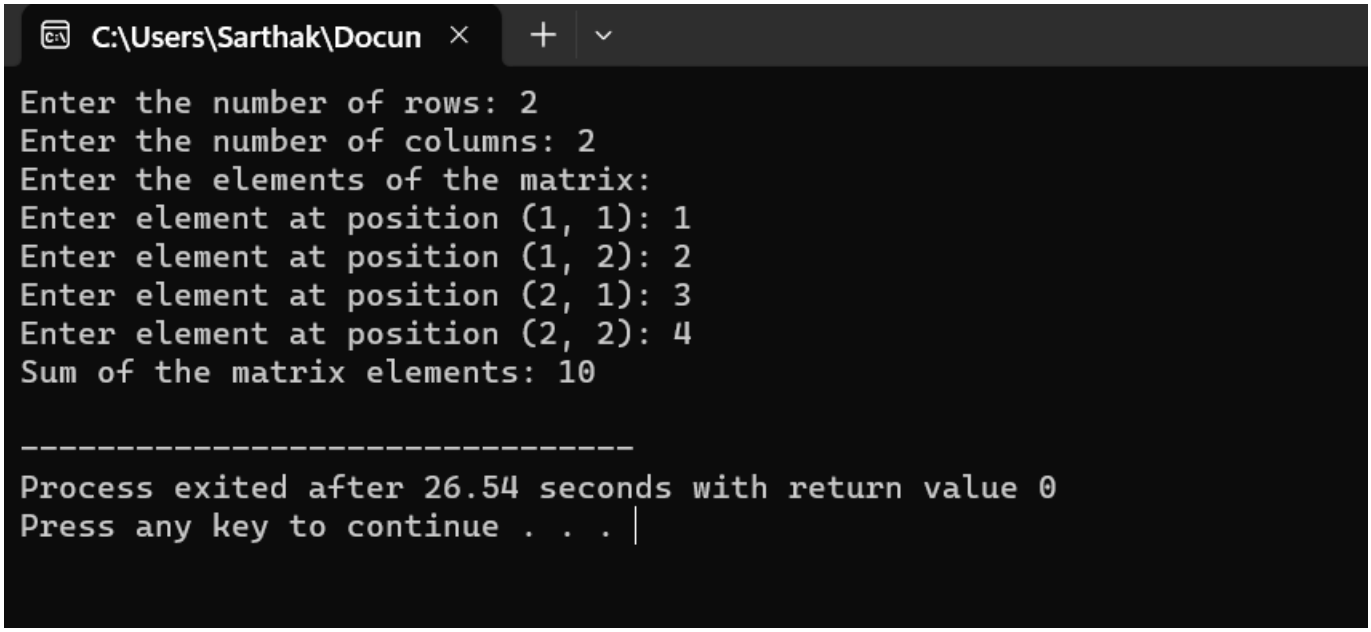
***Ans.*** #include <stdio.h>

```
int main() {
    int rows, cols;
    printf("Enter the number of rows: ");
    scanf("%d", &rows);
    printf("Enter the number of columns: ");
```

```
    scanf("%d", &cols);
    int matrix[rows][cols];
    printf("Enter the elements of the matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("Enter element at position (%d, %d): ", i +
1, j + 1);
            scanf("%d", &matrix[i][j]);
        }
    }
    printf("\nRow Major Order:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("%d ", matrix[i][j]);
        }
        printf("\n");
    }
    printf("\nColumn Major Order:\n");
    for (int j = 0; j < cols; j++) {
        for (int i = 0; i < rows; i++) {
```

```
            printf("%d ", matrix[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

## Output:




## ***Q-3.*** Write a program to add and multiply two 3x3 matrices. You can use 2D array to create a matrix.

***Ans.*** #include <stdio.h>

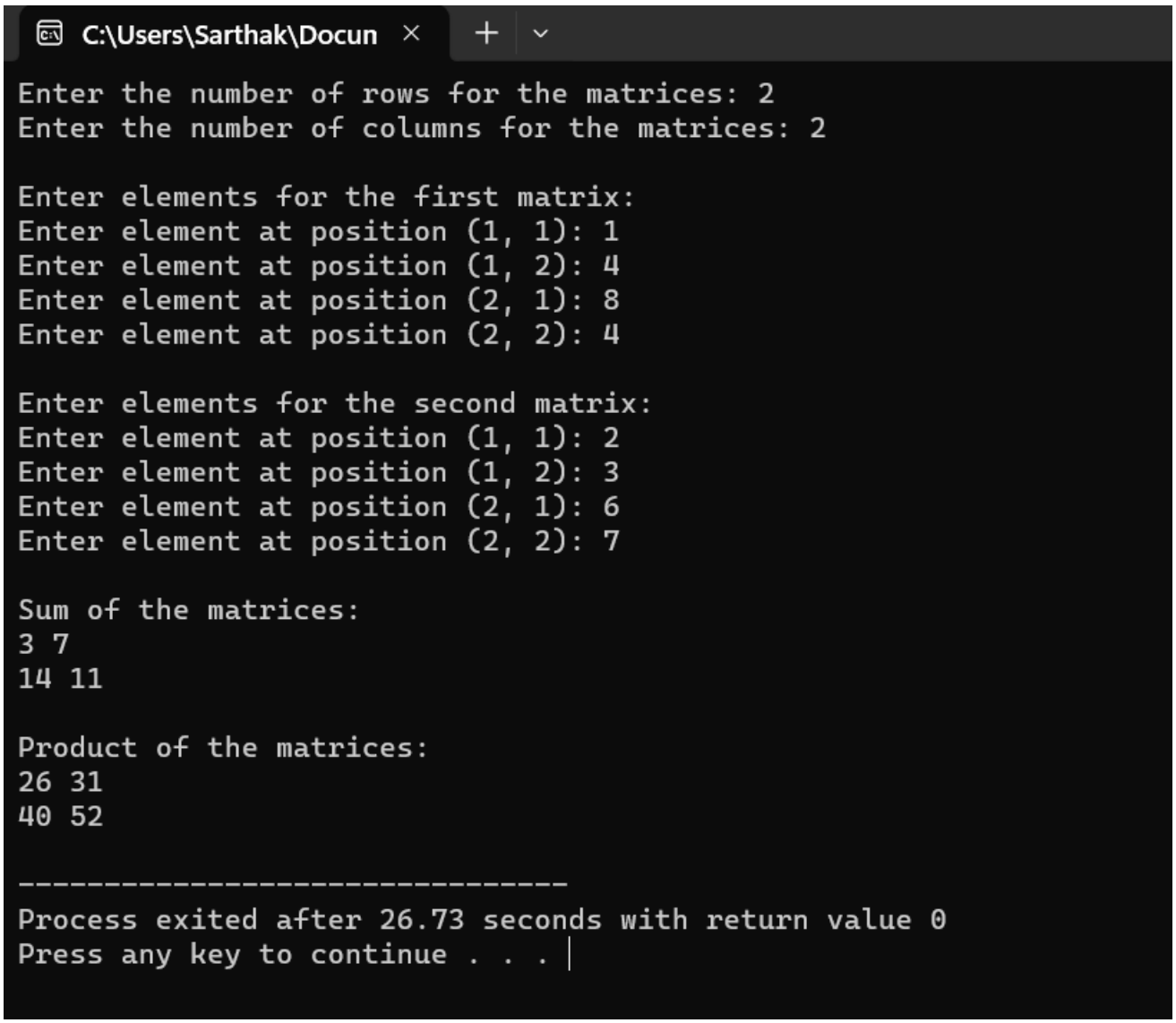
```
int main() {
```

```
    int rows, cols;
    printf("Enter the number of rows for the matrices: ");
    scanf("%d", &rows);
    printf("Enter the number of columns for the
matrices: ");
    scanf("%d", &cols);
    int matrix1[rows][cols], matrix2[rows][cols],
sumMatrix[rows][cols], productMatrix[rows][cols];
    printf("\nEnter elements for the first matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("Enter element at position (%d, %d): ", i +
1, j + 1);
            scanf("%d", &matrix1[i][j]);
        }
    }
    printf("\nEnter elements for the second matrix:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("Enter element at position (%d, %d): ", i +
1, j + 1);
```

```
            scanf("%d", &matrix2[i][j]);
        }
    }
    for (int i = 0; i < rows; i++) {
    }
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            productMatrix[i][j] = 0;
            for (int k = 0; k < cols; k++) {
                productMatrix[i][j] += matrix1[i][k] *
matrix2[k][j];
            }
        }
    }
    printf("\nSum of the matrices:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("%d ", sumMatrix[i][j]);
        }
        printf("\n");
```

```
    }
    printf("\nProduct of the matrices:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            printf("%d ", productMatrix[i][j]);
        }
        printf("\n");

        for (int j = 0; j < cols; j++) {
            sumMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
        }
    }
    return 0;
}
```

# Output:




## ***Q-4.*** Write the program to print sum of all diagonal elements, upper triangular matrix and lower triangular matrix.

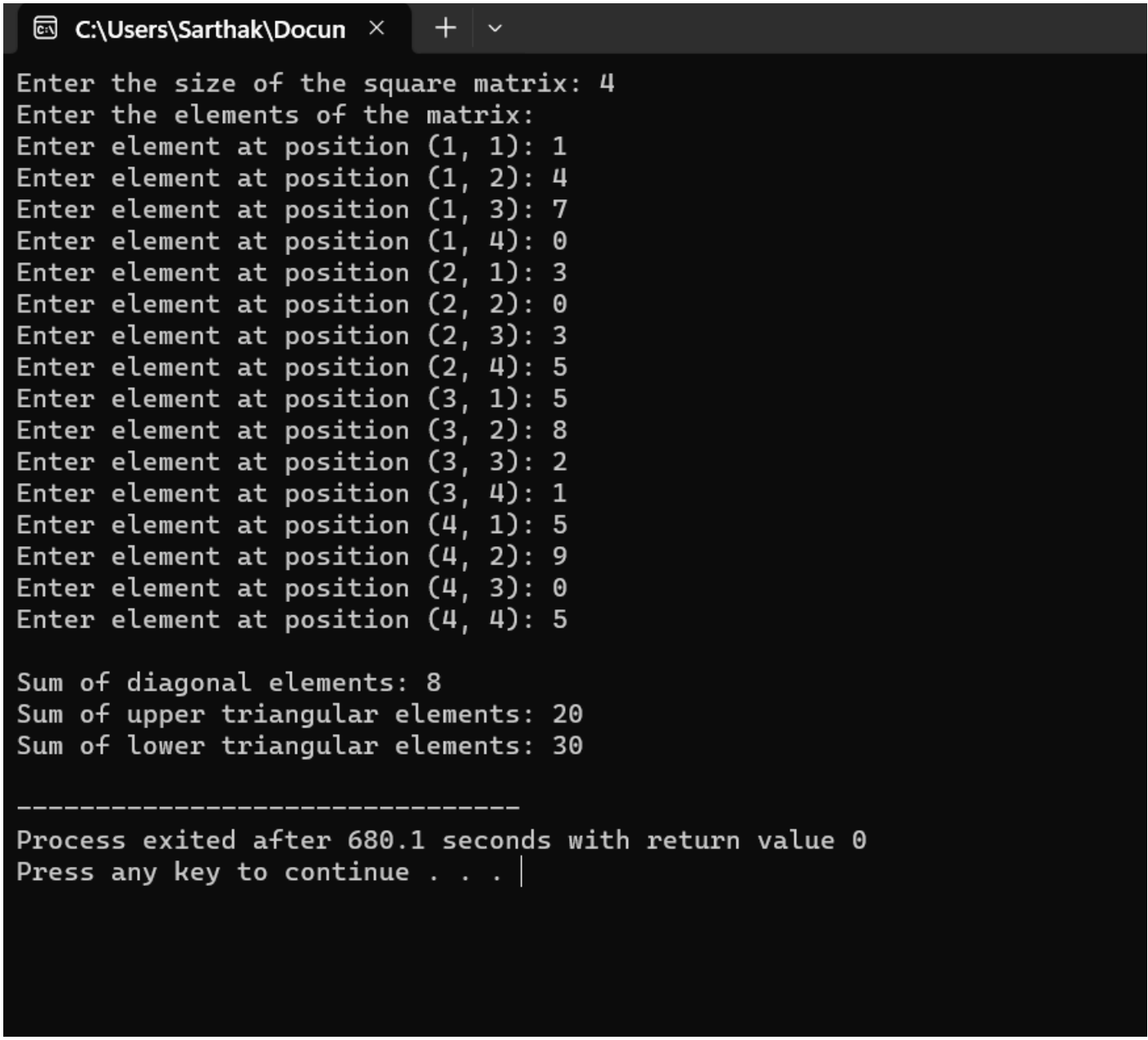
## ***Ans.***

```
#include <stdio.h>
```

```
int main() {
int size;
printf("Enter the size of the square matrix: ");
scanf("%d", &size);
int matrix[size][size];
printf("Enter the elements of the matrix:\n");
for (int i = 0; i < size; i++) {
    for (int j = 0; j < size; j++) {
        printf("Enter element at position (%d, %d): ", i +
1, j + 1);
        scanf("%d", &matrix[i][j]);
    }
}
int sumDiagonal = 0;
for (int i = 0; i < size; i++) {
    sumDiagonal += matrix[i][i];
}
int sumUpperTriangular = 0;
for (int i = 0; i < size; i++) {
    for (int j = i + 1; j < size; j++) {
```

```
            sumUpperTriangular += matrix[i][j];
        }
    }
    int sumLowerTriangular = 0;
    for (int i = 0; i < size; i++) {
        for (int j = 0; j < i; j++) {
            sumLowerTriangular += matrix[i][j];
        }
    }
    printf("\nSum of diagonal elements: %d\n", sumDiagonal);
    printf("Sum of upper triangular elements: %d\n", sumUpperTriangular);
    printf("Sum of lower triangular elements: %d\n", sumLowerTriangular);
    return 0;
}
```

# Output:




## ***Q-5.*** **Write the program to find the frequency of odd and even elements in matrix.**

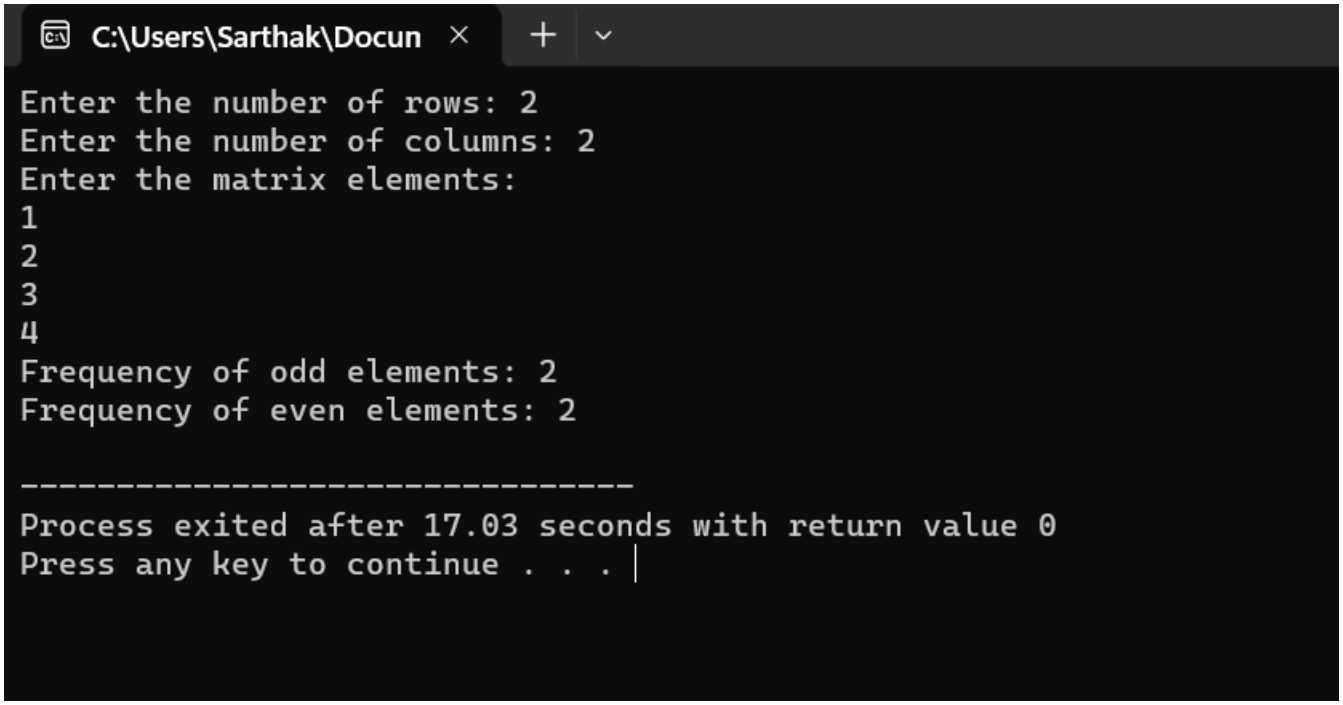
## ***Ans.***

```
#include <stdio.h>
```

```
int main() {
    int rows, cols;
    printf("Enter the number of rows: ");
    scanf("%d", &rows);
    printf("Enter the number of columns: ");
    scanf("%d", &cols);
    int matrix[rows][cols];
    printf("Enter the matrix elements:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            scanf("%d", &matrix[i][j]);
        }
    }
    int oddFrequency = 0, evenFrequency = 0;
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            if (matrix[i][j] % 2 == 0) {
                evenFrequency++;
            } else {
                oddFrequency++;
```

```
        }
      }
    }
    printf("Frequency of odd elements: %d\n", oddFrequency);
    printf("Frequency of even elements: %d\n", evenFrequency);
    return 0;
  }
```

# Output:



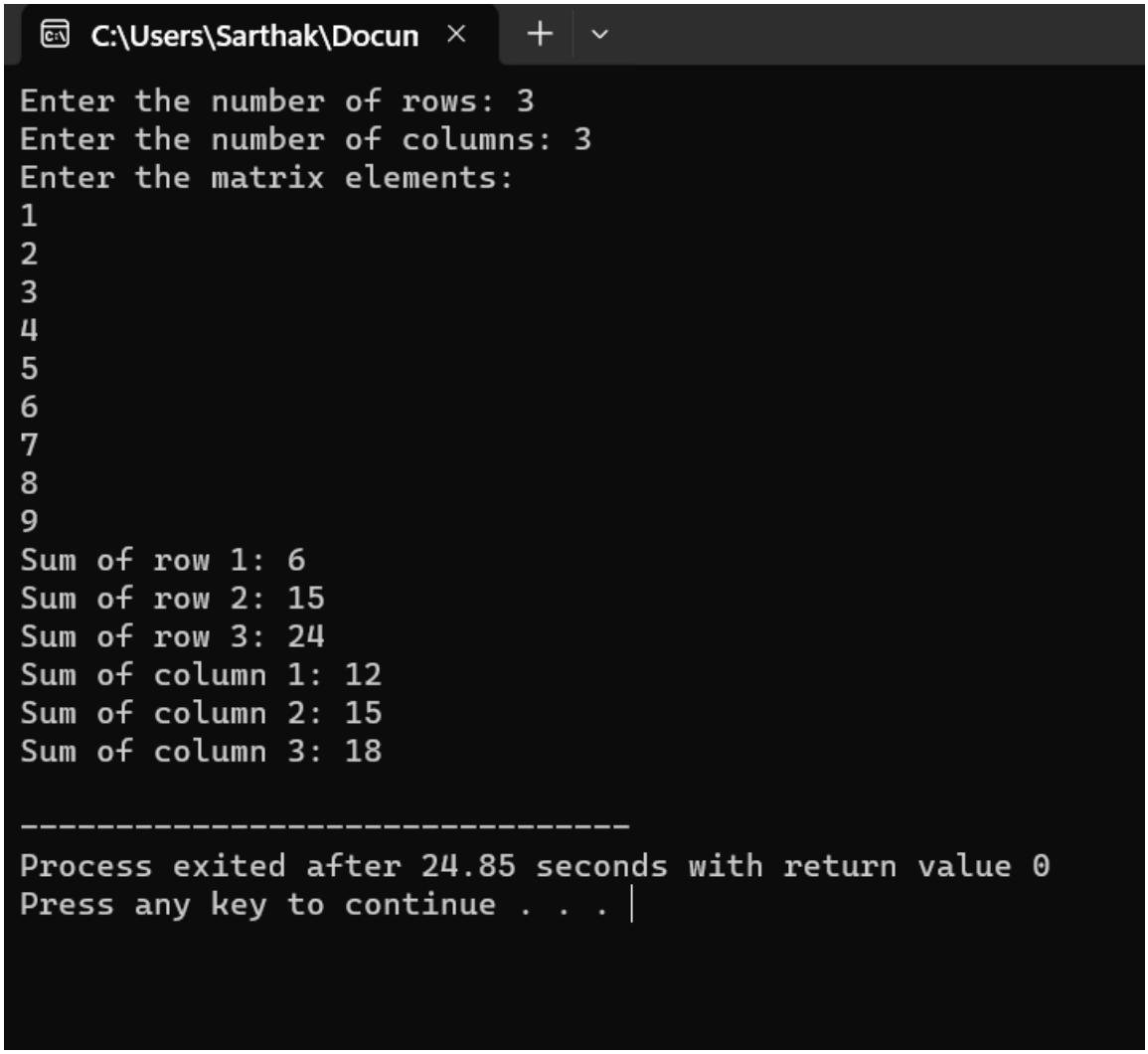
## ***Q-6.*** **Write the program to find sum of each row and sum of each column of matrix.**

## **Ans.**

```
#include <stdio.h>
int main() {
    int rows, cols;
    printf("Enter the number of rows: ");
    scanf("%d", &rows);
    printf("Enter the number of columns: ");
    scanf("%d", &cols);
    int matrix[rows][cols];
    printf("Enter the matrix elements:\n");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            scanf("%d", &matrix[i][j]);
        }
    }
    for (int i = 0; i < rows; i++) {
```

```
        int rowSum = 0;
        for (int j = 0; j < cols; j++) {
            rowSum += matrix[i][j];
        }
        printf("Sum of row %d: %d\n", i + 1, rowSum);
    }
    for (int j = 0; j < cols; j++) {
        int colSum = 0;
        for (int i = 0; i < rows; i++) {
            colSum += matrix[i][j];
        }
        printf("Sum of column %d: %d\n", j + 1, colSum);
    }
    return 0;
}
```

# Output:



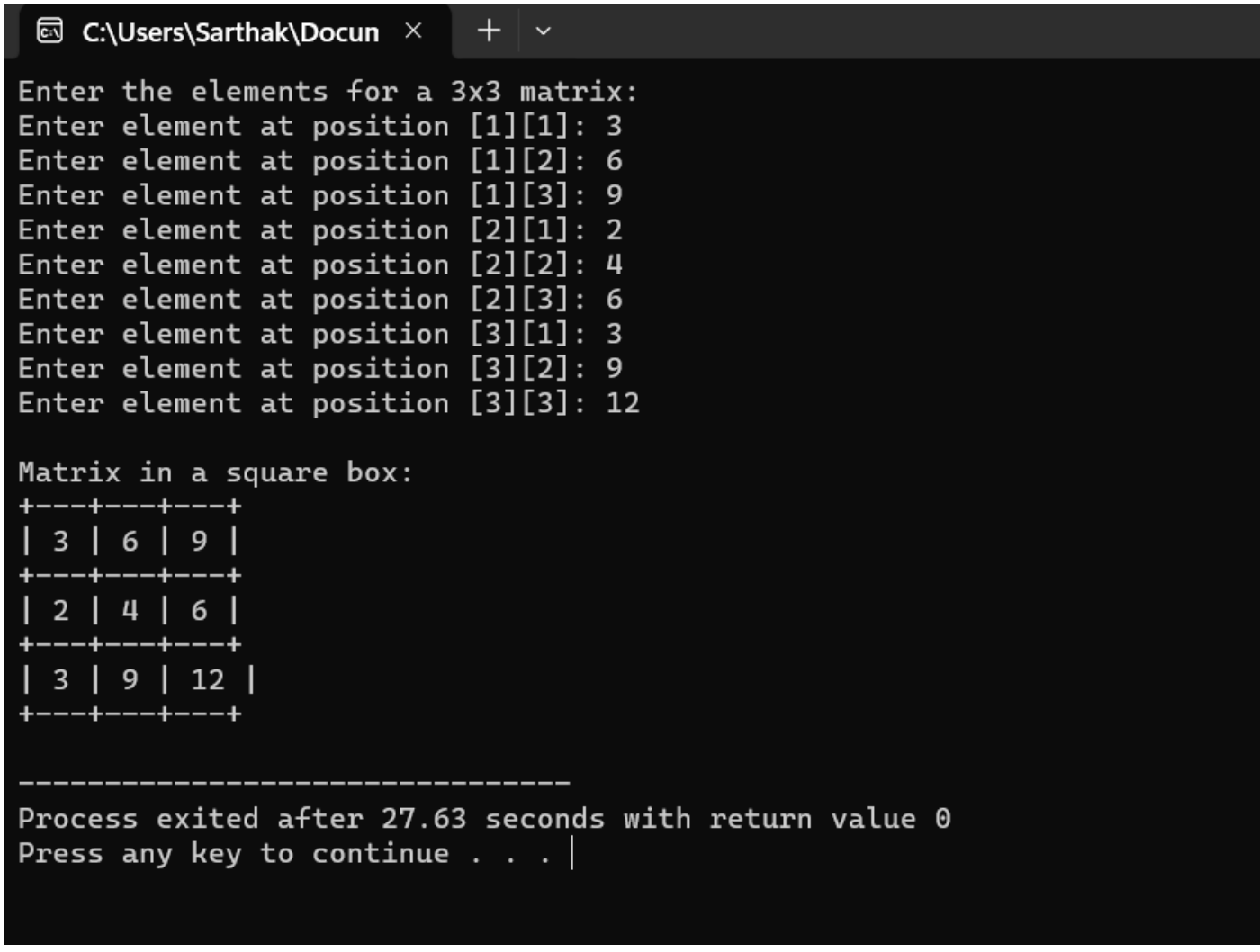

## *Q-7.* Initialize a 2D array of 3*3 matrix.

## Ans.

```
#include <stdio.h>
int main() {
    int matrix[3][3];
    printf("Enter the elements for a 3x3 matrix:\n");
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
```

```
            printf("Enter element at position [%d][%d]: ", i +
1, j + 1);
            scanf("%d", &matrix[i][j]);
        }
    }
    printf("\nMatrix in a square box:\n");
    printf("+---+---+---+\n");
    for (int i = 0; i < 3; i++) {
        printf("| %d | %d | %d |\n", matrix[i][0],
matrix[i][1], matrix[i][2]);
        if (i < 2) {
            printf("+---+---+---+\n");
        }
    }
    printf("+---+---+---+\n");
    return 0;
}
```

# Output:




**<u>*Q-8.*</u> A square matrix, one having the same number of rows and columns, is called a diagonal matrix if it's only non-zero elements are on the diagonal from upper left to lower right. It is called upper triangular matrix if all elements bellow the diagonal are**

**zeroes, and lower triangular matrix, if all the elements above the diagonal are zeroes. Write a program that reads a matrix and determines if it is one of the above mentioned three special matrices.**

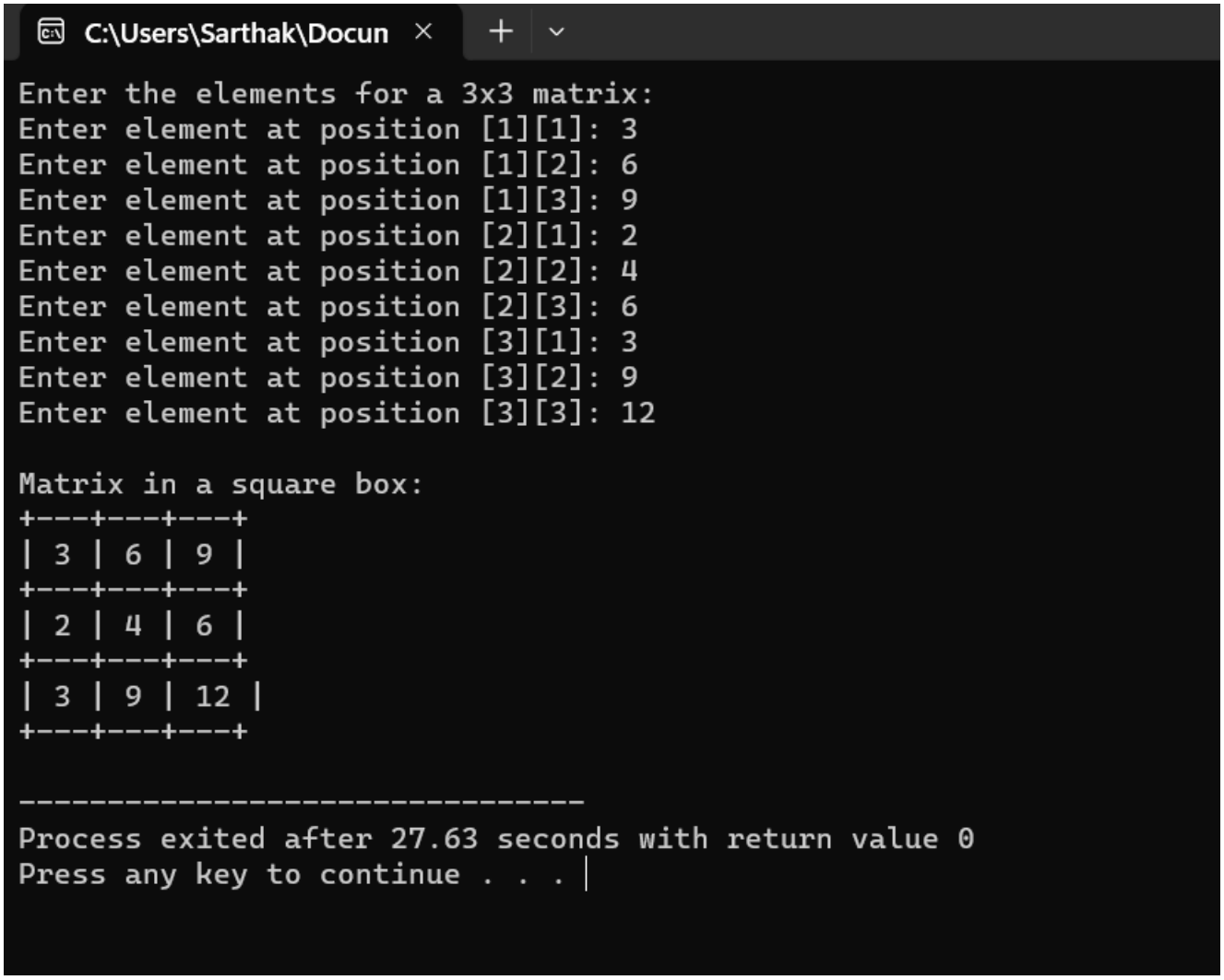
## Ans.

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

```
int isDiagonal = 1;
int isUpperTriangular = 1;
int isLowerTriangular = 1;
for (int i = 0; i < n; i++) {
    for (int j = 0; j < n; j++) {
        if (i != j && matrix[i][j] != 0) {
            isDiagonal = 0;
        }
        if (i < j && matrix[i][j] != 0) {
            isUpperTriangular = 0;
        }
        if (i > j && matrix[i][j] != 0) {
            isLowerTriangular = 0;
        }
    }
}
if (isDiagonal) {
    printf("The matrix is a diagonal matrix.\n");
} else if (isUpperTriangular) {
```

```
        printf("The matrix is an upper triangular
matrix.\n");
    } else if (isLowerTriangular) {
        printf("The matrix is a lower triangular matrix.\n");
    } else {
        printf("The matrix is not diagonal, upper
triangular, or lower triangular.\n");
    }
    return 0;
}
```

# Output:




## ***Q-9.*** **Write the program to check whether the matrix is sparse matrix or not.**

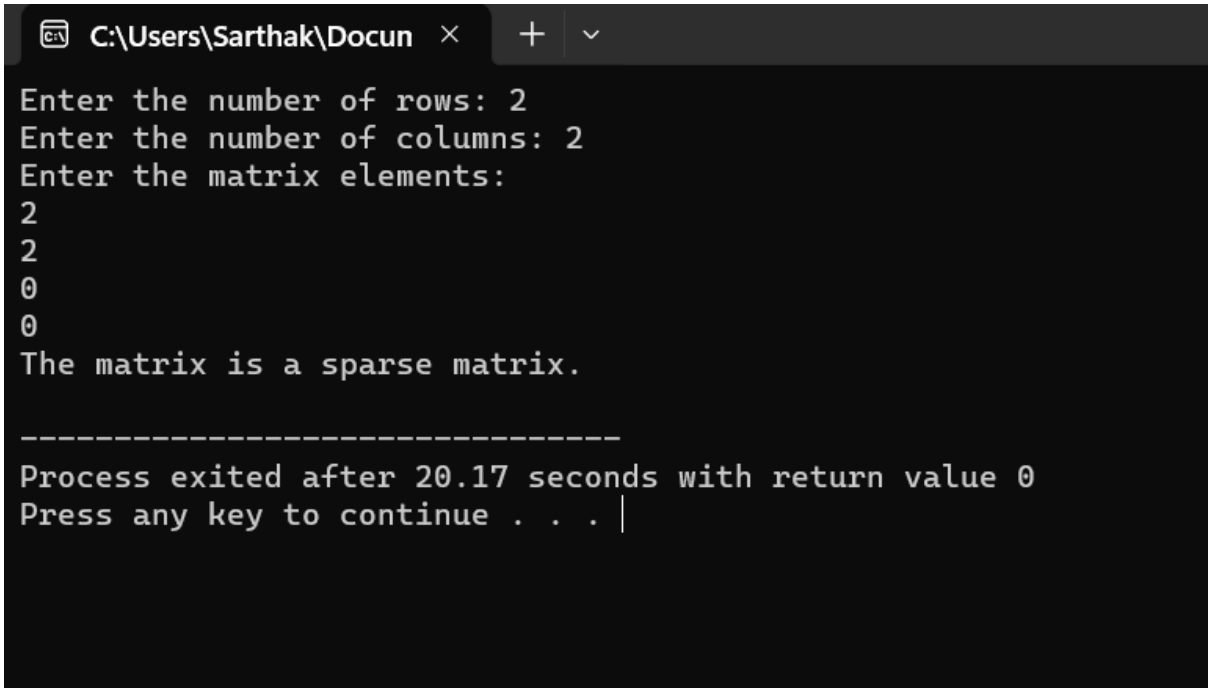
## ***Ans.***

```
#include <stdio.h>

int main() {

    int rows, cols;
```

```
printf("Enter the number of rows: ");
scanf("%d", &rows);
printf("Enter the number of columns: ");
scanf("%d", &cols);
int matrix[rows][cols];
printf("Enter the matrix elements:\n");
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        scanf("%d", &matrix[i][j]);
    }
}
int nonZeroCount = 0;
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        if (matrix[i][j] != 0) {
            nonZeroCount++;
        }
    }
}
int threshold = rows * cols / 2;
```

```
    if (nonZeroCount <= threshold) {
        printf("The matrix is a sparse matrix.\n");
    } else {
        printf("The matrix is not a sparse matrix.\n");
    }
    return 0;
}
```

# Output:



# ***Week-8 Questions:***

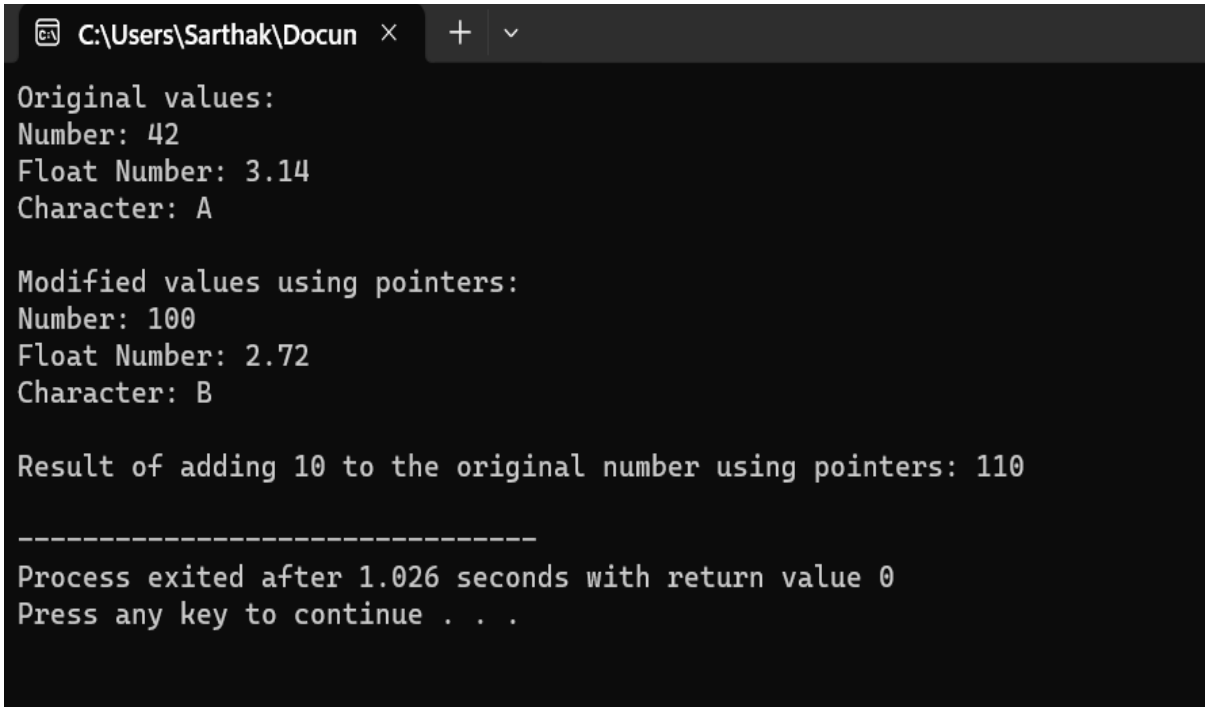
## ***Q-1.*** **Write a C program to create, initialize and use pointers.**

## **Ans.**

```
#include <stdio.h>
int main() {
int number = 42;
float floatNumber = 3.14;
char character = 'A';
int *intPointer;
float *floatPointer;
char *charPointer;
intPointer = &number;
floatPointer = &floatNumber;
charPointer = &character;
printf("Original values:\n");
printf("Number: %d\n", number);
printf("Float Number: %.2f\n", floatNumber);
printf("Character: %c\n\n", character);
```

```
*intPointer = 100;
*floatPointer = 2.718;
*charPointer = 'B';
printf("Modified values using pointers:\n");
printf("Number: %d\n", number);
printf("Float Number: %.2f\n", floatNumber);
printf("Character: %c\n\n", character);
int anotherNumber = 10;
int *resultPointer = &number;
*resultPointer += anotherNumber;
printf("Result of adding %d to the original number
using pointers: %d\n", anotherNumber,
*resultPointer);
return 0;
}
```

# Output:



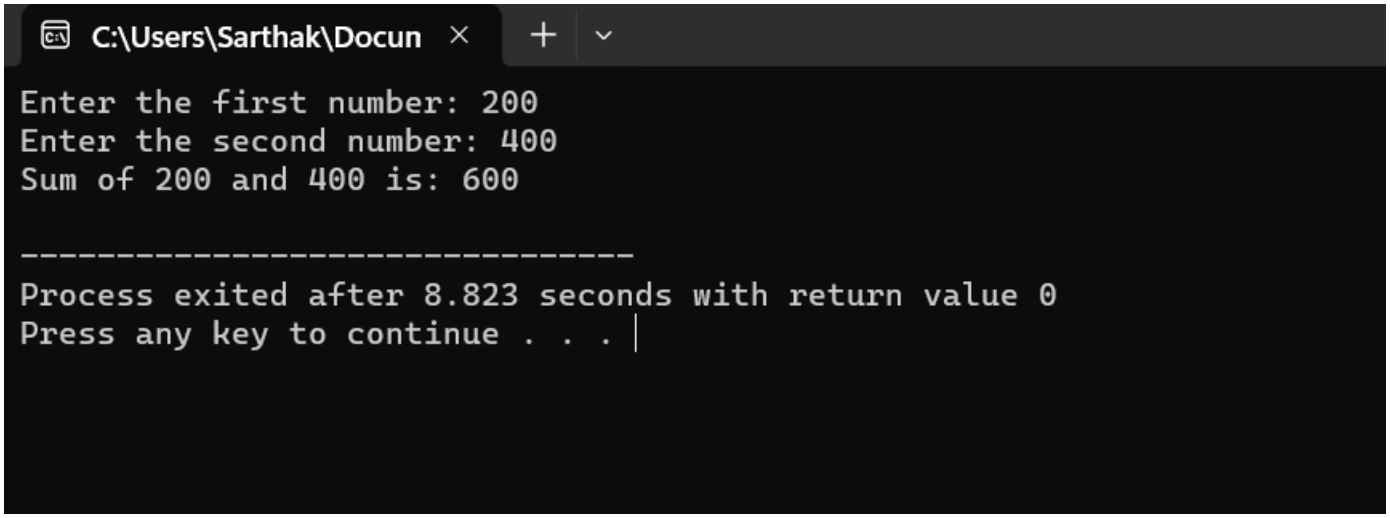

## *Q-2.* Write a C program to add two numbers using pointers.

## Ans.

```
#include<stdio.h>
 int main()
{
int num1, num2, sum;
int *ptr1, *ptr2;
ptr1 = &num1;
ptr2 = &num2;
printf("Enter the first number: ");
```

```
scanf("%d", ptr1);
printf("Enter the second number: ");
scanf("%d", ptr2);
sum = *ptr1 + *ptr2;
printf("Sum of %d and %d is: %d\n", *ptr1, *ptr2, sum);
return 0;
}
```

# Output:



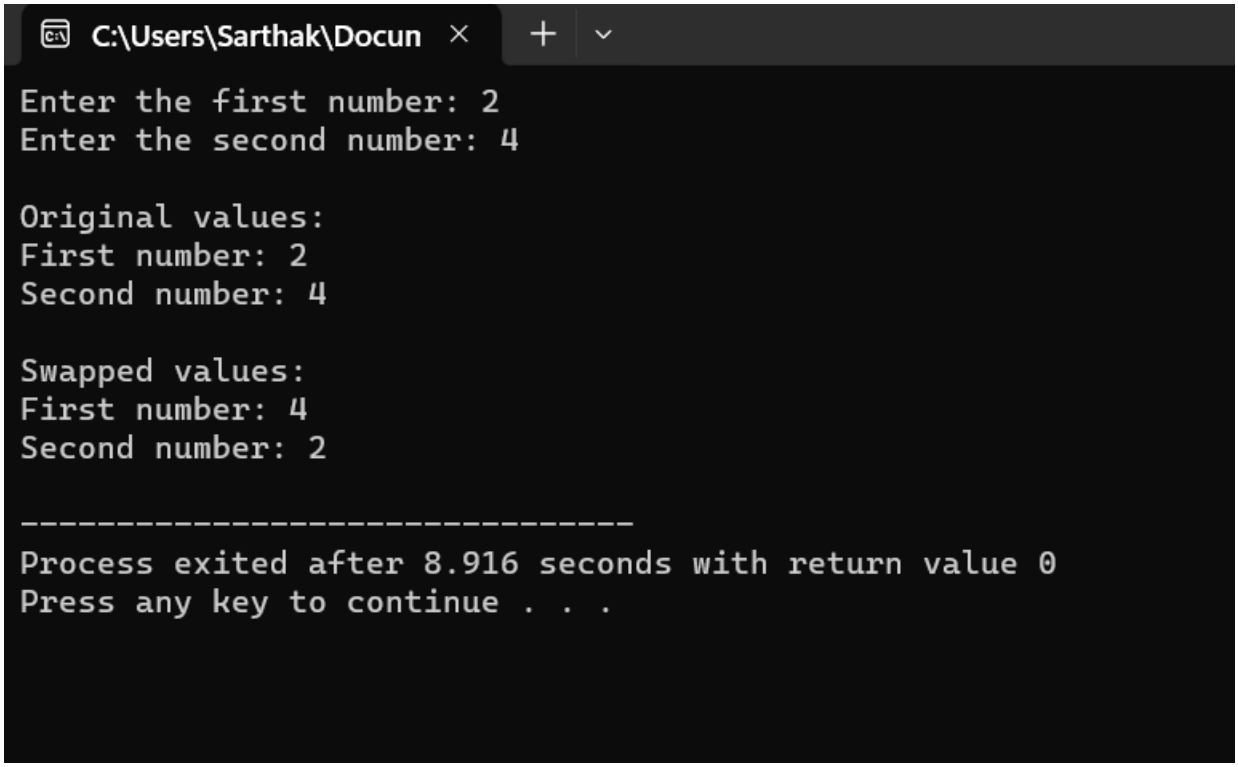

## *Q-3.* Write a C program to swap two numbers using pointers.

## Ans.

```
#include <stdio.h>
void swap(int *num1, int *num2) {
```

```
int temp = *num1;
*num1 = *num2;
*num2 = temp;
}
int main() {
int num1, num2;
printf("Enter the first number: ");
scanf("%d", &num1);
printf("Enter the second number: ");
scanf("%d", &num2);
printf("\nOriginal values:\n");
printf("First number: %d\n", num1);
printf("Second number: %d\n", num2);
swap(&num1, &num2);
printf("\nSwapped values:\n");
printf("First number: %d\n", num1);
printf("Second number: %d\n", num2);
return 0;
}
```

# Output:



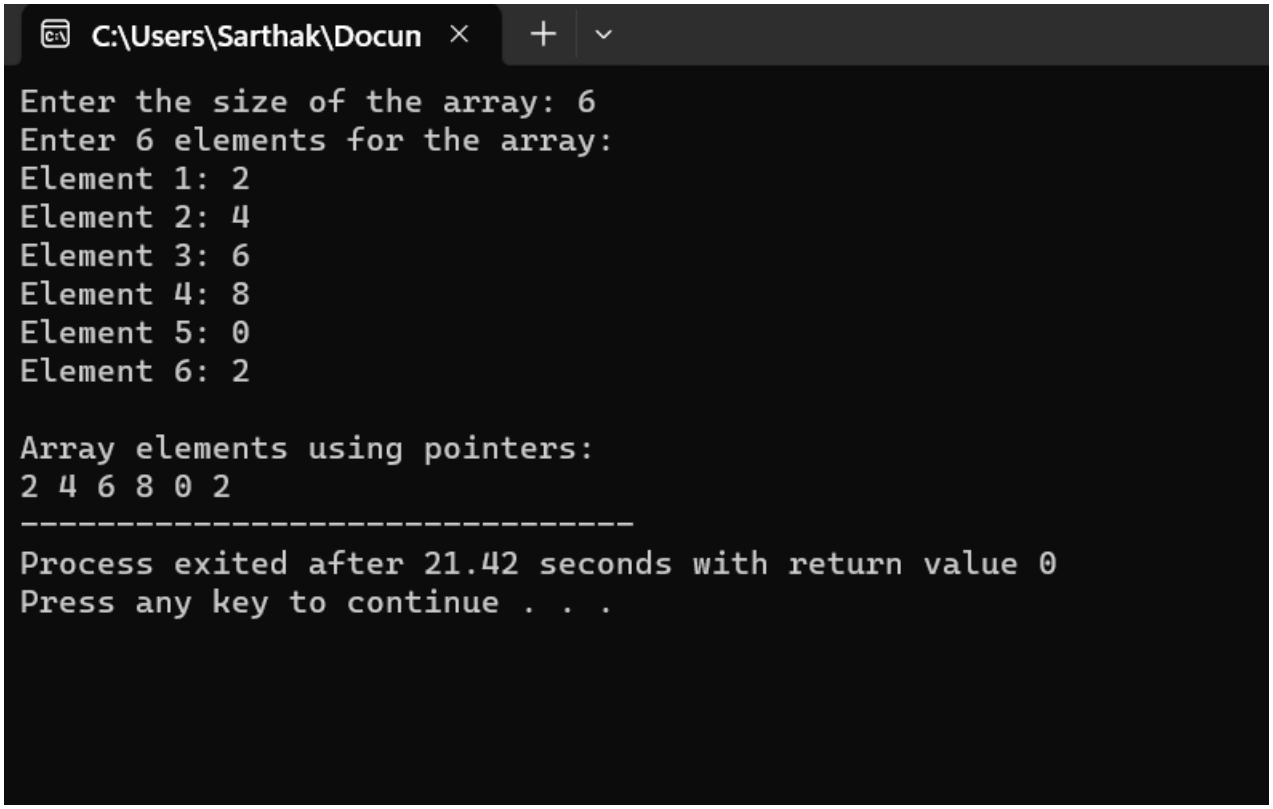

## *Q-4.* Write a C program to input and print array elements using pointer.

## Ans.

```
#include <stdio.h>
int main() {
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
```

```
}
int arr[size];
printf("Enter %d elements for the array:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &(*(arr + i)));
}
printf("\nArray elements using pointers:\n");
for (int i = 0; i < size; i++) {
printf("%d ", *(arr + i));
}
return 0;
}
```

# Output:




## *Q-5.* Write a C program to copy one array to another using pointer.

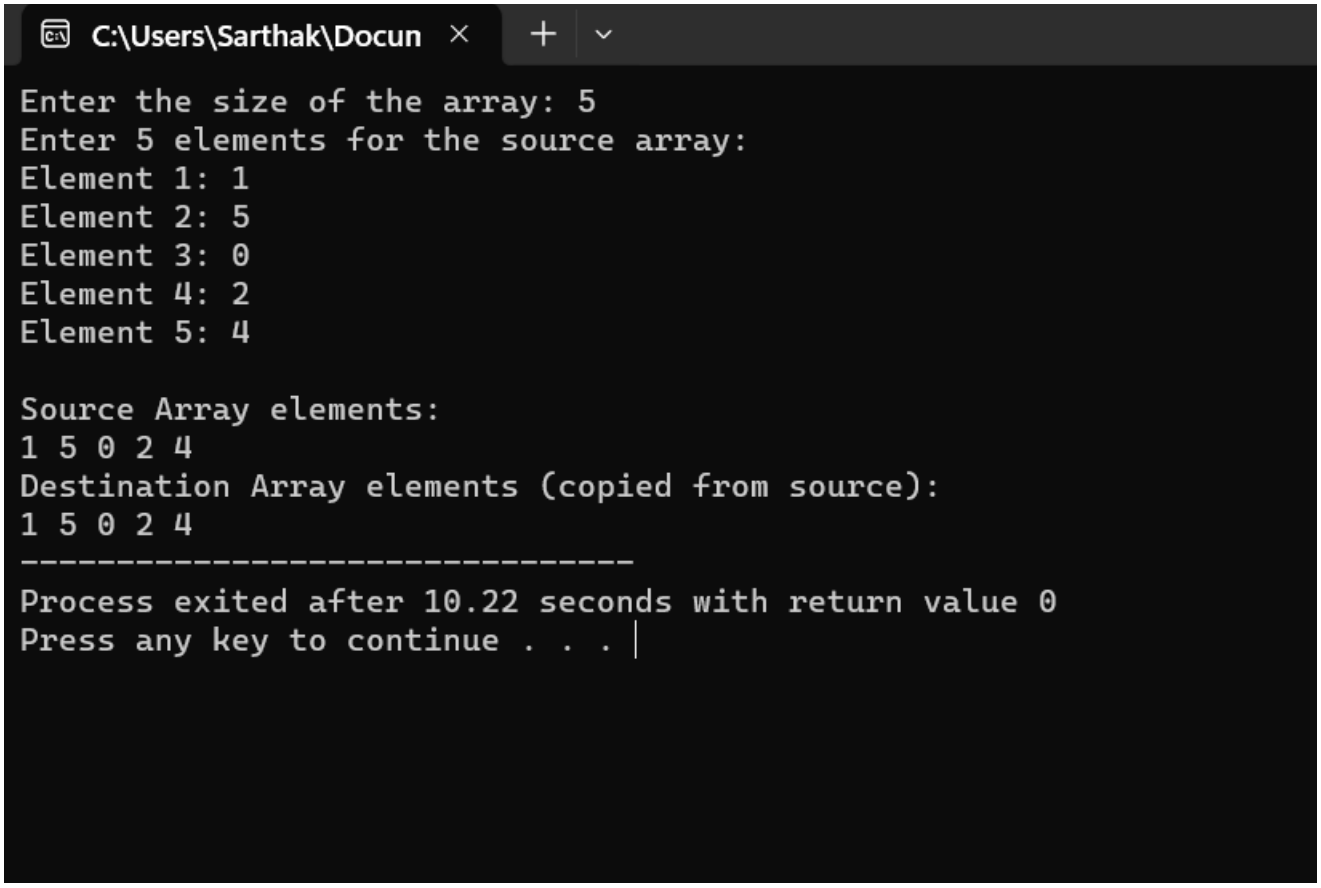
## Ans.

```
#include<stdio.h>
void copyArray(int *source, int *destination, int size)
{
for (int i = 0; i < size; i++)
{
 *(destination + i) = *(source + i);
}
```

```
}
int main()
{
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0)
{
printf("Invalid array size. Exiting...\n");
return 1;
}
int sourceArray[size];
int destinationArray[size];
printf("Enter %d elements for the source array:\n",
size);
for (int i = 0; i < size; i++)
{
printf("Element %d: ", i + 1);
scanf("%d", &(*(sourceArray + i)));
}
```

```
copyArray(sourceArray, destinationArray, size);
printf("\nSource Array elements:\n");
for (int i = 0; i < size; i++)
{
printf("%d ", *(sourceArray + i));
}
// Print destination array elements (copied array)
printf("\nDestination Array elements (copied from source):\n");
for (int i = 0; i < size; i++)
{
printf("%d ", *(destinationArray + i));
}
return 0;
}
```

# Output:




## *Q-6.* Write a C program to swap two arrays using pointers.

## Ans.

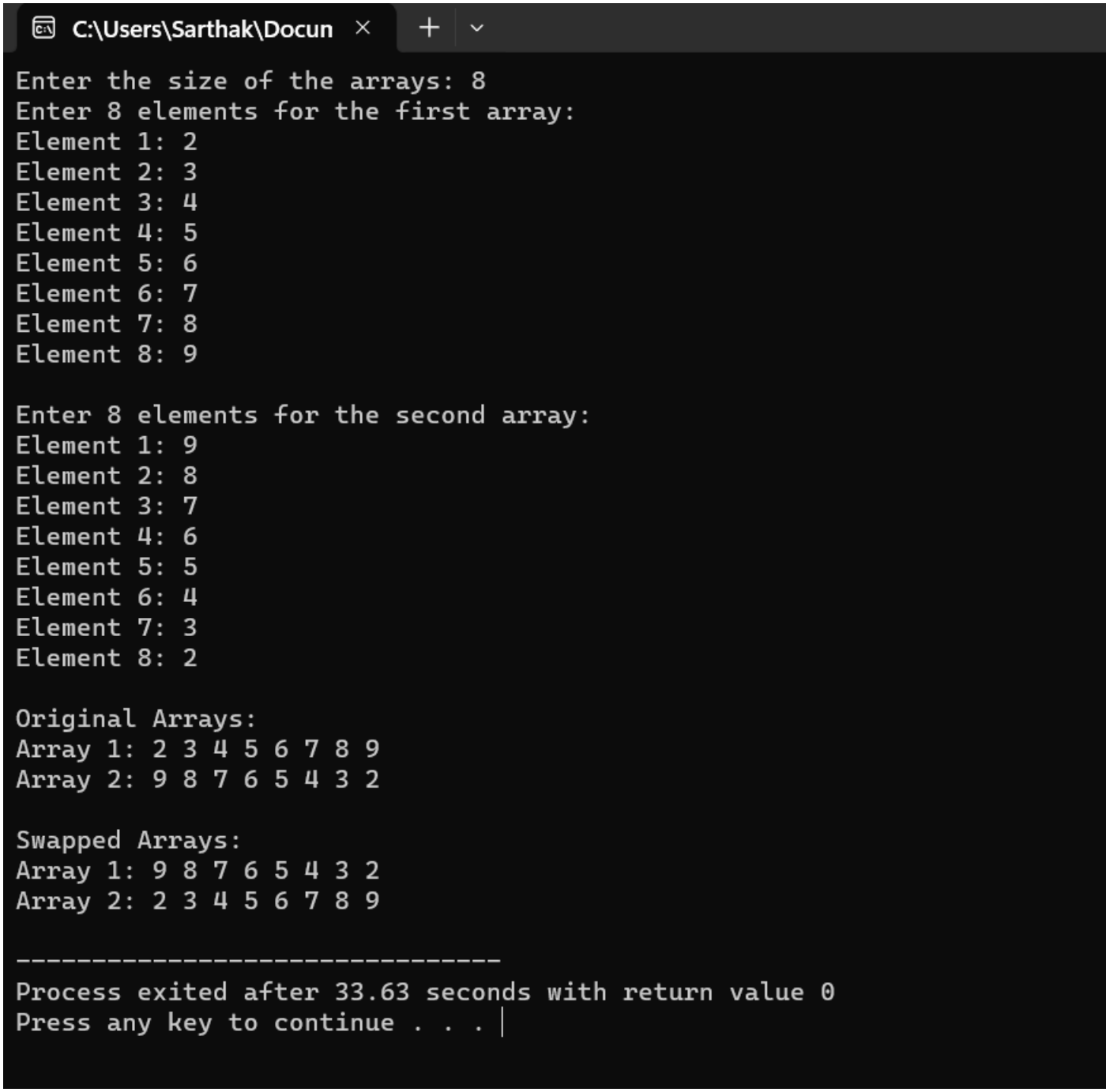
```
#include <stdio.h>

void swapArrays(int *arr1, int *arr2, int size) {

for (int i = 0; i < size; i++) {

int temp = *(arr1 + i);

*(arr1 + i) = *(arr2 + i);

*(arr2 + i) = temp;
```

```
}
}
void printArray(int *arr, int size) {
for (int i = 0; i < size; i++) {
printf("%d ", *(arr + i));
}
printf("\n");
}
int main() {
int size;
printf("Enter the size of the arrays: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
int array1[size], array2[size];
printf("Enter %d elements for the first array:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
```

```
scanf("%d", &(*(array1 + i)));
}
printf("\nEnter %d elements for the second array:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &(*(array2 + i)));
}
printf("\nOriginal Arrays:\n");
printf("Array 1: ");
printArray(array1, size);
printf("Array 2: ");
printArray(array2, size);
swapArrays(array1, array2, size);
printf("\nSwapped Arrays:\n");
printf("Array 1: ");
printArray(array1, size);
printf("Array 2: ");
printArray(array2, size);
return 0;
```

}

# Output:



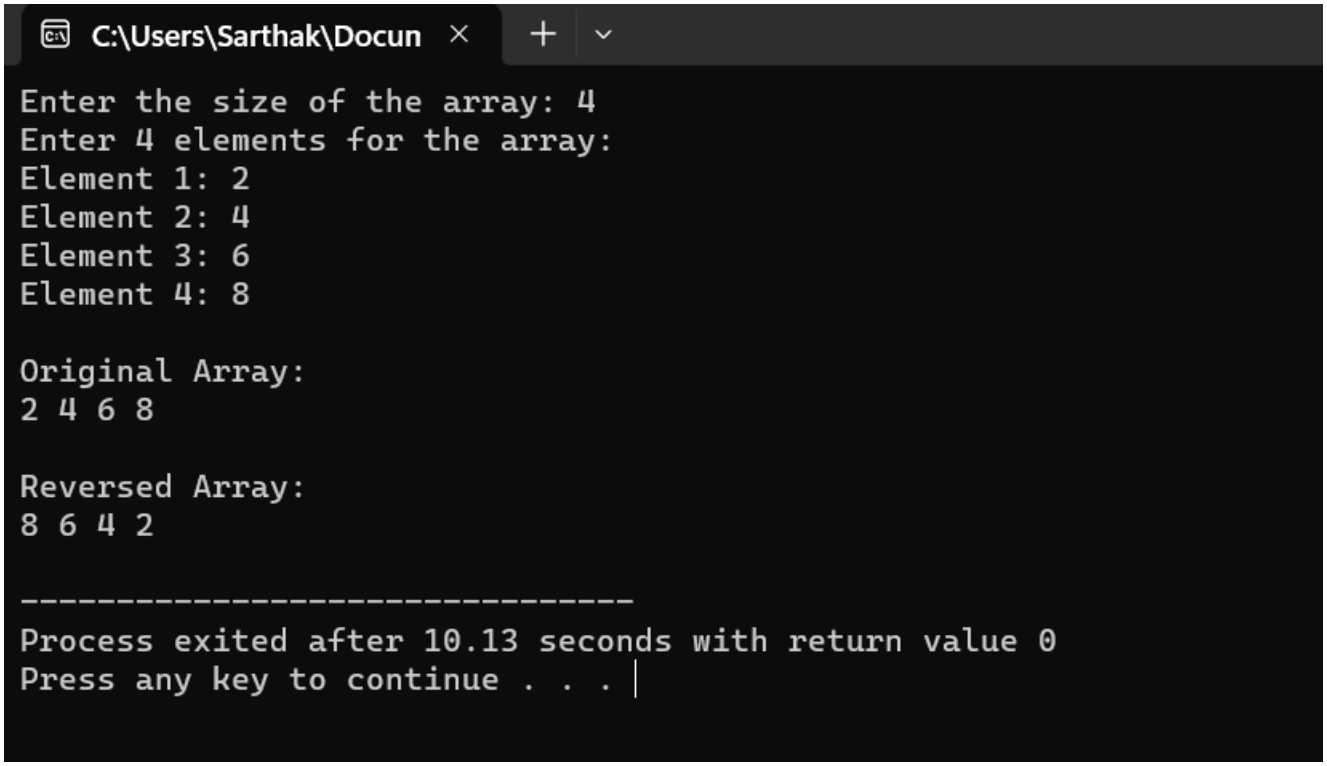

## *Q-7.* Write a C program to reverse an array using pointers.

## Ans.

```
#include <stdio.h>
void reverseArray(int *arr, int size) {
int *start = arr;
int *end = arr + size - 1;
while (start < end) {
int temp = *start;
*start = *end;
*end = temp;
start++;
end--;
}
}
void printArray(int *arr, int size) {
for (int i = 0; i < size; i++) {
printf("%d ", *(arr + i));
}
printf("\n");
}
int main() {
```

```
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
if (size <= 0) {
printf("Invalid array size. Exiting...\n");
return 1;
}
int array[size];
printf("Enter %d elements for the array:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &(*(array + i)));
printf("\nOriginal Array:\n");
printArray(array, size);
reverseArray(array, size);
printf("\nReversed Array:\n");
printArray(array, size);
return 0;
}
```

# Output:




## *Q-8.* Write a C program to add two matrix using pointers.

## Ans.

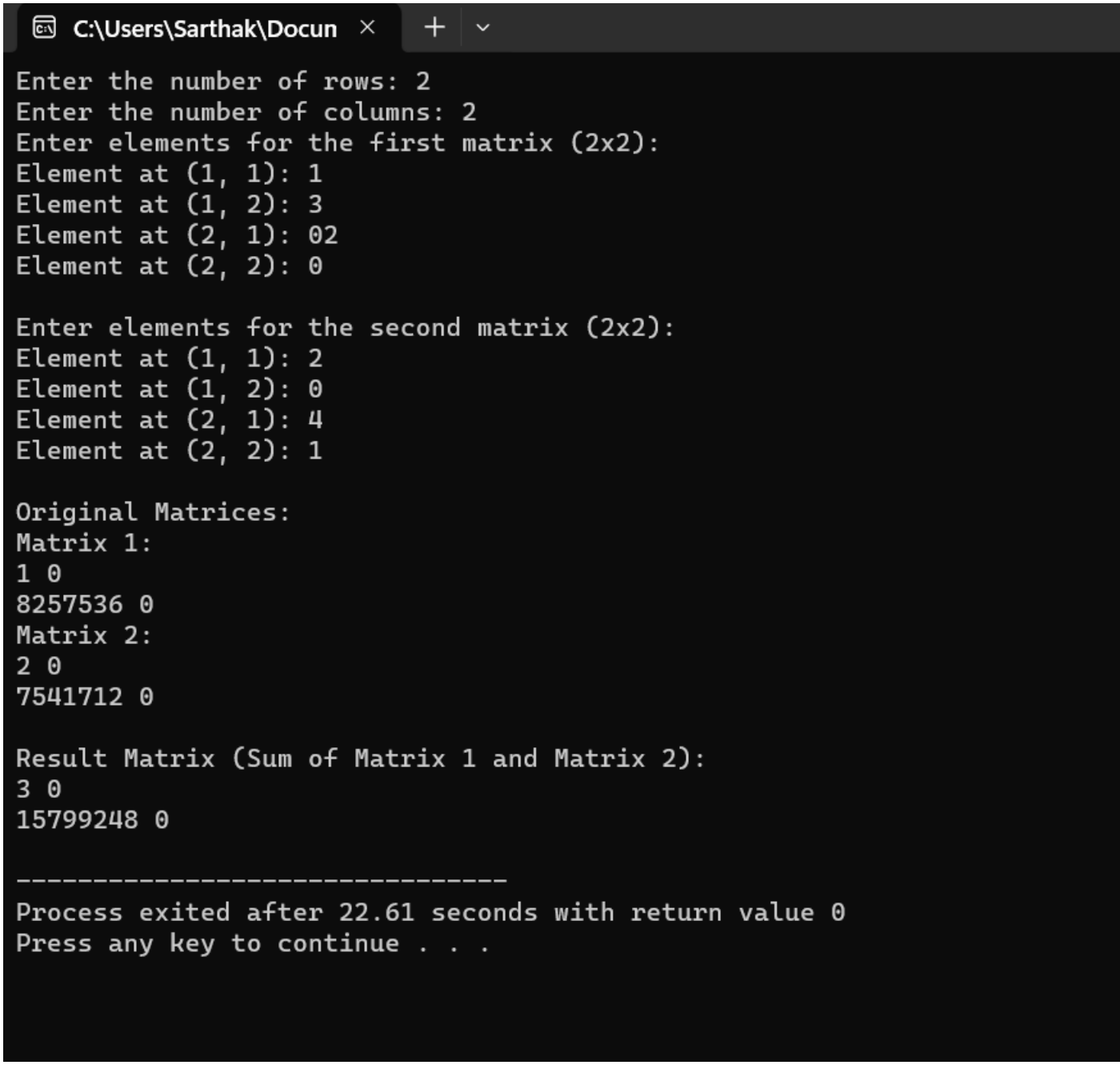
```
#include <stdio.h>

#define MAX_SIZE 10

void addMatrices(int *matrix1, int *matrix2, int *result,
int rows, int cols) {

for (int i = 0; i < rows; i++) {

for (int j = 0; j < cols; j++) {

*(result + i * cols + j) = *(matrix1 + i * cols + j) +
*(matrix2 + i * cols + j);
```

```
}
}
}
void printMatrix(int *matrix, int rows, int cols) {
for (int i = 0; i < rows; i++) {
for (int j = 0; j < cols; j++) {
printf("%d ", *(matrix + i * cols + j));
}
printf("\n");
}
}
int main() {
int rows, cols;
printf("Enter the number of rows: ");
scanf("%d", &rows);
printf("Enter the number of columns: ");
scanf("%d", &cols);
if (rows <= 0 || cols <= 0 || rows > MAX_SIZE || cols > MAX_SIZE) {
printf("Invalid matrix size. Exiting...\n");
```

```
return 1;
}
int matrix1[MAX_SIZE][MAX_SIZE],
matrix2[MAX_SIZE][MAX_SIZE],
result[MAX_SIZE][MAX_SIZE];
printf("Enter elements for the first matrix (%dx%d):\n",
rows, cols);
for (int i = 0; i < rows; i++) {
for (int j = 0; j < cols; j++) {
printf("Element at (%d, %d): ", i + 1, j + 1);
scanf("%d", &(*(matrix1 + i * cols + j)));
}
}
printf("\nEnter elements for the second matrix
(%dx%d):\n", rows, cols);
for (int i = 0; i < rows; i++) {
for (int j = 0; j < cols; j++) {
printf("Element at (%d, %d): ", i + 1, j + 1);
scanf("%d", &(*(matrix2 + i * cols + j))); // Using
pointer notation to access matrix
}
```

```
}
addMatrices((int *)matrix1, (int *)matrix2, (int *)result, rows, cols);
printf("\nOriginal Matrices:\n");
printf("Matrix 1:\n");
printMatrix((int *)matrix1, rows, cols);
printf("Matrix 2:\n");
printMatrix((int *)matrix2, rows, cols);
printf("\nResult Matrix (Sum of Matrix 1 and Matrix 2):\n");
printMatrix((int *)result, rows, cols);
return 0;
}
```

# Output:




## *Q-9.* Write a C program to multiply two matrix using pointers.

## Ans.

```
#include <stdio.h>

#define MAX_SIZE 10
```

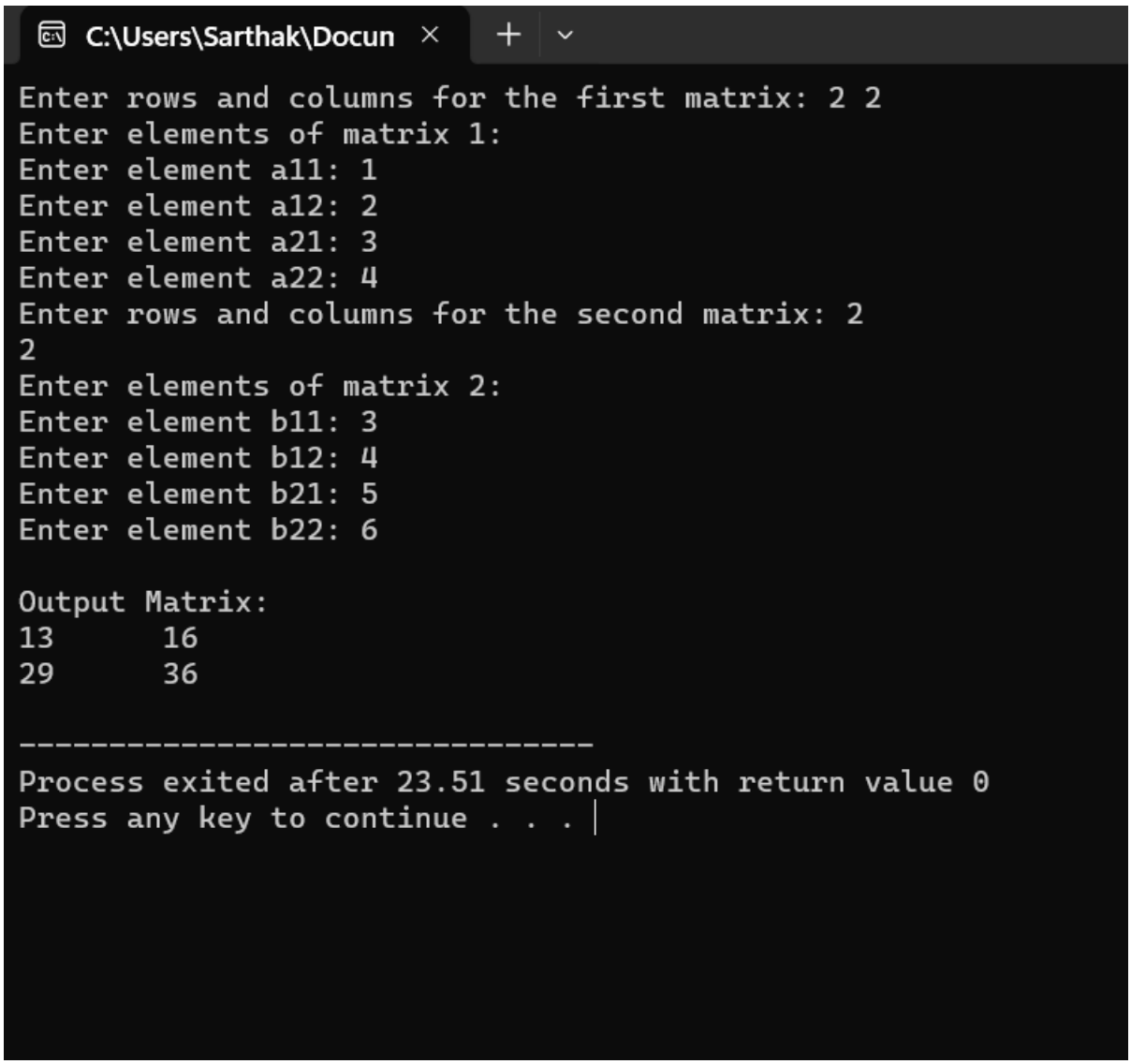
```
void multiplyMatrices(int
firstMatrix[MAX_SIZE][MAX_SIZE], int
secondMatrix[MAX_SIZE][MAX_SIZE], int
result[MAX_SIZE][MAX_SIZE], int rowFirst, int
columnFirst, int rowSecond, int columnSecond) {
   // Initializing elements of result matrix to 0
   for (int i = 0; i < rowFirst; ++i) {
      for (int j = 0; j < columnSecond; ++j) {
         result[i][j] = 0;
      }
   }
   // Multiplying firstMatrix and secondMatrix and
storing in result
   for (int i = 0; i < rowFirst; ++i) {
      for (int j = 0; j < columnSecond; ++j) {
         for (int k = 0; k < columnFirst; ++k) {
            result[i][j] += firstMatrix[i][k] *
secondMatrix[k][j];
         }
      }
   }
```

```
}
void displayMatrix(int matrix[MAX_SIZE][MAX_SIZE],
int row, int column) {
    for (int i = 0; i < row; ++i) {
        for (int j = 0; j < column; ++j) {
            printf("%d\t", matrix[i][j]);
        }
        printf("\n");
    }
}
int main() {
    int firstMatrix[MAX_SIZE][MAX_SIZE],
secondMatrix[MAX_SIZE][MAX_SIZE],
result[MAX_SIZE][MAX_SIZE];
    int rowFirst, columnFirst, rowSecond, columnSecond;

    printf("Enter rows and columns for the first matrix:
");
    scanf("%d %d", &rowFirst, &columnFirst);

    printf("Enter elements of matrix 1:\n");
```

```
    for (int i = 0; i < rowFirst; ++i) {
        for (int j = 0; j < columnFirst; ++j) {
            printf("Enter element a%d%d: ", i + 1, j + 1);
            scanf("%d", &firstMatrix[i][j]);
        }
    }
    printf("Enter rows and columns for the second
matrix: ");
    scanf("%d %d", &rowSecond, &columnSecond);

    if (columnFirst != rowSecond) {
        printf("Error! Number of columns in the first
matrix should be equal to the number of rows in the
second matrix.\n");
        return 0;
    }
    printf("Enter elements of matrix 2:\n");
    for (int i = 0; i < rowSecond; ++i) {
        for (int j = 0; j < columnSecond; ++j) {
            printf("Enter element b%d%d: ", i + 1, j + 1);
            scanf("%d", &secondMatrix[i][j]);
```

```
        }
    }
    multiplyMatrices(firstMatrix, secondMatrix, result,
rowFirst, columnFirst, rowSecond, columnSecond);
    // Displaying the multiplication result
    printf("\nOutput Matrix:\n");
    displayMatrix(result, rowFirst, columnSecond);
    return 0;
}
```

# Output:


C:\Users\Sarthak\Docun
Enter rows and columns for the first matrix: 2 2
Enter elements of matrix 1:
Enter element a11: 1
Enter element a12: 2
Enter element a21: 3
Enter element a22: 4
Enter rows and columns for the second matrix: 2
2
Enter elements of matrix 2:
Enter element b11: 3
Enter element b12: 4
Enter element b21: 5
Enter element b22: 6
Output Matrix:
13 16
29 36
Process exited after 23.51 seconds with return value 0
Press any key to continue . . .

# ***Week-9 Questions:***

## *Q-1.* Write a C program to Search string.

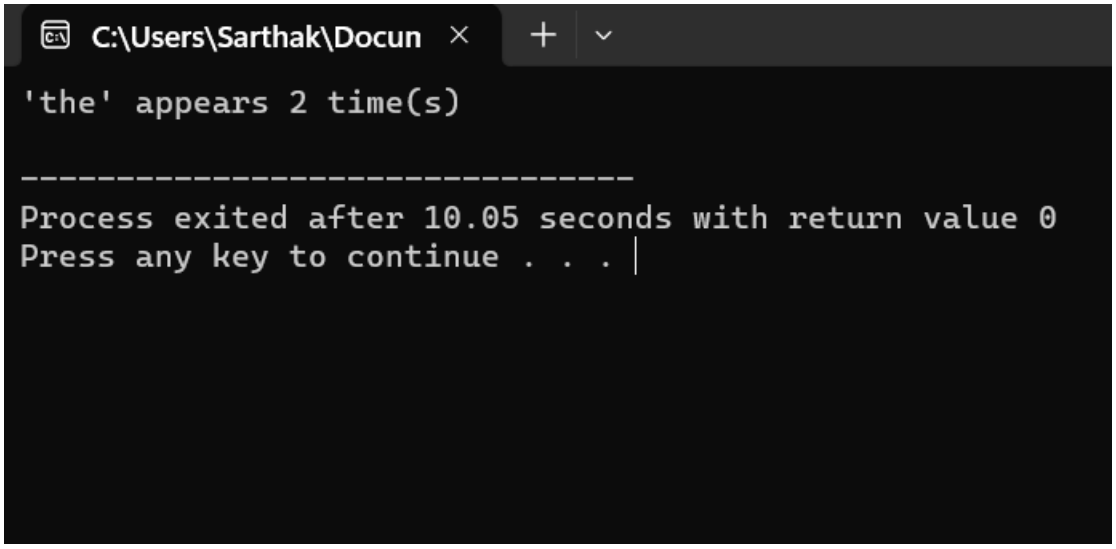
## Ans-1.

```
#include <stdio.h>
#include <string.h>
int main() {
char s1[] = "Beauty is in the eye of the beholder";
char s2[] = "the";
int n = 0;
int m = 0;
int times = 0;
int len = strlen(s2);
while(s1[n] != '\0') {
if(s1[n] == s2[m]) {
while(s1[n] == s2[m] && s1[n] !='\0') {
n++;
m++;
```

```
}
if(m == len && (s1[n] == ' ' || s1[n] == '\0')) {
times++;
}
} else {
while(s1[n] != ' ') { // Skip to next word
n++;
if(s1[n] == '\0')
break;
}
}
n++;
m=0;
}
if(times > 0) {
printf("'%s' appears %d time(s)\n", s2, times);
} else {
printf("'%s' does not appear in the sentence.\n", s2);
}
return 0;
```

}

# Output:




## *Q-2.* Write a C program to Reverse words in string.

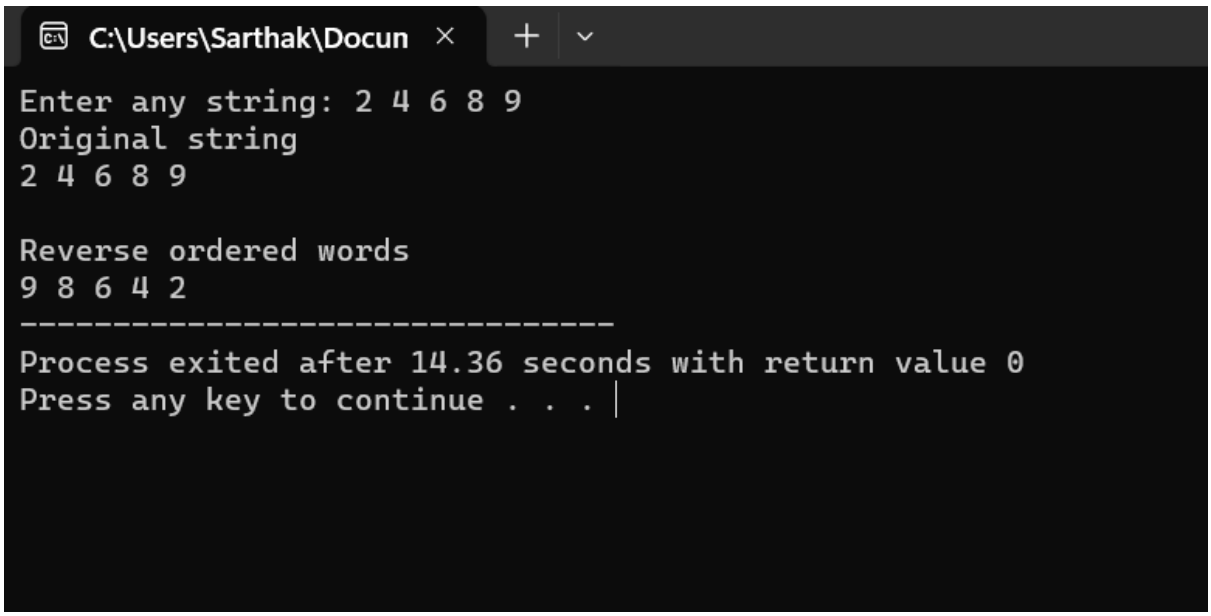
## Ans-2.

```
#include <stdio.h>
#include <string.h>
#define MAX_SIZE 100
int main()
{
char str[100], reverse[100];
int len, i, index, wordStart, wordEnd;
printf("Enter any string: ");
```

```
gets(str);
len = strlen(str);
index = 0;
wordStart = len - 1;
wordEnd = len - 1;
while(wordStart > 0)
{
if(str[wordStart] == ' ')
{
i = wordStart + 1;
while(i <= wordEnd)
{
reverse[index] = str[i];
i++;
index++;
}
reverse[index++] = ' ';
wordEnd = wordStart - 1;
}
wordStart--;
```

```
}
for(i=0; i<=wordEnd; i++)
{
reverse[index] = str[i];
index++;
}
reverse[index] = '\0';
printf("Original string \n%s\n\n", str);
printf("Reverse ordered words \n%s", reverse);
return 0;
}
```

# Output:



## *Q-3.* Write a C program to count vowels, consonants, etc.

## Ans-3.

```
#include <stdio.h>
int main() {
char line[150];
int vowels, consonant, digit, space;
vowels = consonant = digit = space = 0;
printf("Enter a line of string: ");
fgets(line, sizeof(line), stdin);
for (int i = 0; line[i] != '\0'; ++i) {
line[i] = tolower(line[i]);
if (line[i] == 'a' || line[i] == 'e' || line[i] == 'i' ||
line[i] == 'o' || line[i] == 'u') {
++vowels;
}
else if ((line[i] >= 'a' && line[i] <= 'z')) {
++consonant;
}
```

```
else if (line[i] >= '0' && line[i] <= '9') {
++digit;
}
else if (line[i] == ' ') {
++space;
}
}
printf("Vowels: %d", vowels);
printf("\nConsonants: %d", consonant);
printf("\nDigits: %d", digit);
printf("\nWhite spaces: %d", space);
return 0;
}
```

## ***Q-4.*** **Create a program to separate characters in a given string?**

## **Ans-4.**

```
#include <stdio.h>
#include <stdlib.h>
void main(){
```

```
char str[100];
int l= 0;
printf("\n\separate the individual characters from a string :\n");
printf("-------------------------------------------------\n");
printf("Input the string : ");
fgets(str, sizeof str, stdin);
printf("The characters of the string are : \n");
while(str[l]!='\0')
{
printf("%c ", str[l]);
l++;
}
printf("\n");
}
```

## ***Q-5.*** **Write a program to take two strings from user and concatenate them also add a space between them using strcat() function.**

# Ans-5.

```
#include <stdio.h>
#include <string.h>
int main()
{
char a[100], b[100];
printf("Enter the first string\n");
gets(a);
printf("Enter the second string\n");
gets(b);
strcat(a,b);
printf("String obtained on concatenation is %s\n",a);
return 0;
}
```

**Sample Input:**

Jai Gla

Jai Gla

**Sample output:**

**Identical**

## *Q-6.* Write a C program to take a string from user and make it toggle its case i.e. lower case to upper case and upper case to lower case.

## Ans-6.

```
#include <stdio.h>
void toggleChars(char str[])
{
for (int i = 0; str[i] != '\0'; i++) {
if (str[i] >= 'A' && str[i] <= 'Z')
str[i] = str[i] + 'a' - 'A';
else if (str[i] >= 'a' && str[i] <= 'z')
str[i] = str[i] + 'A' - 'a';
}
}
int main()
{
char str[] = " HElLo wOrlD";
toggleChars(str);
```

```
printf("String after toggle \n");
printf("%s\n", str);
return 0;
}
```

## *Q-7.* Write a C program to take two strings as input from user and check they are identical or not without using string functions.

## Ans-7.

```
#include <stdio.h>
#include <string.h>
int main()
{
char Str1[100], Str2[100];
int result, i;
printf("\n Please Enter the First String : ");
gets(Str1);
printf("\n Please Enter the Second String : ");
gets(Str2);
```

```
for(i = 0; Str1[i] == Str2[i] && Str1[i] == '\0'; i++);
if(Str1[i] < Str2[i])
{
printf("\n str1 is Less than str2");
}
else if(Str1[i] > Str2[i])
{
printf("\n str2 is Less than str1");
}
else
{
printf("\n str1 is Equal to str2");
}
return 0;
}
```

## ***Q-8.*** **Write a C program to take a list of a student's names from user by asking**

**number of students and sort them alphabetical order.**

## Ans-8.

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main() {
int numStudents;
printf("Enter the number of students: ");
scanf("%d", &numStudents);
if (numStudents <= 0) {
printf("Invalid number of students. Exiting...\n");
return 1;
}
char **studentNames = (char **)malloc(numStudents * sizeof(char *));
for (int i = 0; i < numStudents; i++) {
printf("Enter the name of student %d: ", i + 1);
studentNames[i] = (char *)malloc(100 * sizeof(char));
```

```
scanf("%s", studentNames[i]);
}
for (int i = 0; i < numStudents - 1; i++) {
for (int j = i + 1; j < numStudents; j++) {
if (strcmp(studentNames[i], studentNames[j]) > 0) {
char *temp = studentNames[i];
studentNames[i] = studentNames[j];
studentNames[j] = temp;
}
}
}
printf("\nSorted names in alphabetical order:\n");
for (int i = 0; i < numStudents; i++) {
printf("%d. %s\n", i + 1, studentNames[i]);
}
for (int i = 0; i < numStudents; i++) {
free(studentNames[i]);
}
free(studentNames);
return 0; }
```

# ***Week-10 Questions:***

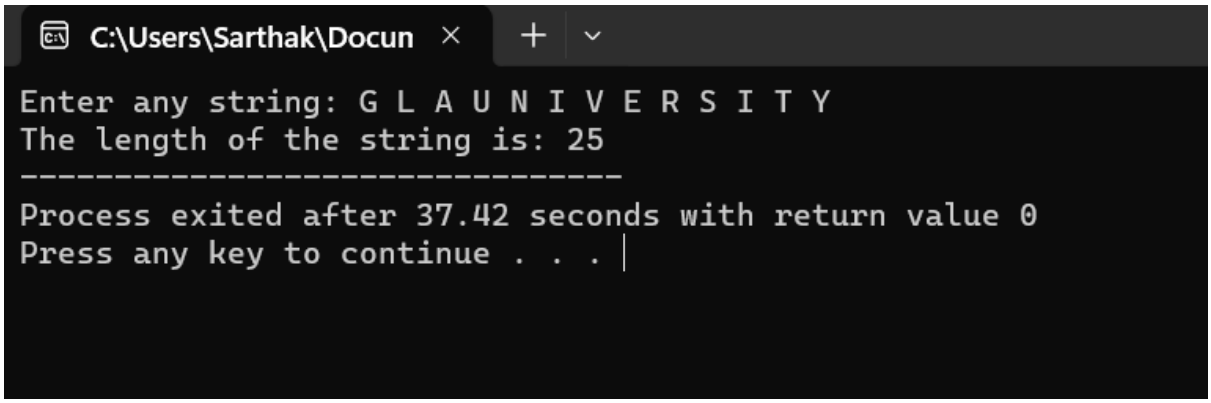
## ***Q-1.*** **Write a C program to find length of string using pointers.**

## **Ans-1.**

```
#include <stdio.h>
int main() {
char str[100], * ptr;
int count;
printf("Enter any string: ");
gets(str);

ptr = str;
count = 0;

while ( *ptr != '\0') {
count++;
ptr++;
}
```

```
printf("The length of the string is: %d", count);
return 0;
}
```

# Output:



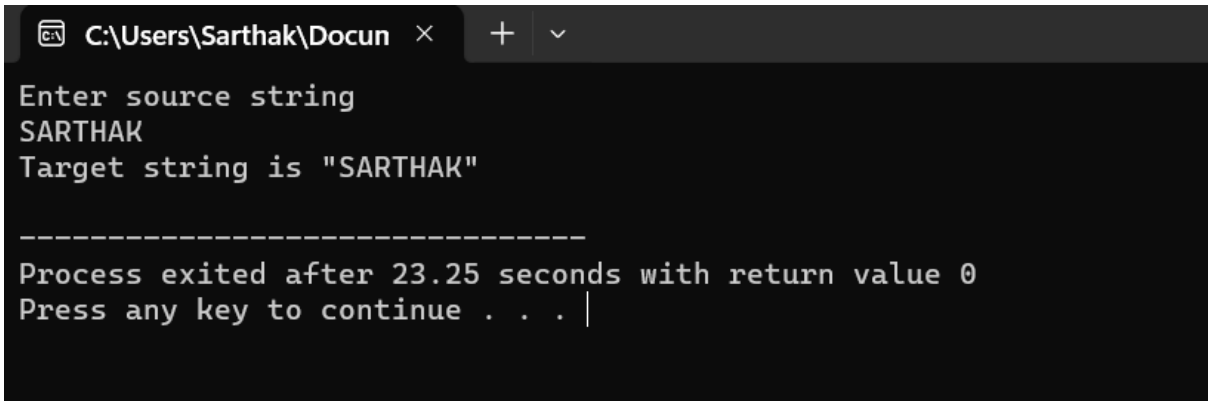

## *Q-2.* Write a C program to copy one string to another using pointer.

## Ans-2.

```
#include<stdio.h>
void copy_string(char*, char*);
main()
{
char source[100], target[100];
printf("Enter source string\n");
gets(source);
```

```
copy_string(target, source);
printf("Target string is \"%s\"\n", target);
return 0;
}
void copy_string(char *target, char *source)
{
while(*source)
{
*target = *source;
source++;
target++;
}
*target = '\0';
}
```

# Output:



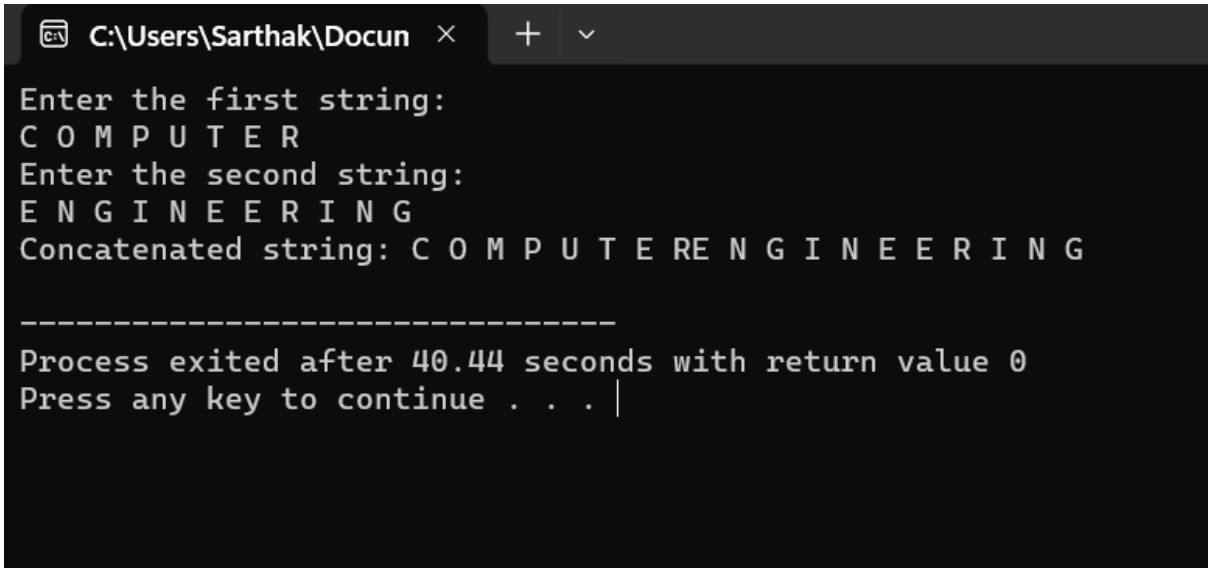
## ***Q-3*** Write a C program to concatenate two strings using pointers.

## Ans-3.

```
#include <stdio.h>
void concatenate(char *str1, char *str2) {
while (*str1) {
str1++;
}
while (*str2) {
*str1 = *str2;
str1++;
str2++;
}
*str1 = '\0';
}
int main() {
char string1[100], string2[50];
printf("Enter the first string:\n");
gets(string1);
```

```
printf("Enter the second string:\n");
gets(string2);
concatenate(string1, string2);
printf("Concatenated string: %s\n", string1);
return 0;
}
```

# Output:




# Q-4. Write a C program to compare two strings using pointers.

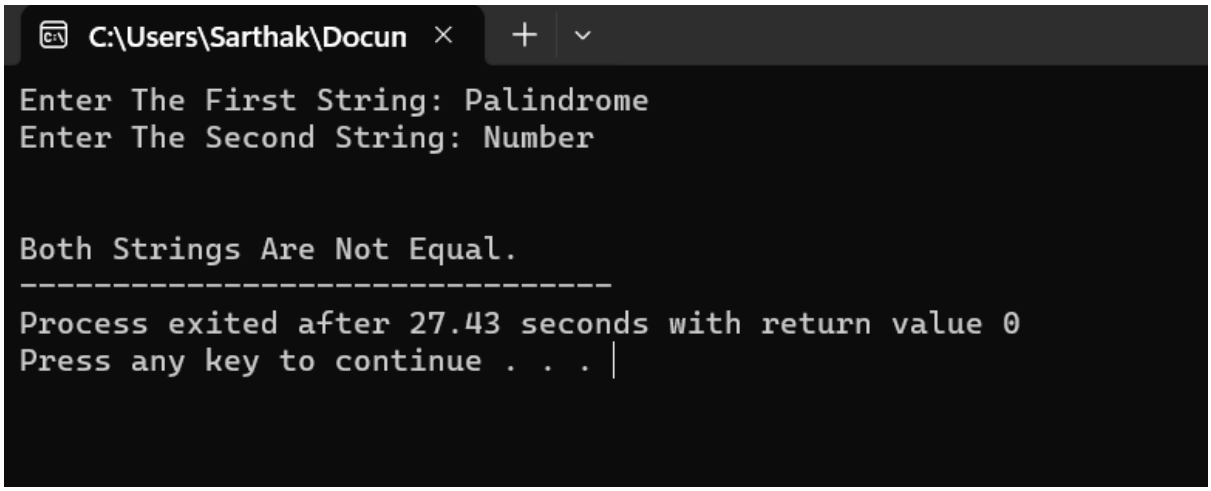
# Ans-4.

```
#include <iostream>
using namespace std;
```

```
int main()
{
char string1[50],string2[50],*str1,*str2;
int i,equal = 0;
printf("Enter The First String: ");
scanf("%s",string1);
printf("Enter The Second String: ");
scanf("%s",string2);
str1 = string1;
str2 = string2;
while(*str1 == *str2)
{
if ( *str1 == '\0' || *str2 == '\0' )
break;
str1++;
str2++;
}
if( *str1 == '\0' && *str2 == '\0' )
printf("\n\nBoth Strings Are Equal.");
else
```

```
printf("\n\nBoth Strings Are Not Equal.");
}
```

# Output:




## *Q-5* WAP to find largest among three numbers using pointer.

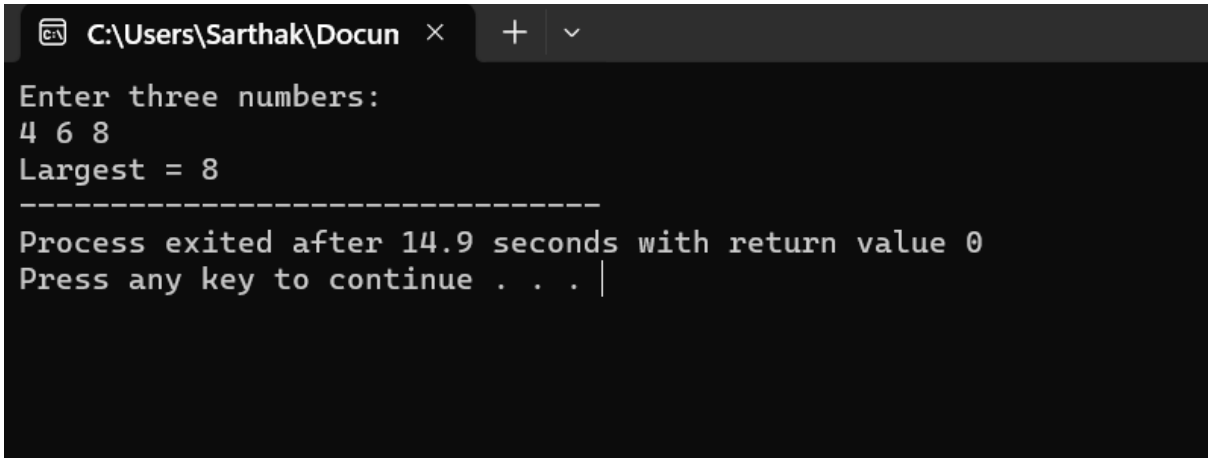
## *Q-6* WAP to find largest among three numbers using pointer.

## Ans-5 & 6.

```
#include<stdio.h>
int main()
{
int a,b,c,*pa, *pb, *pc;
printf("Enter three numbers:\n");
```

```
scanf("%d%d%d", &a,&b,&c);
/* Referencing */
pa= &a;
pb= &b;
pc= &c;
if(*pa > *pb && *pa > *pc)
{
printf("Largest is: %d", *pa);
}
else if(*pb > *pc && *pb > *pc)
{
printf("Largest is : %d", *pb);
}
else
{
printf("Largest = %d", *pc);
}
return 0;
}
```

# Output:




## *Q-7.* WAP to find factorial of a number using pointer.

## Ans-7.

```
#include<stdio.h>
void findFactorial(int,int *);
int main(){
int i,factorial,n;
printf("Enter a number: ");
scanf("%d",&n);
findFactorial(n,&factorial);
printf("Factorial of %d is: %d",n,*factorial);
return 0;
}
void findFactorial(int n,int *factorial){
```

```
int i;
*factorial =1;
for(i=1;i<=n;i++)
*factorial=*factorial*i;
}
```

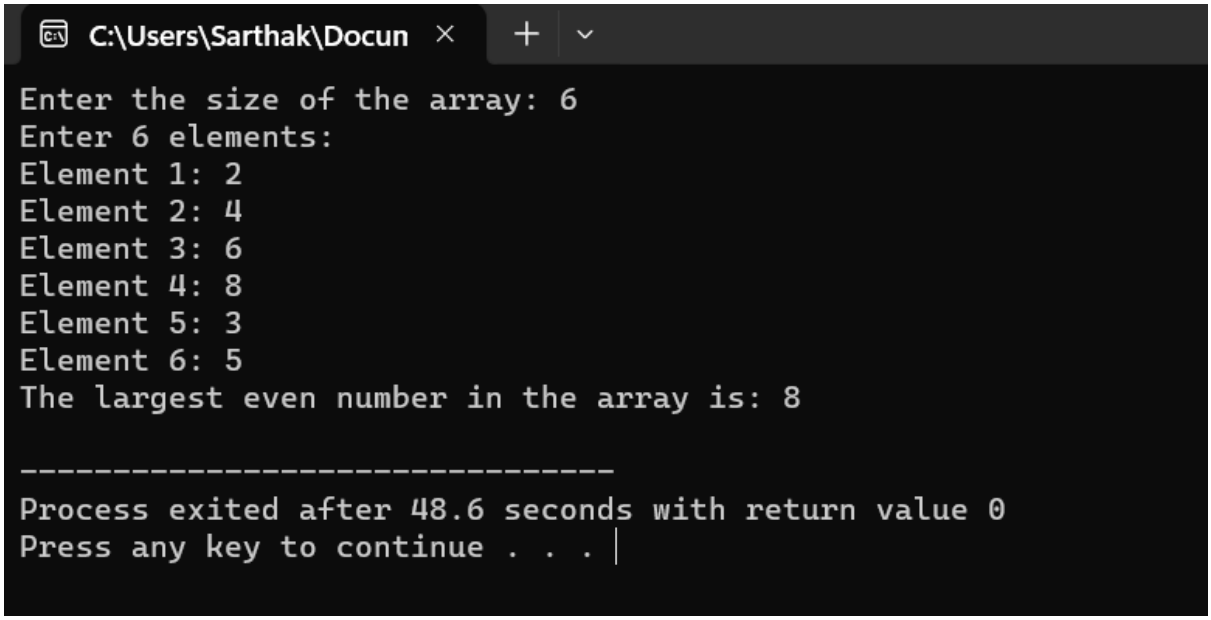
## ***Q-8.*** **Write a program to print largest even number present in an array using pointer to an array.**

## **Ans-8.**

```
#include <stdio.h>
int findLargestEven(int *arr, int size) {
int largestEven = -1;
for (int i = 0; i < size; i++) {
if (arr[i] % 2 == 0 && arr[i] > largestEven) {
largestEven = arr[i];
}
}
return largestEven;
}
```

```
int main() {
int size;
printf("Enter the size of the array: ");
scanf("%d", &size);
int arr[size];
printf("Enter %d elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &arr[i]);
}
int *ptr = arr;
int largestEven = findLargestEven(ptr, size);
if (largestEven != -1) {
printf("The largest even number in the array is: %d\n",
largestEven);
} else {
printf("No even numbers found in the array.\n");
}
return 0;
}
```

# Output:




## *Q-9.* WAP to find sum of elements of an array using array of pointer.

## Ans-9.

```
#include <stdio.h>
#include <malloc.h>
void main()
{
int i, n, sum = 0;
int *a;
printf("Enter the size of array A \n");
scanf("%d", &n);
```

```
a = (int *) malloc(n * sizeof(int));
printf("Enter Elements of the List \n");
for (i = 0; i < n; i++)
{
scanf("%d", a + i);
}
for (i = 0; i < n; i++)
{
sum = sum + *(a + i);
printf("Sum of all elements in array = %d\n", sum);
return 0;
}
```

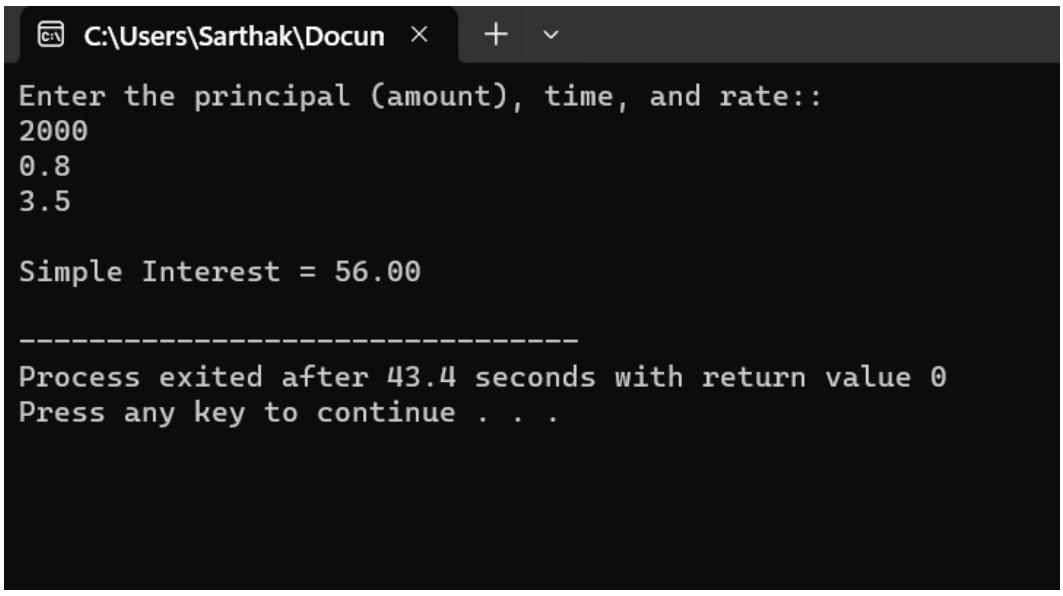
## ***Q-10.*** WAP to compute simple interest using pointers.

## Ans-10.

```
#include<stdio.h>
int main() {
float p, t, r, SI;
float *x, *y, *z; // These are the pointer variables
```

```
printf("Enter the principal (amount), time, and rate::\n");
scanf("%f%f%f", &p, &t, &r);
x = &p;
y = &t;
z = &r;

SI = (*x * *y * *z) / 100;
printf("\nSimple Interest = %.2f\n", SI);
return 0;
}
```

# Output:



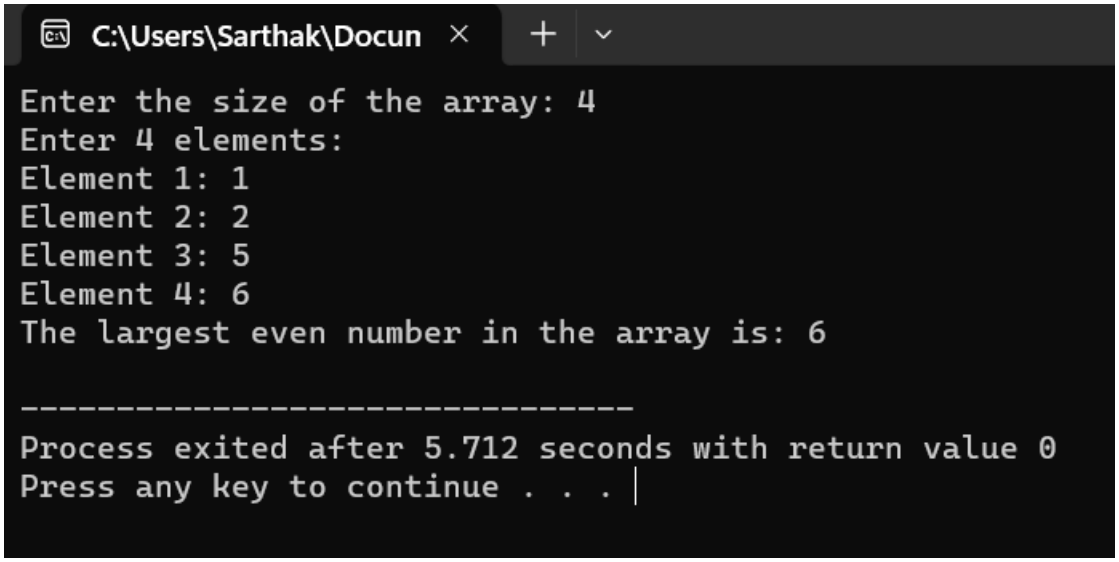
## ***Q-11.*** Write a program to print largest even number present in an array using pointer to an array.

## Ans-11.

```
#include <stdio.h>
int findLargestEven(int *arr, int size) {
int largestEven = -1; // Assuming all elements are non-negative
for (int i = 0; i < size; i++) {
if (arr[i] % 2 == 0 && arr[i] > largestEven) {
largestEven = arr[i];
}
}
return largestEven;
}
int main() {
int size;

printf("Enter the size of the array: ");
```

```
scanf("%d", &size);
int arr[size];
printf("Enter %d elements:\n", size);
for (int i = 0; i < size; i++) {
printf("Element %d: ", i + 1);
scanf("%d", &arr[i]);
}
int *ptr = arr;
int largestEven = findLargestEven(ptr, size);
if (largestEven != -1) {
printf("The largest even number in the array is: %d\n",
largestEven);
} else {
printf("No even numbers found in the array.\n");
}
return 0;
}
```

# Output:


C:\Users\Sarthak\Docun
Enter the size of the array: 4
Enter 4 elements:
Element 1: 1
Element 2: 2
Element 3: 5
Element 4: 6
The largest even number in the array is: 6
--------------------------------
Process exited after 5.712 seconds with return value 0
Press any key to continue . . .

# ***Week-11 Questions:***

## ***Q-1.*** Write a C function to return the maximum of three integers.

## Ans-1.

```
#include<stdio.h>
double max3(double x,double y,double z);
void main () {
double i;
double a,b,c;
clrscr();
printf("Enter the value of x,y,z:\n");
scanf("%lf%lf%lf",&a,&b,&c);
i= max3(a,b,c) ;
printf("%lf",i);
getch();
}
double max3(double x,double y,double z) {
double max;
```

```
if (x > y)
max = x;
else max = y;
if (z > max)
max = z;
return max;
}
```

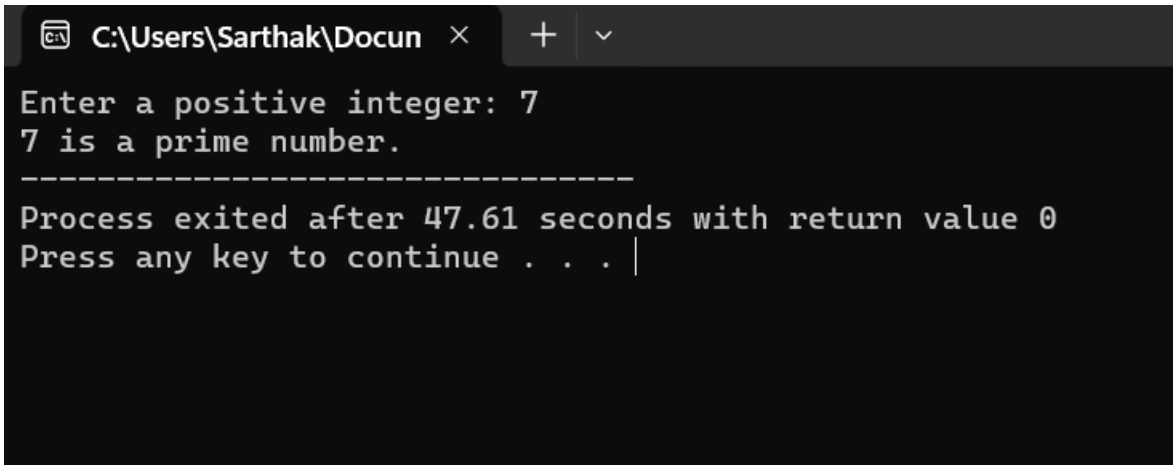
## ***Q-2.*** **Write a C function to check if a given number is prime or not.**

## **Ans-2.**

```
#include <stdio.h>
int main() {
int n, i, flag = 0;
printf("Enter a positive integer: ");
scanf("%d", &n);
if (n == 0 || n == 1)
flag = 1;
for (i = 2; i <= n / 2; ++i) {
if (n % i == 0) {
```

```
flag = 1;
break;
}
}
if (flag == 0)
printf("%d is a prime number.", n);
else
printf("%d is not a prime number.", n);
return 0;
}
```

# Output:



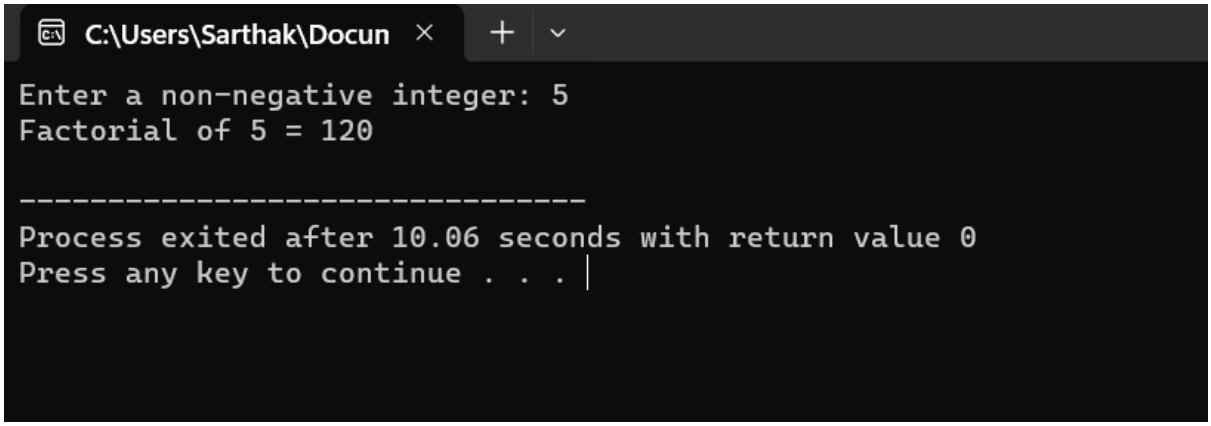

## ***Q-3*** Write a C function to compute the factorial of a non-negative integer.

## Ans-3.

```
#include <stdio.h>
unsigned long long factorial(int n) {
    if (n == 0 || n == 1) {
        return 1;
    } else {
        return n * factorial(n - 1);
    }
}
int main() {
    int num;
    printf("Enter a non-negative integer: ");
    scanf("%d", &num);
    if (num < 0) {
        printf("Factorial is not defined for negative
numbers.\n");
    } else {
        unsigned long long result = factorial(num);
        printf("Factorial of %d = %llu\n", num, result);
    }
    return 0;
```

```
}
```

# Output:



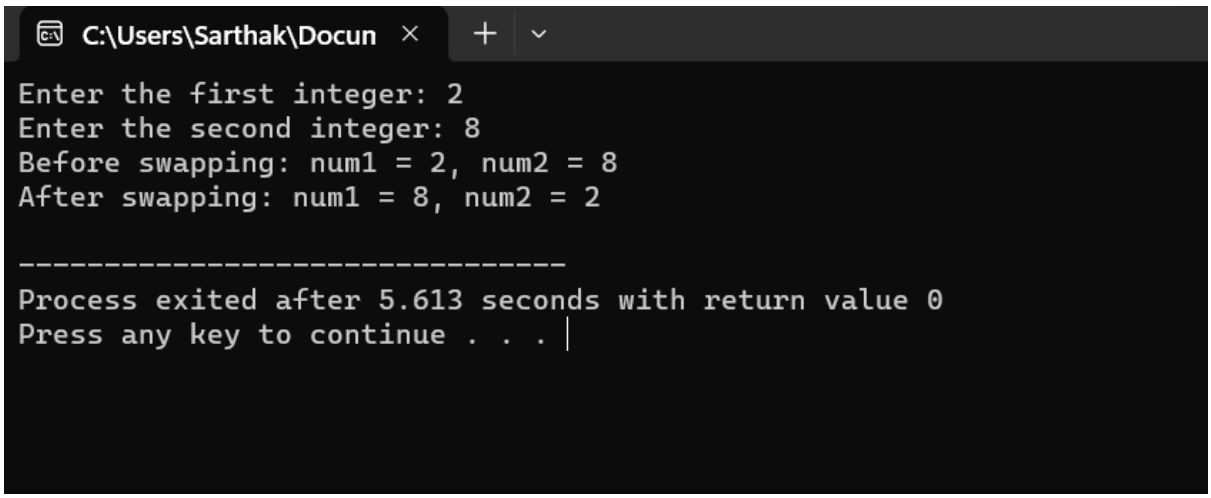

## *Q-4* Write a C function to swap the values of two integers in actual arguments.

## Ans-4.

```
#include <stdio.h>
void swapIntegers(int *a, int *b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}
int main() {
    int num1, num2;
```

```
    printf("Enter the first integer: ");
    scanf("%d", &num1);
    printf("Enter the second integer: ");
    scanf("%d", &num2);
    printf("Before swapping: num1 = %d, num2 = %d\n", num1, num2);
    swapIntegers(&num1, &num2);
    printf("After swapping: num1 = %d, num2 = %d\n", num1, num2);
    return 0;
}
```

# Output:



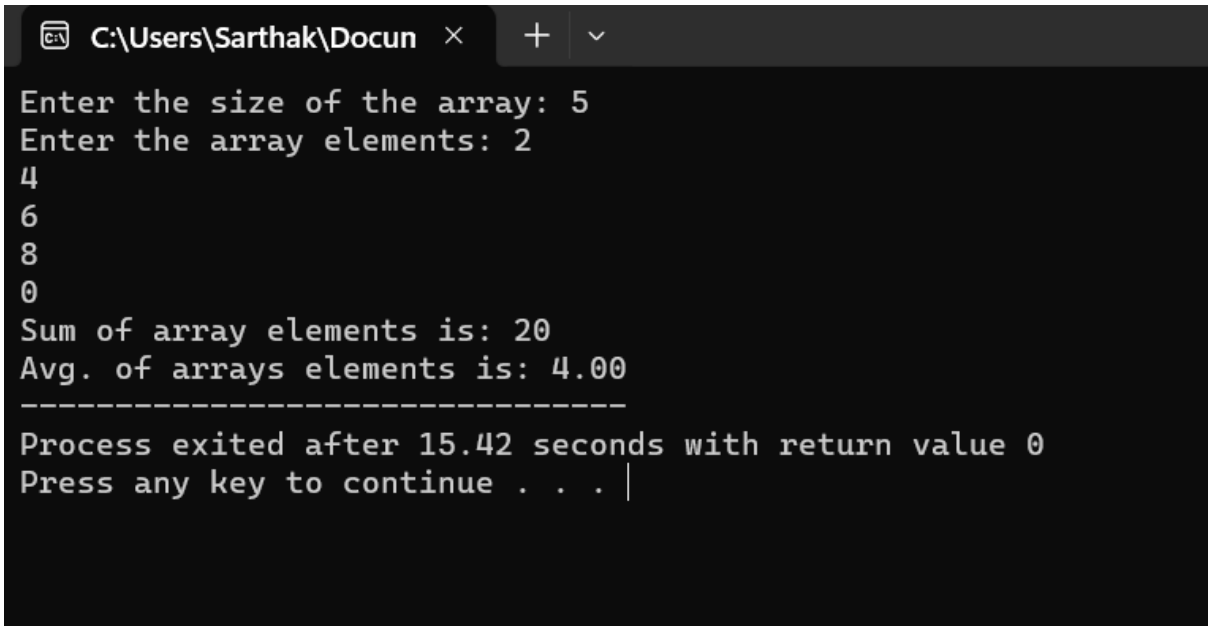
## *Q-5.* Write a C function to compute the sum and average of an array of integers.

## Ans-5.

```
#include <stdio.h>
int main(){
int arr[100], size, sum;
float avg;
printf("Enter the size of the array: ");
scanf("%d", &size);
printf("Enter the array elements: ");
for(int i = 0; i < size; i++){
scanf("%d", &arr[i]);
}
sum = 0;
for(int i = 0; i < size; i++){
sum = sum + arr[i];
}
avg = sum / size;
```

```
printf("Sum of array elements is: %d", sum);
printf("\nAvg. of arrays elements is: %.2f", avg);
return 0;
}
```

# Output:



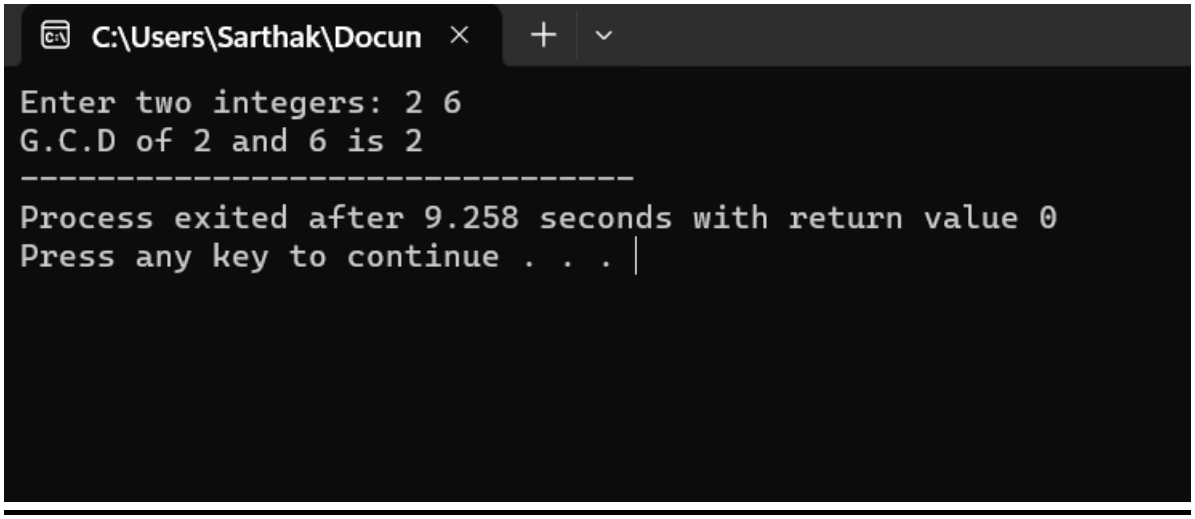

## *Q-6.* Write a C function to find the GCD (Greatest Common Divisor) of two non negative integers using Euclid's algorithm.

## Ans-6.

```
#include <stdio.h>
int main()
```

```
{
int n1, n2, i, gcd;
printf("Enter two integers: ");
scanf("%d %d", &n1, &n2);
for(i=1; i <= n1 && i <= n2; ++i)
{
if(n1%i==0 && n2%i==0)
gcd = i;
}
printf("G.C.D of %d and %d is %d", n1, n2, gcd);
return 0;
}
```

# Output:



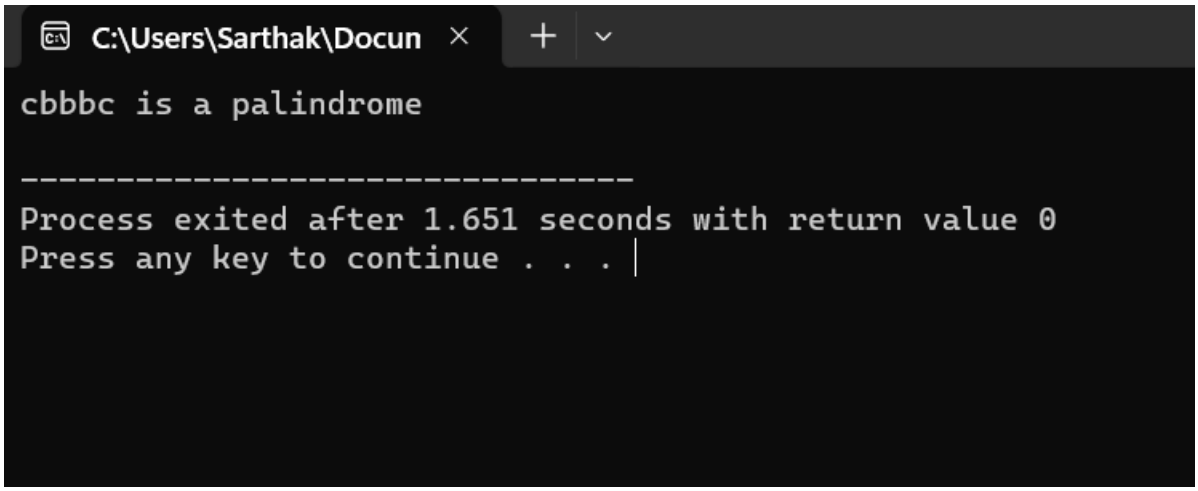
## *Q-7.* Write a C function to check if a given string is a valid palindrome, considering only alphanumeric characters and ignoring cases.

## Ans-7.

```
#include <stdio.h>
#include <string.h>
int main()
{
char str[] = { "cbbbc" };
int l = 0;
int h = strlen(str) - 1;
while (h > l) {
if (str[l++] != str[h--]) {
printf("%s is not a palindrome\n", str);
return 0;
}
}
printf("%s is a palindrome\n", str);
```

```
return 0;
}
```

# Output:



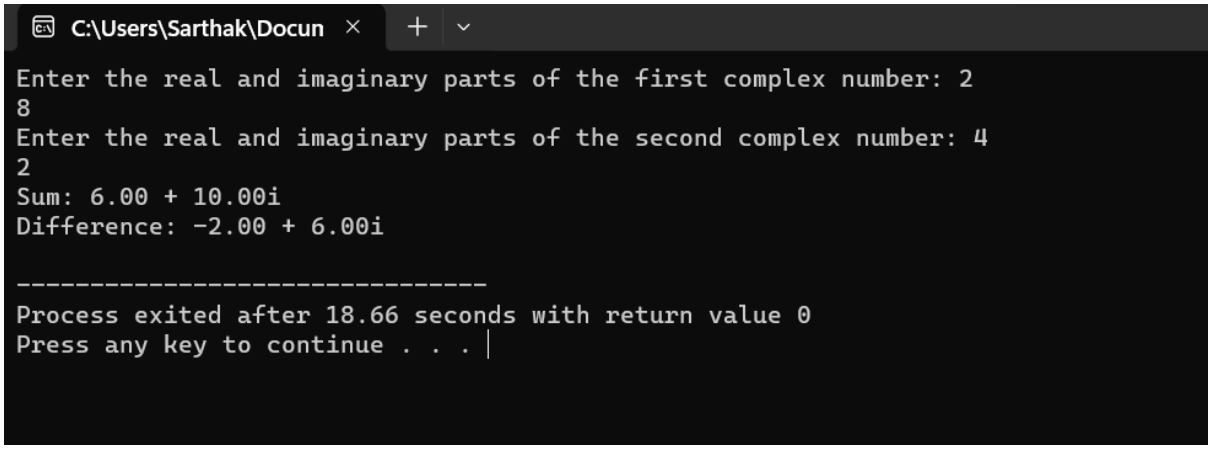

## *Q-8.* Write a C function to calculate the sum and difference of two complex numbers.

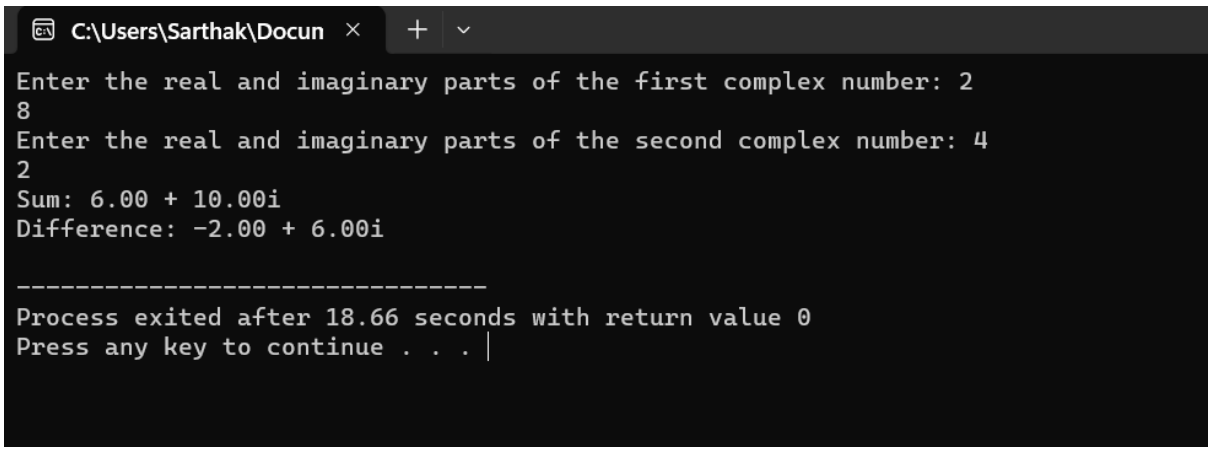
## Ans-8.

```
#include <stdio.h>
void addComplex(float real1, float imaginary1, float real2, float imaginary2, float *resultReal, float *resultImaginary) {
    *resultReal = real1 + real2;
    *resultImaginary = imaginary1 + imaginary2;
}
```

```
int main() {
    float real1, imaginary1, real2, imaginary2;
    printf("Enter the real and imaginary parts of the first complex number: ");
    scanf("%f %f", &real1, &imaginary1);
    printf("Enter the real and imaginary parts of the second complex number: ");
    scanf("%f %f", &real2, &imaginary2);
    float sumReal, sumImaginary;
    addComplex(real1, imaginary1, real2, imaginary2, &sumReal, &sumImaginary);
    printf("Sum: %.2f + %.2fi\n", sumReal, sumImaginary);
    printf("Difference: %.2f + %.2fi\n", real1 - real2, imaginary1 - imaginary2);

    return 0;
}
```

# Output:


C:\Users\Sarthak\Docun
Enter the real and imaginary parts of the first complex number: 2
8
Enter the real and imaginary parts of the second complex number: 4
2
Sum: 6.00 + 10.00i
Difference: -2.00 + 6.00i
--------------------------------
Process exited after 18.66 seconds with return value 0
Press any key to continue . . .


C:\Users\Sarthak\Docun
Enter the real and imaginary parts of the first complex number: 2
8
Enter the real and imaginary parts of the second complex number: 4
2
Sum: 6.00 + 10.00i
Difference: -2.00 + 6.00i
--------------------------------
Process exited after 18.66 seconds with return value 0
Press any key to continue . . .

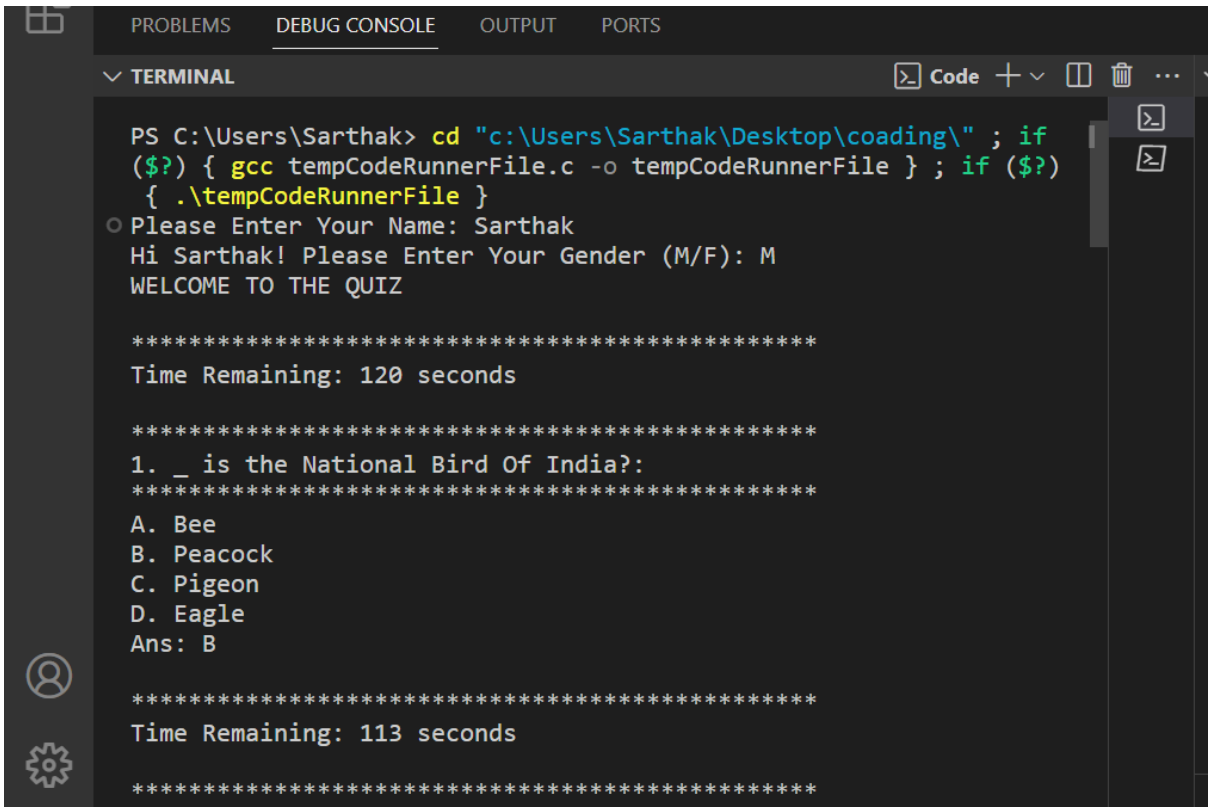
# A Basic C Program of Quiz:

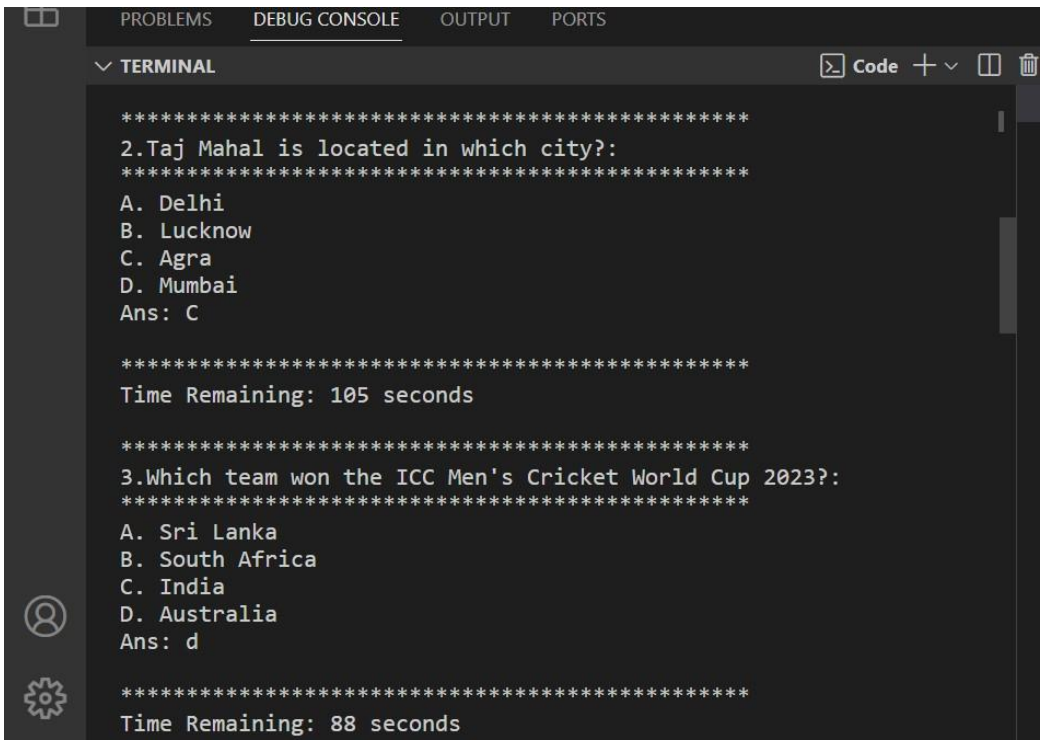
```c
#include<string.h>
#include<time.h>
#include<ctype.h>

int main() {
    char name[50];
    char gender;
    int total_questions = 10;
    printf("Please Enter Your Name: ");
    gets(name);
    printf("Hi %s! Please Enter Your Gender (M/F): ", name);
    scanf(" %c", &gender);
    char questions[][100] = {
        "1. _ is the National Bird Of India?: ",
        "2.Taj Mahal is located in which city?: ",
        "3.Which team won the ICC Men's Cricket World Cup 2023?: ",
        "4.What is the Capital of Maharashtra?: ",
        "5. Kolkata is also known as City Of _?:",
        "6.Fear of being alone is called _ ?:",
        "7.Study of earthquake is called_?: ",
        "8.What is the full form of WHO?: ",
        "9.Which city is called the City of Lakes?: ",
        "10.Who was the first President Of India?: "
    };

    ////////////////////////////////////////////////////////////////////////////
////////////////////////////////

    char options[][100] = {
        "A. Bee", "B. Peacock", "C. Pigeon", "D. Eagle",
        "A. Delhi", "B. Lucknow", "C. Agra", "D. Mumbai",
        "A. Sri Lanka", "B. South Africa", "C. India", "D. Australia",
        "A. Jodhpur", "B. Assam", "C. Mumbai", "D. New Delhi",
        "A. Lakes", "B. Joy", "C. Ghats", "D. Gods",
        "A. Autophobia", "B. Claustrophobia", "C. Hydrophobia", "D.
Acrophobia",
        "A. Seismology", "B. Biology", "C. Kinesology", "D. Cosmology",
        "A. World Harvest Organization", "B. Well Heart Organization", "C.
World Health Orgazisation", "D. World High Organization",
        "A. Raipur", "B. Jaipur", "C. Udaipur", "D. Chennai",
        "A. Dr. Rajendra Prasad", "B. Mahatma Gandhi", "C. Dr. APJ Abdul
Kalam", "D. Pt. Jawahlal Nehru"
    };
```

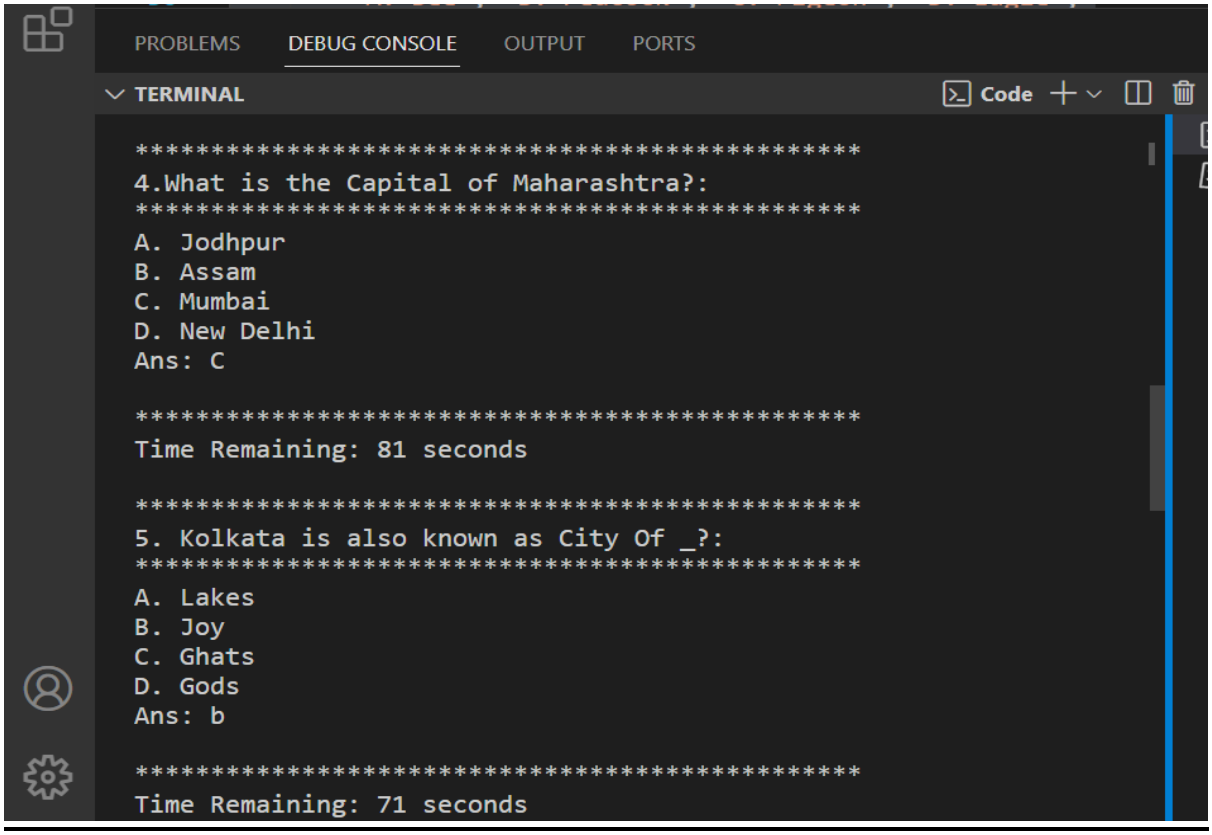
```c
    char answers[10] = {'B', 'C', 'D', 'C', 'B', 'A', 'A', 'C', 'C', 'A'};
    int numberofquestions = sizeof(questions) / sizeof(questions[0]);
    char Ans;
    int score = 0;

    printf("WELCOME TO THE QUIZ\n");

    time_t start, end;
    double timeTaken;
    time(&start);

    for (int i = 0; i < numberofquestions; i++) {
        time(&end);
        timeTaken = difftime(end, start);

        if (timeTaken > 120) {
            printf("\nTime's up! Quiz is over.\n");
            break;
        }

        printf("\n*********************************************\n");
        printf("Time Remaining: %.0lf seconds\n", 120 - timeTaken);
        printf("\n*********************************************\n");

        printf("%s", questions[i]);
        printf("\n*********************************************\n");

        for (int j = (i * 4); j < (i * 4) + 4; j++) {
            printf("%s\n", options[j]);
        }

        printf("Ans: ");
        scanf(" %c", &Ans);

        Ans = toupper(Ans);

        if (Ans == answers[i]) {
            score++;
        } else {
            score==0;
        }
    }

    printf("\n*********************\n");
    printf("FINAL SCORE: %d / %d \n", score, numberofquestions);
    printf("Time Taken: %.0lf seconds\n", timeTaken);
    printf("*******************\n");
```

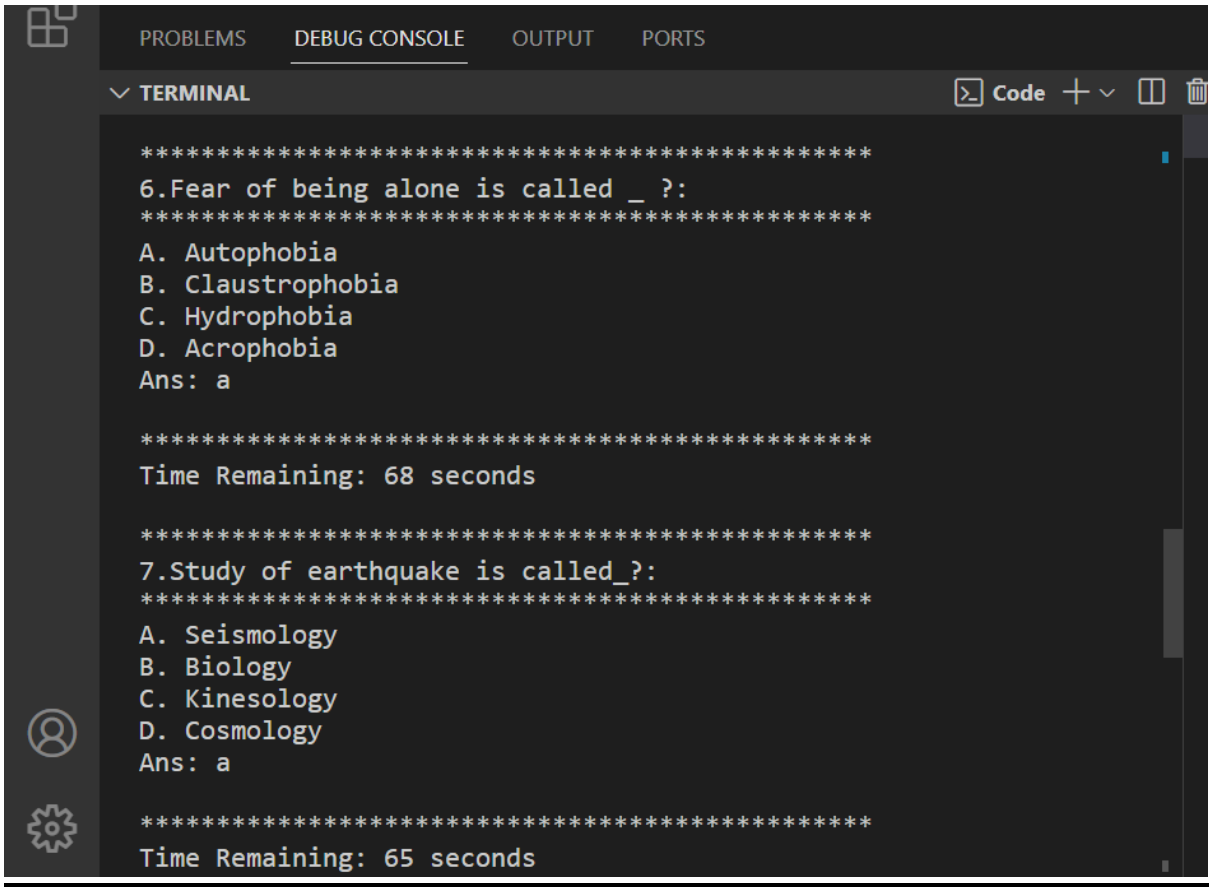
```
    return 0;
}
```

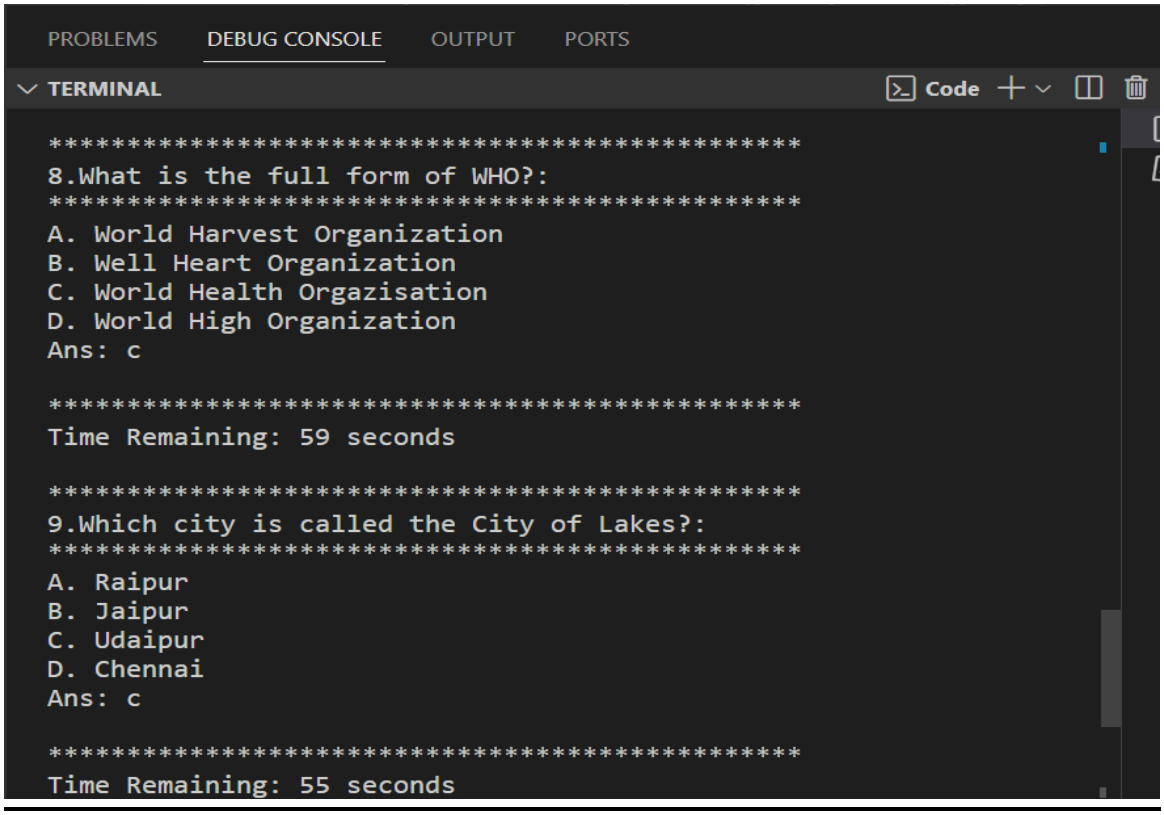
# Output:

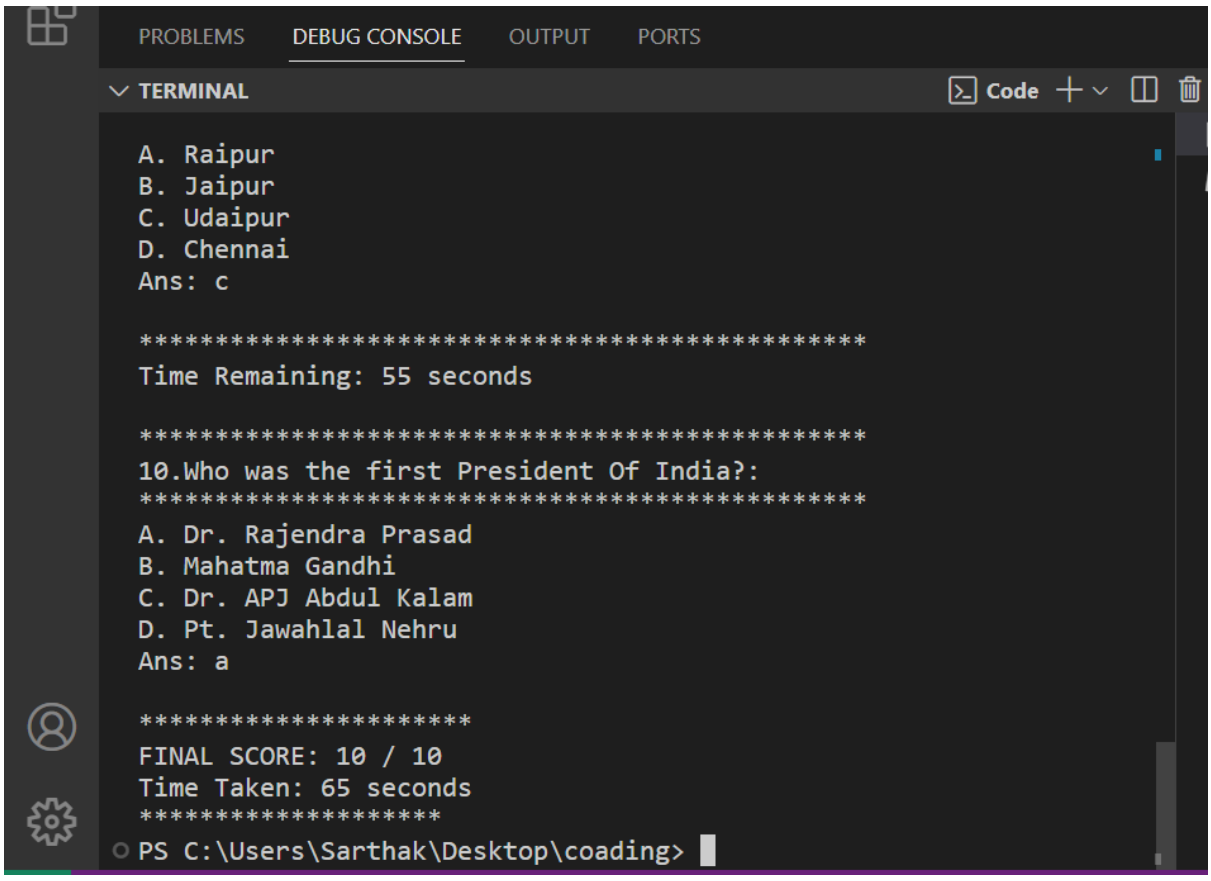



PROBLEMS
DEBUG CONSOLE
OUTPUT
PORTS
TERMINAL
Code
**********
4.What is the Capital of Maharashtra?:
**********
A. Jodhpur
B. Assam
C. Mumbai
D. New Delhi
Ans: C
**********
Time Remaining: 81 seconds
**********
5. Kolkata is also known as City Of _?:
**********
A. Lakes
B. Joy
C. Ghats
D. Gods
Ans: b
**********
Time Remaining: 71 seconds


PROBLEMS
DEBUG CONSOLE
OUTPUT
PORTS
TERMINAL
Code
**********
6.Fear of being alone is called _ ?:
**********
A. Autophobia
B. Claustrophobia
C. Hydrophobia
D. Acrophobia
Ans: a
**********
Time Remaining: 68 seconds
**********
7.Study of earthquake is called_?:
**********
A. Seismology
B. Biology
C. Kinesology
D. Cosmology
Ans: a
**********
Time Remaining: 65 seconds


PROBLEMS
DEBUG CONSOLE
OUTPUT
PORTS
TERMINAL
Code
**********
8.What is the full form of WHO?:
**********
A. World Harvest Organization
B. Well Heart Organization
C. World Health Orgazisation
D. World High Organization
Ans: c
**********
Time Remaining: 59 seconds
**********
9.Which city is called the City of Lakes?:
**********
A. Raipur
B. Jaipur
C. Udaipur
D. Chennai
Ans: c
**********
Time Remaining: 55 seconds


PROBLEMS
DEBUG CONSOLE
OUTPUT
PORTS
TERMINAL
Code
A. Raipur
B. Jaipur
C. Udaipur
D. Chennai
Ans: c
**********
Time Remaining: 55 seconds
**********
10.Who was the first President Of India?:
**********
A. Dr. Rajendra Prasad
B. Mahatma Gandhi
C. Dr. APJ Abdul Kalam
D. Pt. Jawahlal Nehru
Ans: a
**********
FINAL SCORE: 10 / 10
Time Taken: 65 seconds
**********
PS C:\Users\Sarthak\Desktop\coading>