Programming for problem solving Lab

(MCAC191)

Assignment Submitted to

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Of

Maulana Abul Kalam Azad University of Technology, West Bengal

MAULANA ABUL KALAM AZAD
UNIVERSITY OF TECHNOLOGY,
WEST BENGAL

Utech

In Pursuit Of Knowledge And Excellence

For

MCA

In

Department of Information Science

Submitted by:

Name : Suchorit Saha

Roll no :

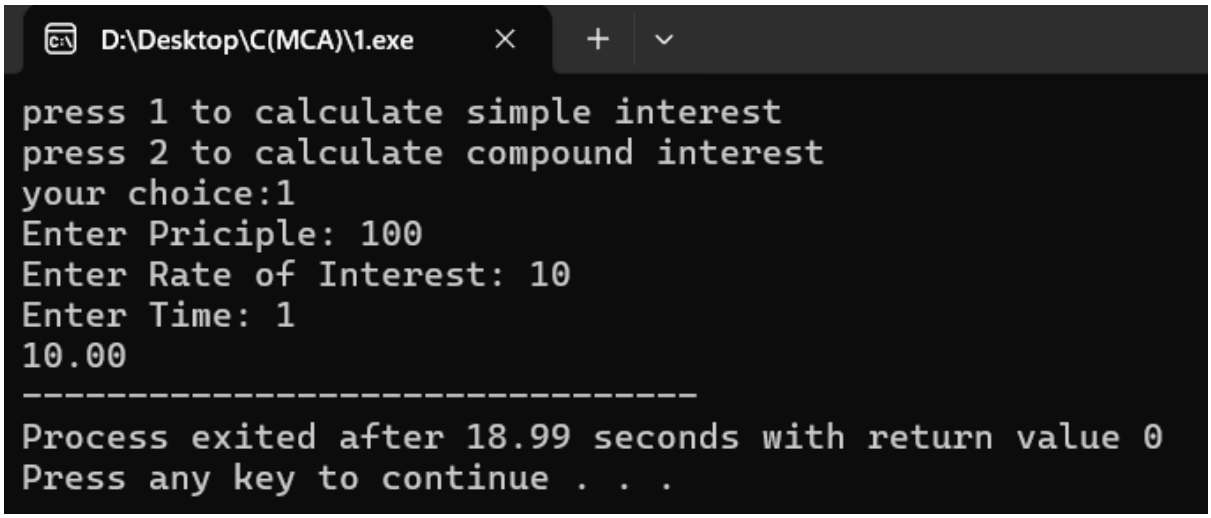
Reg no :

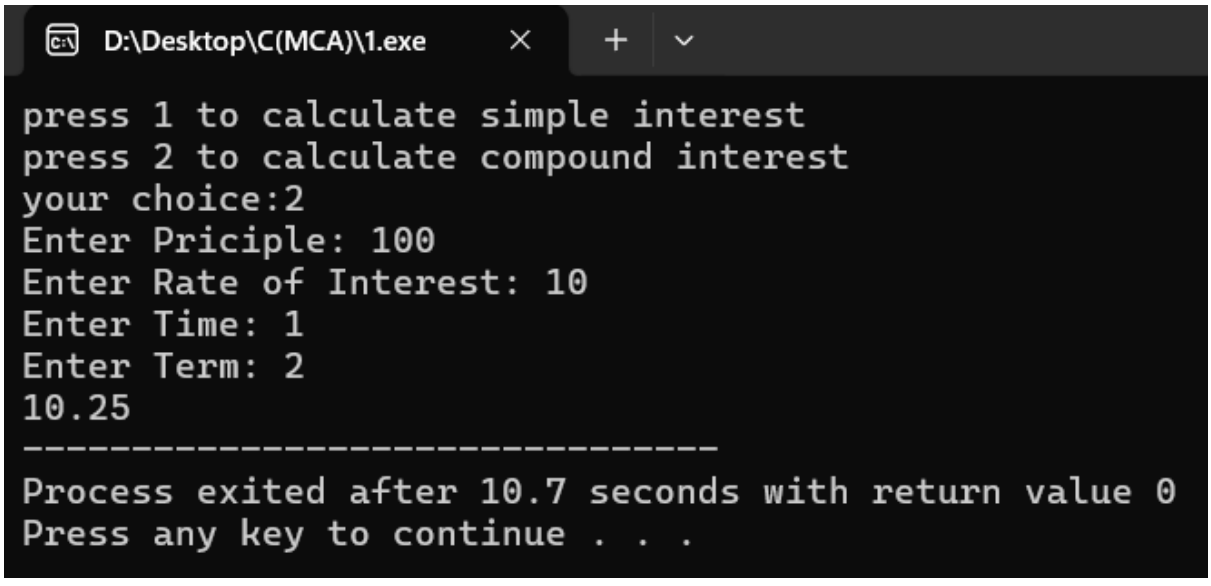
Semester : I

```
/*
Write a program to calculate simple and compound interest
*/

#include<stdio.h>
#include <math.h>

float simpleInterest(float principle,int roi,int time){
	return ((principle*roi*time)/100);
}
double compoundInterest(float principle,int roi,int n,int time){
	float r=(float)roi/100;
	double a=principle*pow((1+(r/n)),n*time);
	return a-principle;
}

int main(){
	int c,r,t,n;
	float p;
	printf("press 1 to calculate simple interest\npress 2 to calculate compound interest\nyour choice:");
	scanf("%d",&c);
	printf("Enter Priciple: ");
	scanf("%f",&p);
	printf("Enter Rate of Interest: ");
	scanf("%d",&r);
	printf("Enter Time: ");
	scanf("%d",&t);
```

```
        if(c==2){
                printf("Enter Term: ");
                scanf("%d",&n);
                printf("%.2lf",compoundInterest(p,r,n,t));
        }
        else if(c==1){
                printf("%.2lf",simpleInterest(p,r,t));
        }
        return 0;
}
```

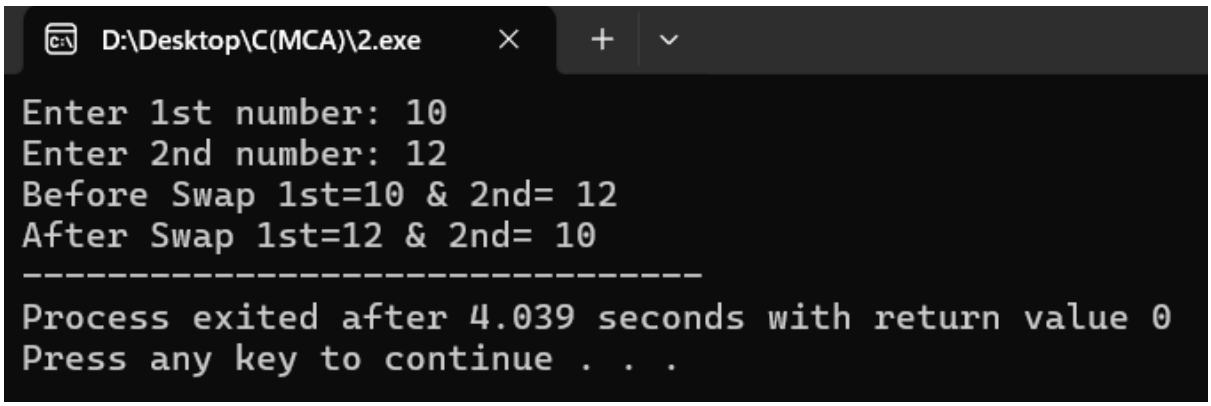
Output:





```
/*
Write a program to swap values of two variables with and without using third variable
*/
#include<stdio.h>
void swap(int *p,int *q){
	*p=*p+*q;
	*q=*p-*q;
	*p=*p-*q;
	printf("Result 1st=%d & 2nd= %d",*p,*q);
}
int main(){
	int i,j;
	printf("Enter 1st number: ");
	scanf("%d",&i);
	printf("Enter 2nd number: ");
	scanf("%d",&j);
	printf("Result 1st=%d & 2nd= %d\n",i,j);
	swap(&i,&j);
}
```

Output:



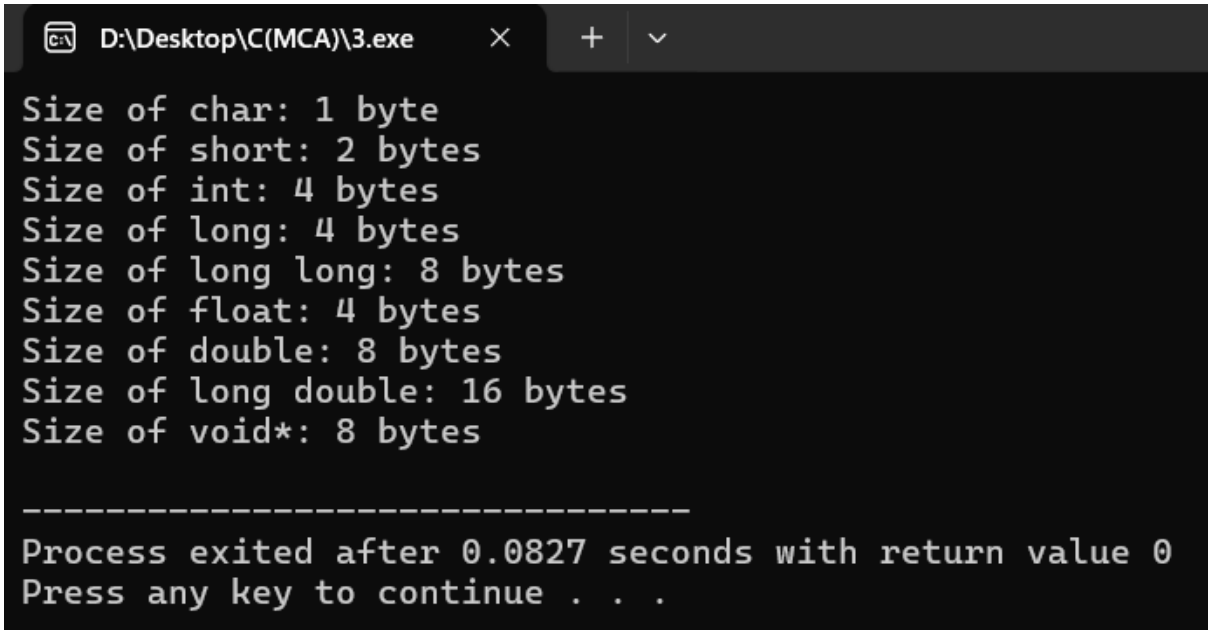
/*

Write a program to display the size of every data type using "sizeof" operator.

*/

```
#include <stdio.h>
int main() {
   printf("Size of char: %zu byte\n", sizeof(char));
   printf("Size of short: %zu bytes\n", sizeof(short));
   printf("Size of int: %zu bytes\n", sizeof(int));
   printf("Size of long: %zu bytes\n", sizeof(long));
   printf("Size of long long: %zu bytes\n", sizeof(long long));
   printf("Size of float: %zu bytes\n", sizeof(float));
   printf("Size of double: %zu bytes\n", sizeof(double));
   printf("Size of long double: %zu bytes\n", sizeof(long double));
   printf("Size of void*: %zu bytes\n", sizeof(void*));
   return 0;
}
```

Output:



/*Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.*/

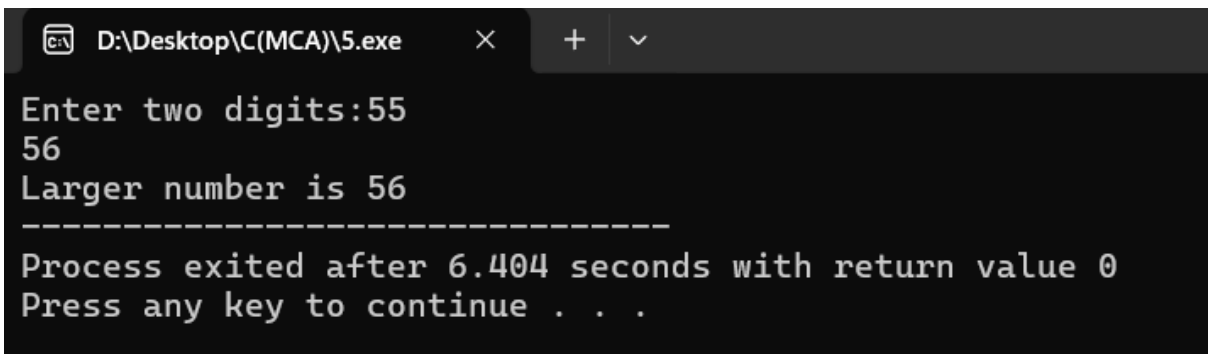
```
#include<stdio.h>

int main(){

    int x;
    printf("Choose a digit: ");
    scanf("%d",&x);
    printf("Your digit is %d",x);
    printf("\nAfter post increment by 1 = %d",x++);//no change
    printf("\nAfter pre increment by 1 = %d",++x);//increase by 2
    printf("\nAfter post decrement by 1 = %d",x--);//no change
    printf("\nAfter pre decrement by 1 = %d",--x);//increase by 2
}
```

Output:

```
Choose a digit: 10
Your digit is 10
After post increment by 1 = 10
After pre increment by 1 = 12
After post decrement by 1 = 12
After pre decrement by 1 = 10
--------------------------------
Process exited after 5.281 seconds with return value 0
Press any key to continue . . .
```

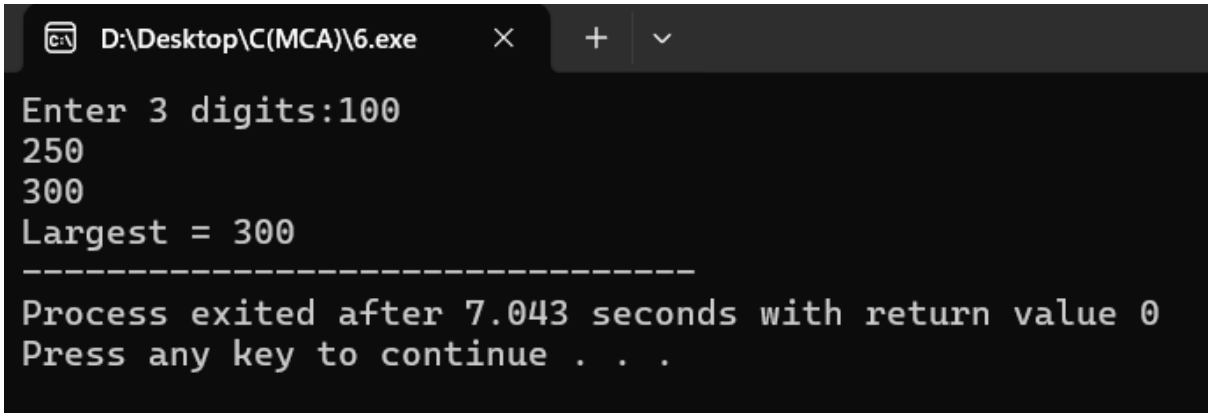
```
/*
Write a program to input two numbers and display the maximum number.
*/
#include<stdio.h>

int max(int i,int j){
	if(i>j)
		return i;
	else
		return j;
}

int main(){
	int i,j;
	printf("Enter two digits:");
	scanf("%d",&i);
	scanf("%d",&j);
	printf("Larger number is %d",max(i,j));
}
```

Output:



```
#include<stdio.h>

int main(){
	int a,b,c,l;

	printf("Enter 3 digits:");
	scanf("%d %d %d",&a,&b,&c);

	l=(a>b)?((a>c)?a:c):((b>c)?b:c);
	printf("Largest = %d",l);
}
```

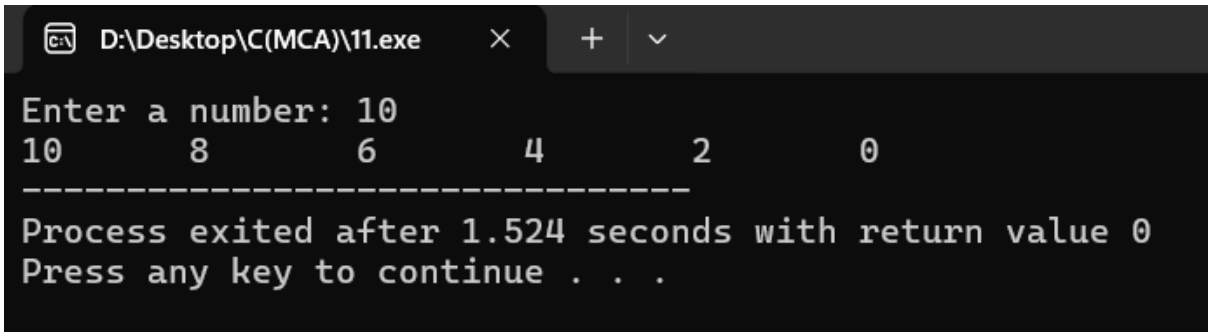
Output:




```
/*
Write a program to print number in reverse order with a difference of 2.
*/

#include<stdio.h>

void revPrint(int upperBound){
	for(int i=upperBound;i>=0;i-=2){
		printf("%d\t",i);
```

```
        }
}

int main(){
        int n;
        printf("Enter a number: ");
        scanf("%d",&n);
        revPrint(n);
        return 0;
}
```

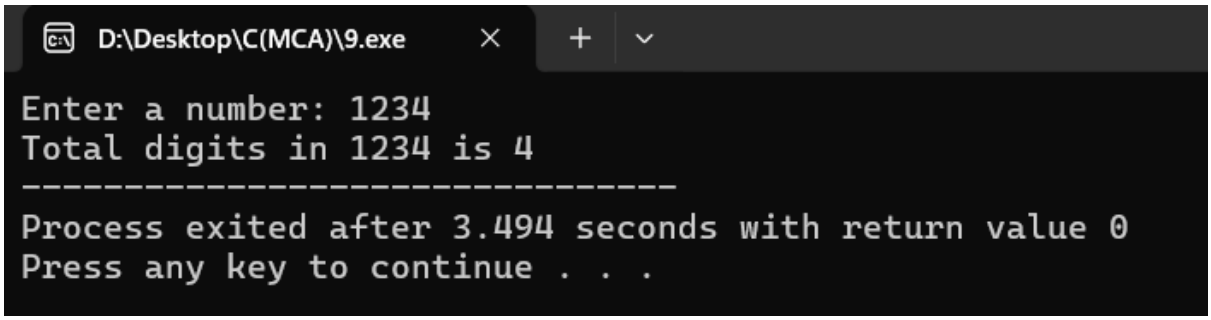
Output:




```
/*
Write a program to count number of digits in a given integer
*/

#include<stdio.h>

int count(int num){
        int count=0;
        while(num>0){
                count++;
                num=num/10;
```

```
    }
    return count;
}
int main(){
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    printf("Total digits in %d is %d",n,count(n));
    return 0;
}
```

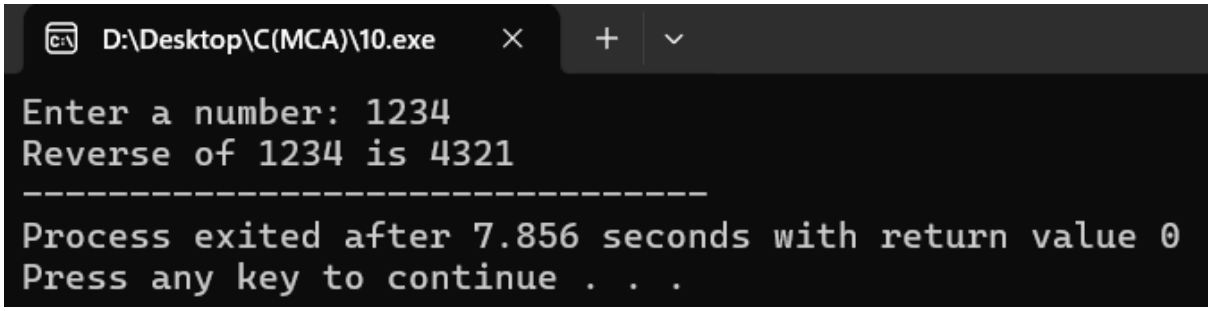
Output:




```
/*
Write a program to reverse a given integer
*/
#include<stdio.h>

int reverse(int num){
    int rev,temp;
    while(num>0){
        temp=num%10;
        rev=(rev*10)+temp;
        num/=10;
```

```
    }
    return rev;
}

int main(){
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    printf("Reverse of %d is %d",n,reverse(n));
    return 0;
}
```

Output:



/*Write a program to input name, marks of 5 subjects of a student and display the name of the student, the

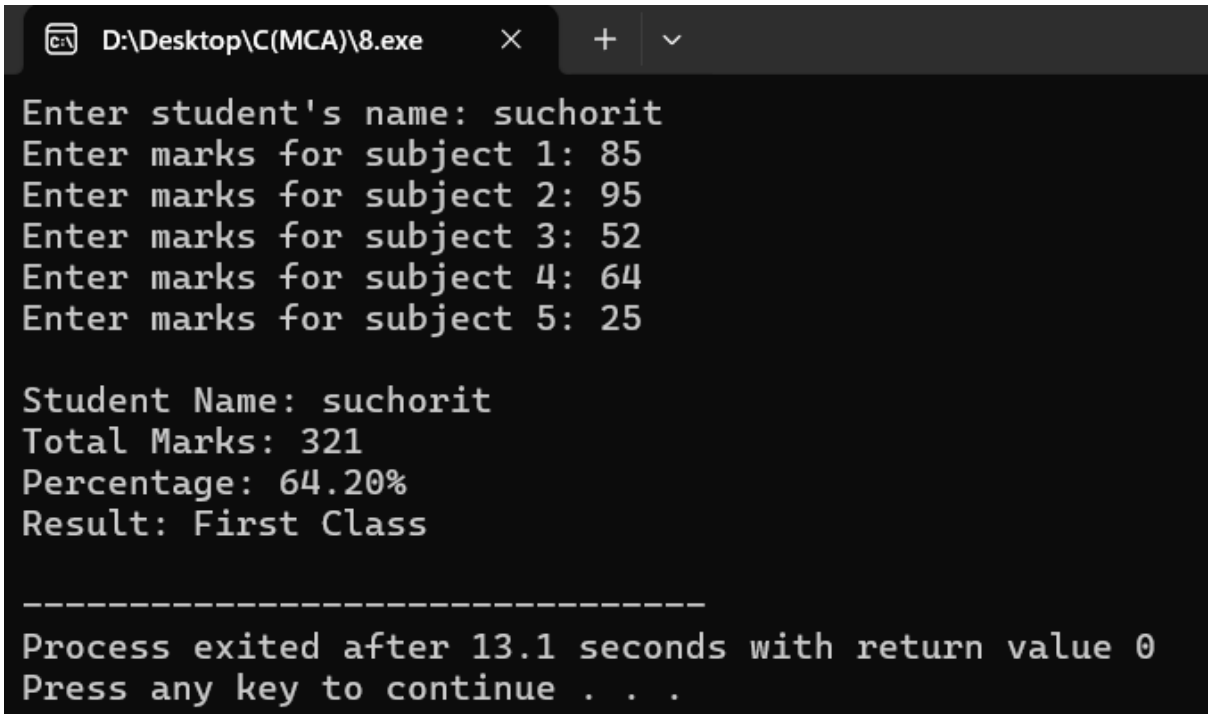
total marks scored, percentage scored and the class of result*/

```
#include <stdio.h>

struct Student {
   char name[50];
   int marks[5];
   int totalMarks;
   float percentage;
```

```
    char resultClass[20];
};
void calculateResult(struct Student *student) {
    student->totalMarks = 0;
    for (int i = 0; i < 5; i++) {
        student->totalMarks += student->marks[i];
    }
    student->percentage = (student->totalMarks / 5.0);
    if (student->percentage >= 85) {
        sprintf(student->resultClass, "Distinction");
    } else if (student->percentage >= 60) {
        sprintf(student->resultClass, "First Class");
    } else if (student->percentage >= 50) {
        sprintf(student->resultClass, "Second Class");
    } else if (student->percentage >= 35) {
        sprintf(student->resultClass, "Pass");
    } else {
        sprintf(student->resultClass, "Fail");
    }
}

int main() {
    struct Student student;
    printf("Enter student's name: ");
    scanf("%s", student.name);

    for (int i = 0; i < 5; i++) {
```

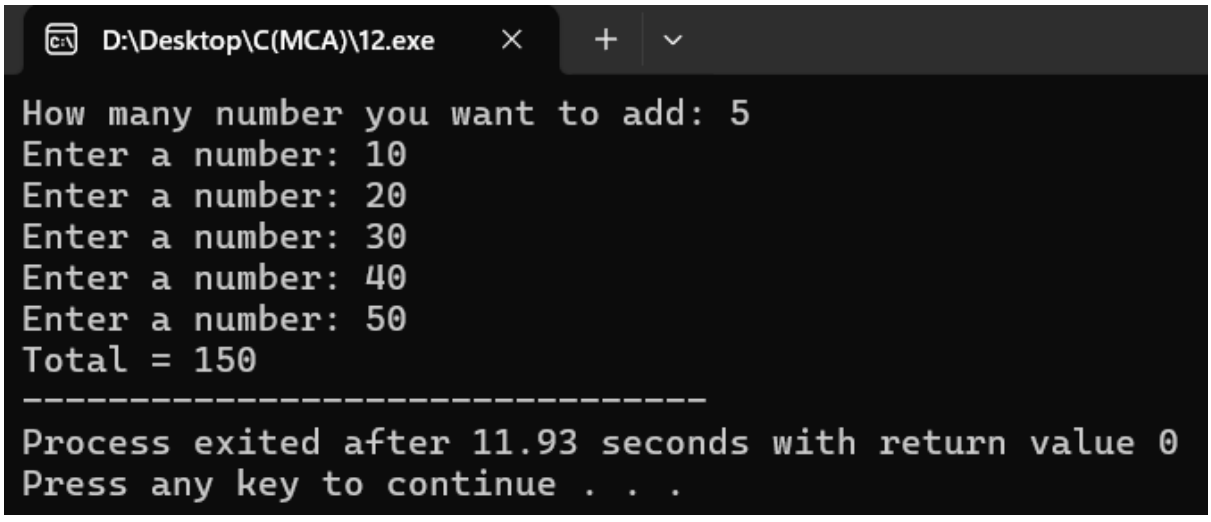
```
        printf("Enter marks for subject %d: ", i + 1);
        scanf("%d", &student.marks[i]);
    }
    // Calculate total marks, percentage, and result classification
    calculateResult(&student);
    // Display the result
    printf("\nStudent Name: %s\n", student.name);
    printf("Total Marks: %d\n", student.totalMarks);
    printf("Percentage: %.2f%%\n", student.percentage);
    printf("Result: %s\n", student.resultClass);
    return 0;
}
```

Output:



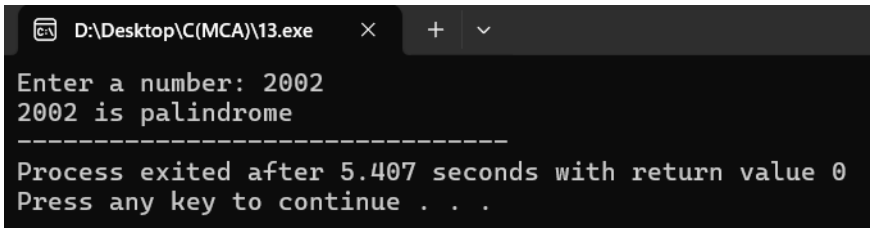
```
/*
Write a program to print the sum of digits of a number using for loop.
*/
#include<stdio.h>
int main(){
	int n,total=0;
	printf("How many number you want to add: ");
	scanf("%d",&n);
	int temp=0;
	for(int i=0;i<n;i++){
		printf("Enter a number: ");
		scanf("%d",&temp);
		total+=temp;
	}
	printf("Total = %d",total);
	return 0;
}
```

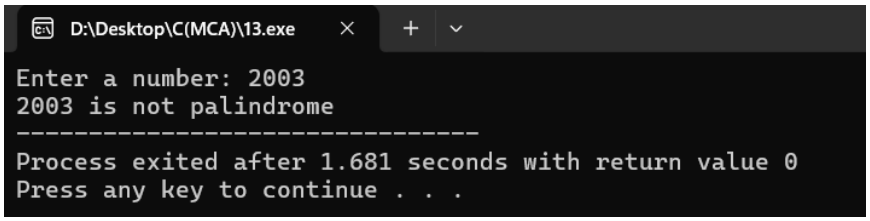
Output:



```
/*
Write a program to check whether a number is Palindrome or not.
*/
#include<stdio.h>
int reverse(int num){
	int rev,temp;
	while(num>0){
		temp=num%10;
		rev=(rev*10)+temp;
		num/=10;
	}
	return rev;
}
int main(){
	int n,rev;
	printf("Enter a number: ");
	scanf("%d",&n);
	rev=n;
	if(n==reverse(rev))
		printf("%d is palindrome",n);
	else
		printf("%d is not palindrome",n);
	return 0;
}
```

Output:

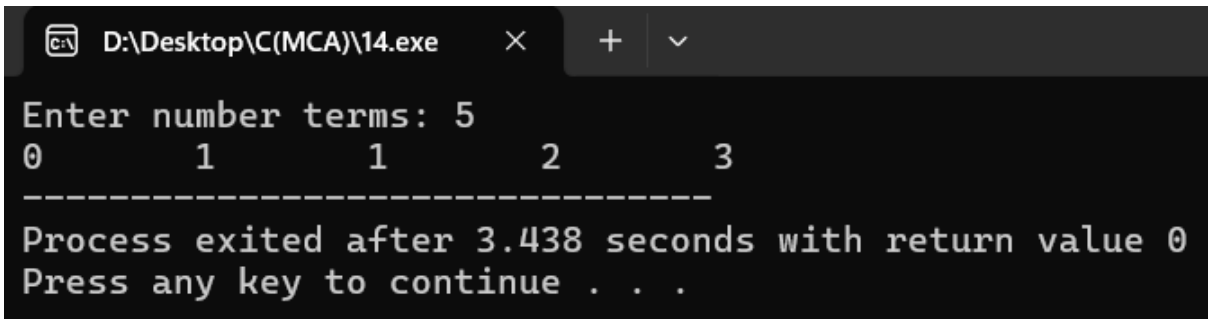





```
/*
Write a program to generate Fibonacci series
*/


#include<stdio.h>


int fibo(int num){
        if(num<=1){
                return num;
        }
        else{
                return fibo(num-1)+fibo(num-2);
        }
}


int main(){
        int n;
        printf("Enter number terms: ");
        scanf("%d",&n);
```

```
    for(int i=0;i<n;i++){
        printf("%d\t",fibo(i));
    }
    return 0;

}
```

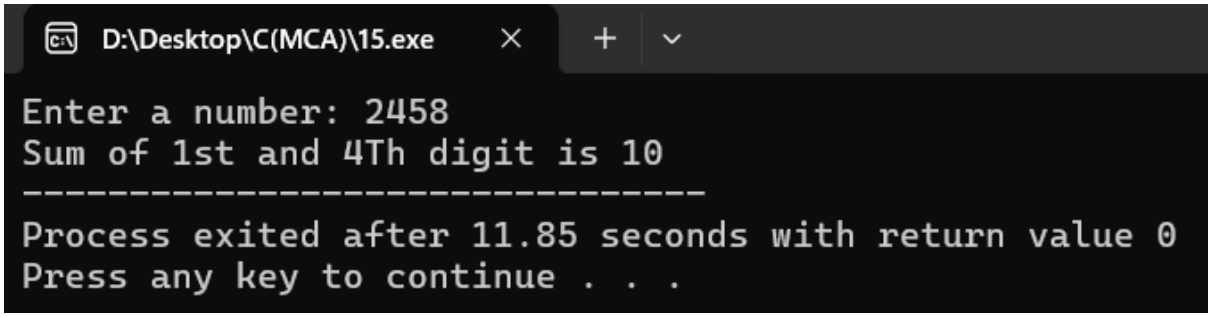
Output:




```
/*
If a four-digit number is input through the keyboard, write a program to obtain the sum of the first and
last digit of this number
*/

#include<stdio.h>

int sumFirstLast(int num){
    int temp,total=0;
    for(int i=0;i<4;i++){
        temp=num%10;
        if(i==0 | i==3){
            total+=temp;
        }
        num/=10;
```

```
    }
    return total;
}

int main(){
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    printf("Sum of 1st and 4Th digit is %d",sumFirstLast(n));
    return 0;
}
```

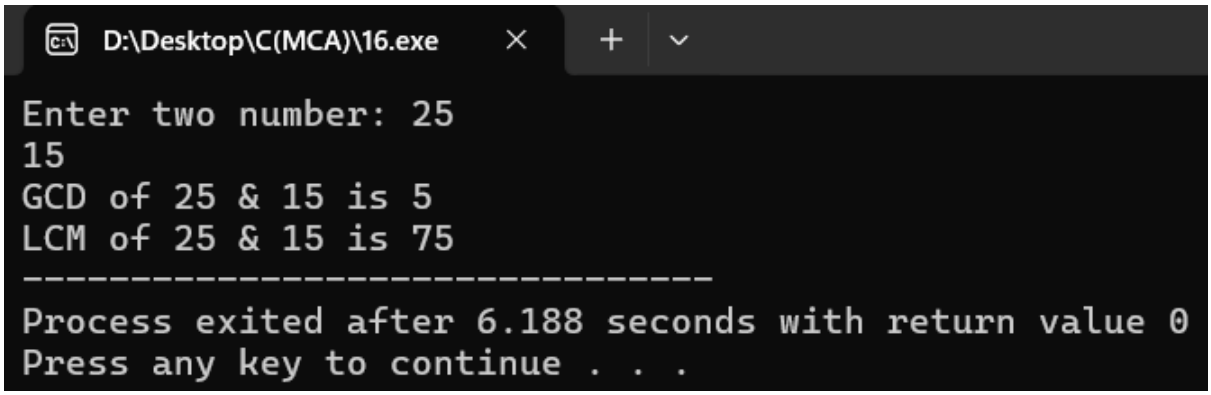
Output:




```
/*
Write a program to find GCD (greatest common divisor or HCF) and LCM (least common multiple) of
two numbers
*/

#include<stdio.h>
int gcd(int a,int b){
    int m;
    m=a%b;
    while(m>0){
```

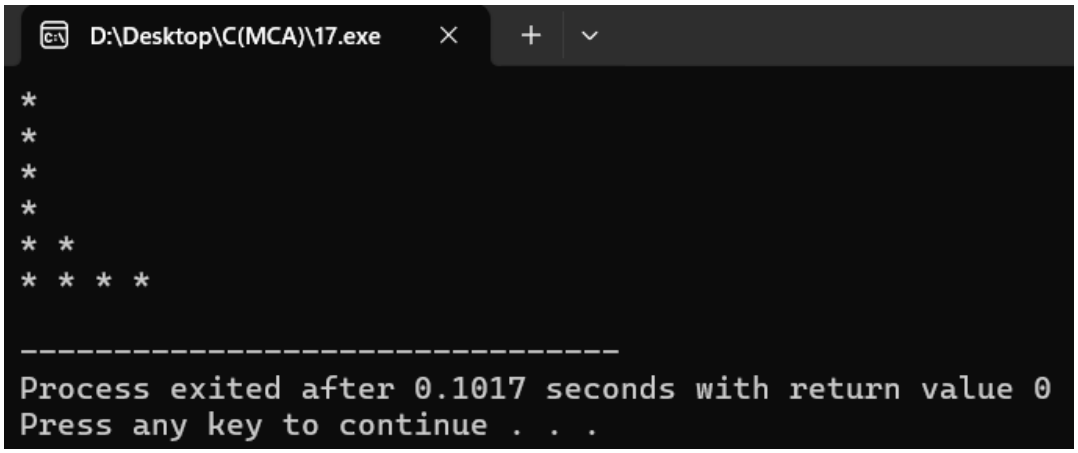
```
            a=b;
            b=m;
            m=a%b;
        }
        return b;
}
int lcm(int a,int b){
        return ((a*b)/gcd(a,b));
}
int main(){
        int n,m;
        printf("Enter two number: ");
        scanf("%d %d",&m,&n);
        printf("GCD of %d & %d is %d",m,n,gcd(m,n));
        printf("\nLCM of %d & %d is %d",m,n,lcm(m,n));
        return 0;
}
```

Output:



```
/*
Program: Write a program to display the following pattern.
*
*
*
* *
* * * *
*/
#include<stdio.h>
int main(){
	for(int i=0;i<=5;i++){
		if(i<4){
			printf("*\n");
		}
		else{
			for(int j=0;j<((i==4)?2:4);j++){
				printf("* ");
			}
			printf("\n");
		}
	}
	return 0;
}
```

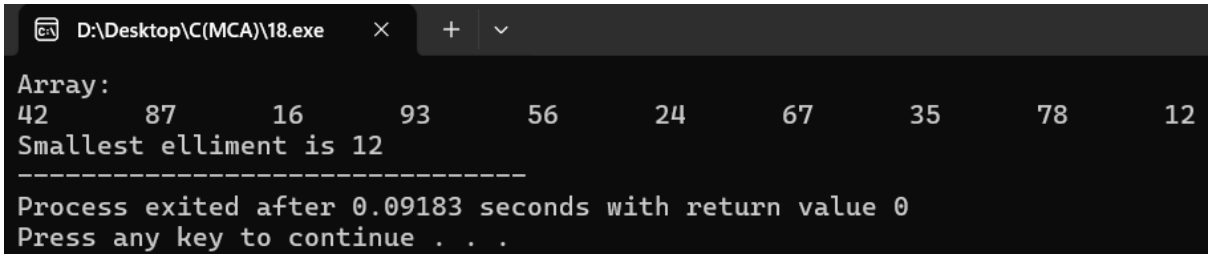
Output:




```
/*
Write a Program to find the largest and smallest element in Array
*/
#include<stdio.h>

int searchSmallest(int num[],int n){
        int s=num[0];
        for(int i=1;i<n;i++){
                if(num[i]<s){
                        s=num[i];
                }
        }
        return s;
}

int main(){
        int num[]={42,87,16,93,56,24,67,35,78,12};
        int n=sizeof(num)/sizeof(num[0]);
        printf("Smallest elliment is %d",searchSmallest(num,n));
```

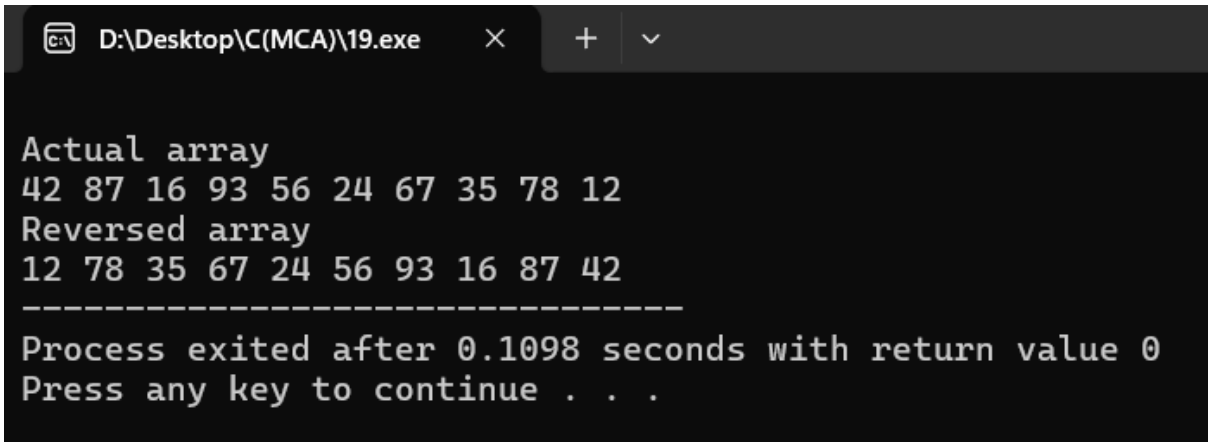
```
    return 0;
}
```

Output:




```
/*
Write a Program to reverse the array elements in C Programming.
*/
#include<stdio.h>

int main(){
    int num[]={42,87,16,93,56,24,67,35,78,12};
    int n=sizeof(num)/sizeof(num[0]);

    printf("\nActual array\n");
    for(int i=0;i<n;i++){
        printf("%d ",num[i]);
    }

    printf("\nReversed array\n");
    for(int i=n-1;i>=0;i--){
        printf("%d ",num[i]);
    }
    return 0;
}
```

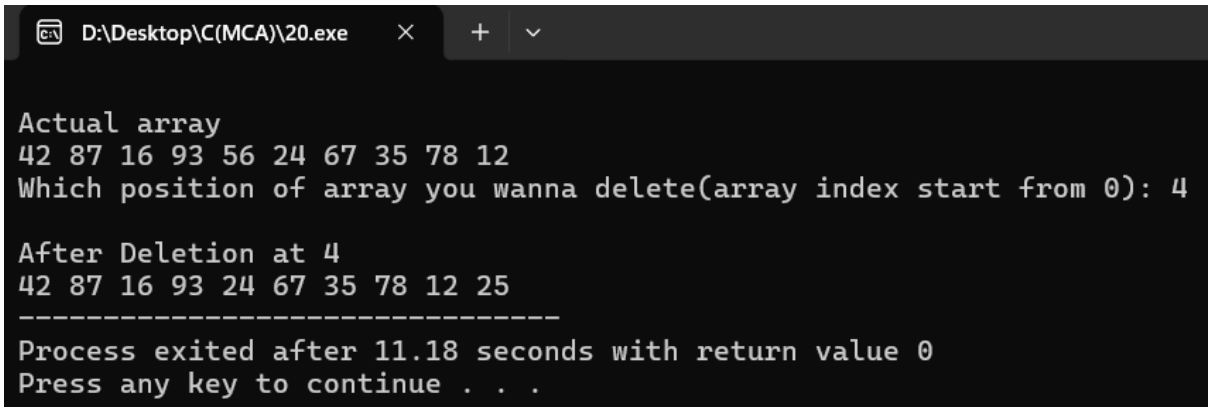
Output:




```
/*
Write a Program for deletion of an element from the specified location from Array
*/


#include<stdio.h>


int main(){
        int num[]={42,87,16,93,56,24,67,35,78,12};
        int n=sizeof(num)/sizeof(num[0]);


        printf("\nActual array\n");
        for(int i=0;i<n;i++){
        printf("%d ",num[i]);
        }


        int pos;
        printf("\nWhich position of array you wanna delete(array index start from 0): ");
        scanf("%d",&pos);
```

```
        for(int i=pos;i<=n;i++){
                num[i]=num[i+1];
        }

        printf("\nAfter Deletion at %d\n",pos);
        for(int i=0;i<n;i++){
        printf("%d ",num[i]);
        }
}
```

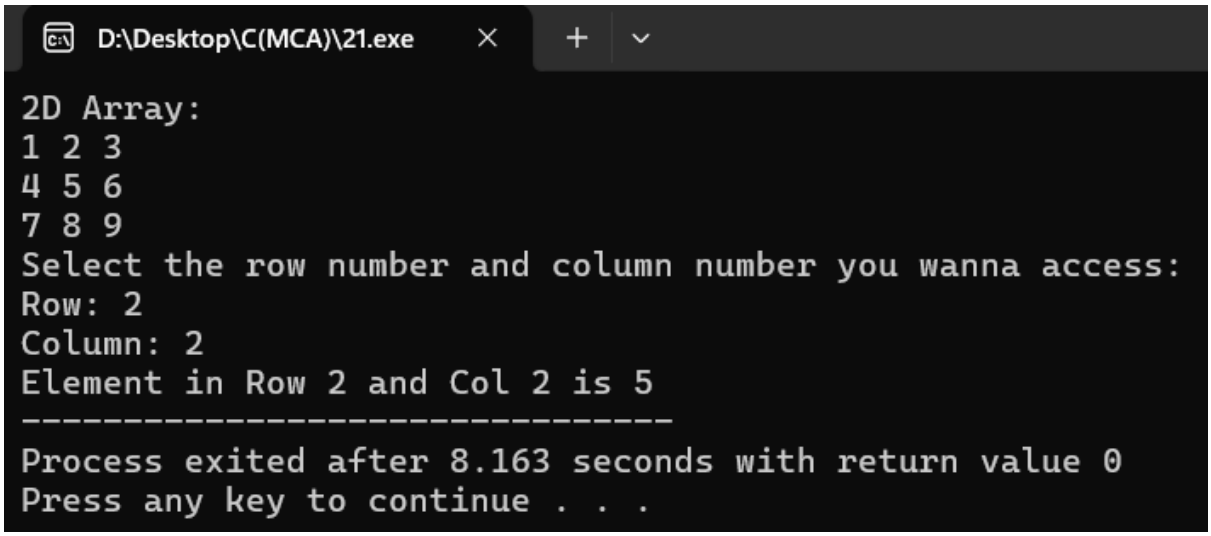
Output:




```
/*
Write a Program to access an element in 2-D Array.
*/
#include<stdio.h>
int main(){
        int row=3;
        int col=3;
        int nums[row][col]={
                                {1,2,3},{4,5,6},{7,8,9}
        };
```

```
    printf("2D Array:\n");
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            printf("%d ",nums[i][j]);
        }
        printf("\n");
    }
    printf("Select the row number and column number you wanna access:\n");
    printf("Row: ");
    scanf("%d",&row);
    printf("Column: ");
    scanf("%d",&col);
    printf("Element in Row %d and Col %d is %d",row,col,nums[row-1][col-1]);
    return 0;
}
```

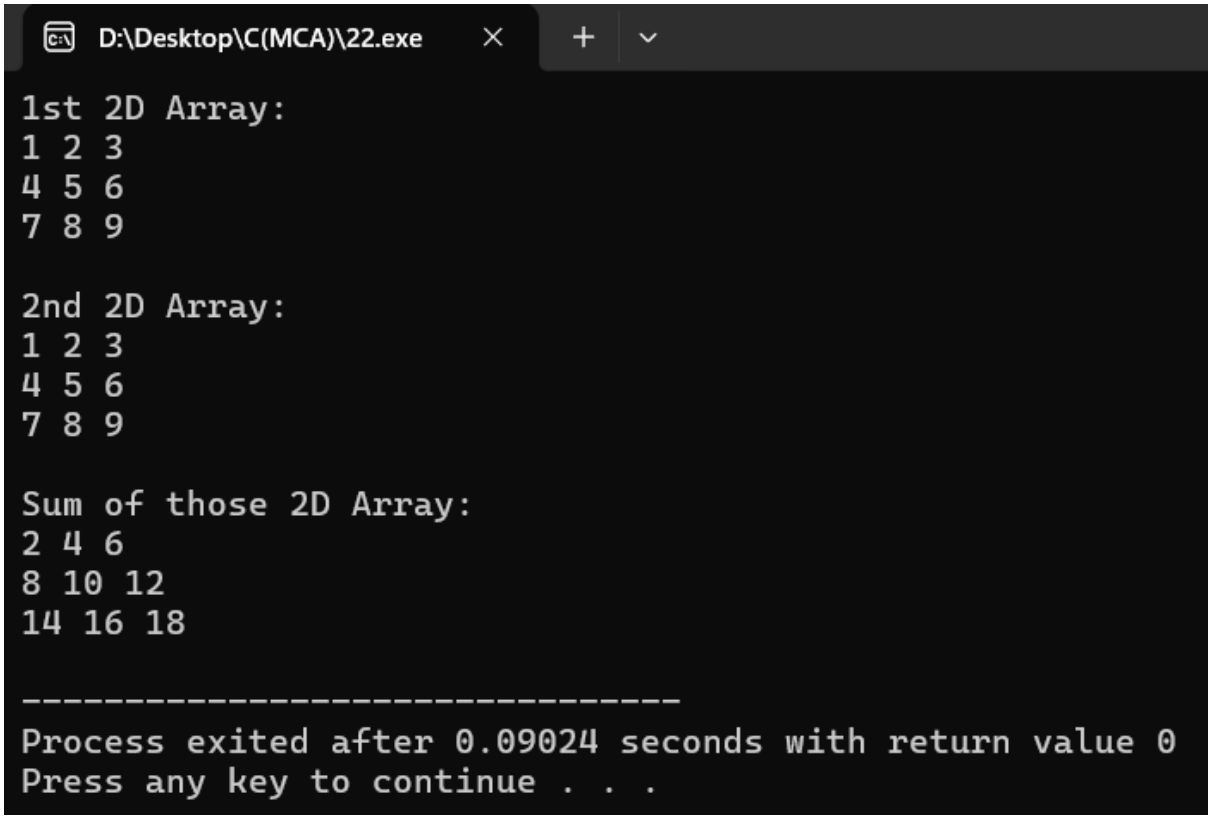
Output:



```
/*
Write a program for addition of two matrices of any order in C.
*/
#include<stdio.h>

int main(){
	int row=3;
	int col=3;
	int nums[row][col]={
				{1,2,3},{4,5,6},{7,8,9}
	};
	int nums2[row][col]={
				{1,2,3},{4,5,6},{7,8,9}
	};
	printf("1st 2D Array:\n");
	for(int i=0;i<row;i++){
		for(int j=0;j<col;j++){
			printf("%d ",nums[i][j]);
		}
		printf("\n");
	}
	printf("\n2nd 2D Array:\n");
	for(int i=0;i<row;i++){
		for(int j=0;j<col;j++){
			printf("%d ",nums2[i][j]);
		}
		printf("\n");
```

```
    }
    printf("\nSum of those 2D Array:\n");
    for(int i=0;i<row;i++){
        for(int j=0;j<col;j++){
            printf("%d ",nums[i][j]+nums2[i][j]);
        }
        printf("\n");
    }
    return 0;

}
```

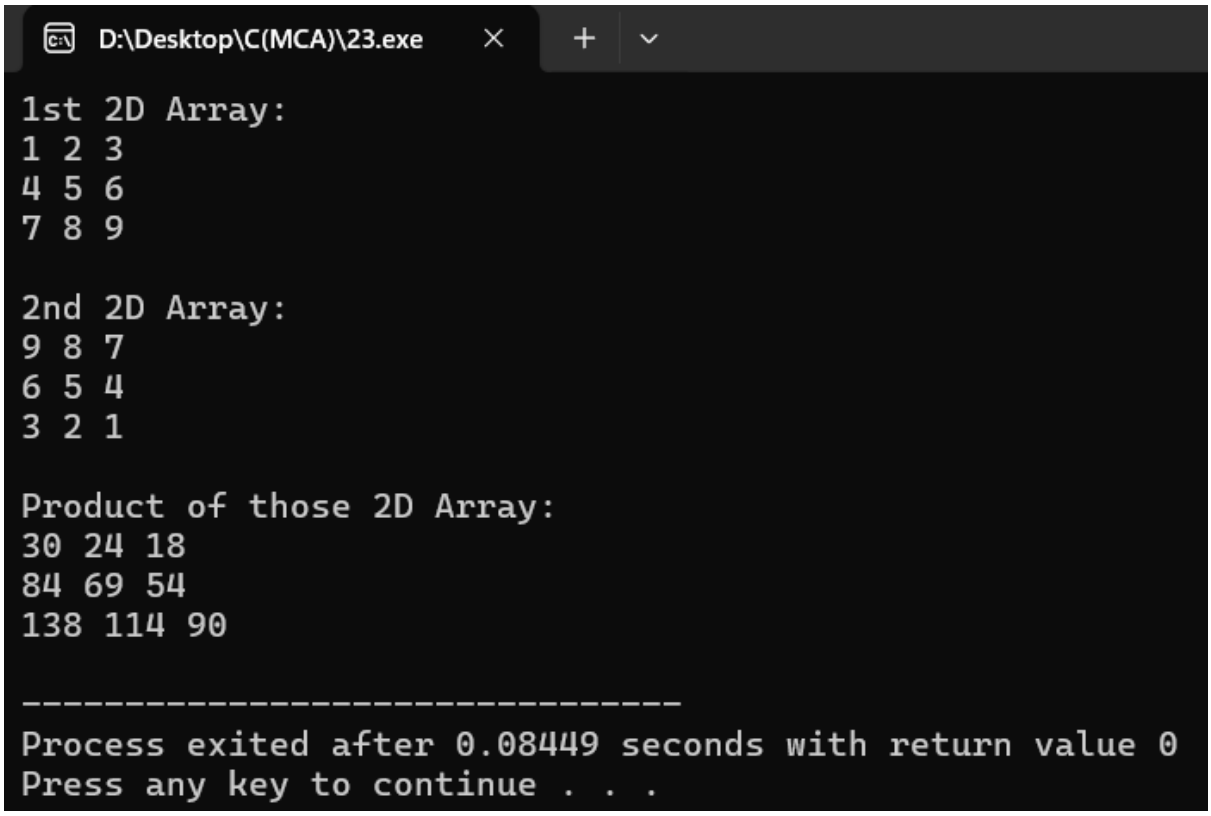
Output:



```
/*
Write a Program to multiply two 3 X 3 Matrices
*/
#include<stdio.h>

int main(){

	int row=3;
	int col=3;

	int nums[row][col]={
				{1,2,3},{4,5,6},{7,8,9}
	};

	int nums2[row][col]={
				{9,8,7},{6,5,4},{3,2,1}
	};
	int product[3][3];



	printf("1st 2D Array:\n");
	for(int i=0;i<row;i++){
		for(int j=0;j<col;j++){
			printf("%d ",nums[i][j]);
		}
		printf("\n");
	}
```

```
        printf("\n2nd 2D Array:\n");
        for(int i=0;i<row;i++){
                for(int j=0;j<col;j++){
                        printf("%d ",nums2[i][j]);
                }
                printf("\n");
        }

        for(int i=0;i<row;i++){
                for(int j=0;j<col;j++){
                        product[i][j]=0;
                        for(int k=0;k<row;k++){
                                product[i][j]+=nums[i][k]*nums2[k][j];
                        }
                }
        }
        printf("\nProduct of those 2D Array:\n");
        for(int i=0;i<row;i++){
                for(int j=0;j<col;j++){
                        printf("%d ",product[i][j]);
                }
                printf("\n");
        }
        return 0;

}
```

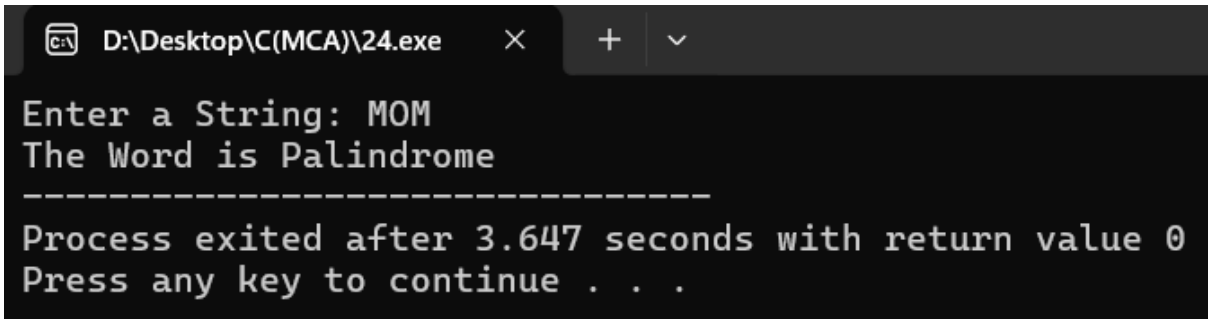
Output:




```
/*
Write a program to read a string and check for palindrome without using string related function (a string
is palindrome if its half is mirror by itself eg: abcdcba).
*/

#include<stdio.h>

void palindromeCheck(char s[],int n){

    int count=0;
    int i=0;
    int j=n-1;
    for(int i=0;(i<n/2);i++){
        if(s[i]!=s[n-1-i]){
```

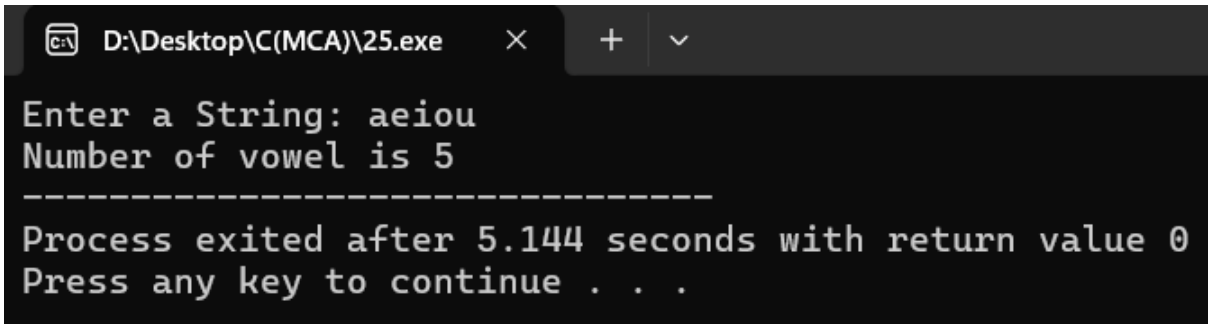
```
                count++;
                break;
            }
        }
        if(count==0){
            printf("The Word is Palindrome");
        }
        else
            printf("Not a palindrome Word");
}
int main(){
        char s[100];
        int len=0;
        printf("Enter a String: ");
        scanf("%s",&s);
        while(s[len]!='\0'){
            len++;
        }
        palindromeCheck(s,len);
        return 0;
}
```

Output:



```
/*
Write a program to accept a string and count the number of vowels present in this String
*/
#include<stdio.h>

int countVowel(char s[],int len){
	int count=0;
	for(int i=0;i<len;i++){
		if(s[i]=='A' || s[i]=='E' || s[i]=='I' || s[i]=='O' || s[i]=='U' || s[i]=='a' || s[i]=='e' || s[i]=='i' || s[i]=='o' || s[i]=='u')
			count++;
	}
	return count;
}

int main(){
	char s[100];
	int len=0;
	printf("Enter a String: ");
	scanf("%s",&s);
	while(s[len]!='\0'){
		len++;
	}
	printf("Number of vowel is %d",countVowel(s,len));
	return 0;
}
```

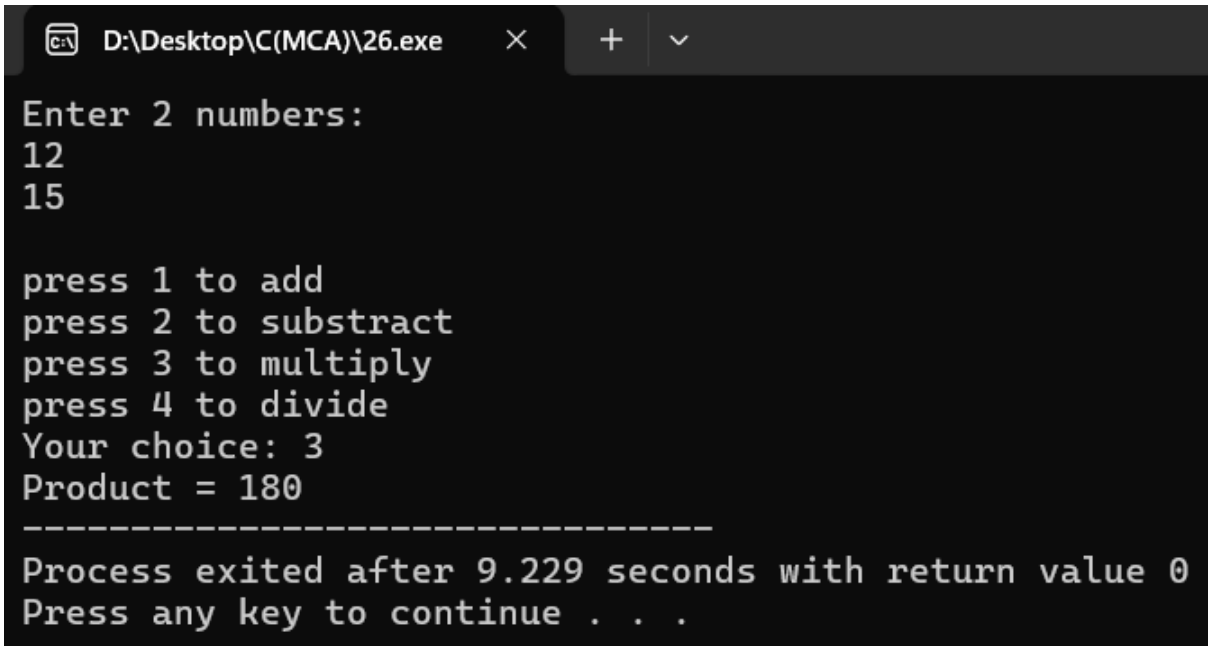
Output:




```
/*
Write a program to add, subtract, multiply and divide two integers using userdefined type function with
return type.
*/
#include<stdio.h>
int sum(int a,int b){
	return a+b;
}
int sub(int a,int b){
	return a-b;
}
int mul(int a,int b){
	return a*b;
}
int div(int a,int b){
	return a/b;
}
int main(){
	int a,b,c;
	printf("Enter 2 numbers: \n");
	scanf("%d %d",&a,&b);
```

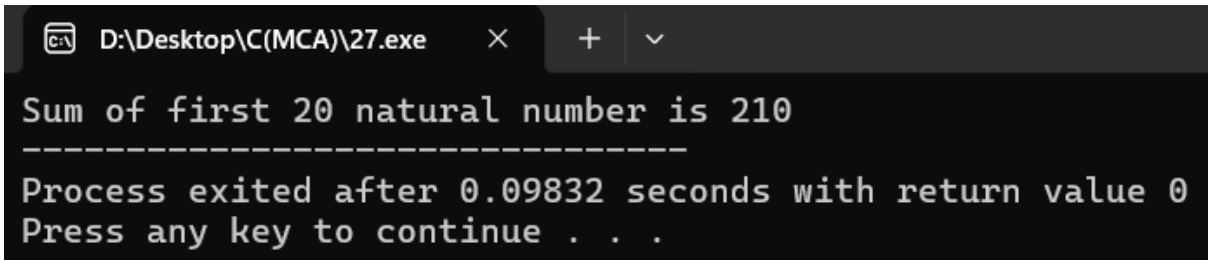
```
printf("\npress 1 to add\npress 2 to substract\npress 3 to multiply\npress 4 to divide\nYour choice: ");
        scanf("%d",&c);
        switch(c){
                case 1:
                        printf("Sum = %d",sum(a,b));
                        break;
                case 2:
                        printf("Differnce = %d",sub(a,b));
                        break;
                case 3:
                        printf("Product = %d",mul(a,b));
                        break;
                case 4:
                        printf("Qutaint = %d",div(a,b));
                        break;
                default:
                        printf("Wrong input!!!");
                        break;
        }
        return 0;
}
```

Output:



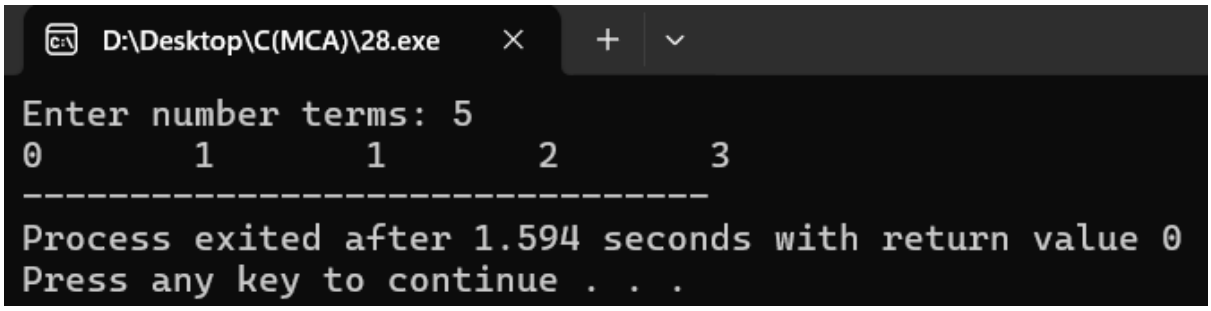

```
/*
Write a program to calculate sum of first 20 natural numbers using recursive function
*/
#include<stdio.h>

int sum(int limit){
	if(limit<=1){
		return 1;
	}
	else{
		return limit+sum(limit-1);
	}
}
int main(){
	printf("Sum of first 20 natural number is %d",sum(20));
}
```

Output:




```
/*
Write a program to generate Fibonacci series using recursive function
*/


#include<stdio.h>
int fibo(int num){
	if(num<=1){
		return num;
	}
	else{
		return fibo(num-1)+fibo(num-2);
	}
}
int main(){
	int n;
	printf("Enter number terms: ");
	scanf("%d",&n);
	for(int i=0;i<n;i++){
		printf("%d\t",fibo(i));
	}
	return 0;
}
```

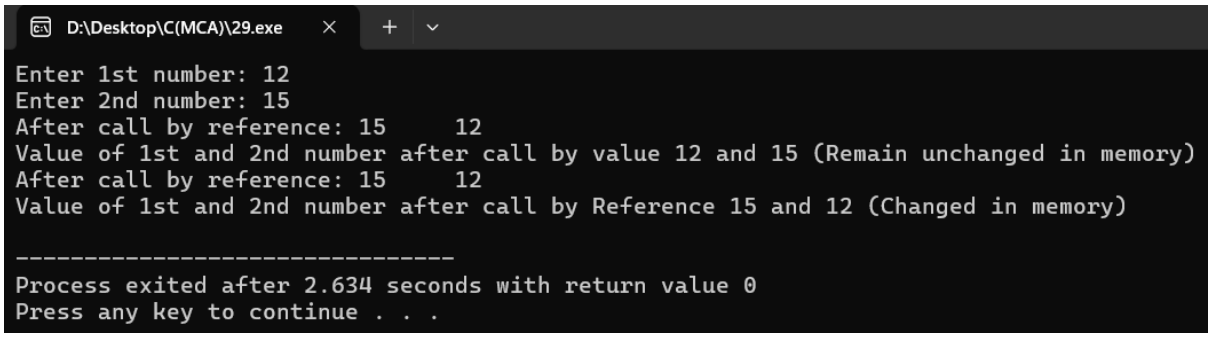
Output:




```
/*
Write a program to swap two integers using call by value and call by reference methods of passing
arguments to a function.
*/
#include<stdio.h>

void callByReference(int *p,int *q){
        *p=*p+*q;
        *q=*p-*q;
        *p=*p-*q;

        printf("After call by reference: %d\t%d",*p,*q);
}

void callByValue(int p,int q){
        p=p+q;
        q=p-q;
        p=p-q;

        printf("After call by reference: %d\t%d",p,q);
}
```

```
int main(){
	int m,n;
	printf("Enter 1st number: ");
	scanf("%d",&m);
	printf("Enter 2nd number: ");
	scanf("%d",&n);
	callByValue(m,n);
	printf("\nValue of 1st and 2nd number after call by value %d and %d (Remain unchanged in memory)\n",m,n);
	callByReference(&m,&n);
	printf("\nValue of 1st and 2nd number after call by Reference %d and %d (Changed in memory)\n",m,n);
	return 0;
}
```

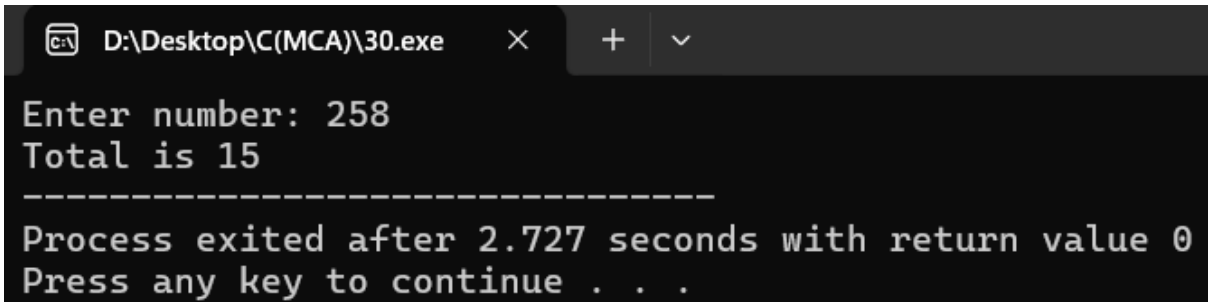
Output:




```
/*
Write a program to find sum of digits of the number using Recursive Function
*/
#include<stdio.h>

int sum(int num){
```

```
    static int total=0;
    if(num>0){
        total+=num%10;
        return sum(num/10);
    }

    return total;
}

int main(){
    int n;
    printf("Enter number: ");
    scanf("%d",&n);

    printf("Total is %d",sum(n));
    return 0;
}
```

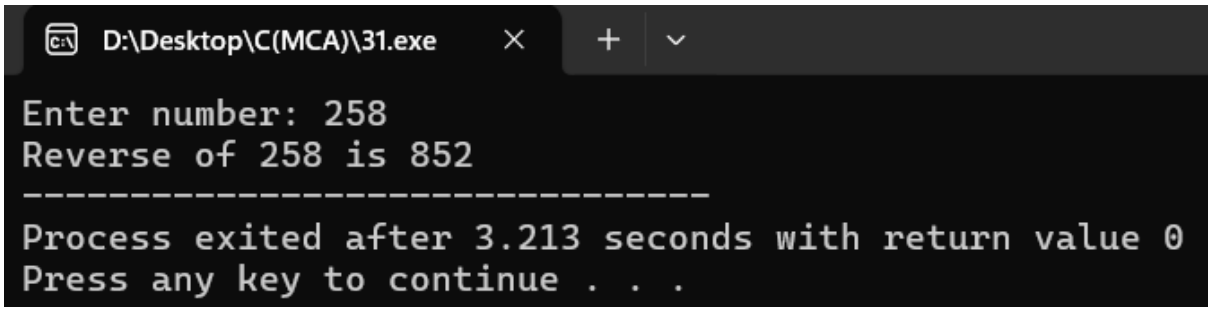
Output:




```
/*
Write a program to read an integer number and print the reverse of that number using recursion
*/

#include<stdio.h>
```

```
int revRec(int num){
	static int rev=0;
	if(num>0){
		rev=(rev*10)+(num%10);
		revRec(num/10);
	}
	return rev;
}

int main(){
	int n;
	printf("Enter number: ");
	scanf("%d",&n);

	printf("Reverse of %d is %d",n,revRec(n));
	return 0;
}
```

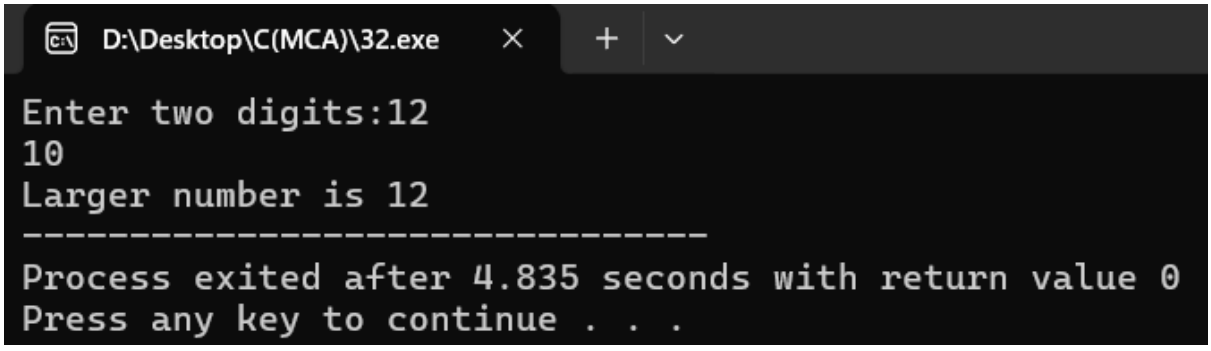
Output:




```
/*
Write a C program to find maximum and minimum between two numbers using functions.
*/

#include<stdio.h>
```

```
int max(int i,int j){
	if(i>j)
		return i;
	else
		return j;
}

int main(){
	int i,j;
	printf("Enter two digits:");
	scanf("%d",&i);
	scanf("%d",&j);
	printf("Larger number is %d",max(i,j));
}
```

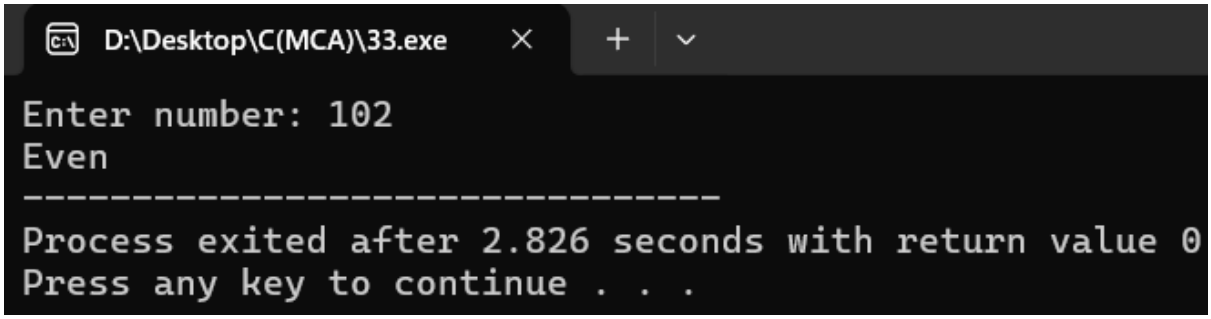
Output:

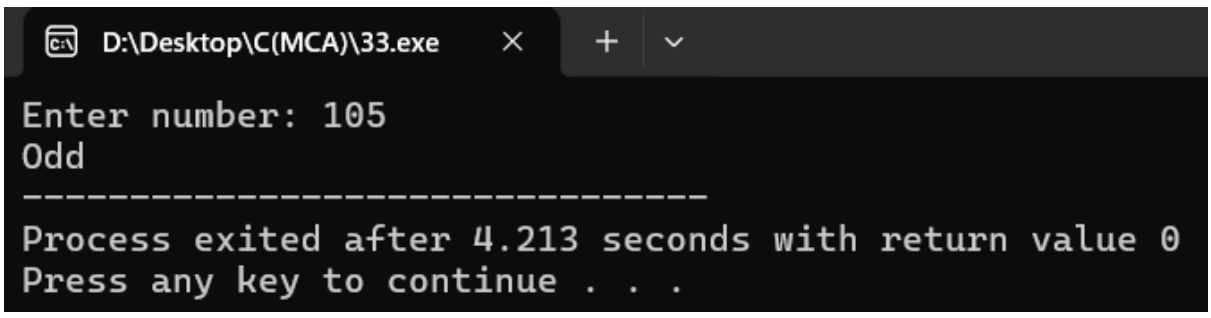



```
/*
Write a C program to check whether a number is even or odd using functions.
*/

#include<stdio.h>
```

```
void oddEven(int num){
	if(num%2==0)
		printf("Even");
	else
		printf("Odd");
}

int main(){
	int n;
	printf("Enter number: ");
	scanf("%d",&n);

	oddEven(n);
}
```

Output:



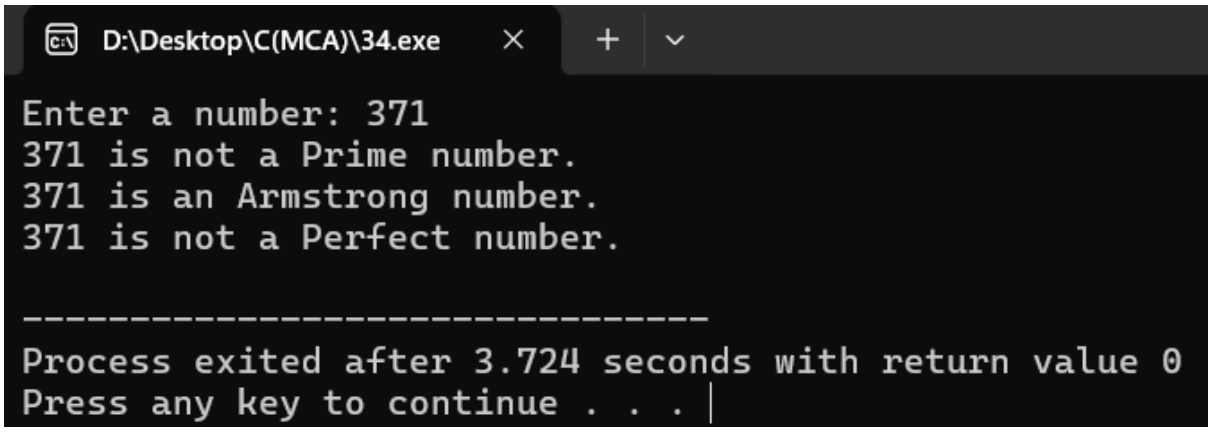


```
/*
Write a C program to check whether a number is prime, Armstrong or perfect number using functions
*/

#include <stdio.h>
#include <math.h>

// Function to check if a number is prime
int isPrime(int num) {
    if (num <= 1) return 0; // Not prime
    for (int i = 2; i <= sqrt(num); i++) {
        if (num % i == 0) return 0; // Divisible, not prime
    }
    return 1; // Prime
}

// Function to check if a number is an Armstrong number
int isArmstrong(int num) {
    int originalNum = num, sum = 0, digits = 0;
    // Count the number of digits
    while (originalNum != 0) {
        digits++;
        originalNum /= 10;
    }
    originalNum = num;
    // Calculate the sum of the power of digits
    while (originalNum != 0) {
```

```
    int digit = originalNum % 10;
    sum += pow(digit, digits);
    originalNum /= 10;
  }
  return sum == num; // Return true if sum equals the original number
}

// Function to check if a number is a perfect number
int isPerfect(int num) {
  int sum = 0;
  for (int i = 1; i <= num / 2; i++) {
    if (num % i == 0) sum += i; // Add divisors
  }
  return sum == num; // Perfect number if sum equals the number
}

// Main function
int main() {
  int num;

  printf("Enter a number: ");
  scanf("%d", &num);

  // Check if the number is prime
  if (isPrime(num)) {
    printf("%d is a Prime number.\n", num);
  } else {
```

```
        printf("%d is not a Prime number.\n", num);
    }

    // Check if the number is an Armstrong number
    if (isArmstrong(num)) {
        printf("%d is an Armstrong number.\n", num);
    } else {
        printf("%d is not an Armstrong number.\n", num);
    }

    // Check if the number is a perfect number
    if (isPerfect(num)) {
        printf("%d is a Perfect number.\n", num);
    } else {
        printf("%d is not a Perfect number.\n", num);
    }

    return 0;
}
```

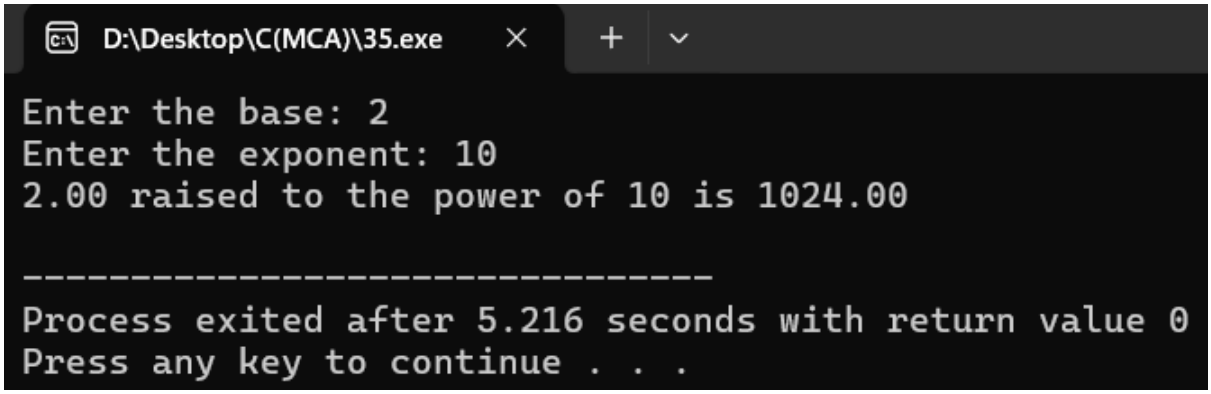
Output:



```
/*
Write a C program to find power of any number using recursion
*/

#include <stdio.h>

// Function to calculate power using recursion
double power(double base, int exponent) {
    if (exponent == 0) {
        return 1; // Base case: any number raised to 0 is 1
    } else if (exponent > 0) {
        return base * power(base, exponent - 1); // Recursive case for positive exponent
    } else {
        return 1 / power(base, -exponent); // Handle negative exponent
    }
}

// Main function
int main() {
    double base;
    int exponent;

    printf("Enter the base: ");
    scanf("%lf", &base);
    printf("Enter the exponent: ");
```

```
    scanf("%d", &exponent);

    double result = power(base, exponent);
    printf("%.2lf raised to the power of %d is %.2lf\n", base, exponent, result);

    return 0;
}
```

Output:

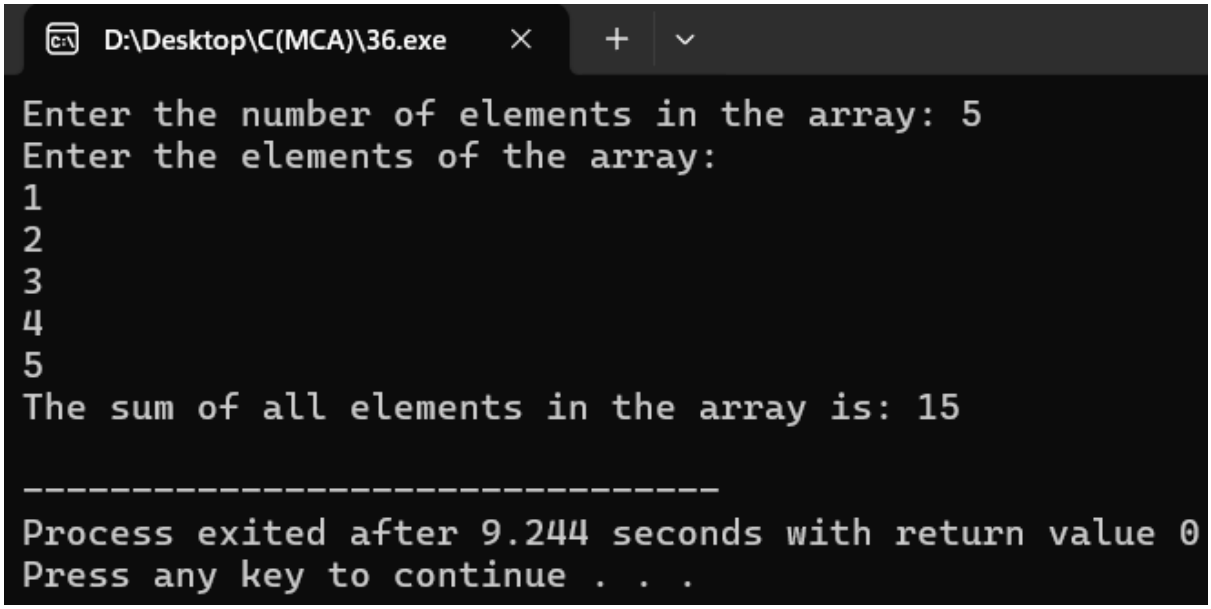


// Question : Write a program to find the sum of all the elements of an array using pointers.

```
#include <stdio.h>

int main() {
    int n, i;
    int sum = 0;
    int *ptr;
    printf("Enter the number of elements in the array: ");
    scanf("%d", &n);
```

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

Output:

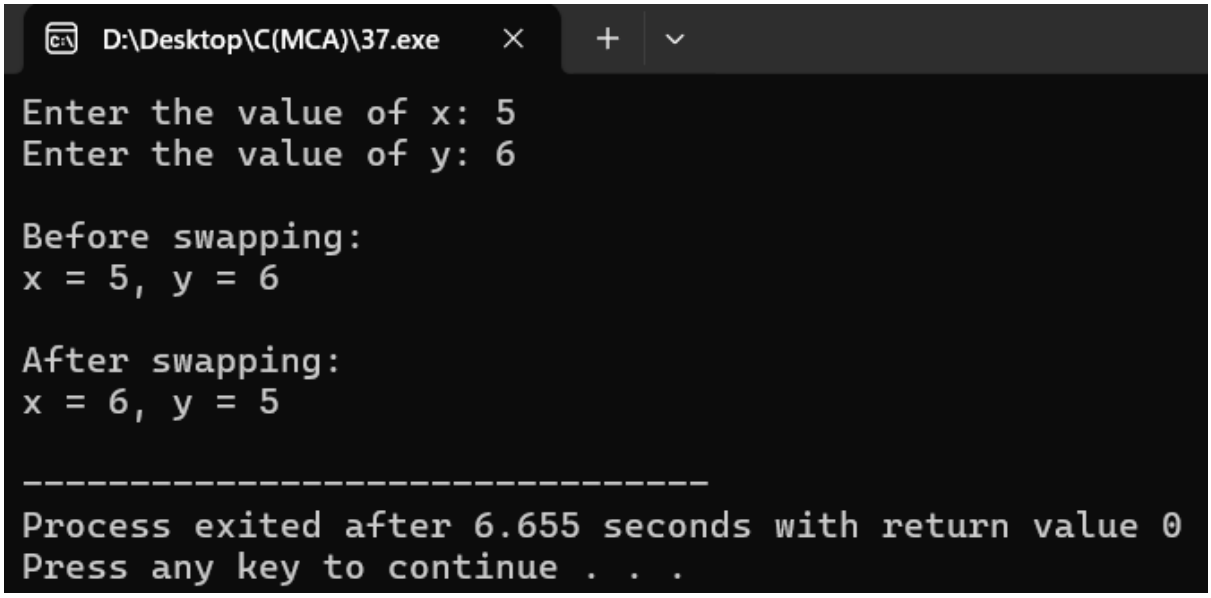


//Question: Write a program to swap value of two variables using pointer.

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

```
void swap(int *a, int *b) {
    int temp;
    temp = *a;
    *a = *b;
    *b = temp;
}

int main() {
    int x, y;


    printf("Enter the value of x: ");
    scanf("%d", &x);
    printf("Enter the value of y: ");
    scanf("%d", &y);

    printf("\nBefore swapping:\n");
    printf("x = %d, y = %d\n", x, y);


    swap(&x, &y);

    printf("\nAfter swapping:\n");
    printf("x = %d, y = %d\n", x, y);

    return 0;
}
```

Output:

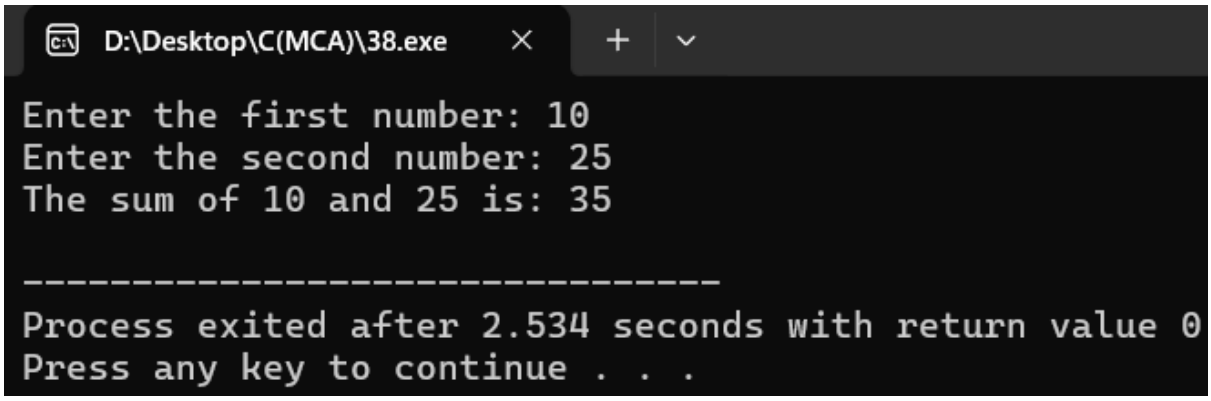


//Question : Write a program to add two numbers using pointers.

```
#include <stdio.h>

int main() {
   int num1, num2, sum;
   int *ptr1, *ptr2;



   printf("Enter the first number: ");
   scanf("%d", &num1);
   printf("Enter the second number: ");
   scanf("%d", &num2);



   ptr1 = &num1;
```

```
    ptr2 = &num2;


    sum = *ptr1 + *ptr2;


    printf("The sum of %d and %d is: %d\n", num1, num2, sum);

    return 0;
}
```

Output:

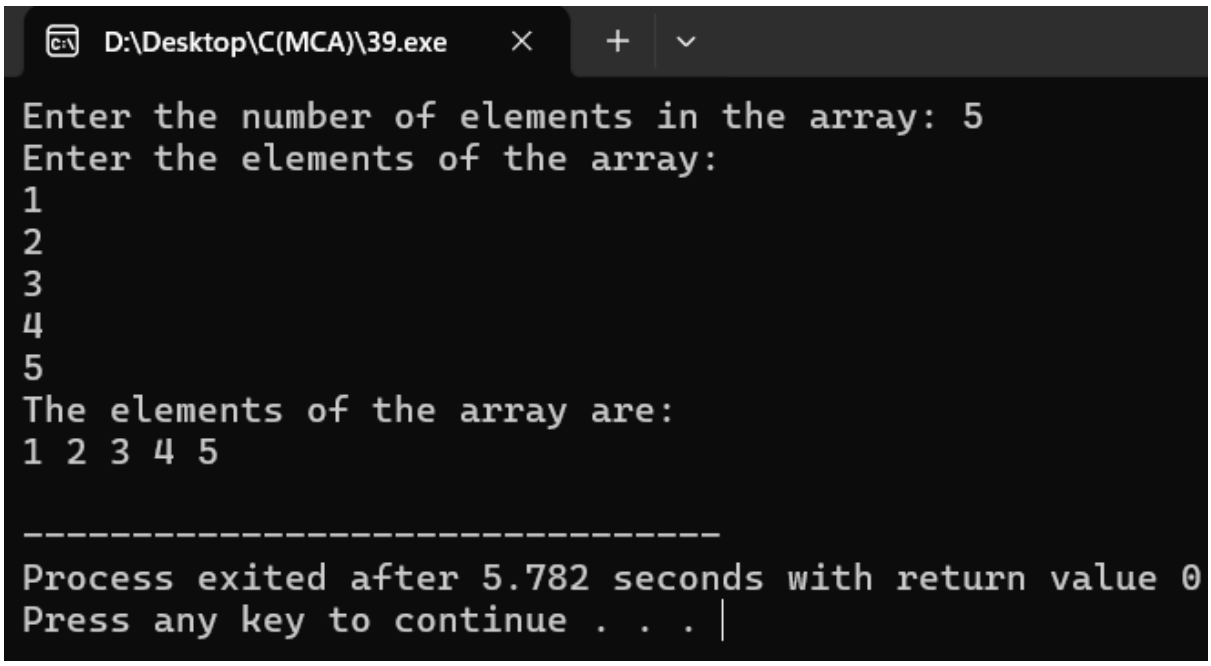


//Question : Write a program to input and print array elements using pointer.

```
#include <stdio.h>

int main() {
    int n, i;
    int *ptr;
    printf("Enter the number of elements in the array: ");
    scanf("%d", &n);
```

```
    int arr[n];
    ptr = arr;
    printf("Enter the elements of the array:\n");
    for (i = 0; i < n; i++) {
        scanf("%d", (ptr + i));
    }
    printf("The elements of the array are:\n");
    for (i = 0; i < n; i++) {
        printf("%d ", *(ptr + i));
    }
    printf("\n");
    return 0;
}
```

Output:

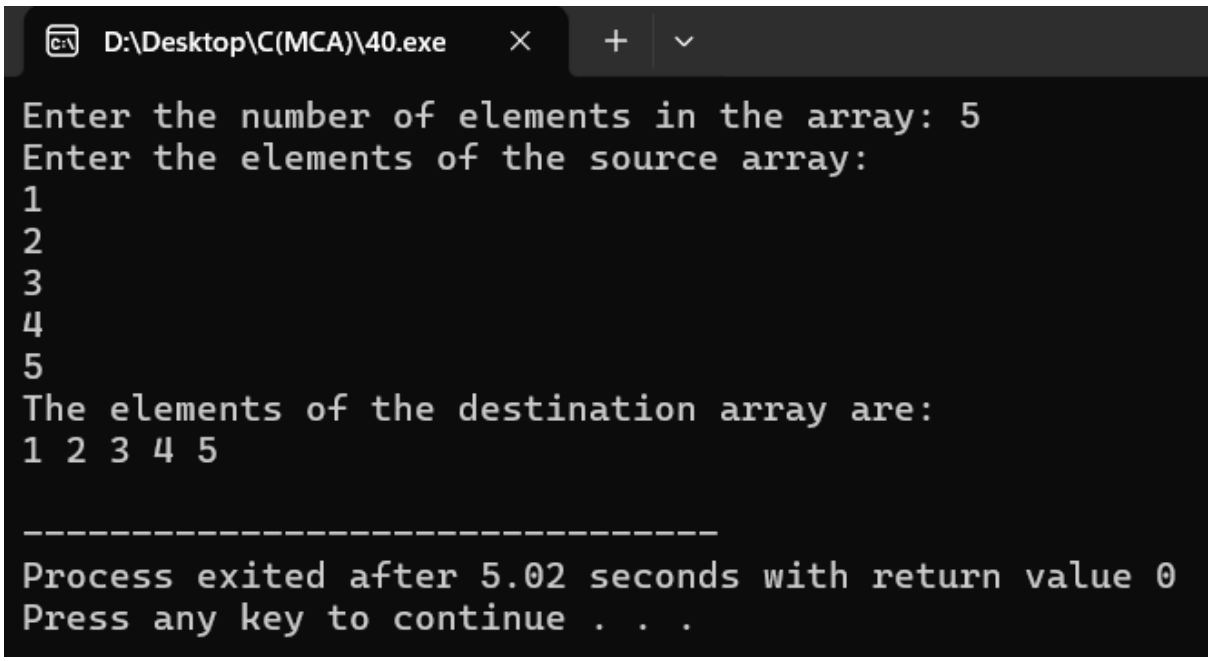


// Question : Write a program to copy one array to another using pointer.

```
#include <stdio.h>

int main() {
   int n, i;
   int *sourcePtr, *destPtr;


   printf("Enter the number of elements in the array: ");
   scanf("%d", &n);


   int source[n], destination[n];


   sourcePtr = source;
   destPtr = destination;


   printf("Enter the elements of the source array:\n");
   for (i = 0; i < n; i++) {
      scanf("%d", (sourcePtr + i));
   }
```

```
    for (i = 0; i < n; i++) {
        *(destPtr + i) = *(sourcePtr + i);
    }


    printf("The elements of the destination array are:\n");
    for (i = 0; i < n; i++) {
        printf("%d ", *(destPtr + i));
    }

    printf("\n");

    return 0;
}
```

Output:

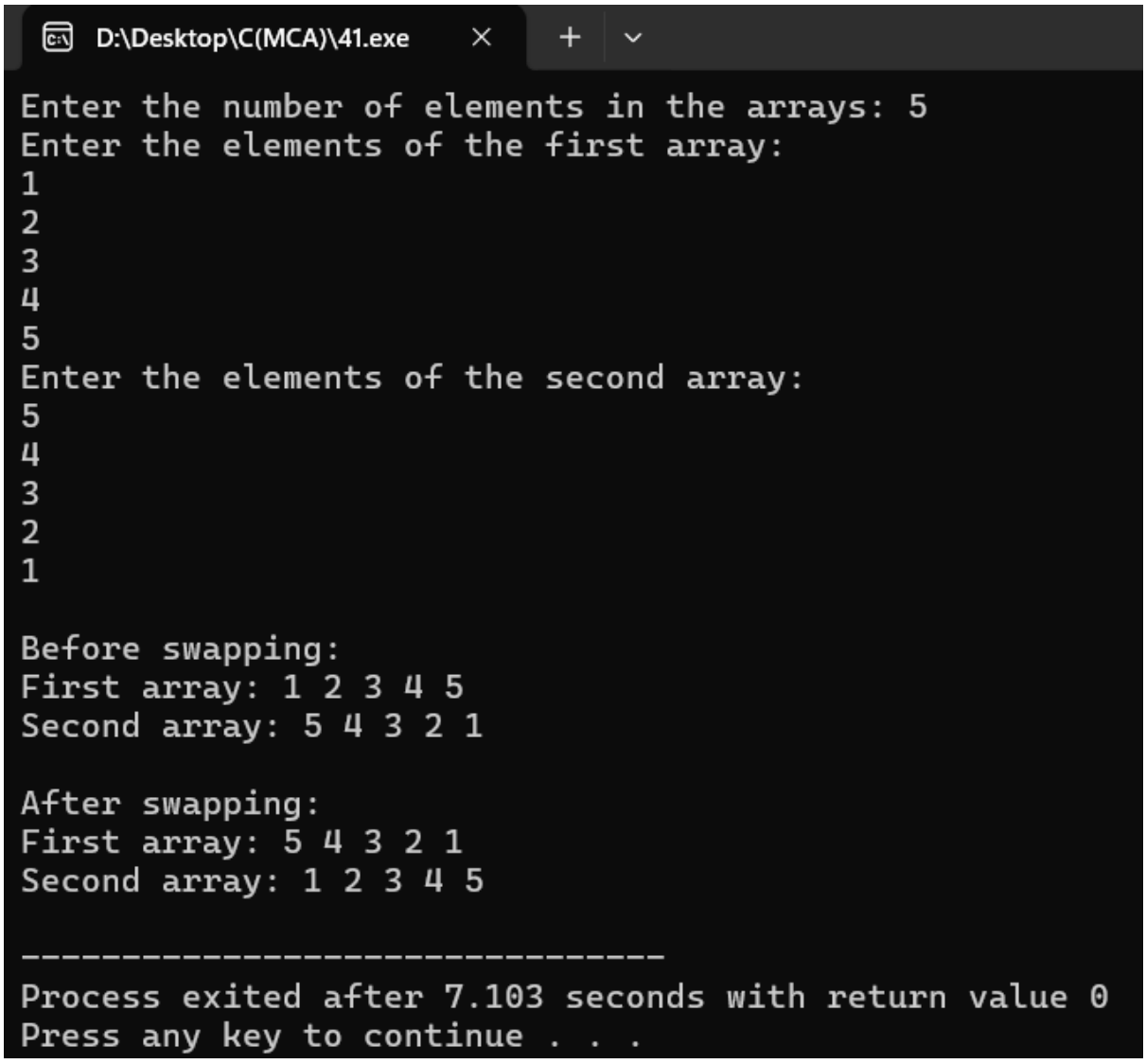


```
//Question : Write a program to swap two arrays using pointers.
#include <stdio.h>

void swapArrays(int *arr1, int *arr2, int n) {
    int temp;
    for (int i = 0; i < n; i++) {
        temp = *(arr1 + i);    // Store the value of arr1[i] in temp
        *(arr1 + i) = *(arr2 + i);  // Copy the value of arr2[i] to arr1[i]
        *(arr2 + i) = temp;    // Assign the value of temp to arr2[i]
    }
}

int main() {
    int n;

    // Input the size of the arrays
    printf("Enter the number of elements in the arrays: ");
    scanf("%d", &n);

    // Declare two arrays
    int arr1[n], arr2[n];

    // Input elements for the first array
    printf("Enter the elements of the first array:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr1[i]);
```

```
}

// Input elements for the second array
printf("Enter the elements of the second array:\n");
for (int i = 0; i < n; i++) {
   scanf("%d", &arr2[i]);
}

// Print the arrays before swapping
printf("\nBefore swapping:\n");
printf("First array: ");
for (int i = 0; i < n; i++) {
   printf("%d ", arr1[i]);
}
printf("\nSecond array: ");
for (int i = 0; i < n; i++) {
   printf("%d ", arr2[i]);
}
printf("\n");

// Swap the arrays
swapArrays(arr1, arr2, n);

// Print the arrays after swapping
printf("\nAfter swapping:\n");
printf("First array: ");
for (int i = 0; i < n; i++) {
```

```
        printf("%d ", arr1[i]);
    }
    printf("\nSecond array: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", arr2[i]);
    }
    printf("\n");

    return 0;
}
```

Output:

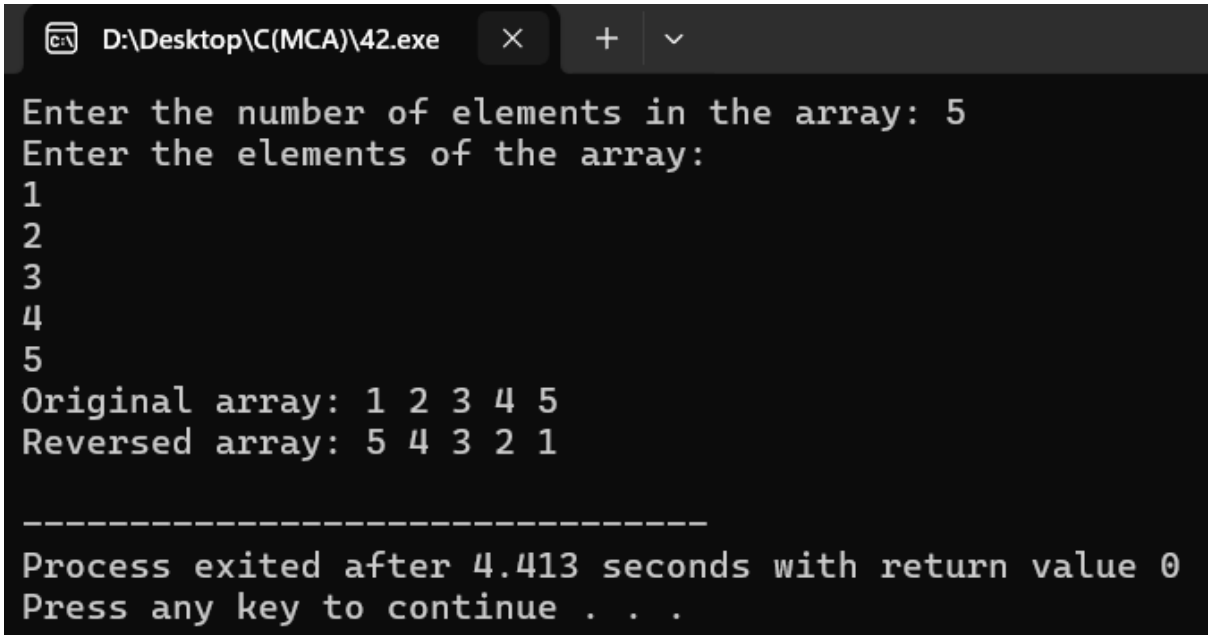


```
// Question: Write a program to reverse an array using pointers.

#include <stdio.h>

void reverseArray(int *arr, int n) {
    int *start = arr;
    int *end = arr + n - 1;
    int temp;

    while (start < end) {

        temp = *start;
        *start = *end;
        *end = temp;



        start++;
        end--;
    }
}

int main() {
    int n, i;



    printf("Enter the number of elements in the array: ");
```

```
scanf("%d", &n);


int arr[n];


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


printf("Original array: ");
for (i = 0; i < n; i++) {
   printf("%d ", arr[i]);
}
printf("\n");


reverseArray(arr, n);


printf("Reversed array: ");
for (i = 0; i < n; i++) {
   printf("%d ", arr[i]);
}
printf("\n");
```

```
    return 0;
}
```

Output:

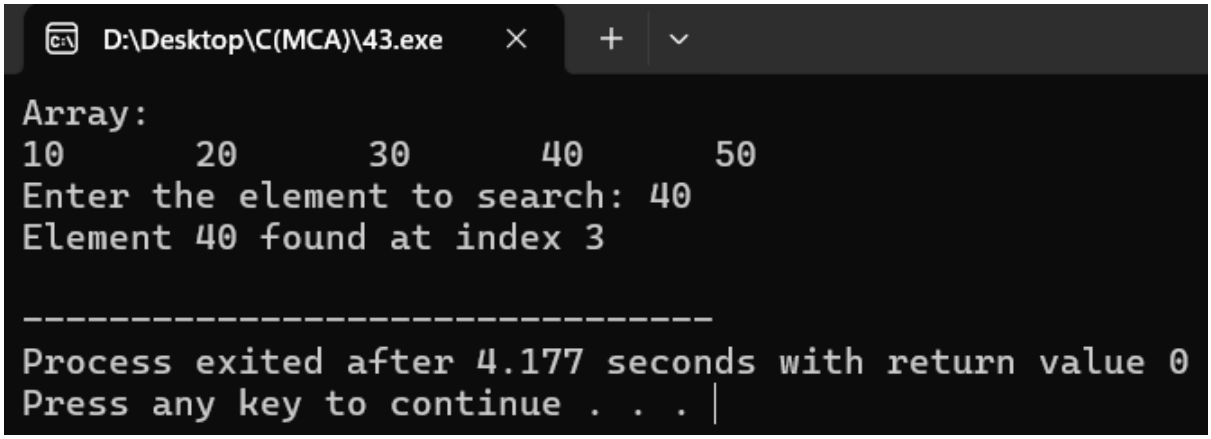


/*Write a program to search an element in array using pointers.*/

```
#include <stdio.h>


int main()
{
   int arr[] = {10, 20, 30, 40, 50};
   int size = sizeof(arr) / sizeof(arr[0]); // Calculate the size of the array
   int *ptr = arr; // Pointer to the first element of the array
   int searchElement, found = 0;
   printf("Array:\n");
   for (int i = 0; i < size; i++) {
      printf("%d\t",arr[i]);
      }
```

```
    // Ask the user for the element to search
    printf("\nEnter the element to search: ");
    scanf("%d", &searchElement);

    // Search for the element using pointer
    for (int i = 0; i < size; i++) {
        if (*(ptr + i) == searchElement) { // Dereferencing pointer
            printf("Element %d found at index %d\n", searchElement,
i);
            found = 1;
            break;
        }
    }
    // If the element is not found
    if (!found) {
        printf("Element %d not found in the array.\n",
searchElement);
    }
    return 0;
}
```

Output:



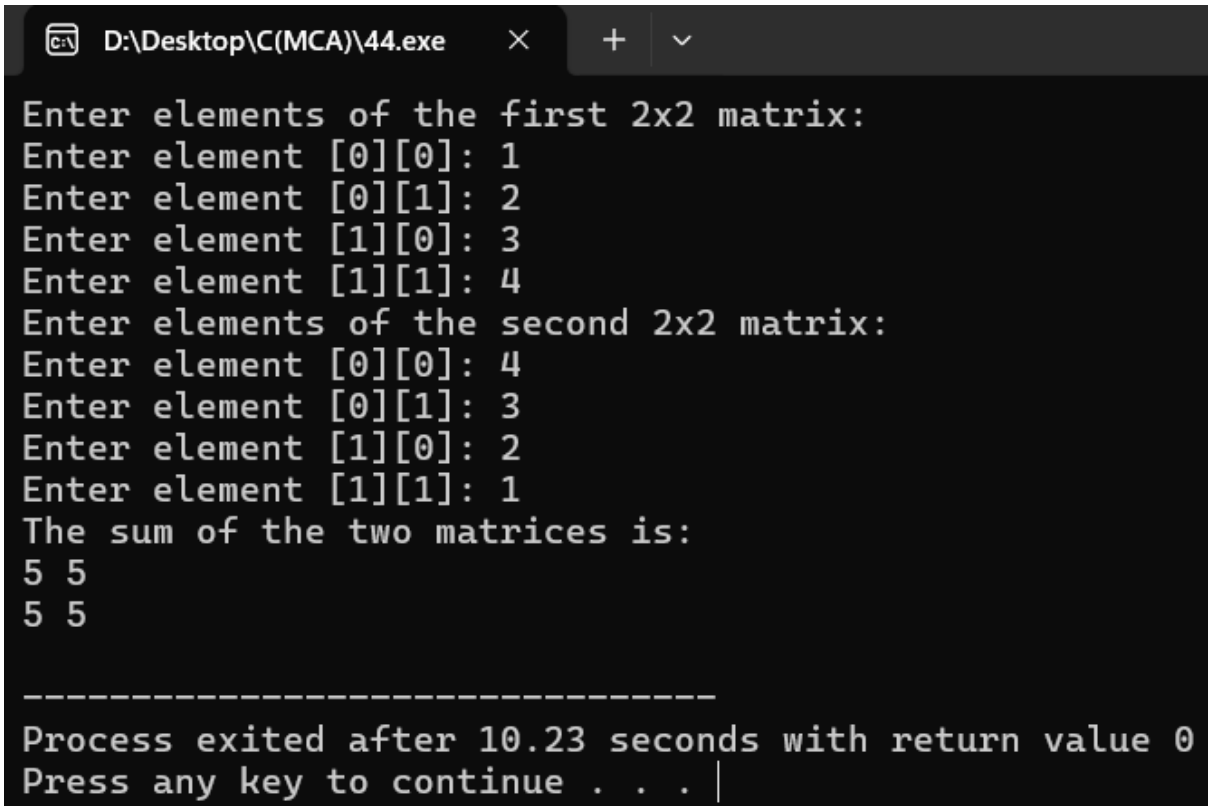
/*Write a program to add two 2 X 2 matrix using pointers.*/

```
#include <stdio.h>


int main() {
   // Declare two 2x2 matrices and the result matrix
   int matrix1[2][2], matrix2[2][2], result[2][2];
   int *ptr1, *ptr2, *ptr_result;

   // Set pointers to point to the first element of the matrices
   ptr1 = &matrix1[0][0];
   ptr2 = &matrix2[0][0];
   ptr_result = &result[0][0];

   // Input elements for the first matrix
   printf("Enter elements of the first 2x2 matrix:\n");
   for (int i = 0; i < 2; i++) {
      for (int j = 0; j < 2; j++) {
         printf("Enter element [%d][%d]: ", i, j);
         scanf("%d", (ptr1 + i * 2 + j));  // Accessing matrix using pointer arithmetic
      }
```

```
    }

    // Input elements for the second matrix
    printf("Enter elements of the second 2x2 matrix:\n");
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            printf("Enter element [%d][%d]: ", i, j);
            scanf("%d", (ptr2 + i * 2 + j));  // Accessing matrix using pointer arithmetic
        }
    }

    // Adding the two matrices and storing the result
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            *(ptr_result + i * 2 + j) = *(ptr1 + i * 2 + j) + *(ptr2 + i * 2 + j); // Pointer addition
        }
    }

    // Display the result
    printf("The sum of the two matrices is:\n");
    for (int i = 0; i < 2; i++) {
        for (int j = 0; j < 2; j++) {
            printf("%d ", *(ptr_result + i * 2 + j));  // Accessing the result matrix using pointer
        }
        printf("\n");
```

```
    }

    return 0;
}
```

Output:



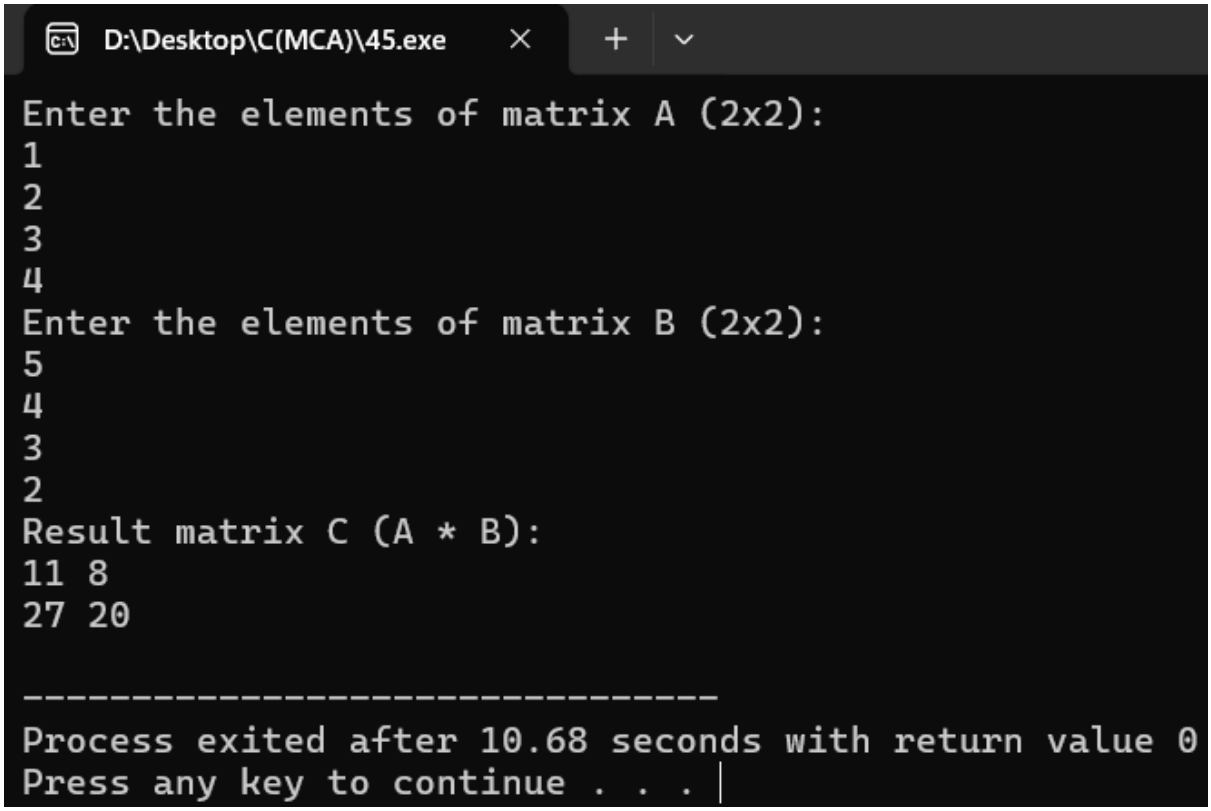
/*Write a program to multiply two 2 X 2 matrix using pointers*/

```
#include <stdio.h>

int main() {
    int A[2][2], B[2][2], C[2][2];
    int *pA = &A[0][0];  // Pointer to the first element of matrix A
    int *pB = &B[0][0];  // Pointer to the first element of matrix B
```

```
int *pC = &C[0][0];  // Pointer to the first element of matrix C

// Input elements for matrix A
printf("Enter the elements of matrix A (2x2):\n");
for (int i = 0; i < 2; i++) {
   for (int j = 0; j < 2; j++) {
      scanf("%d", pA++);
   }
}

// Input elements for matrix B
printf("Enter the elements of matrix B (2x2):\n");
for (int i = 0; i < 2; i++) {
   for (int j = 0; j < 2; j++) {
      scanf("%d", pB++);
   }
}

// Matrix multiplication (C = A * B)
pA = &A[0][0];  // Reset pointer to the start of matrix A
pB = &B[0][0];  // Reset pointer to the start of matrix B

for (int i = 0; i < 2; i++) {
   for (int j = 0; j < 2; j++) {
      *(pC + i * 2 + j) = 0; // Initialize the result matrix
      for (int k = 0; k < 2; k++) {
         *(pC + i * 2 + j) += *(pA + i * 2 + k) * *(pB + k * 2 + j);
```

```
        }
      }
    }

    // Display the result matrix
    printf("Result matrix C (A * B):\n");
    for (int i = 0; i < 2; i++) {
      for (int j = 0; j < 2; j++) {
        printf("%d ", *(pC + i * 2 + j));
      }
      printf("\n");
    }

    return 0;
}
```

Output:

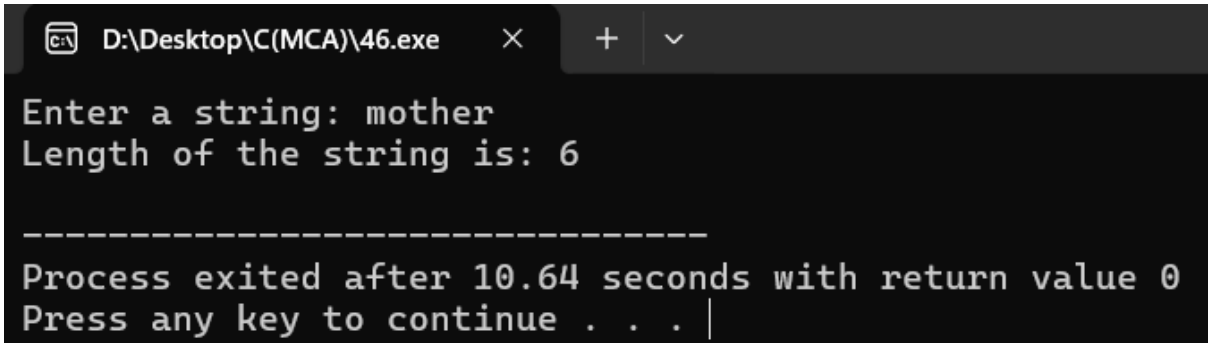


/*Write a program to find length of string using pointers*/

```
#include <stdio.h>

int main() {
    char str[100];
    char *ptr;
    int length = 0;

    // Taking input from the user
    printf("Enter a string: ");
    gets(str);

    // Pointer initialization
    ptr = str;
```

```
    // Traverse the string until the null-terminator is found
    while (*ptr != '\0') {
        length++;
        ptr++;  // Move to the next character
    }

    // Output the length of the string
    printf("Length of the string is: %d\n", length);

    return 0;
}
```

Output:

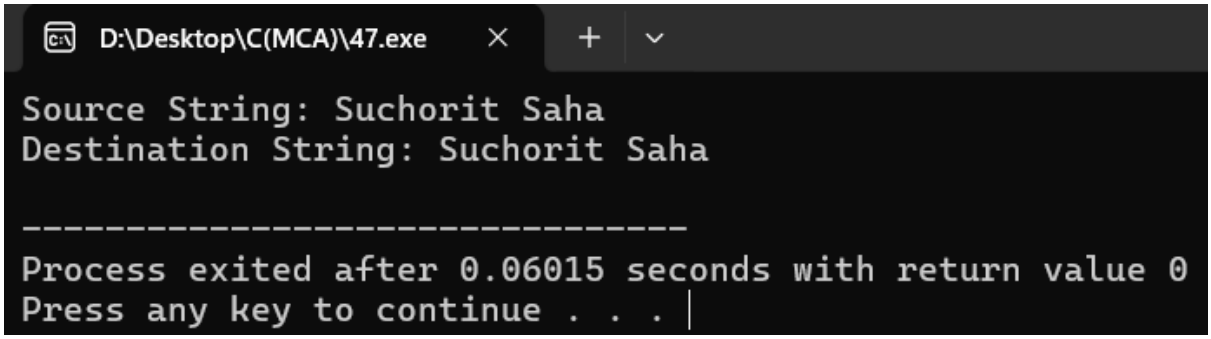


/*Write a program to copy one string to another using pointer.*/

```
#include <stdio.h>

int main() {
    char source[] = "Suchorit Saha";  // Source string
    char destination[50];  // Destination string (large enough to hold the copied string)

    // Pointer to source and destination
```

```
    char *src = source;
    char *dest = destination;

    // Copying each character from source to destination using pointers
    while (*src != '\0') {
        *dest = *src;  // Copy character from source to destination
        src++;        // Move the source pointer to the next character
        dest++;       // Move the destination pointer to the next position
    }

    *dest = '\0';  // Null-terminate the destination string

    // Print both strings to verify the copy
    printf("Source String: %s\n", source);
    printf("Destination String: %s\n", destination);

    return 0;
}
```

Output:

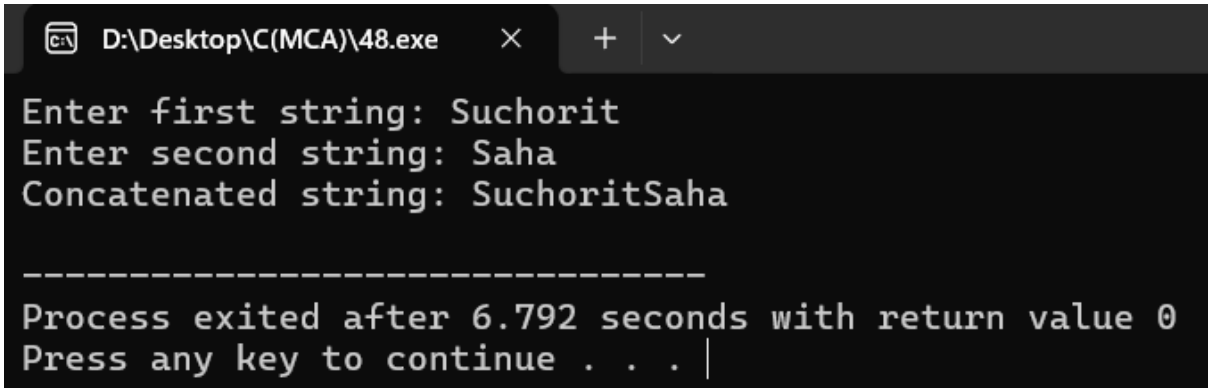


/*Write a program to concatenate two strings using pointers*/

```
#include <stdio.h>

void concatenateStrings(char *str1, char *str2) {
   // Move the pointer 'str1' to the end of the first string
   while (*str1 != '\0') {
      str1++;  // Increment the pointer to the next character
   }

   // Now, copy the characters of str2 to the end of str1
   while (*str2 != '\0') {
      *str1 = *str2;  // Copy the character from str2 to str1
      str1++;         // Move the pointer in str1
      str2++;         // Move the pointer in str2
   }

   //  add the null terminator at the end of the concatenated string
   *str1 = '\0';
}

int main() {
   char str1[100], str2[50];

   // Input two strings
   printf("Enter first string: ");
   gets(str1);

   printf("Enter second string: ");
```

```
    gets(str2);


    // Concatenate the strings using pointers
    concatenateStrings(str1, str2);

    // Print the concatenated result
    printf("Concatenated string: %s\n", str1);

    return 0;
}
```

Output:



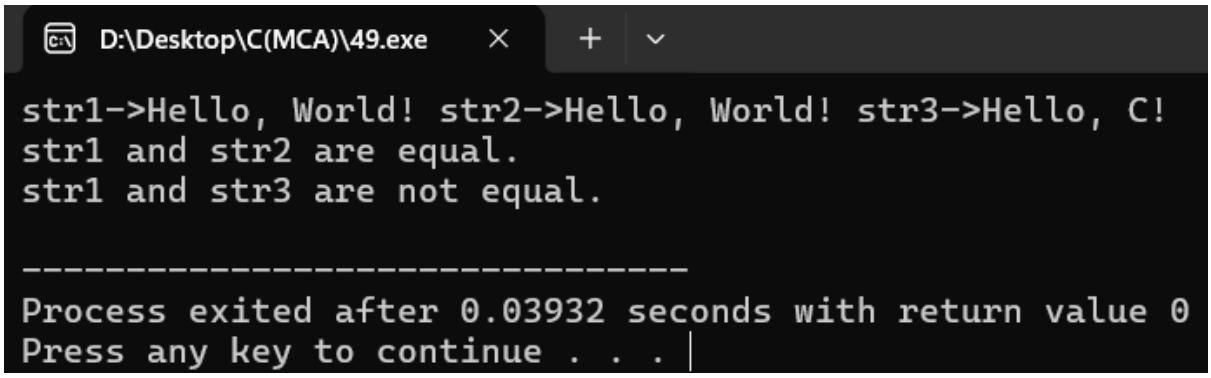
/*Write a program to compare two strings using pointers*/

```
#include <stdio.h>

int compareStrings(const char *str1, const char *str2) {
    // Loop through both strings using pointers
    while (*str1 != '\0' && *str2 != '\0') {
        if (*str1 != *str2) {
```

```
            return 0;  // Strings are not equal
        }
        str1++;
        str2++;
    }

    // Check if both strings are of the same length
    if (*str1 == '\0' && *str2 == '\0') {
        return 1;  // Strings are equal
    }

    return 0;  // Strings are not equal, one string is longer
}

int main() {
    char str1[] = "Hello, World!";
    char str2[] = "Hello, World!";
    char str3[] = "Hello, C!";

         printf("str1->%s str2->%s str3->%s",str1,str2,str3);
    if (compareStrings(str1, str2)) {
        printf("\nstr1 and str2 are equal.\n");
    } else {
        printf("str1 and str2 are not equal.\n");
    }

    if (compareStrings(str1, str3)) {
```

```
        printf("str1 and str3 are equal.\n");
    } else {
        printf("str1 and str3 are not equal.\n");
    }

    return 0;
}
```

Output:



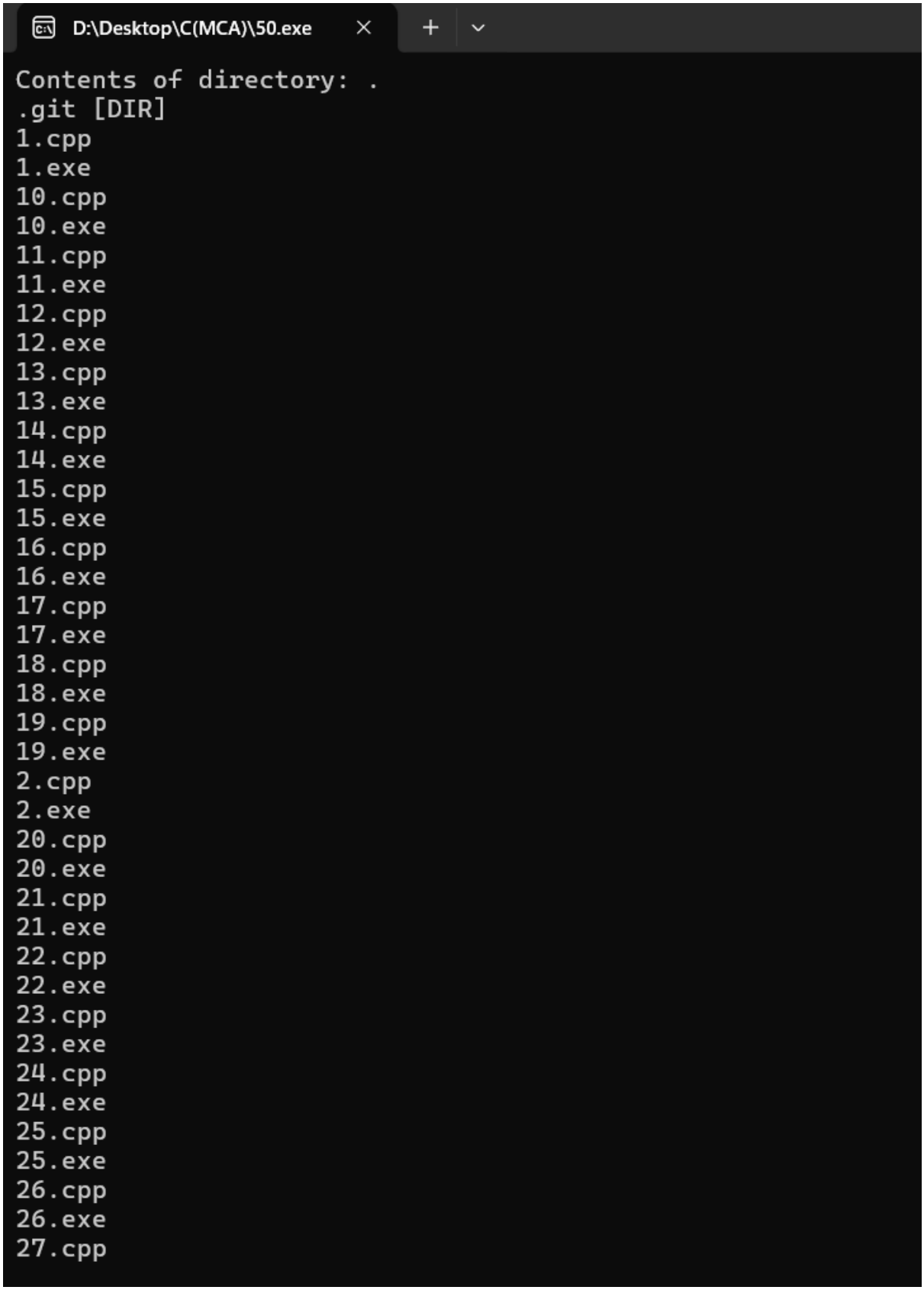
/*C Program to list all files and sub-directories in a directory*/

```
#include <stdio.h>
#include <stdlib.h>
#include <dirent.h> // For directory functions
#include <sys/stat.h> // For file status

void listDirectory(const char *path) {
    struct dirent *entry;
    DIR *dir = opendir(path);

    if (dir == NULL) {
        perror("Unable to read directory");
        return;
```

```
    }

    printf("Contents of directory: %s\n", path);
    while ((entry = readdir(dir)) != NULL) {
        // Skip the current and parent directory entries
        if (entry->d_name[0] == '.' &&
            (entry->d_name[1] == '\0' || (entry->d_name[1] == '.' &&
entry->d_name[2] == '\0'))) {
            continue;
        }

        // Print the name of the file or directory
        printf("%s", entry->d_name);

        // Check if it's a directory
        struct stat fileStat;
        char fullPath[1024];
        snprintf(fullPath, sizeof(fullPath), "%s/%s", path, entry-
>d_name);

        if (stat(fullPath, &fileStat) == 0 && S_ISDIR(fileStat.st_mode))
{
            printf(" [DIR]");
        }
        printf("\n");
    }

    closedir(dir);
```

```
}

int main(int argc, char *argv[]) {
    const char *path;

    if (argc > 1) {
        path = argv[1]; // Use user-provided path
    } else {
        path = "."; // Default to current directory
    }

    listDirectory(path);

    return 0;
}
```

Output:

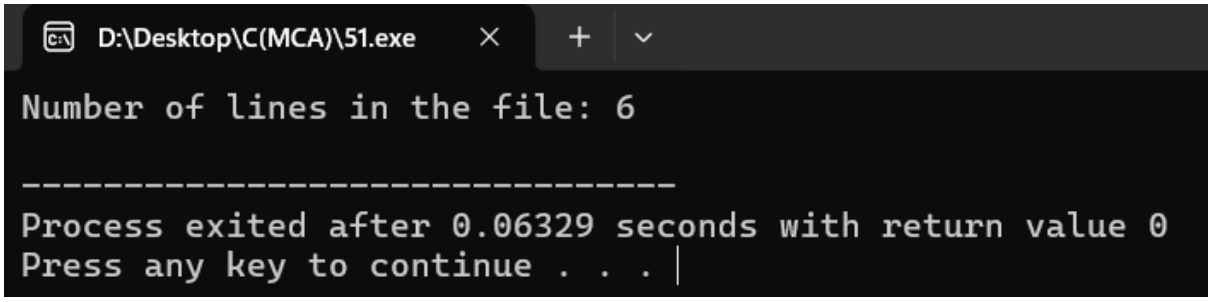


/*C Program to count number of lines in a file*/

```
#include <stdio.h>

int main() {
   FILE *file;
   char ch;
   int line_count = 1;

   // Open the file in read mode
   file = fopen("example.txt", "r");

   if (file == NULL) {
      // Check if the file was opened successfully
      printf("Error opening file.\n");
      return 1;
   }

   // Read the file character by character
   while ((ch = fgetc(file)) != EOF) {
      if (ch == '\n') {
         line_count++;  // Increment the line count whenever a newline character is encountered
      }
   }

   // Close the file
   fclose(file);
```

```
    printf("Number of lines in the file: %d\n", line_count);

    return 0;
}
```

Output:

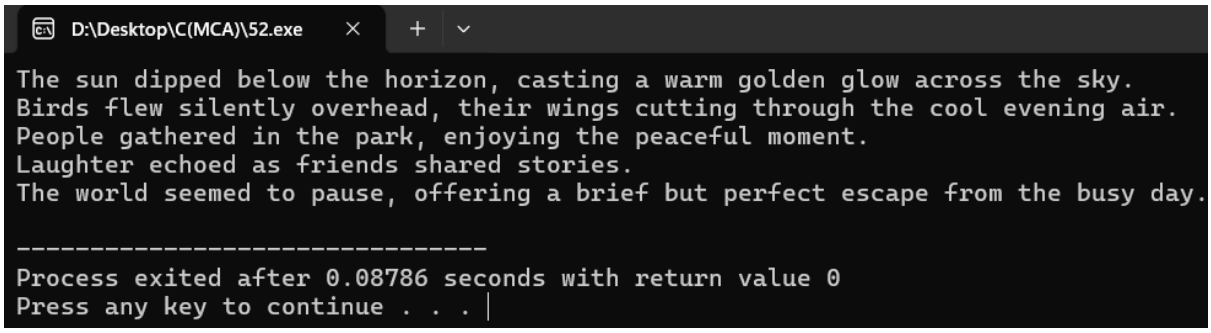


/*C Program to print contents of file*/

```
#include <stdio.h>

int main() {
    FILE *file;
    char ch;

    // Open the file in read mode
    file = fopen("example.txt", "r");

    // Check if file opened successfully
    if (file == NULL) {
        printf("Could not open the file.\n");
        return 1;
    }

    // Read and print the content of the file character by character
```

```
    while ((ch = fgetc(file)) != EOF) {
        putchar(ch);
    }

    // Close the file after reading
    fclose(file);

    return 0;
}
```

Output:

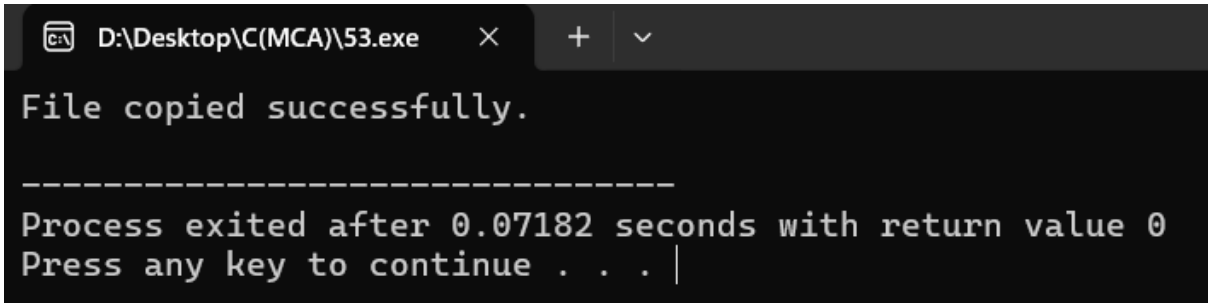


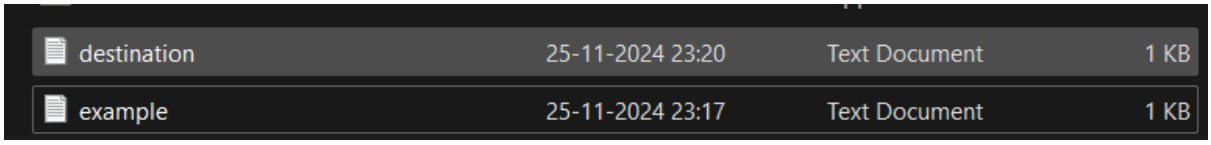
/*C Program to copy contents of one file to another file*/

```
#include <stdio.h>

int main() {
    FILE *sourceFile, *destinationFile;
    char ch;

    // Open the source file in read mode
    sourceFile = fopen("example.txt", "r");
    if (sourceFile == NULL) {
        printf("Error opening source file.\n");
```

```
        return 1;
    }

    // Open the destination file in write mode
    destinationFile = fopen("destination.txt", "w");
    if (destinationFile == NULL) {
        printf("Error opening destination file.\n");
        fclose(sourceFile);  // Don't forget to close the source file before returning
        return 1;
    }

    // Read each character from the source file and write it to the destination file
    while ((ch = fgetc(sourceFile)) != EOF) {
        fputc(ch, destinationFile);
    }

    printf("File copied successfully.\n");

    // Close both files
    fclose(sourceFile);
    fclose(destinationFile);

    return 0;
}
```

Output:





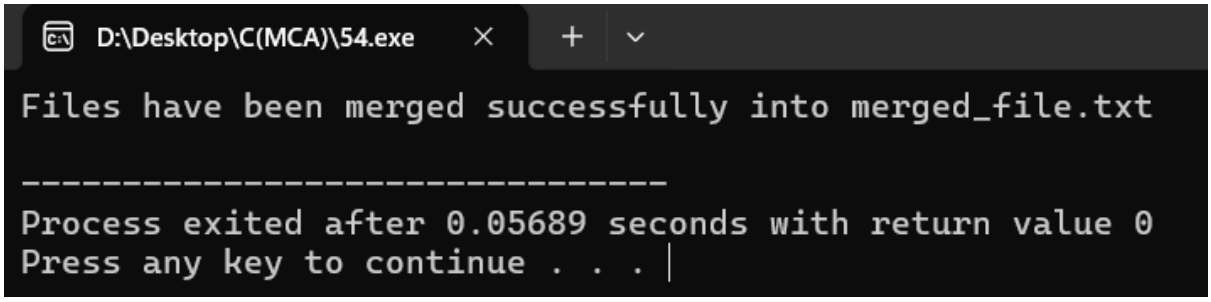
/*C Program to merge contents of two files into a third file*/

```
#include <stdio.h>

int main() {
   FILE *file1, *file2, *file3;
   char ch;

   // Open the first file in read mode
   file1 = fopen("example.txt", "r");
   if (file1 == NULL) {
      printf("Could not open file1.txt\n");
      return 1;
   }

   // Open the second file in read mode
   file2 = fopen("destination.txt", "r");
   if (file2 == NULL) {
      printf("Could not open file2.txt\n");
      fclose(file1);
```

```
    return 1;
  }

  // Open the third file in write mode (creates or overwrites)
  file3 = fopen("merged_file.txt", "w");
  if (file3 == NULL) {
    printf("Could not open merged_file.txt\n");
    fclose(file1);
    fclose(file2);
    return 1;
  }

  // Copy contents of the first file to the third file
  while ((ch = fgetc(file1)) != EOF) {
    fputc(ch, file3);
  }

  // Copy contents of the second file to the third file
  while ((ch = fgetc(file2)) != EOF) {
    fputc(ch, file3);
  }

  printf("Files have been merged successfully into
merged_file.txt\n");

  // Close all the files
  fclose(file1);
  fclose(file2);
```

```
    fclose(file3);

    return 0;
}
```

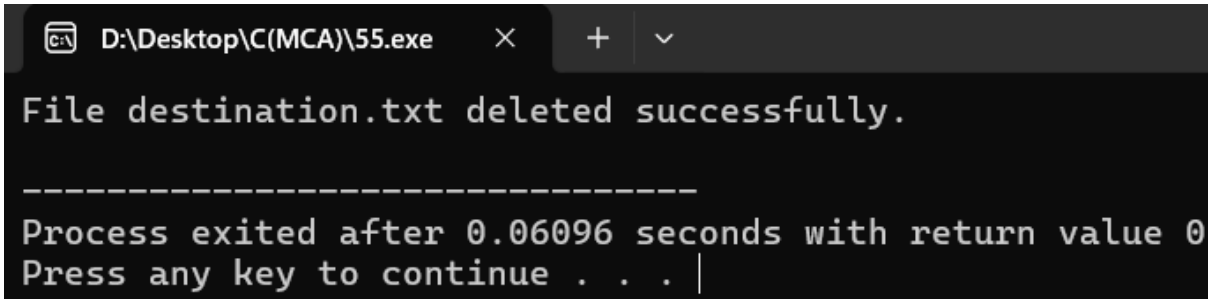
Output:



/*. C program to delete a file*/

```
#include <stdio.h>

int main() {
    const char *filename = "destination.txt";  // Specify the file you want to delete

    // Attempt to delete the file
    if (remove(filename) == 0) {
        printf("File %s deleted successfully.\n", filename);
    } else {
        printf("Error occured in deleting the file %s.\n", filename);
    }

    return 0;
}
```

Output:


D:\Desktop\C(MCA)\55.exe
File destination.txt deleted successfully.

Process exited after 0.06096 seconds with return value 0
Press any key to continue . . .