DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Lab Code: PROGRAMMING FUNDAMENTALS

Lab File

Submitted To: **Submitted By:**

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Science and Engineering

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EXPERIMENT 1

AIM: Write a C program to find sum and average of two numbers.

CODE:
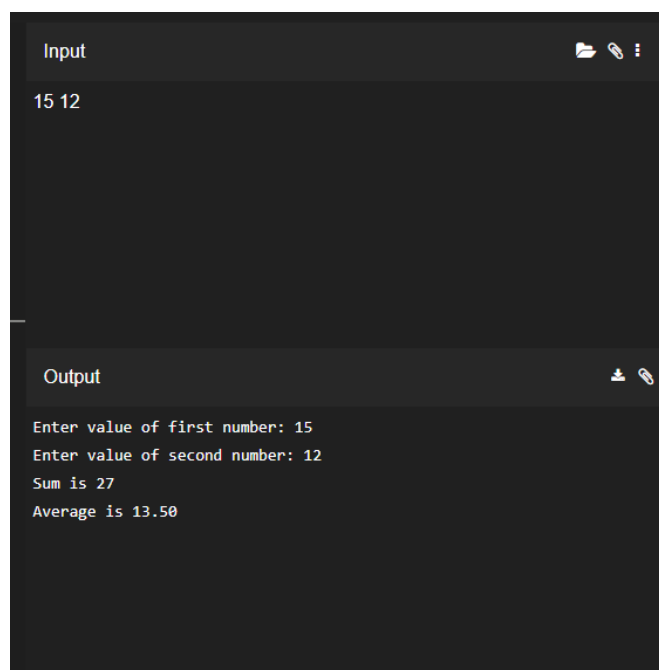
```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x,y,sum;
    printf("Enter value of first number:");
    scanf("%d",&x);
    printf(" %d\n",x); //this printf used only when using online IDE

    printf("Enter value of second number:");
    scanf("%d",&y);
    printf(" %d\n",y); //this printf used only when using online IDE

    sum=x+y;
    float average= (float)sum/2;
    printf("Sum is %d \nAverage is %.2f",sum,average);
    return 0;
}
```

OUTPUT:

Input

15 12

Output

Enter value of first number: 15
Enter value of second number: 12
Sum is 27
Average is 13.50

EXPERIMENT 2

AIM: Write a C program to find the greatest of 10 numbers.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int n1,n2,n3,n4,n5,n6,n7,n8,n9,n10;
    printf("Enter value of 1st no.: ");
    scanf("%d",&n1);
    printf("Enter value of 2nd no.: ");
    scanf("%d",&n2);
    printf("Enter value of 3rd no.: ");
    scanf("%d",&n3);
    printf("Enter value of 4th no.: ");
    scanf("%d",&n4);
    printf("Enter value of 5th no.: ");
    scanf("%d",&n5);
    printf("Enter value of 6th no.: ");
    scanf("%d",&n6);
    printf("Enter value of 7th no.: ");
    scanf("%d",&n7);
    printf("Enter value of 8th no.: ");
    scanf("%d",&n8);
    printf("Enter value of 9th no.: ");
    scanf("%d",&n9);
    printf("Enter value of 10th no.: ");
    scanf("%d",&n10);
    printf("\n");

    if(n1>=n2 && n1>=n3 && n1>=n4 && n1>=n5 && n1>=n6 && n1>=n7 && n1>=n8 && n1>=n9 && n1>=n10)
    printf("Highest of the numbers is %d",n1);
    else if(n2>=n1 && n2>=n3 && n2>=n4 && n2>=n5 && n2>=n6 && n2>=n7 && n2>=n8 && n2>=n9 && n2>=n10)
    printf("Highest of the numbers is %d",n2);
    else if(n3>=n1 && n3>=n2 && n3>=n4 && n3>=n5 && n3>=n6 && n3>=n7 && n3>=n8 && n3>=n9 && n3>=n10)
    printf("Highest of the numbers is %d",n3);
    else if(n4>=n1 && n4>=n2 && n4>=n3 && n4>=n5 && n4>=n6 && n4>=n7 && n4>=n8 && n4>=n9 && n4>=n10)
    printf("Highest of the numbers is %d",n4);
    else if(n5>=n1 && n5>=n2 && n5>=n3 && n5>=n4 && n5>=n6 && n5>=n7 && n5>=n8 && n5>=n9 && n5>=n10)
    printf("Highest of the numbers is %d",n5);
    else if(n6>=n1 && n6>=n2 && n6>=n3 && n6>=n4 && n6>=n5 && n6>=n7 && n6>=n8 && n6>=n9 && n6>=n10)
```

```c
    printf("Highest of the numbers is %d",n6);
    else if(n7>=n1 && n7>=n2 && n7>=n3 && n7>=n4 && n7>=n5 && n7>=n6 && n7>=n8 && n7>=n9 && n7>=n10)
    printf("Highest of the numbers is %d",n7);
    else if(n8>=n1 && n8>=n2 && n8>=n3 && n8>=n4 && n8>=n5 && n8>=n6 && n8>=n7 && n8>=n9 && n8>=n10)
    printf("Highest of the numbers is %d",n8);
    else if(n9>=n1 && n9>=n2 && n9>=n3 && n9>=n4 && n9>=n5 && n9>=n6 && n9>=n7 && n9>=n8 && n9>=n10)
    printf("Highest of the numbers is %d",n9);
    else if(n10>=n1 && n10>=n2 && n10>=n3 && n10>=n4 && n10>=n5 && n10>=n6 && n10>=n7 && n10>=n8 && n10>=n9)
    printf("Highest of the numbers is %d",n10);
    printf("\n\n\n");
    return 0;
}
```

OUTPUT:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc greatest_of_10.c -o greatest_of_10 } ; if ($?) { .\greatest_of_10 }
Enter value of 1st no.: 5
Enter value of 2nd no.: 12
Enter value of 3rd no.: 45
Enter value of 4th no.: 7
Enter value of 5th no.: 15
Enter value of 6th no.: 26
Enter value of 7th no.: 42
Enter value of 8th no.: 35
Enter value of 9th no.: 38
Enter value of 10th no.: 28

Highest of the numbers is 45

PS G:\Codes\CO 102 Programs> 
```

EXPERIMENT 3

AIM: Write a C program to find Simple Interest.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    float p,t,r;
    printf("Enter the value of principle amount: ");
    scanf("%f",&p);
    printf("Enter the value of rate of interest: ");
    scanf("%f",&r);
    printf("Enter the number of years: ");
    scanf("%f",&t);

    float simple_interest = p*t*r/100.0;
    printf("Value of simple interest is %.2f\n\n\n",simple_interest);
    return 0;
}
```

OUTPUT:

```
PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Simple_interest.c -o Simple_interest } ; if ($?) { .\Simple_interest }
Enter the value of principle amount: 200
Enter the value of rate of interest: 25
Enter the number of years: 2
Value of simple interest is 100.00


PS G:\Codes\CO 102 Programs>
```

AIM: Write a C program to print the following pattern (triangle of stars)

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include <stdio.h>
int main()
{
    int rows,space;
    printf("Odd no. of Rows: ");
    scanf("%d",&rows);
    for(int i=1;i<=rows;i=i+2)
    {
        space=(rows-i)/2;
        for(int r=1;r<=rows;++r)
        {
            if(r<=space || r>(rows-space))
                printf(" ");
            else
                printf("*");
        }
        printf("\n");
    }
    return 0;
}
```

OUTPUT:

EXPERIMENT 5

AIM: Write a C program to find whether the entered number is prime.

CODE:
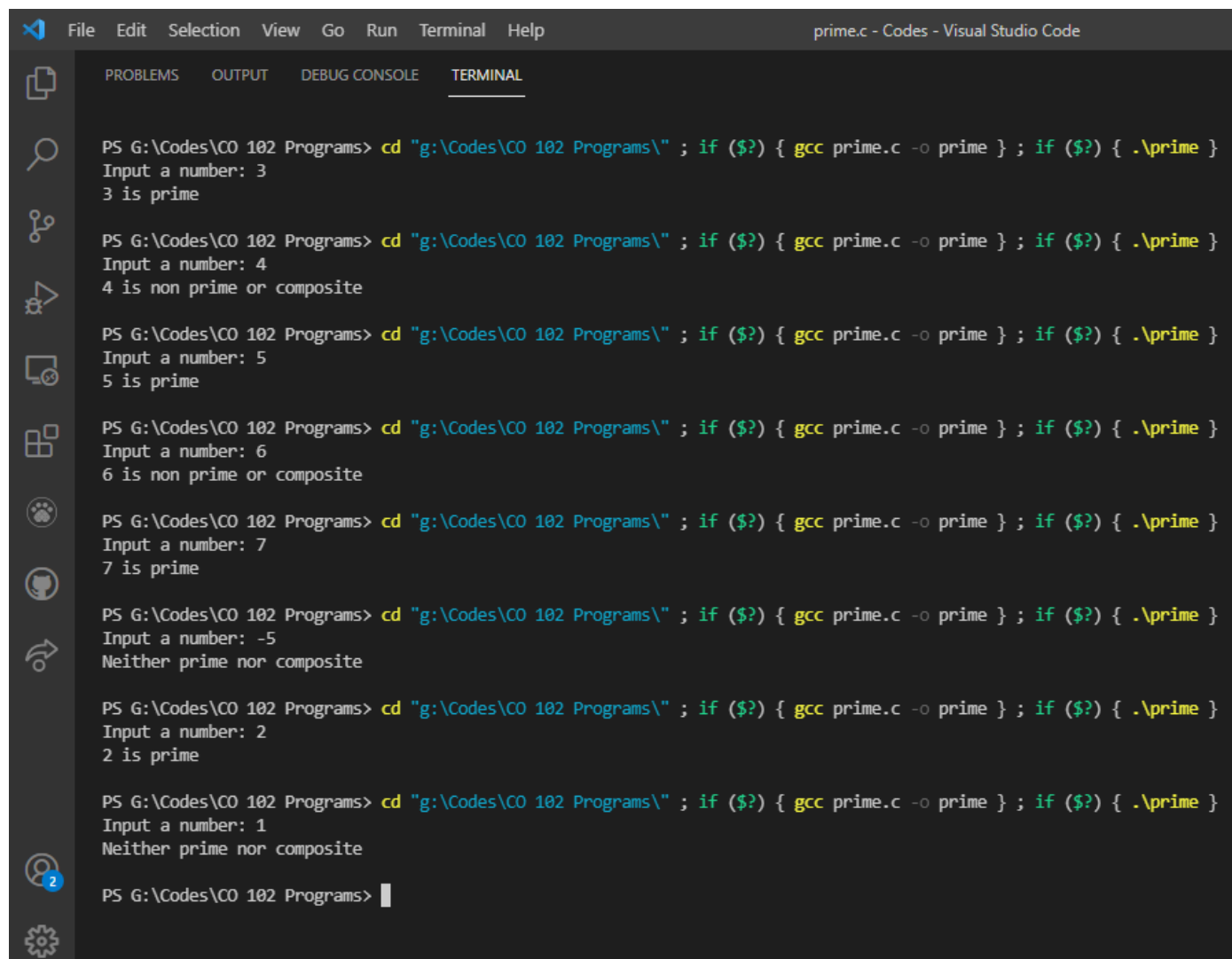
```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
#include<math.h>
int main()
{
    int n,count=0;
    printf("Input a number: ");
    scanf("%d",&n);
    if(n<=1)
    {
        printf("Neither prime nor composite\n\n");
        count=1;
    }

    for(int i=2;i<=sqrt(n) && count==0;++i)
    {
        if(n%i==0)
        {
            printf("%d is non prime or composite\n\n",n);
            count=1;
        }
    }

    if(count==0)
    {
        printf("%d is prime\n\n",n);
    }
    return 0;
}
```

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

```
PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 3
3 is prime

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 4
4 is non prime or composite

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 5
5 is prime

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 6
6 is non prime or composite

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 7
7 is prime

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: -5
Neither prime nor composite

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 2
2 is prime

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc prime.c -o prime } ; if ($?) { .\prime }
Input a number: 1
Neither prime nor composite

PS G:\Codes\CO 102 Programs>
```
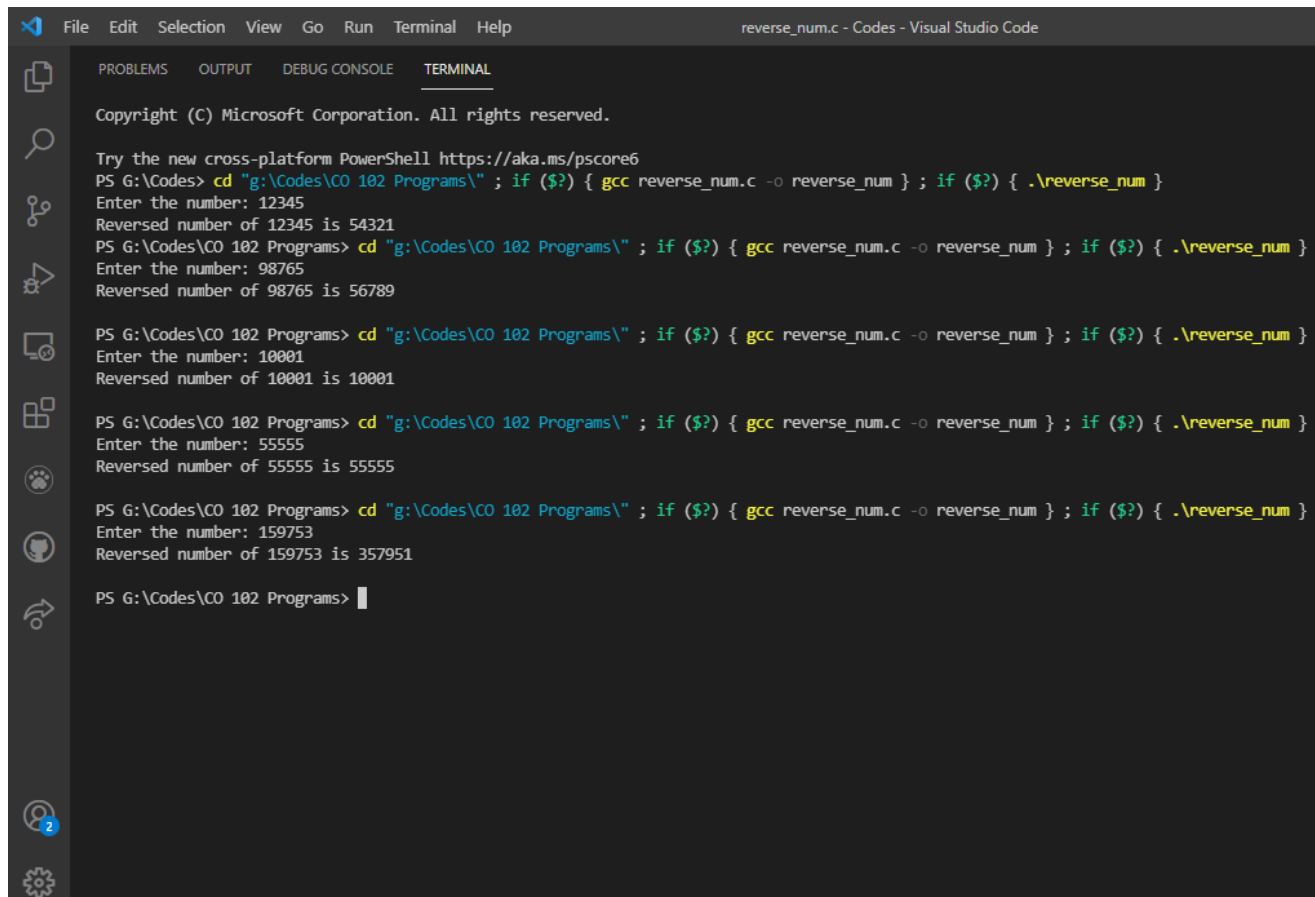
EXPERIMENT 6
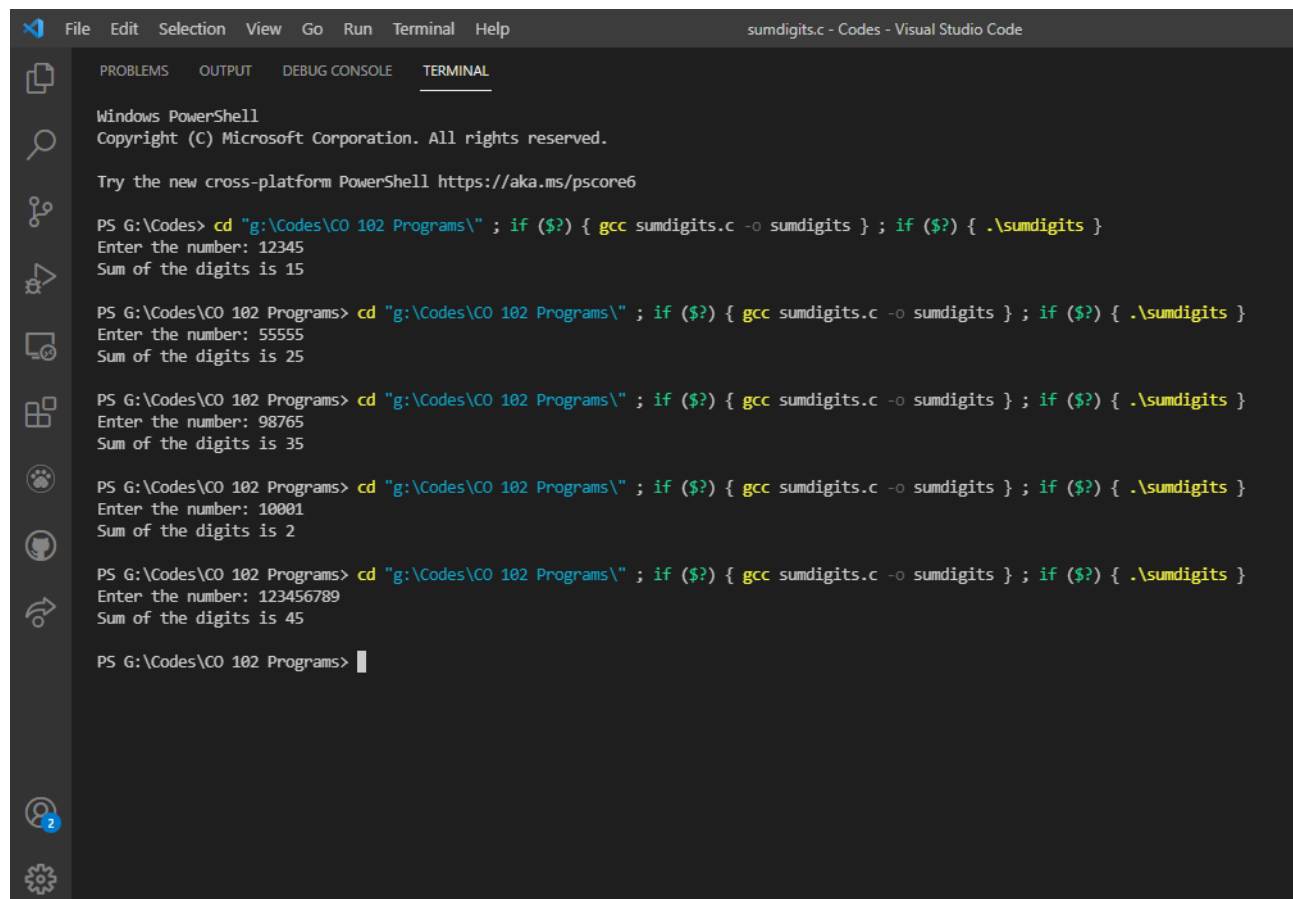
AIM: Write a C program to find the sum of a 5 digit number.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x;
    printf("Enter the number: ");
    scanf("%d",&x);
    int n=x,sum=0;
    while(n!=0)
    {
        sum=sum+n%10;
        n=n/10;
    }
    printf("Sum of the digits is %d\n\n",sum);
    return 0;
}
```

OUTPUT:

EXPERIMENT 7

AIM: Write a C program to reverse a 5 digit number.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x;
    printf("Enter the number: ");
    scanf("%d",&x);
    int n=x,rev=0;
    while(n!=0)
    {
        rev=(rev*10)+(n%10);
        n=n/10;
    }
    printf("Reversed number of %d is %d\n\n",x,rev);
    return 0;
}
```

OUTPUT:

EXPERIMENT 8

AIM: Write a C program to convert decimal to binary and vice versa.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    //Decimal to Binary Conversion

    int x,t,num,binary=0,a=1;
    printf("Enter the decimal number: ");
    scanf("%d",&x);
    printf("\n");
    num=x;

    while(num!=0)
    {
        t=num%2;
        num=(num-t)/2;
        if(t==1)
        {
            binary=binary+a;
            a=10*binary;
        }
        else if(t==0)
        {
            a=10*a;
        }
    }
    printf("Binary form of %d decimal is %d\n\n",x,binary);

    //Binary to Decimal conversion

    int pow=1,n=binary,deci=n%10;
    n=n/10;
    while(n!=0)
    {
        pow=pow*2;
        deci=deci+(n%10)*pow;
        n=n/10;
    }
    printf("Decimal value for %d binary is %d\n\n",binary,deci);

    return 0;
}
```
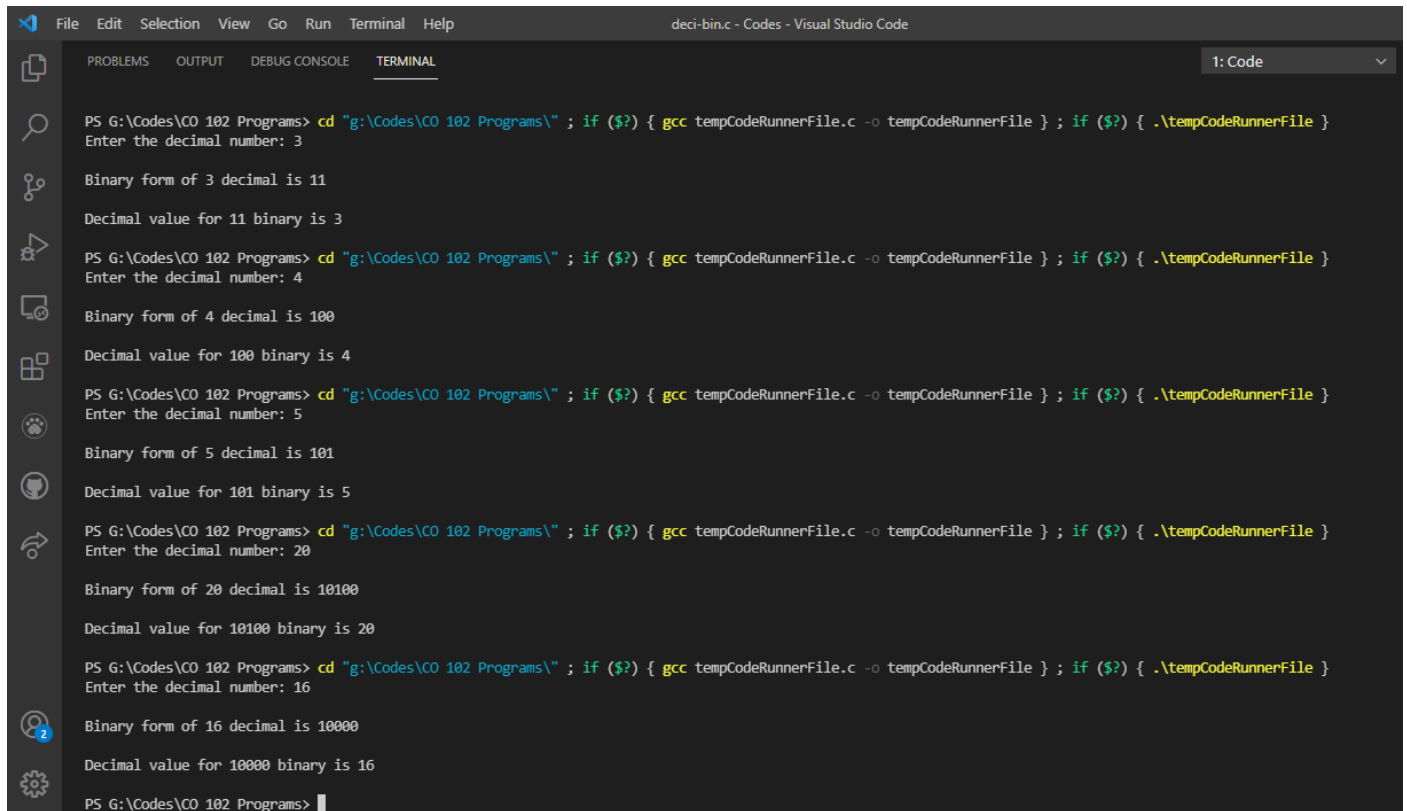
OUTPUT:


```
PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc tempCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
Enter the decimal number: 3

Binary form of 3 decimal is 11

Decimal value for 11 binary is 3

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc tempCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
Enter the decimal number: 4

Binary form of 4 decimal is 100

Decimal value for 100 binary is 4

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc tempCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
Enter the decimal number: 5

Binary form of 5 decimal is 101

Decimal value for 101 binary is 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc tempCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
Enter the decimal number: 20

Binary form of 20 decimal is 10100

Decimal value for 10100 binary is 20

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc tempCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
Enter the decimal number: 16

Binary form of 16 decimal is 10000

Decimal value for 10000 binary is 16

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 9

AIM: Write a C program to implement switch case statement.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int num;
    printf("Enter the marks out of 100: ");
    scanf("%d",&num);
    printf("\n");
    switch(num/10)
    {
    case 10:
        printf("Grade is E\n\n");
        break;
    case 9:
        printf("Grade is O\n\n");
        break;
    case 8:
        printf("Grade is A+\n\n");
        break;
    case 7:
        printf("Grade is A\n\n");
        break;
    case 6:
        printf("Grade is B\n\n");
        break;
    case 5:
        printf("Grade is C\n\n");
        break;
    case 4:
        printf("Grade is D\n\n");
        break;
    default:
        printf("Grade is F\n\n");
        break;
    }
    return 0;
}
```

OUTPUT:

```
PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 100

Grade is E

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 95

Grade is O

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 82

Grade is A+

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 76

Grade is A

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 41

Grade is D

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 39

Grade is F

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc switch.c -o switch } ; if ($?) { .\switch }
Enter the marks out of 100: 54

Grade is C
```
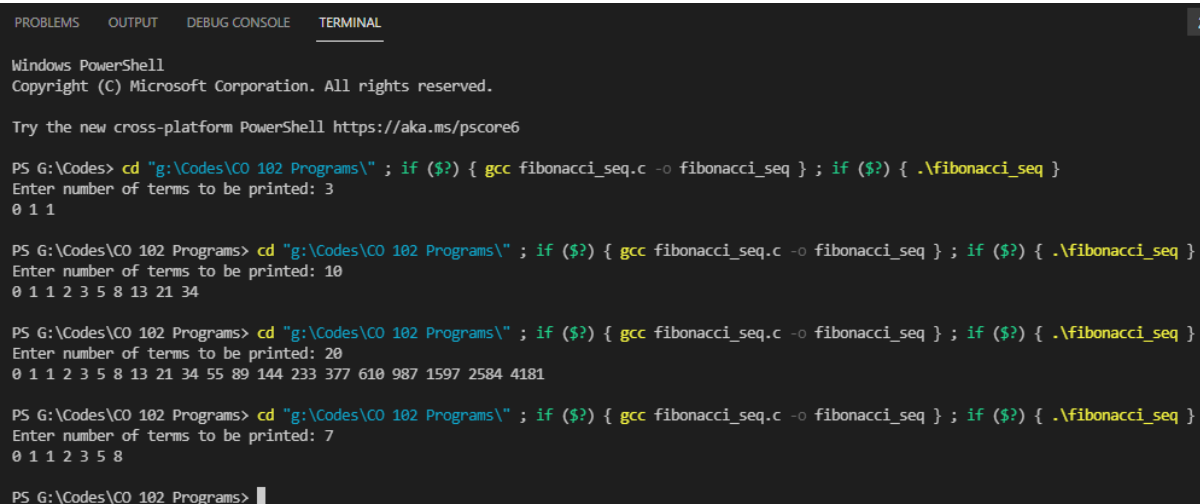
EXPERIMENT 10

AIM: Write a C program to generate the Fibonacci sequence.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x1=0,x2=1,n,x;
    printf("Enter number of terms to be printed: ");
    scanf("%d",&n);
    if(n>=1){printf("%d",x1);}
    if(n>=2){printf(" %d",x2);}
    for(int i=2;i<n;++i)
    {
        x=x2;
        x2=x2+x1;
        x1=x;
        printf(" %d",x2);
    }
    printf("\n\n");
    return 0;
}
```

OUTPUT:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL                                                                    2: Code              ∨

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc fibonacci_seq.c -o fibonacci_seq } ; if ($?) { .\fibonacci_seq }
Enter number of terms to be printed: 3
0 1 1

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc fibonacci_seq.c -o fibonacci_seq } ; if ($?) { .\fibonacci_seq }
Enter number of terms to be printed: 10
0 1 1 2 3 5 8 13 21 34

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc fibonacci_seq.c -o fibonacci_seq } ; if ($?) { .\fibonacci_seq }
Enter number of terms to be printed: 20
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc fibonacci_seq.c -o fibonacci_seq } ; if ($?) { .\fibonacci_seq }
Enter number of terms to be printed: 7
0 1 1 2 3 5 8

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 11
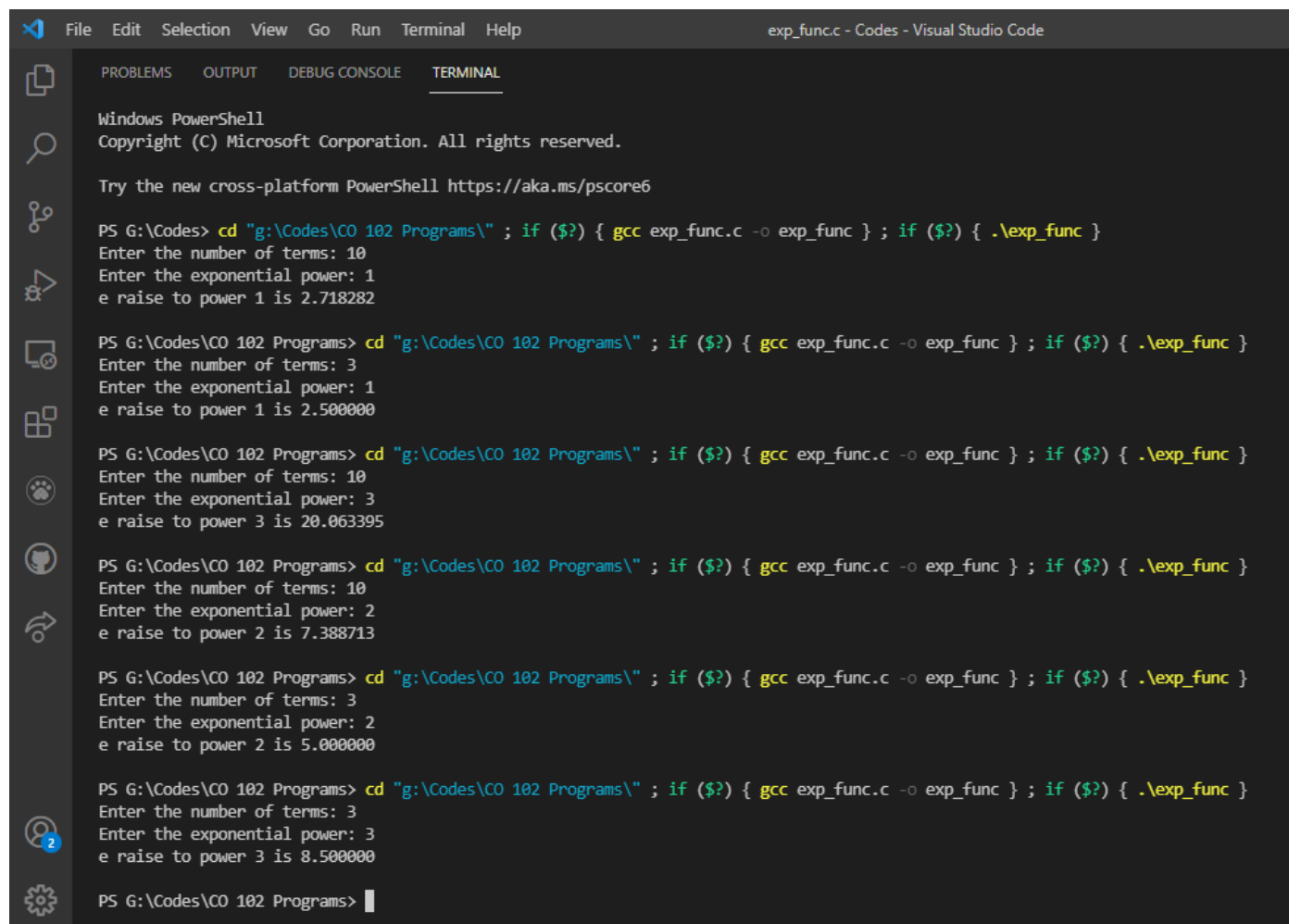
AIM: Write a C program to find exponential function.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int n,pow;
    printf("Enter the number of terms: ");
    scanf("%d",&n);
    printf("Enter the exponential power: ");
    scanf("%d",&pow);
    float x,num=1;
    for(int i=1;i<n;++i)
    {
        x=1;
        for(int r=1;r<=i;++r)
        {
            x=x*(float)pow/r;
        }
        num=num+x;
    }
    printf("e raise to power %d is %f\n\n",pow,num);
    return 0;
}
```

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 10
Enter the exponential power: 1
e raise to power 1 is 2.718282

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 3
Enter the exponential power: 1
e raise to power 1 is 2.500000

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 10
Enter the exponential power: 3
e raise to power 3 is 20.063395

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 10
Enter the exponential power: 2
e raise to power 2 is 7.388713

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 3
Enter the exponential power: 2
e raise to power 2 is 5.000000

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc exp_func.c -o exp_func } ; if ($?) { .\exp_func }
Enter the number of terms: 3
Enter the exponential power: 3
e raise to power 3 is 8.500000

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 12

AIM: Write a C program to search a number from an array using linear search.
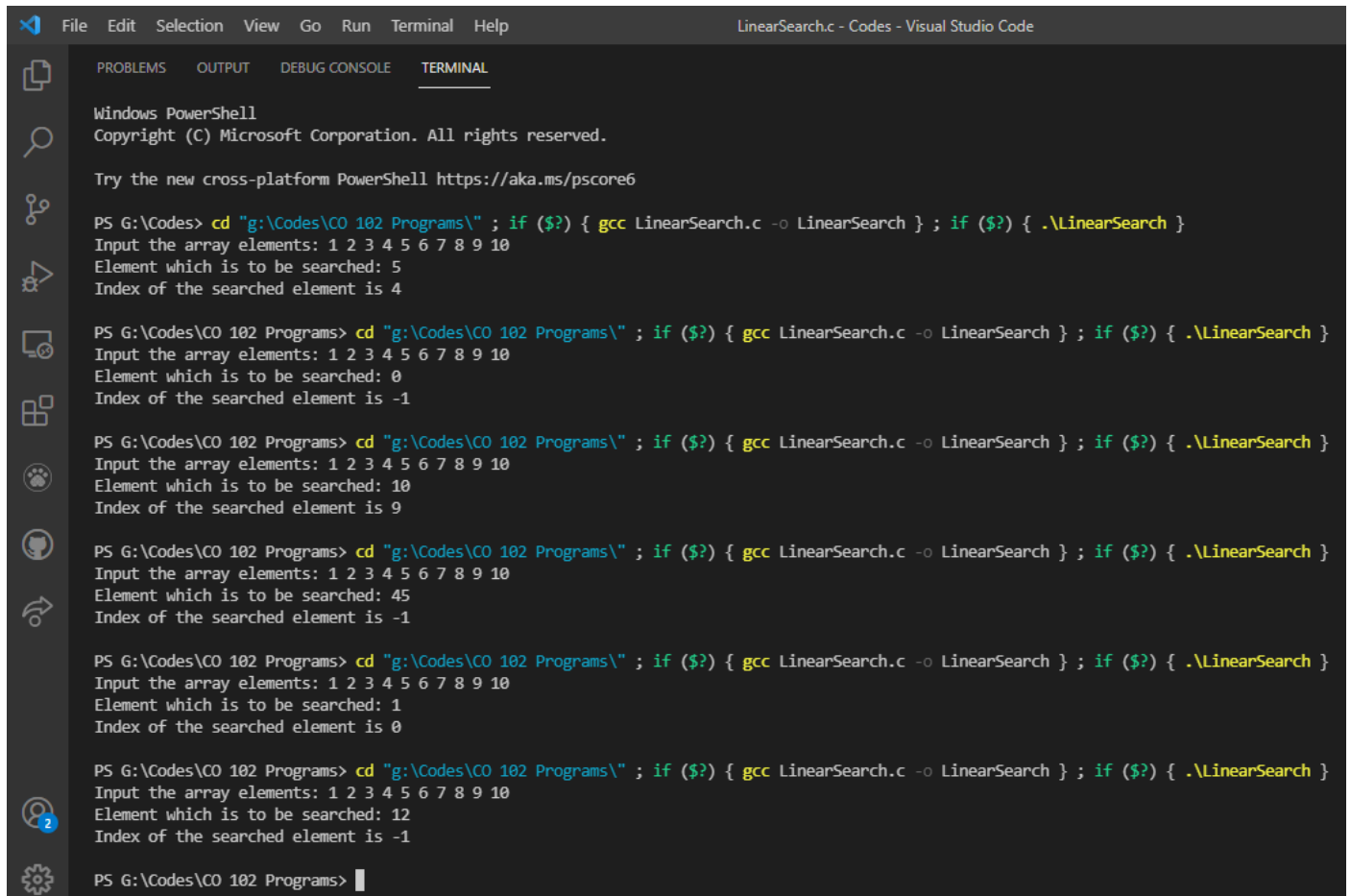
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x[10],y;
    printf("Input the array elements: ");
    for(int i=0;i<10;++i)
    {
        scanf("%d",x+i);
    }
    printf("Element which is to be searched: ");
    scanf("%d",&y);

    int result=-1;
    for(int i=0;i<10;++i)
    {
        if(x[i]==y)
        {
            result=i;
        }
    }
    printf("Index of the searched element is %d\n\n",result);
    return 0;
}
```

EXPERIMENT 13

AIM: Write a C program to search a number from an array using binary search.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x[100],y,n;
    printf("No. of elements in the array: ");
    scanf("%d",&n);
    printf("Input the array elements in increasing order: ");
    for(int i=0;i<n;++i)
    {
        scanf("%d",x+i);
    }
    printf("Element which is to be searched: ");
    scanf("%d",&y);

    int low=0,high=n-1;
    int mid,result=-1;
    while(low<=high)
    {
        mid=(low+high)/2;
        if(x[mid]==y)
        {
            result=mid;
            break;
        }
        if(x[mid]<y)
        {
            low=mid+1;
        }
        if(x[mid]>y)
        {
            high=mid-1;
        }
        if(low>high)
            break;
    }
    printf("Index of the searched element is %d\n\n",result);

    return 0;
}
```

OUTPUT:


```
File  Edit  Selection  View  Go  Run  Terminal  Help                    BinarySearch.c - Codes - Visual Studio Code

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 1
Index of the searched element is 0

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 10
Index of the searched element is 9

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 0
Index of the searched element is -1

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 11
Index of the searched element is -1

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 3
Index of the searched element is 2

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc BinarySearch.c -o BinarySearch } ; if ($?) { .\BinarySearch }
No. of elements in the array: 10
Input the array elements in increasing order: 1 2 3 4 5 6 7 8 9 10
Element which is to be searched: 7
Index of the searched element is 6
```

EXPERIMENT 14

AIM: Write a C program to sort an array using Bubble sort.
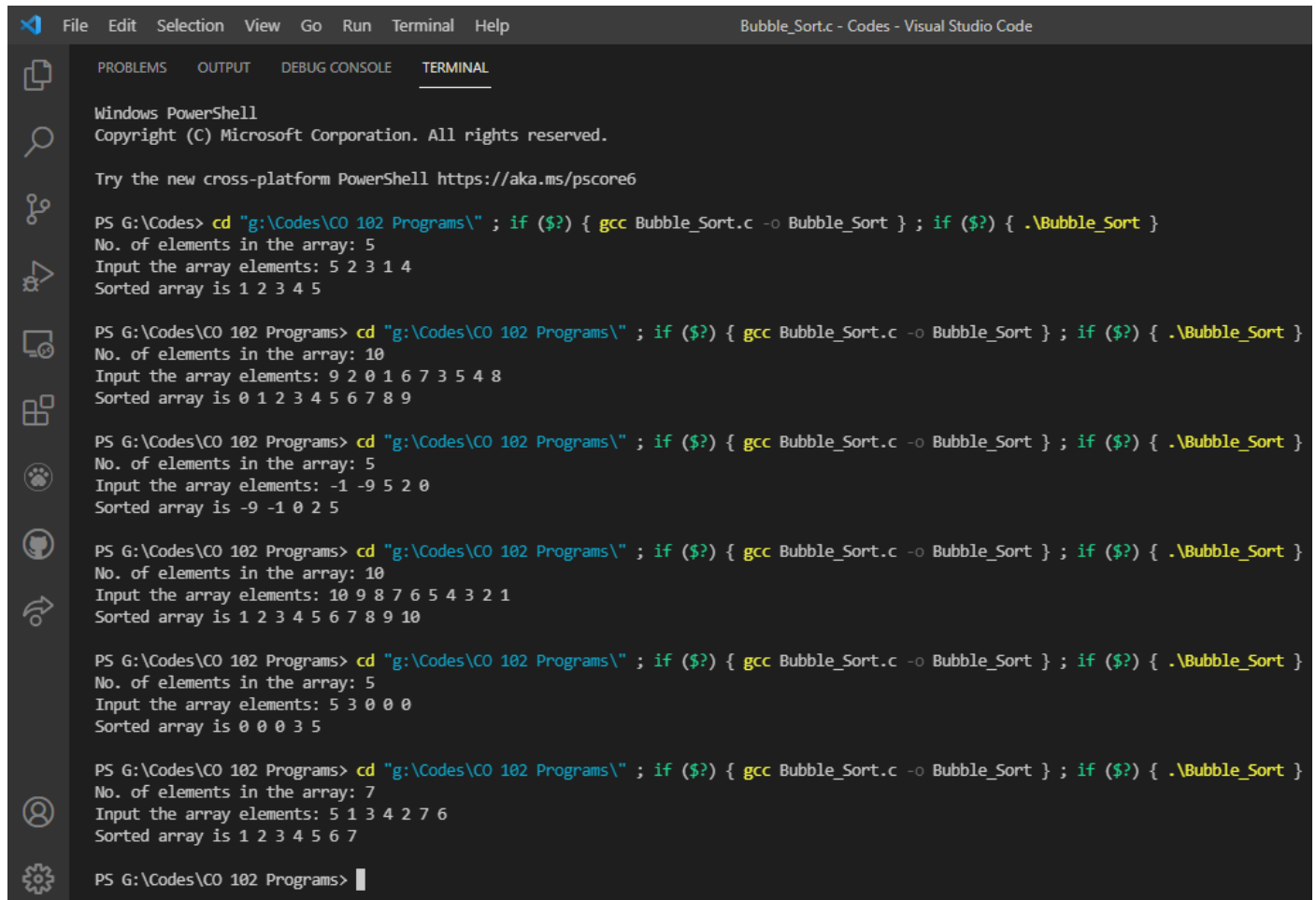
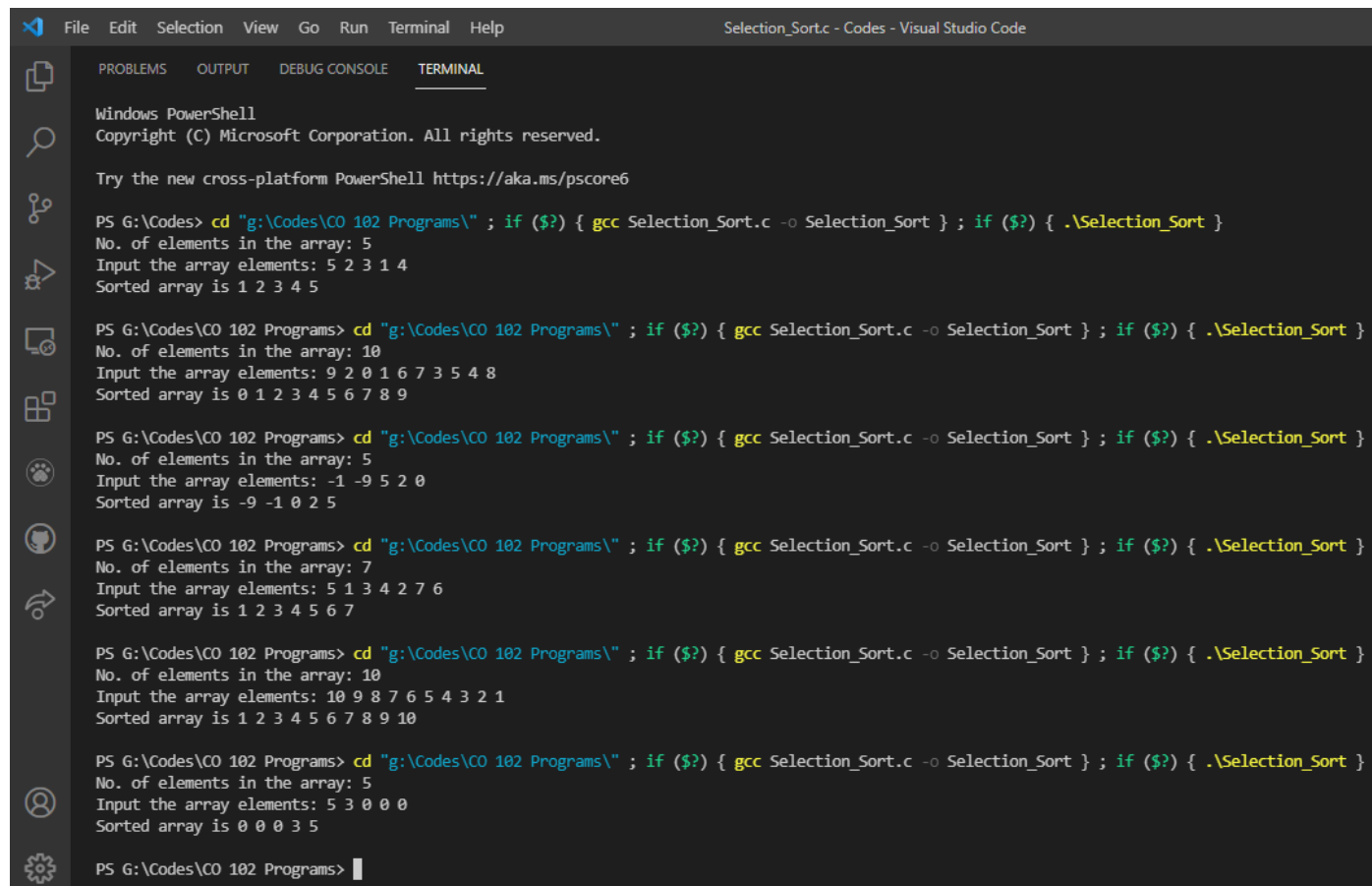**CODE:**

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int arr[100],n;
    printf("No. of elements in the array: ");
    scanf("%d",&n);
    printf("Input the array elements: ");
    for(int i=0;i<n;++i)
    {
        scanf("%d",arr+i);
    }

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

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

OUTPUT:

```
File  Edit  Selection  View  Go  Run  Terminal  Help                    Bubble_Sort.c - Codes - Visual Studio Code

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 5
Input the array elements: 5 2 3 1 4
Sorted array is 1 2 3 4 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 10
Input the array elements: 9 2 0 1 6 7 3 5 4 8
Sorted array is 0 1 2 3 4 5 6 7 8 9

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 5
Input the array elements: -1 -9 5 2 0
Sorted array is -9 -1 0 2 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 10
Input the array elements: 10 9 8 7 6 5 4 3 2 1
Sorted array is 1 2 3 4 5 6 7 8 9 10

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 5
Input the array elements: 5 3 0 0 0
Sorted array is 0 0 0 3 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Bubble_Sort.c -o Bubble_Sort } ; if ($?) { .\Bubble_Sort }
No. of elements in the array: 7
Input the array elements: 5 1 3 4 2 7 6
Sorted array is 1 2 3 4 5 6 7

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 15

AIM: Write a C program to sort an array using selection sort.
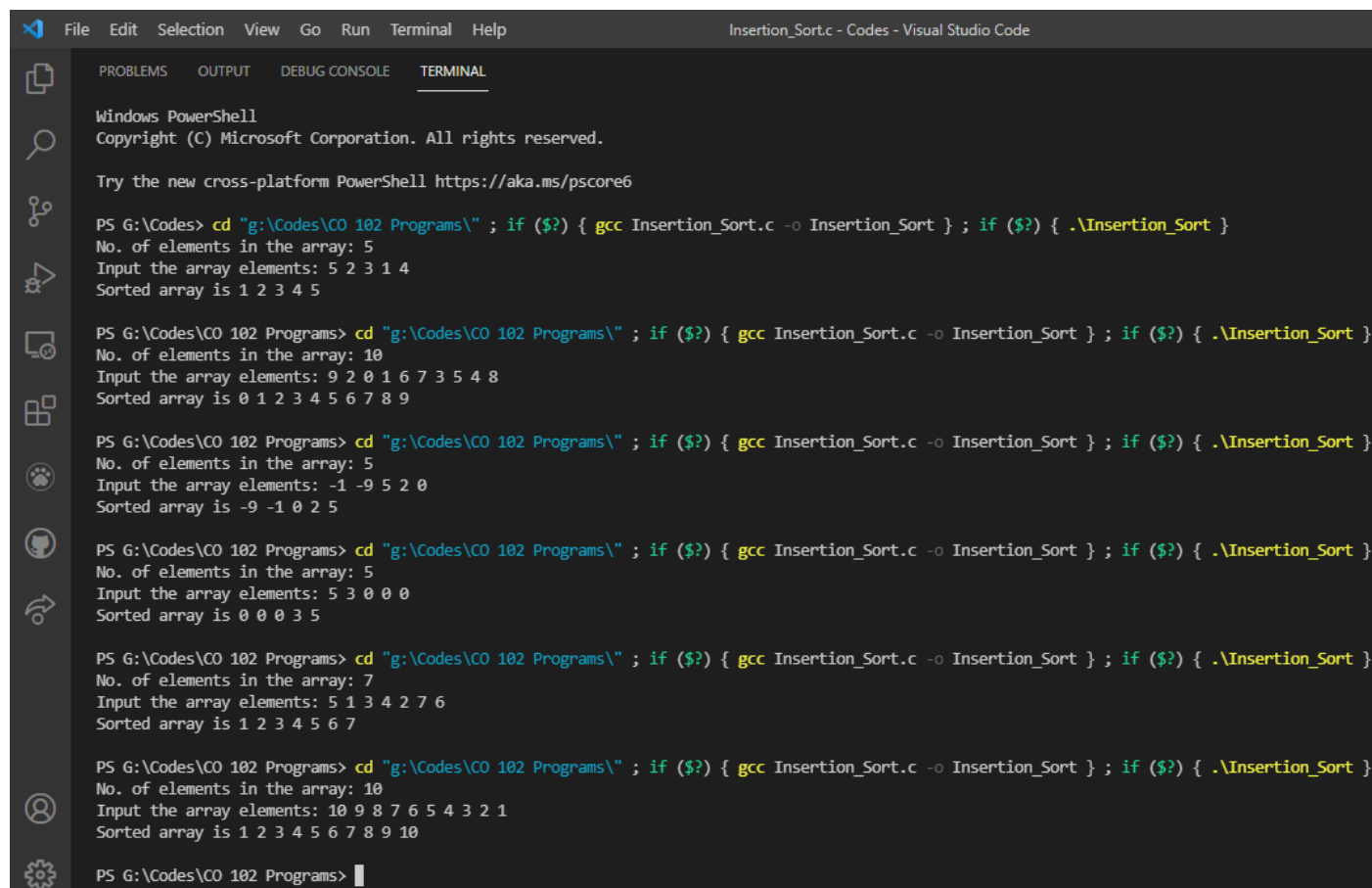
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int arr[100],n;
    printf("No. of elements in the array: ");
    scanf("%d",&n);
    printf("Input the array elements: ");
    for(int i=0;i<n;++i)
    {
        scanf("%d",arr+i);
    }

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

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

OUTPUT:

File Edit Selection View Go Run Terminal Help   Selection_Sort.c - Codes - Visual Studio Code

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 5
Input the array elements: 5 2 3 1 4
Sorted array is 1 2 3 4 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 10
Input the array elements: 9 2 0 1 6 7 3 5 4 8
Sorted array is 0 1 2 3 4 5 6 7 8 9

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 5
Input the array elements: -1 -9 5 2 0
Sorted array is -9 -1 0 2 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 7
Input the array elements: 5 1 3 4 2 7 6
Sorted array is 1 2 3 4 5 6 7

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 10
Input the array elements: 10 9 8 7 6 5 4 3 2 1
Sorted array is 1 2 3 4 5 6 7 8 9 10

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Selection_Sort.c -o Selection_Sort } ; if ($?) { .\Selection_Sort }
No. of elements in the array: 5
Input the array elements: 5 3 0 0 0
Sorted array is 0 0 0 3 5

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 16

AIM: Write a C program to sort an array using insertion sort.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int arr[100],n;
    printf("No. of elements in the array: ");
    scanf("%d",&n);
    printf("Input the array elements: ");
    for(int i=0;i<n;++i)
    {
        scanf("%d",arr+i);
    }

    int temp,k;
    for(int i=1;i<n;++i)
    {
        temp=arr[i];
        k=i;
        while(k>0 && arr[k-1]>temp)
        {
            arr[k]=arr[k-1];
            k--;
        }
        arr[k]=temp;
    }

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

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 5
Input the array elements: 5 2 3 1 4
Sorted array is 1 2 3 4 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 10
Input the array elements: 9 2 0 1 6 7 3 5 4 8
Sorted array is 0 1 2 3 4 5 6 7 8 9

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 5
Input the array elements: -1 -9 5 2 0
Sorted array is -9 -1 0 2 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 5
Input the array elements: 5 3 0 0 0
Sorted array is 0 0 0 3 5

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 7
Input the array elements: 5 1 3 4 2 7 6
Sorted array is 1 2 3 4 5 6 7

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc Insertion_Sort.c -o Insertion_Sort } ; if ($?) { .\Insertion_Sort }
No. of elements in the array: 10
Input the array elements: 10 9 8 7 6 5 4 3 2 1
Sorted array is 1 2 3 4 5 6 7 8 9 10

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 17

AIM: Write a C program to factorial of a number using recursion.
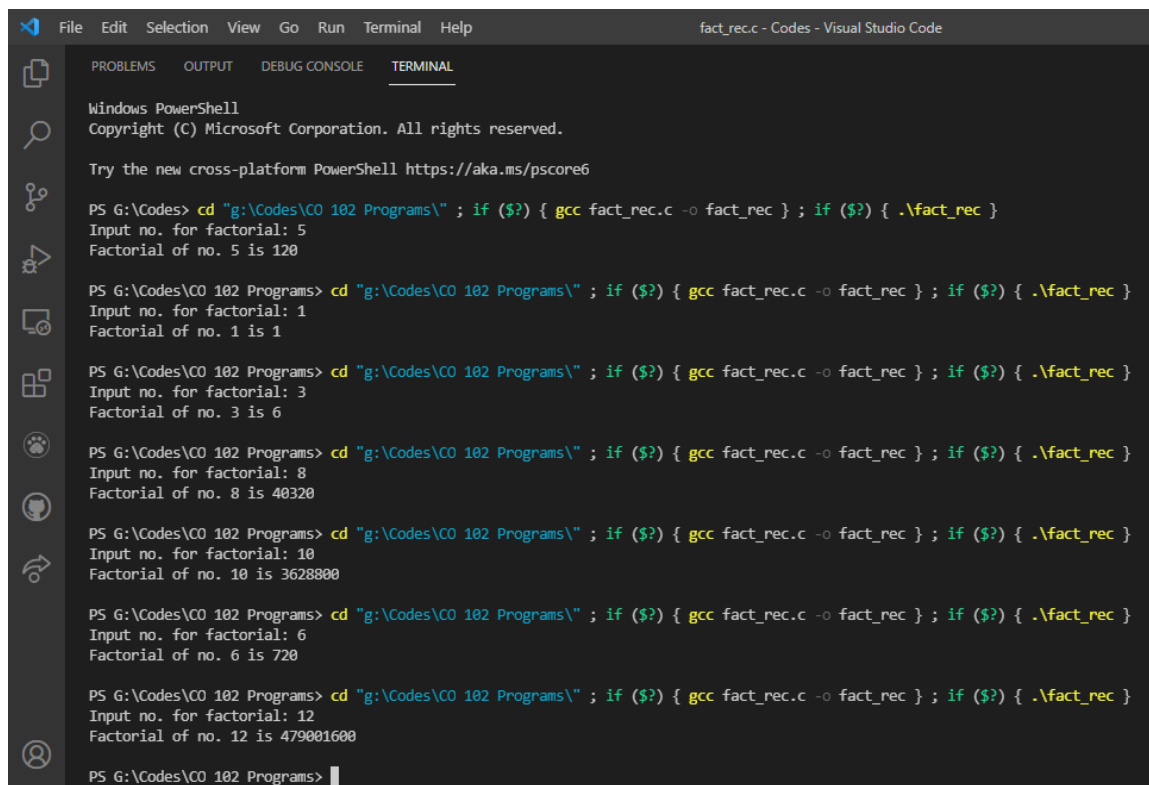
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int fact(int x)
{
    if(x==0 || x==1)
        return 1;
    else
        return x*fact(x-1);
}

int main()
{
    int x;
    printf("Input no. for factorial: ");
    scanf("%d",&x);
    int factorial=fact(x);
    printf("Factorial of no. %d is %d\n\n",x,factorial);
    return 0;
}
```

OUTPUT:

EXPERIMENT 18

AIM: Write a C program to Fibonacci sequence using recursion.
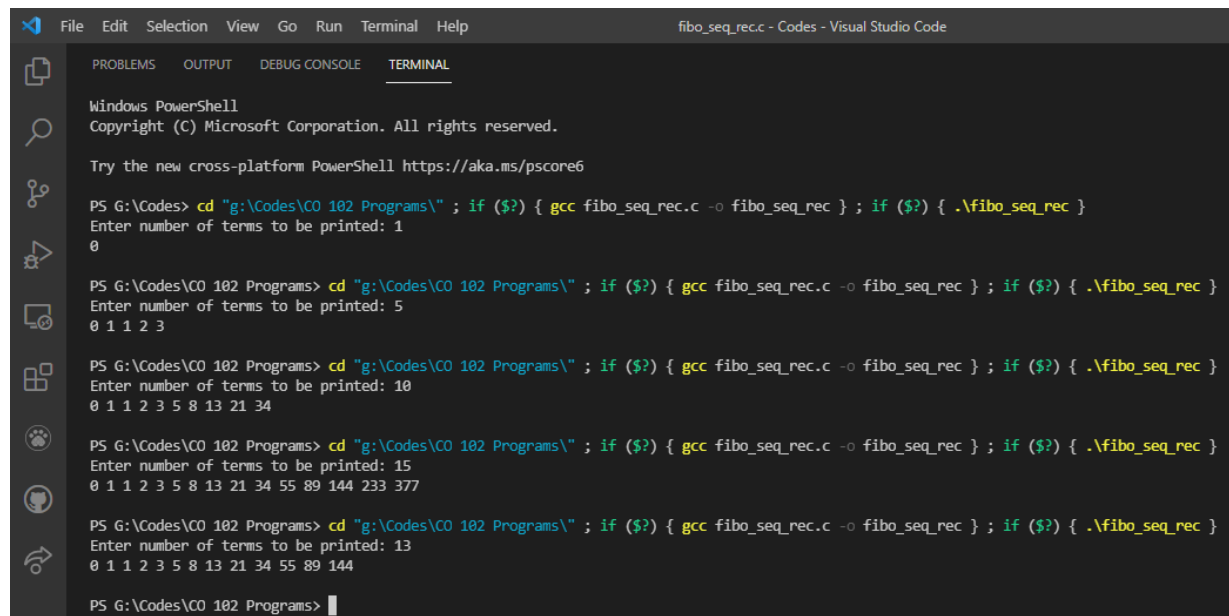
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int fibo(int n, int x, int y)
{
    if(n==0)
        return 0;
    else
        printf(" %d",y);
    return fibo(n-1,y,x+y);
}

int main()
{
    int n,x,y;
    printf("Enter number of terms to be printed: ");
    scanf("%d",&n);
    x=0,y=1;
    if(n>=1)
        printf("%d",x);
    fibo(n-1,0,1);
    printf("\n\n");
    return 0;
}
```

OUTPUT:

EXPERIMENT 19

AIM: Write a C program for the addition of two 3 x 3 matrices.
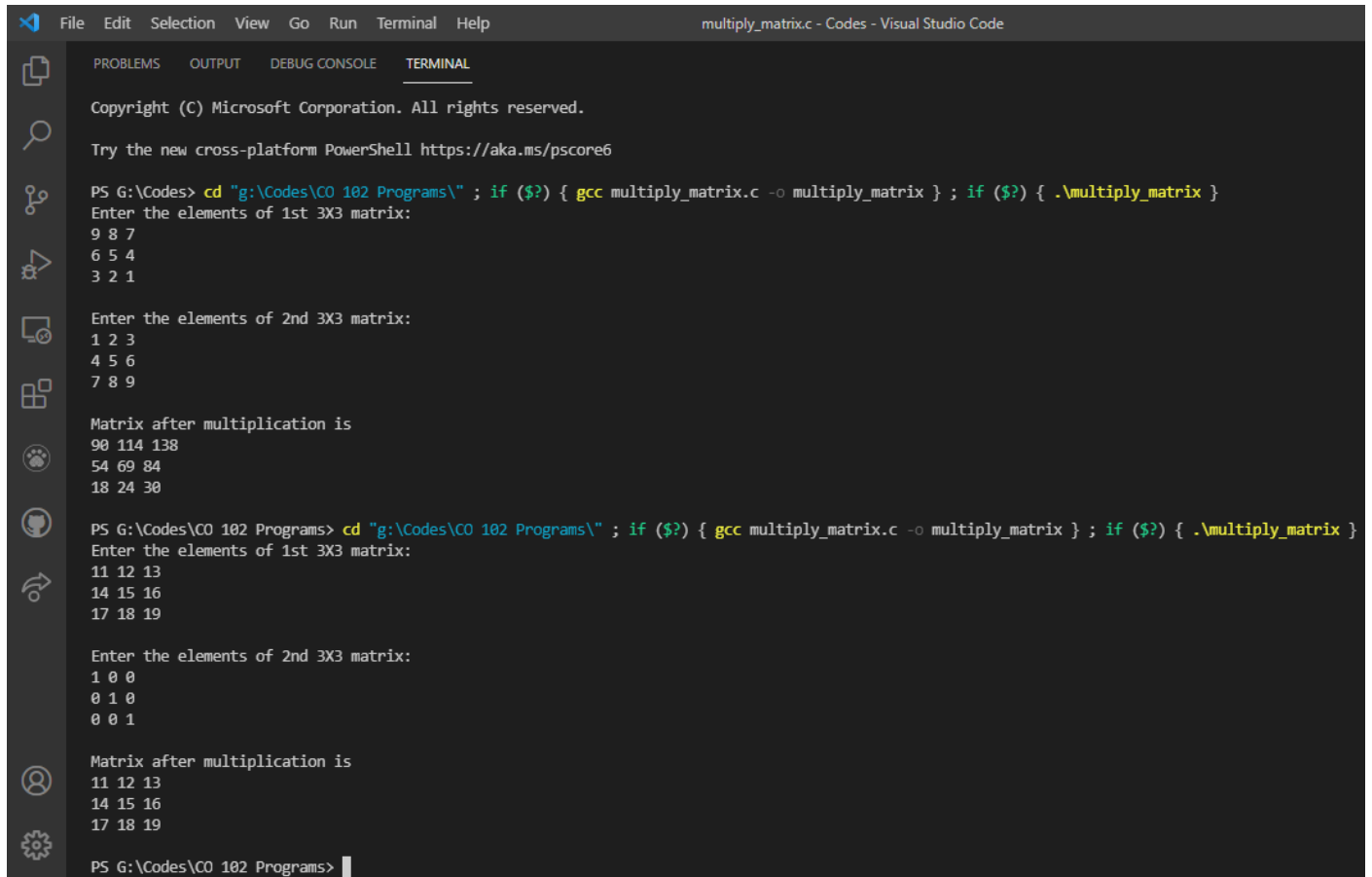
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x[3][3],y[3][3],z[3][3];
    printf("Enter the elements of 1st 3X3 matrix:\n");
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            scanf("%d",&x[i][j]);
        }
    }
    printf("\nEnter the elements of 2nd 3X3 matrix:\n");
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            scanf("%d",&y[i][j]);
        }
    }
    printf("\nMatrix after addition is\n");
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            z[i][j]=0;
            z[i][j]=x[i][j]+y[i][j];
        }
    }
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            printf("%d ",z[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    return 0;
}
```

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc add_matrix.c -o add_matrix } ; if ($?) { .\add_matrix }
Enter the elements of 1st 3X3 matrix:
9 8 7
6 5 4
3 2 1

Enter the elements of 2nd 3X3 matrix:
1 2 3
4 5 6
7 8 9

Matrix after addition is
10 10 10
10 10 10
10 10 10

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc add_matrix.c -o add_matrix } ; if ($?) { .\add_matrix }
Enter the elements of 1st 3X3 matrix:
1 1 1
1 2 1
1 1 1

Enter the elements of 2nd 3X3 matrix:
2 2 2
2 3 2
2 2 2

Matrix after addition is
3 3 3
3 5 3
3 3 3

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 20

AIM: Write a C program to multiply two 3 x 3 matrices

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x[3][3],y[3][3],z[3][3];
    printf("Enter the elements of 1st 3X3 matrix:\n");
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            scanf("%d",&x[i][j]);
        }
    }
    printf("\nEnter the elements of 2nd 3X3 matrix:\n");
    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            scanf("%d",&y[i][j]);
        }
    }
    int sum;
    printf("\nMatrix after multiplication is\n");

    for(int i=0;i<=2;++i){
        for(int j=0;j<=2;++j){
            sum=0;
            for(int k=0;k<=2;++k){
                sum=sum+(x[i][k])*(y[k][j]);
            }
            z[i][j]=sum;
        }
    }

    for(int i=0;i<3;++i){
        for(int j=0;j<3;++j){
            printf("%d ",z[i][j]);
        }
        printf("\n");
    }
    printf("\n");
    return 0;
}
```

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

```
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc multiply_matrix.c -o multiply_matrix } ; if ($?) { .\multiply_matrix }
Enter the elements of 1st 3X3 matrix:
9 8 7
6 5 4
3 2 1

Enter the elements of 2nd 3X3 matrix:
1 2 3
4 5 6
7 8 9

Matrix after multiplication is
90 114 138
54 69 84
18 24 30

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc multiply_matrix.c -o multiply_matrix } ; if ($?) { .\multiply_matrix }
Enter the elements of 1st 3X3 matrix:
11 12 13
14 15 16
17 18 19

Enter the elements of 2nd 3X3 matrix:
1 0 0
0 1 0
0 0 1

Matrix after multiplication is
11 12 13
14 15 16
17 18 19

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 21

AIM: Write a C program to swap two numbers using pointers.

CODE:
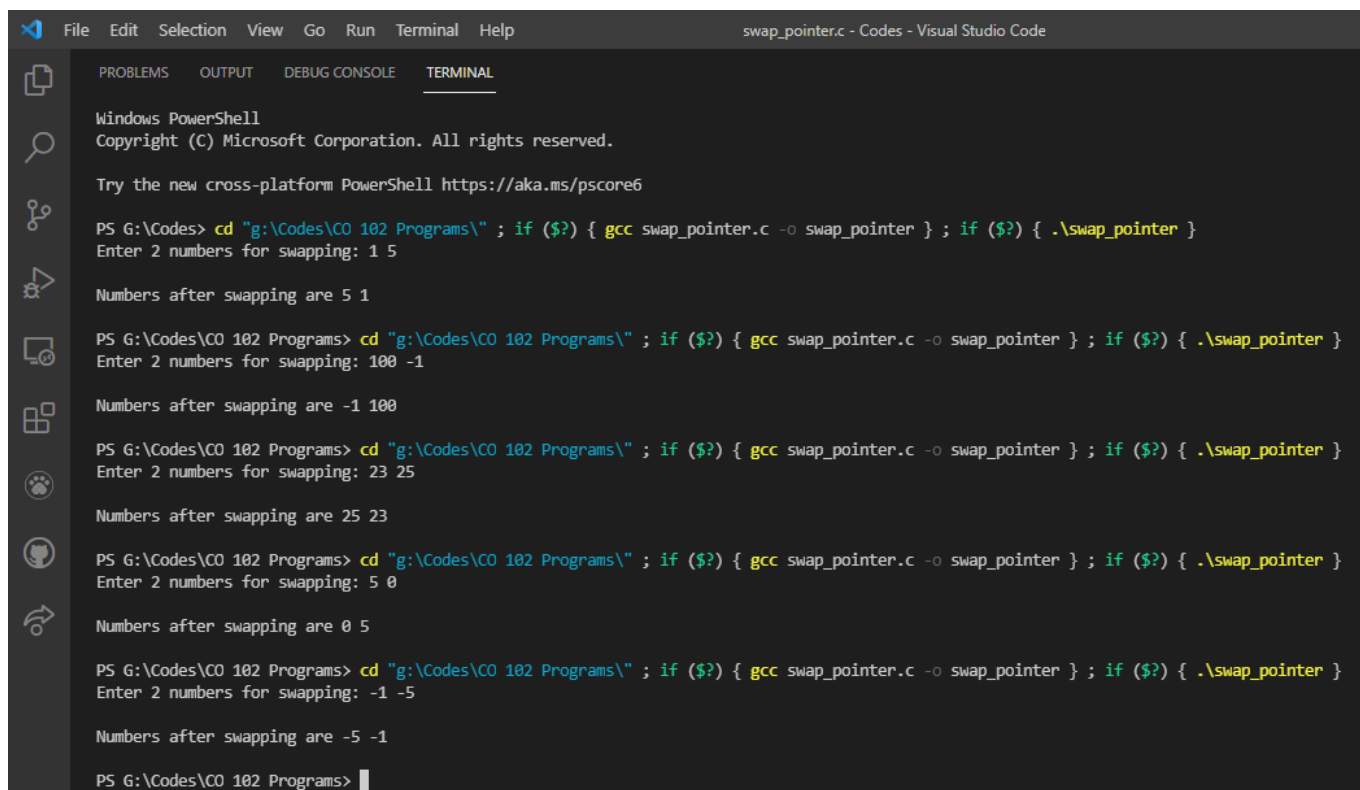
```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    int x,y,temp;
    printf("Enter 2 numbers for swapping: ");
    scanf("%d %d",&x,&y);

    int *a=&x;
    int *b=&y;

    temp=*a;
    *a=*b;
    *b=temp;

    printf("Numbers after swapping are %d %d",x,y);
    return 0;
}
```

OUTPUT:

EXPERIMENT 22

AIM: Write a C program to find the area and perimeter of a circle, rectangle, square and triangle using functions.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>

void circle()
{
    float r;
    printf("Input radius of the circle: ");
    scanf("%f",&r);
    printf("Area of circle is %.2f\nCircumference of circle is %.2f\n\n",3.14*r*r,2*3.14*r
);
}


void rect()
{
    float l,b;
    printf("Input length and breadth of the rectangle: ");
    scanf("%f %f",&l,&b);
    printf("Area of rectangle is %.2f\nPerimeter of circle is %.2f\n\n",l*b,2*(l+b));
}


void sq()
{
    float a;
    printf("Input length of side of square: ");
    scanf("%f",&a);
    printf("Area of square is %.2f\nPerimeter of square is %.2f\n\n",a*a,4*a);
}


void triangle()
{
    float b,h,l1,l2;
    printf("Input length of base and height of triangle: ");
    scanf("%f %f",&b,&h);
    printf("Input length of other 2 sides of triangle: ");
    scanf("%f %f",&l1,&l2);
    printf("Area of triangle is %.2f\nPerimeter of triangle is %.2f\n\n",0.5*b*h,b+l1+l2);
}
```

```c
int main()
{
    int n;
    printf("Write the no. of figure you want:\n");
    printf("1. Cirlce\n2. Rectangle\n3. Square\n4. Triangle\n");
    printf("Write the input: ");
    scanf("%d",&n);
    printf("\n");

    switch(n)
    {
        case 1:
            circle();
            break;
        case 2:
            rect();
            break;
        case 3:
            sq();
            break;
        case 4:
            triangle();
            break;
        default:
            printf("Invalid Input");
            break;
    }
    return 0;
}
```

OUTPUT:

EXPERIMENT 23

AIM: Write a C program to pass and return pointer to function hence calculate average of an array.
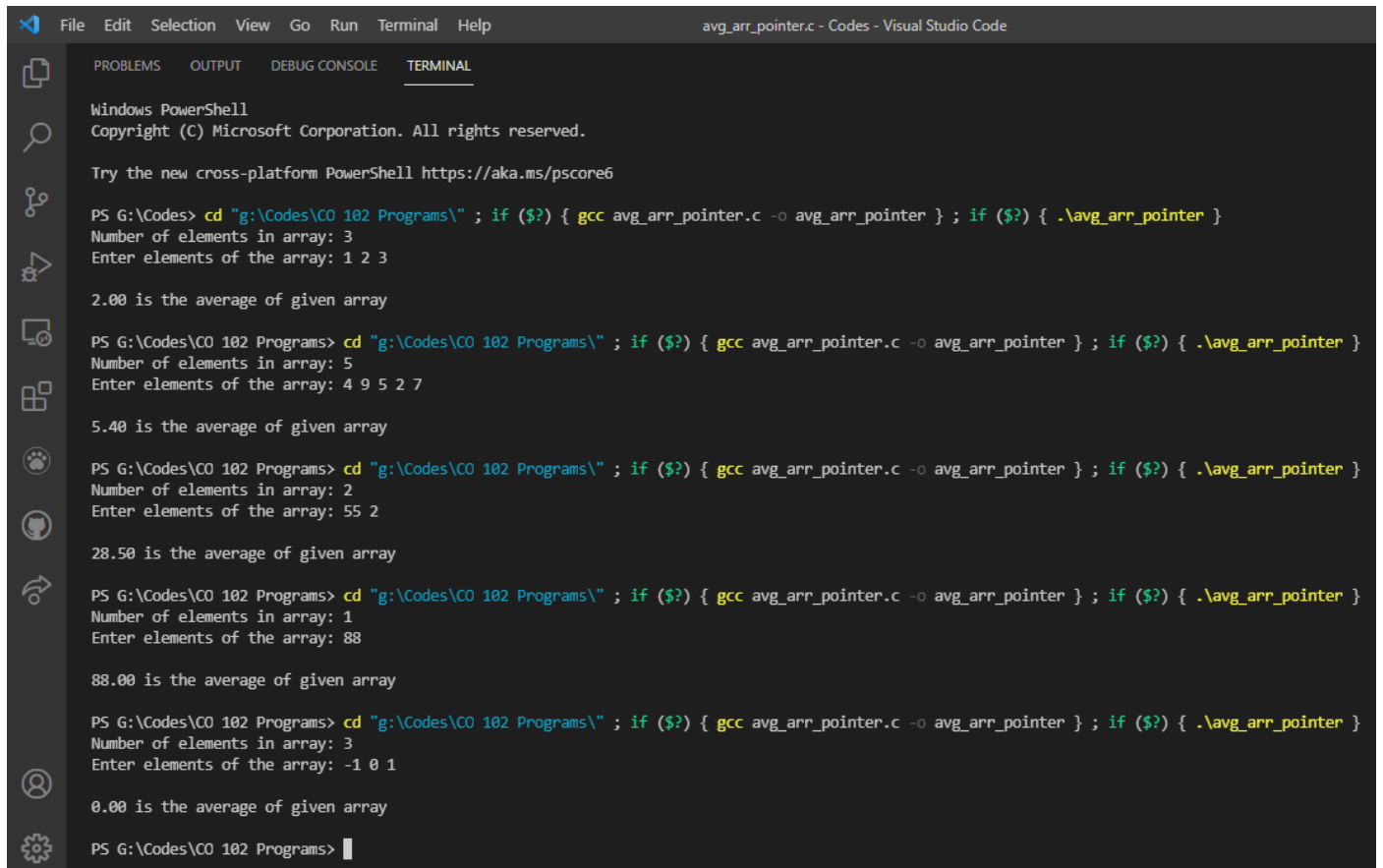
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
float avg(int *p,int n)
{
    int sum=0;
    for(int i=0;i<n;++i){
        sum=sum+(*(p+i));}
    float average=(float)sum/n;
    return average;
}

int main()
{
    int arr[100],n;
    printf("Number of elements in array: ");
    scanf("%d",&n);
    printf("Enter elements of the array: ");
    for(int i=0;i<n;++i){
        scanf("%d",arr+i);}
    float *average;
    *average=avg(arr,n);
    printf("\n%.2f is the average of given array\n\n",*average);
    return 0;
}
```

OUTPUT:

```
Windows PowerShell
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc avg_arr_pointer.c -o avg_arr_pointer } ; if ($?) { .\avg_arr_pointer }
Number of elements in array: 3
Enter elements of the array: 1 2 3

2.00 is the average of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc avg_arr_pointer.c -o avg_arr_pointer } ; if ($?) { .\avg_arr_pointer }
Number of elements in array: 5
Enter elements of the array: 4 9 5 2 7

5.40 is the average of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc avg_arr_pointer.c -o avg_arr_pointer } ; if ($?) { .\avg_arr_pointer }
Number of elements in array: 2
Enter elements of the array: 55 2

28.50 is the average of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc avg_arr_pointer.c -o avg_arr_pointer } ; if ($?) { .\avg_arr_pointer }
Number of elements in array: 1
Enter elements of the array: 88

88.00 is the average of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc avg_arr_pointer.c -o avg_arr_pointer } ; if ($?) { .\avg_arr_pointer }
Number of elements in array: 3
Enter elements of the array: -1 0 1

0.00 is the average of given array

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 24

AIM: Write a C program to pass an array as pointer to a function that calculates the sum of all elements of the array.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int sum(int *p,int n)
{
    int sum=0;
    for(int i=0;i<n;++i){
        sum=sum+(*(p+i));}
    return sum;
}

int main()
{
    int arr[100],n;
    printf("Number of elements in array: ");
    scanf("%d",&n);
    printf("Enter elements of the array: ");
    for(int i=0;i<n;++i){
        scanf("%d",arr+i);}

    int s=sum(arr,n);
    printf("\n%d is the sum of given array\n\n",s);
    return 0;
}
```

OUTPUT:

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc sum_arr_pointer.c -o sum_arr_pointer } ; if ($?) { .\sum_arr_pointer }
Number of elements in array: 3
Enter elements of the array: 1 2 3

6 is the sum of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc sum_arr_pointer.c -o sum_arr_pointer } ; if ($?) { .\sum_arr_pointer }
Number of elements in array: 5
Enter elements of the array: 9 5 1 7 3

25 is the sum of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc sum_arr_pointer.c -o sum_arr_pointer } ; if ($?) { .\sum_arr_pointer }
Number of elements in array: 5
Enter elements of the array: 1 2 3 4 5

15 is the sum of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc sum_arr_pointer.c -o sum_arr_pointer } ; if ($?) { .\sum_arr_pointer }
Number of elements in array: 10
Enter elements of the array: 0 1 2 3 4 5 6 7 8 9

45 is the sum of given array

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc sum_arr_pointer.c -o sum_arr_pointer } ; if ($?) { .\sum_arr_pointer }
Number of elements in array: 3
Enter elements of the array: -1 0 1

0 is the sum of given array

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 25

AIM: Write a C program to demonstrate the example of array of pointers.

CODE:
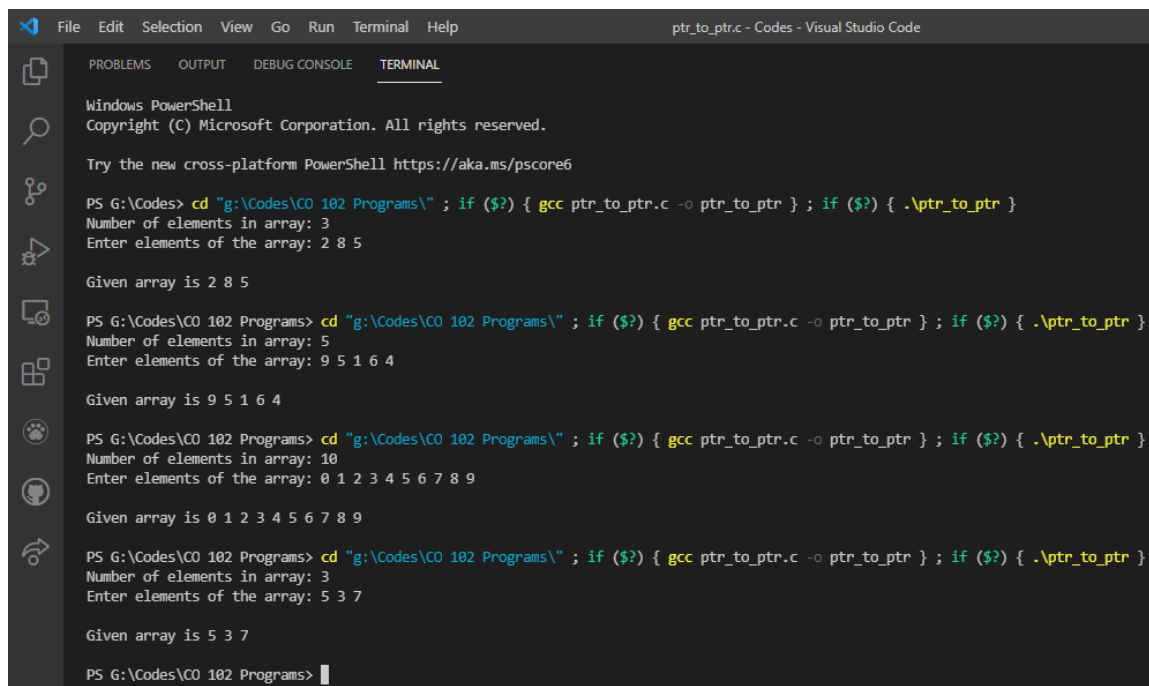
```c
// Aneesh Panchal
// 2K20/A6/56

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

    int *ptr[100];
    for(int i=0;i<n;++i){
        ptr[i]=arr+i;}

    printf("\nGiven array is");
    for(int i=0;i<n;++i){
        printf(" %d",*ptr[i]);}
    printf("\n\n");
    return 0;
}
```

OUTPUT:

EXPERIMENT 26

AIM: Write a C program to find the length of the string without using strlen and then pass the string to characters.

CODE:
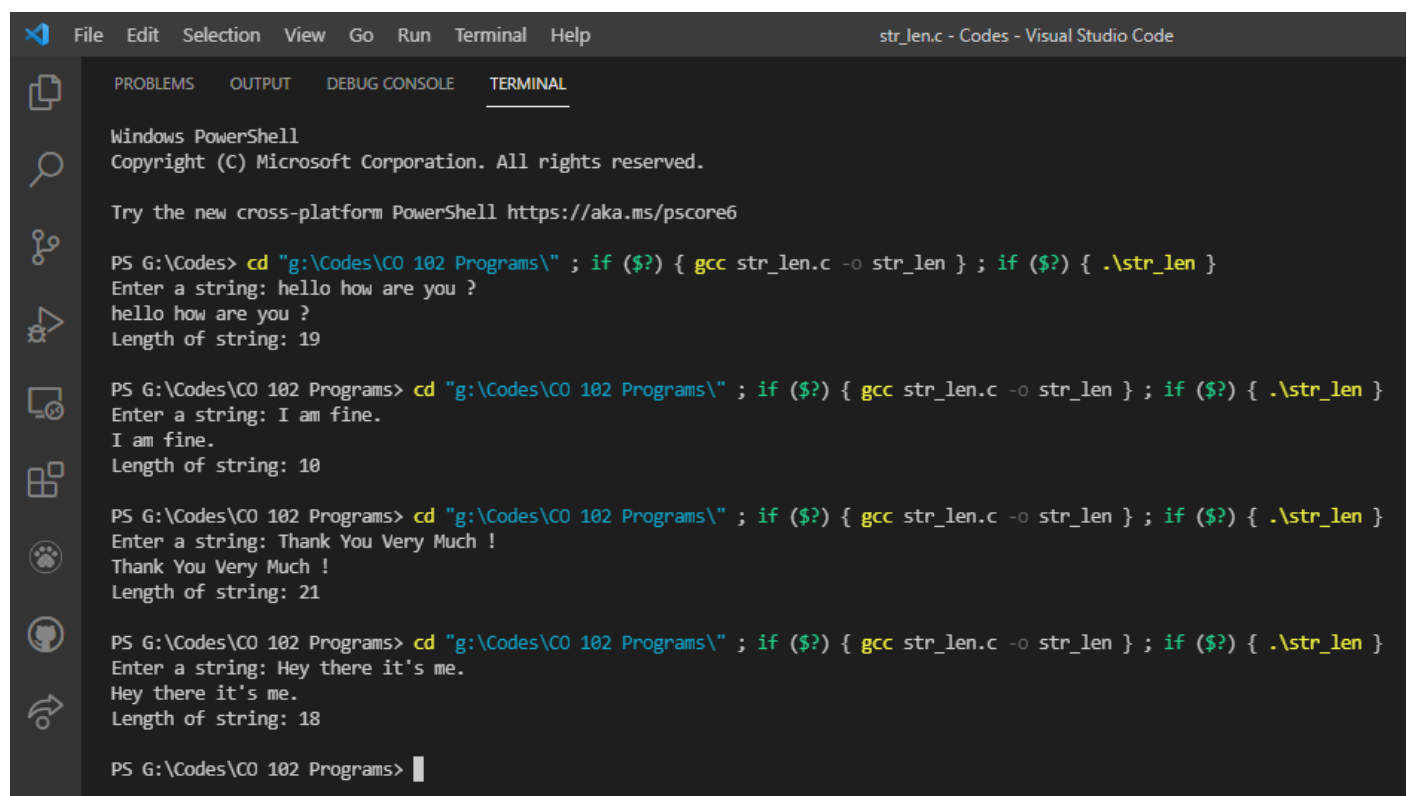
```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str[32];
    int count=0;
    printf("Enter a string: ");
    gets(str);

    while(str[count]!='\0')
        count++;

    puts(str);
    printf("Length of string: %d\n\n",count);
    return 0;
}
```

OUTPUT:

EXPERIMENT 27

AIM: Write a C program to count the number of vowels in a given string.
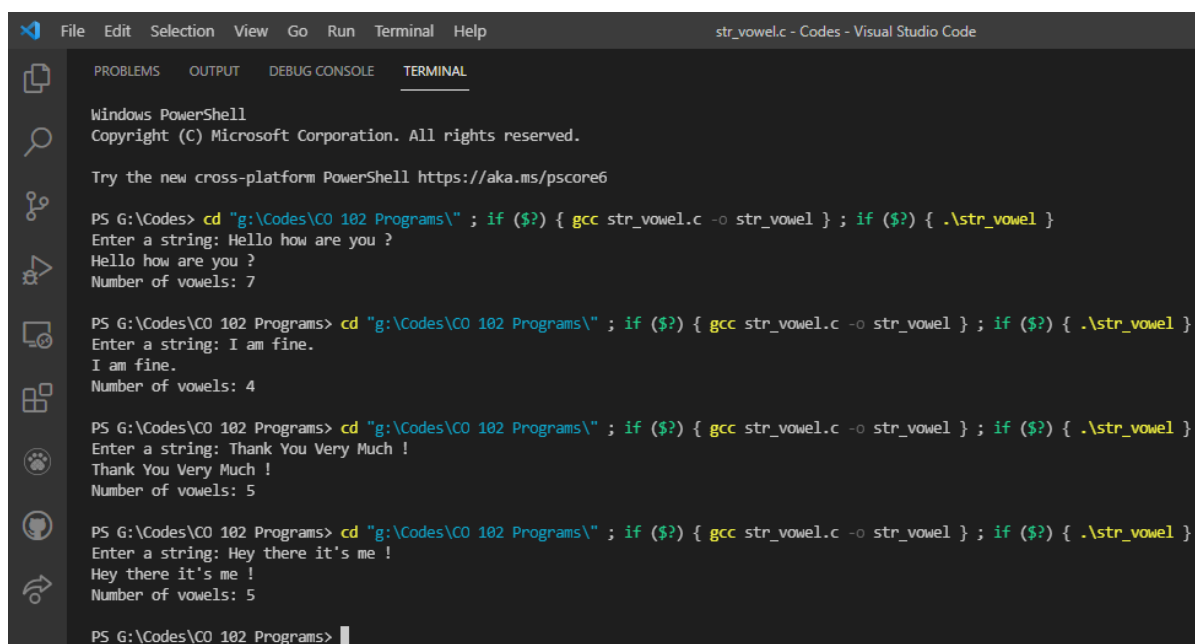
CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str[100];
    int count=0,i=0;
    printf("Enter a string: ");
    gets(str);

    while(str[i]!='\0')
    {
        if(str[i]=='A' || str[i]=='E' || str[i]=='I' || str[i]=='O' || str[i]=='U' ||
            str[i]=='a' || str[i]=='e' || str[i]=='i' || str[i]=='o' || str[i]=='u')
        {
            ++count;
        }
        ++i;
    }
    puts(str);
    printf("Number of vowels: %d\n\n",count);
    return 0;
}
```

OUTPUT:

EXPERIMENT 28

AIM: Write a C program to check if a given string is a palindrome or not.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str[100];
    printf("Enter a string: ");
    gets(str);

    int count=1;
    int len=0;
    while(str[len]!='\0')
        ++len;

    for(int i=0;i<len;++i)
    {
        if(str[i]!=str[len-i-1])
        {
            count=0;
            break;
        }
    }

    if(count==0)
        printf("Given string is not Palindrome\n\n");
    else
        printf("Given string is Palindrome\n\n");
    return 0;
}
```
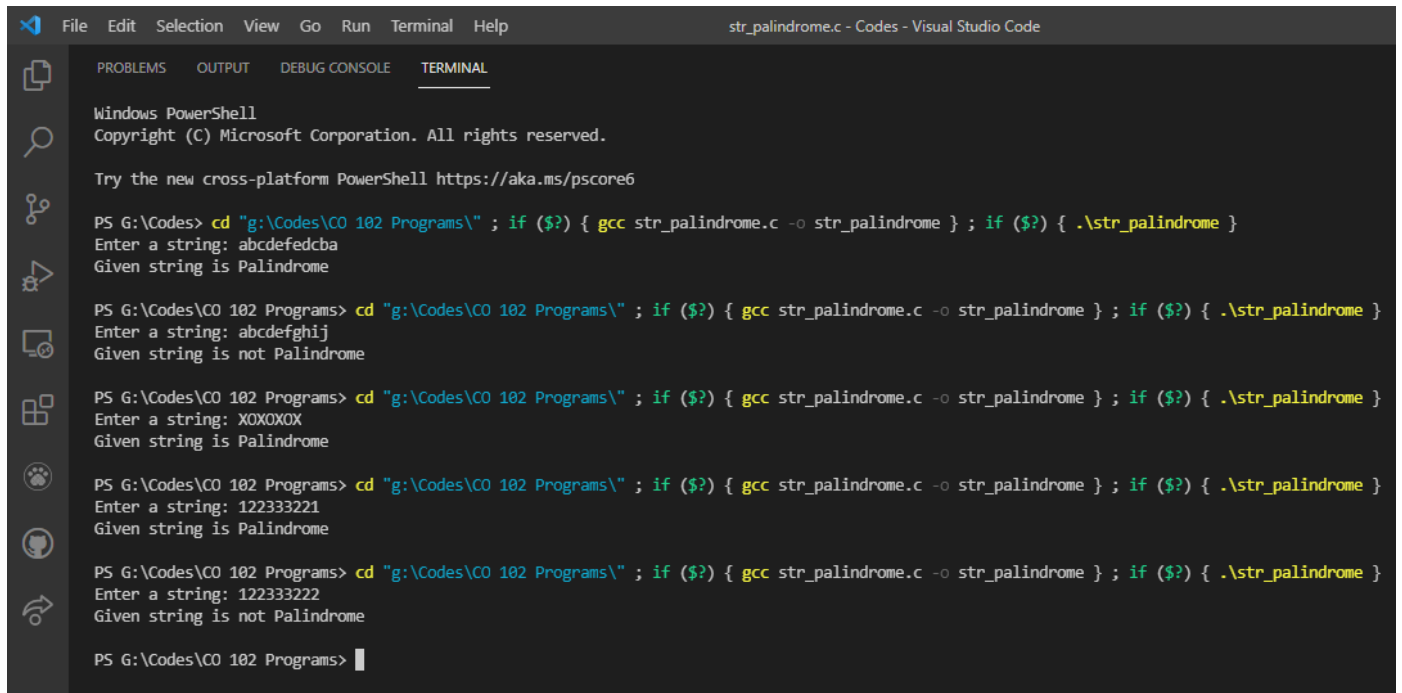
OUTPUT:

File Edit Selection View Go Run Terminal Help   str_palindrome.c - Codes - Visual Studio Code

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
Windows PowerShell
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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_palindrome.c -o str_palindrome } ; if ($?) { .\str_palindrome }
Enter a string: abcdefedcba
Given string is Palindrome

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_palindrome.c -o str_palindrome } ; if ($?) { .\str_palindrome }
Enter a string: abcdefghij
Given string is not Palindrome

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_palindrome.c -o str_palindrome } ; if ($?) { .\str_palindrome }
Enter a string: XOXOXOX
Given string is Palindrome

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_palindrome.c -o str_palindrome } ; if ($?) { .\str_palindrome }
Enter a string: 122333221
Given string is Palindrome

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_palindrome.c -o str_palindrome } ; if ($?) { .\str_palindrome }
Enter a string: 122333222
Given string is not Palindrome

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 29

AIM: Write a C program to string concatenation.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str1[100],str2[100];
    printf("Enter 1st string: ");
    gets(str1);
    printf("Enter 2nd string: ");
    gets(str2);

    int i=0,j=0;
    while(str1[i]!='\0')
        ++i;

    while(str2[j]!='\0')
    {
        str1[i]=str2[j];
        ++i;++j;
    }
    str1[i]='\0';

    printf("\nString after concatenation: ");
    puts(str1);
    printf("\n");
    return 0;
}
```
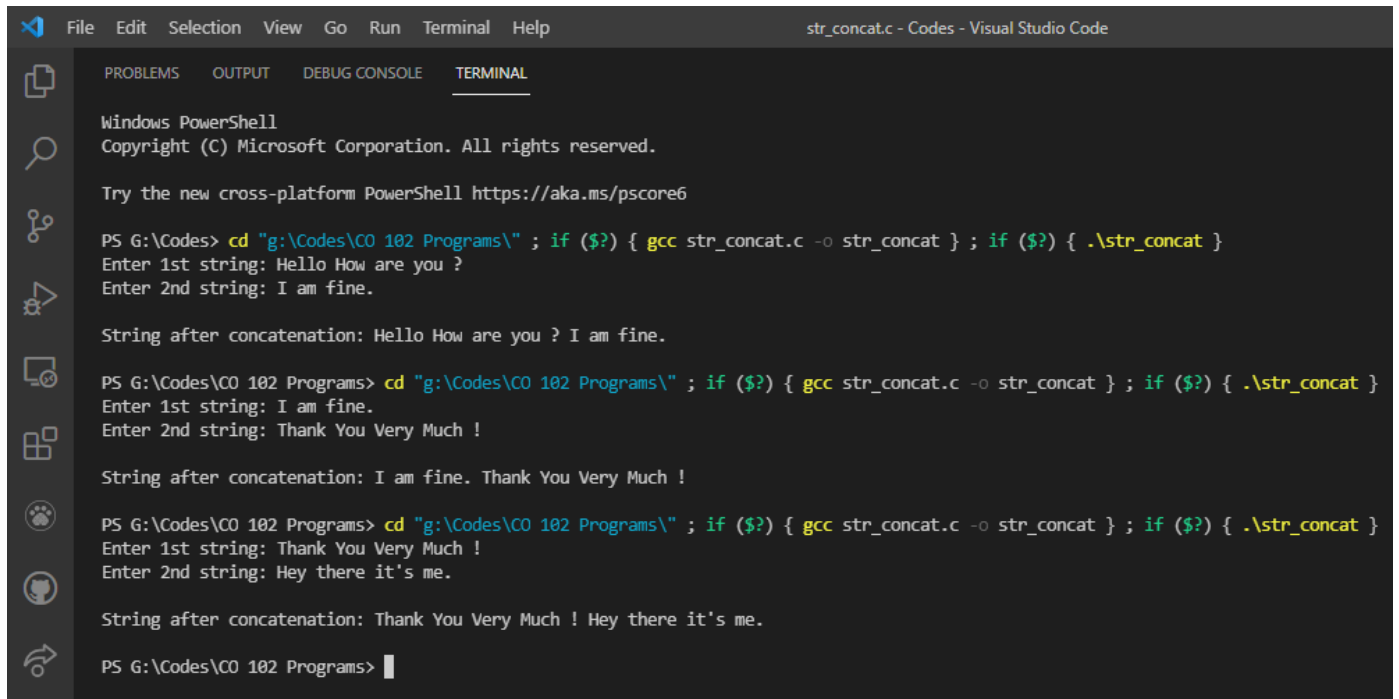
OUTPUT:

```
File  Edit  Selection  View  Go  Run  Terminal  Help                          str_concat.c - Codes - Visual Studio Code

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_concat.c -o str_concat } ; if ($?) { .\str_concat }
Enter 1st string: Hello How are you ?
Enter 2nd string: I am fine.

String after concatenation: Hello How are you ? I am fine.

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_concat.c -o str_concat } ; if ($?) { .\str_concat }
Enter 1st string: I am fine.
Enter 2nd string: Thank You Very Much !

String after concatenation: I am fine. Thank You Very Much !

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_concat.c -o str_concat } ; if ($?) { .\str_concat }
Enter 1st string: Thank You Very Much !
Enter 2nd string: Hey there it's me.

String after concatenation: Thank You Very Much ! Hey there it's me.

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 30

AIM: Write a C program to string comparison.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str1[100],str2[100];
    printf("Enter 1st string: ");
    gets(str1);
    printf("Enter 2nd string: ");
    gets(str2);
    int count=1,len=0;

    int len1=0,len2=0;
    while(str1[len1]!='\0')
        ++len1;
    while(str1[len2]!='\0')
        ++len2;

    if(len1==len2){len=len1;}
    else if(len1>len2){len=len1;}
    else{len=len2;}

    for(int i=0;i<len;++i)
    {
        if(str1[i]!=str2[i])
        {
            count=0;
            break;
        }
    }
    if(count==0)
        printf("Given string are not same\n\n");
    else
        printf("Given string are same\n\n");
    return 0;
}
```
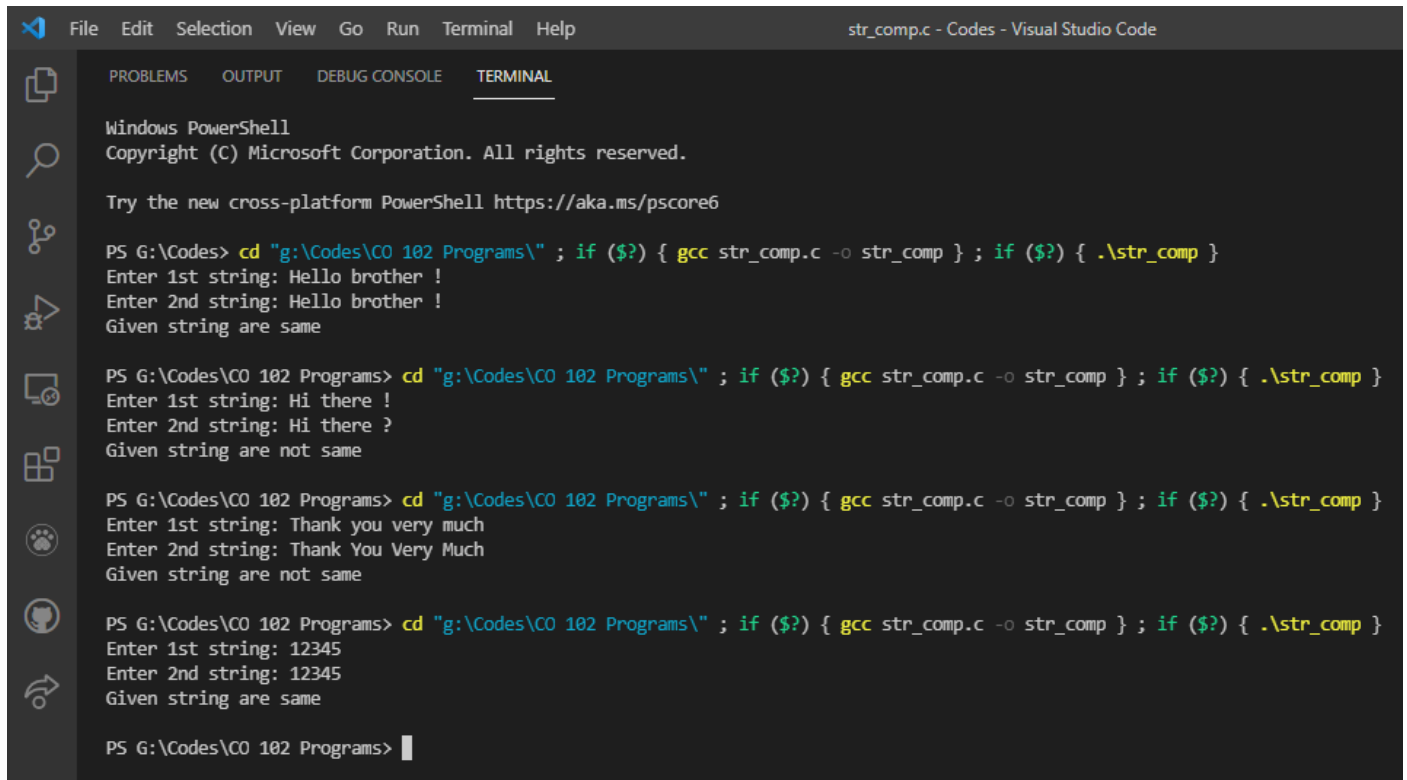
OUTPUT:

EXPERIMENT 31

AIM: Write a C program to string reverse.

CODE:

```c
// Aneesh Panchal
// 2K20/A6/56

#include<stdio.h>
int main()
{
    char str[100];
    printf("Enter a string: ");
    gets(str);

    int len=0;
    char temp;
    while(str[len]!='\0')
        ++len;

    for(int i=0;i<len/2;++i)
    {
        temp=str[i];
        str[i]=str[len-i-1];
        str[len-i-1]=temp;
    }

    printf("\nReversed string: ");
    puts(str);
    printf("\n");
    return 0;
}
```

OUTPUT:


```
File  Edit  Selection  View  Go  Run  Terminal  Help                    str_rev.c - Codes - Visual Studio Code

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_rev.c -o str_rev } ; if ($?) { .\str_rev }
Enter a string: Hello how are you ?

Reversed string: ? uoy era woh olleH

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_rev.c -o str_rev } ; if ($?) { .\str_rev }
Enter a string: I am fine.

Reversed string: .enif ma I

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_rev.c -o str_rev } ; if ($?) { .\str_rev }
Enter a string: Thank You Very Much !

Reversed string: ! hcuM yreV uoY knahT

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_rev.c -o str_rev } ; if ($?) { .\str_rev }
Enter a string: Hey there it's me.

Reversed string: .em s'ti ereht yeH

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 32

AIM: Write a C program to convert a string from lower case to upper case and vice versa.

CODE:

```
//Aneesh Panchal
//2K20/A6/56

#include<stdio.h>
int main()
{
    char str[100];
    printf("Enter a string: ");
    gets(str);

    int len=0;
    while(str[len]!='\0')
        ++len;

    for(int i=0;i<len;++i)
    {
        if(str[i]>=65 && str[i]<=90)
            str[i]=str[i]+32;
        else if(str[i]>=97 && str[i]<=122)
            str[i]=str[i]-32;
    }
    printf("\nConverted string: ");
    puts(str);
    printf("\n");

    return 0;
}
```
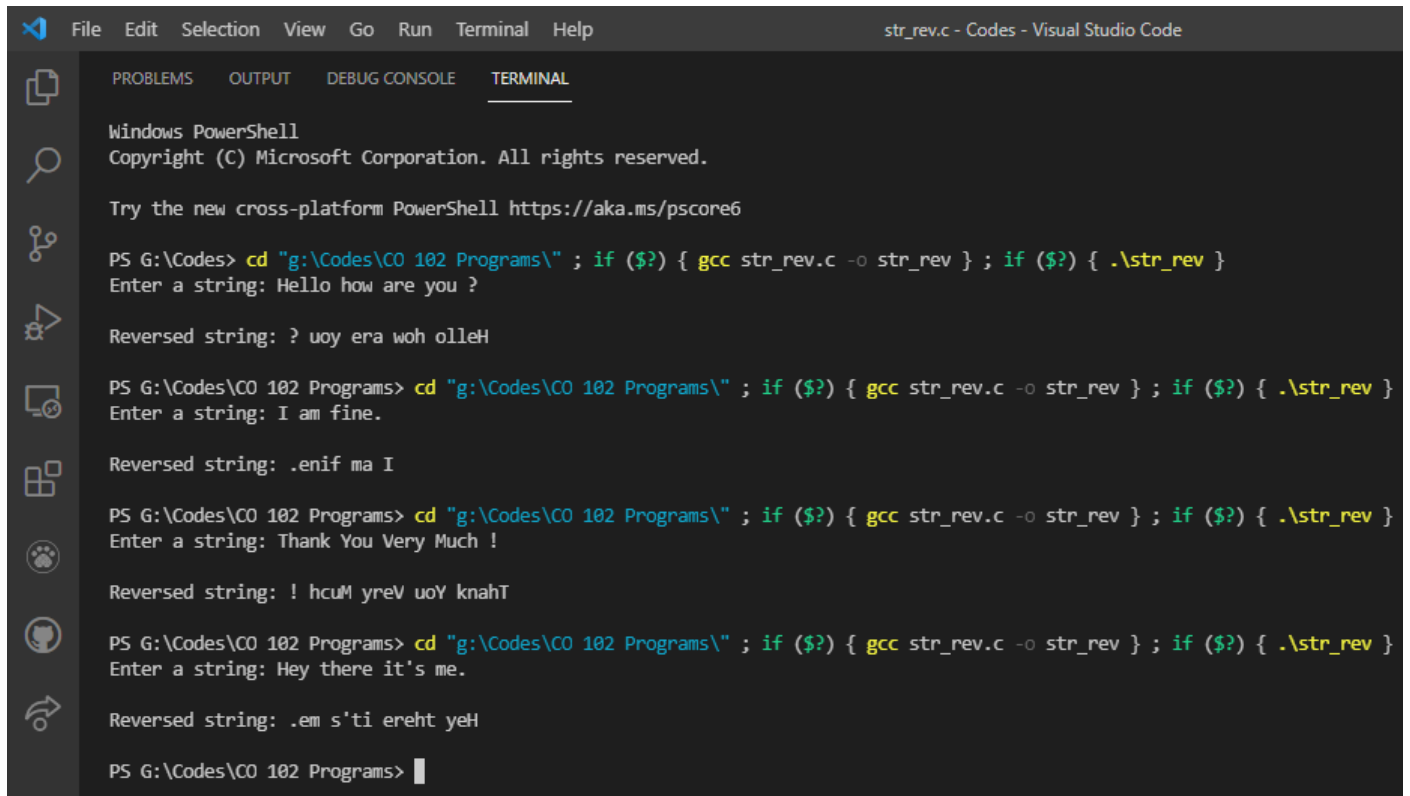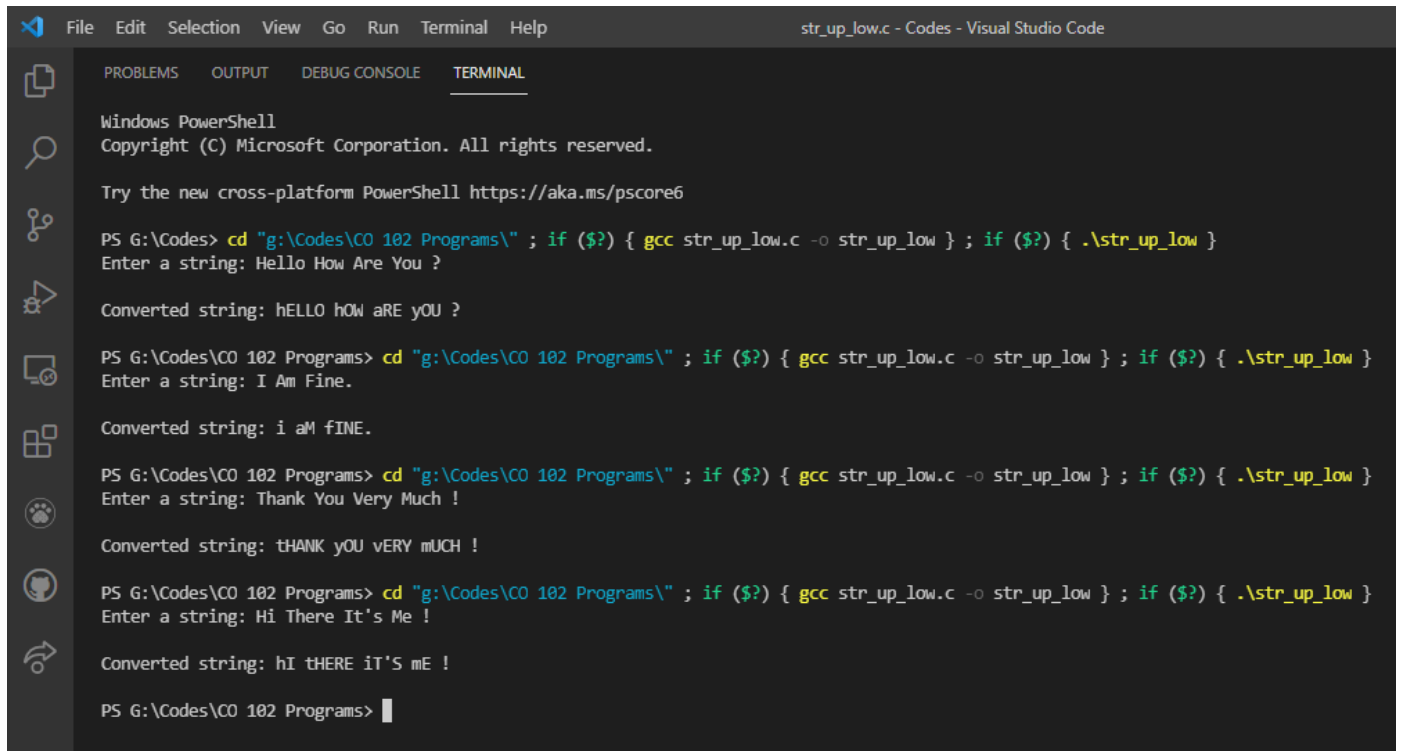
OUTPUT:


```
File  Edit  Selection  View  Go  Run  Terminal  Help                          str_up_low.c - Codes - Visual Studio Code

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL

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PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_up_low.c -o str_up_low } ; if ($?) { .\str_up_low }
Enter a string: Hello How Are You ?

Converted string: hELLO hOW aRE yOU ?

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_up_low.c -o str_up_low } ; if ($?) { .\str_up_low }
Enter a string: I Am Fine.

Converted string: i aM fINE.

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_up_low.c -o str_up_low } ; if ($?) { .\str_up_low }
Enter a string: Thank You Very Much !

Converted string: tHANK yOU vERY mUCH !

PS G:\Codes\CO 102 Programs> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc str_up_low.c -o str_up_low } ; if ($?) { .\str_up_low }
Enter a string: Hi There It's Me !

Converted string: hI tHERE iT'S mE !

PS G:\Codes\CO 102 Programs>
```

EXPERIMENT 33

AIM: Write a C program to generate the employee details using structure.

CODE:

```c
//Aneesh Panchal
//2K20/A6/56

#include<stdio.h>
typedef struct
{
    char name[100];
    int age;
    int salary;
}
employee;

int main()
{
    employee emp[100];
    int n;
    printf("Enter number of employees: ");
    scanf("%d",&n);

    for(int i=0;i<n;++i)
    {
        printf("\nDetails of employee %d:\n",i+1);
        printf("Name: ");
        scanf("%s",emp[i].name);

        printf("Age: ");
        scanf("%d",&emp[i].age);

        printf("Salary: ");
        scanf("%d",&emp[i].salary);
    }

    printf("\n\nDetails of employees:\n");
    for(int i=0;i<n;++i)
    {
        printf("Employee number %d:\n",i+1);
        printf("Name: %s\n",emp[i].name);
        printf("Age: %d\n",emp[i].age);
        printf("Salary: %d\n\n",emp[i].salary);
    }
    return 0;
}
```
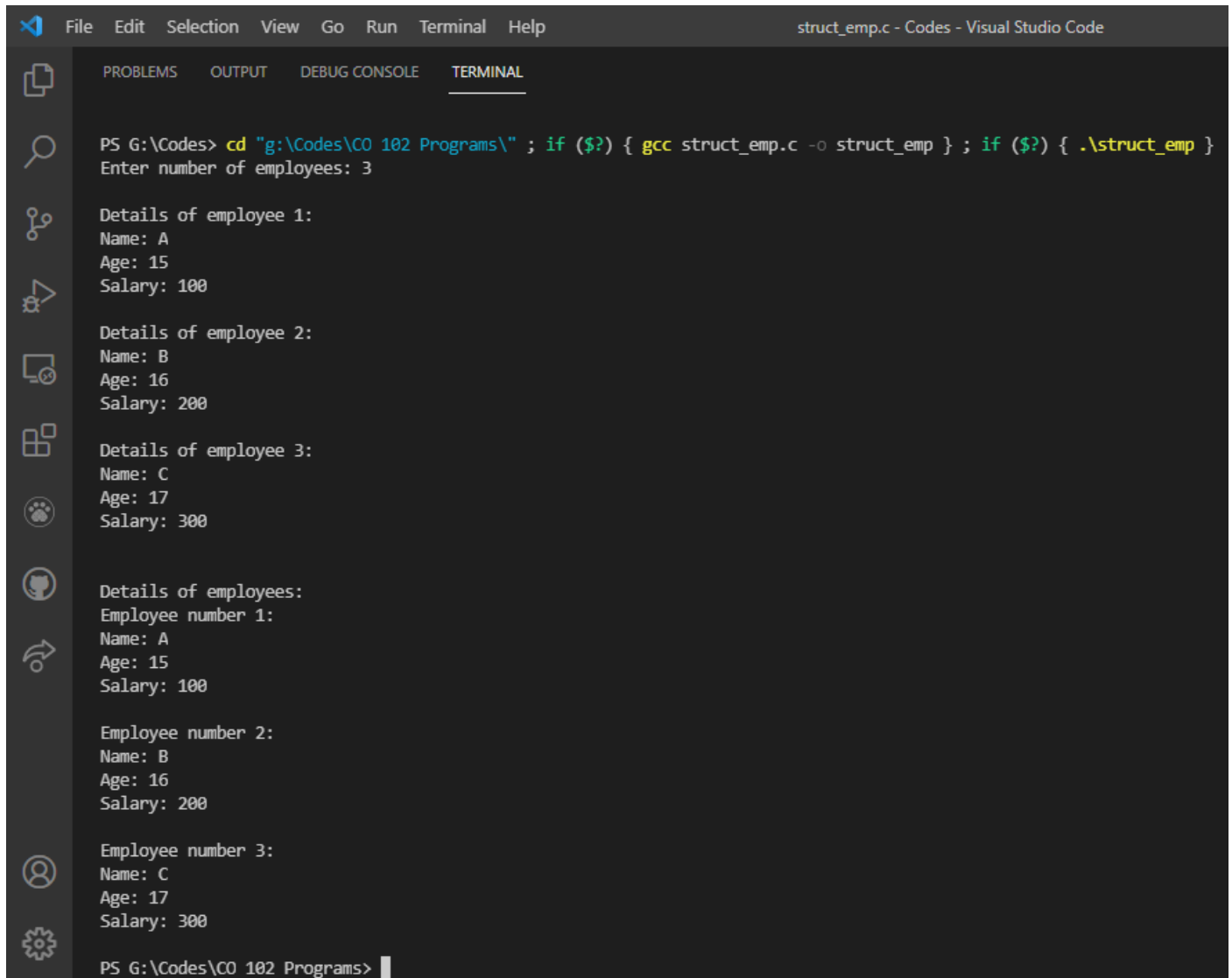
OUTPUT:

File Edit Selection View Go Run Terminal Help   struct_emp.c - Codes - Visual Studio Code

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**

```
PS G:\Codes> cd "g:\Codes\CO 102 Programs\" ; if ($?) { gcc struct_emp.c -o struct_emp } ; if ($?) { .\struct_emp }
Enter number of employees: 3

Details of employee 1:
Name: A
Age: 15
Salary: 100

Details of employee 2:
Name: B
Age: 16
Salary: 200

Details of employee 3:
Name: C
Age: 17
Salary: 300


Details of employees:
Employee number 1:
Name: A
Age: 15
Salary: 100

Employee number 2:
Name: B
Age: 16
Salary: 200

Employee number 3:
Name: C
Age: 17
Salary: 300

PS G:\Codes\CO 102 Programs>
```