PROGRAMMING FOR PROBLEM SOLVING ESC-18105

1. Program to print Welcome to budding Engineers

```
#include<stdio.h>
int main()
{
    puts("Welcome to Budding Engineers");
    return 0;
}
```

Output of the program

```
Welcome to Budding Engineers
```

2. Program to print Address using puts

```
#include<stdio.h>
int main()
{
        puts("Address: 611-E Bhai Randhir Singh Nagar Ludhiana(Punjab)-141012");
        return 0;
}
```

Output of the program

```
Address: 611-E Bhai Randhir Singh Nagar Ludhiana(Punjab)-141012
```

3. Program to find the sum of two numbers

```
#include<stdio.h>
int addnum(int a,int b);
void main()
{
        int a,b;
        printf("Enter two numbers:\n ");
        scanf("%d",&a);
        scanf("%d",&b);
        int s=addnum(a,b);
        printf("Sum= %d\n",s);
}
int addnum(int a,int b)
{
        int s=a+b;
        return s;
}
```

Output of the program

```
Enter two numbers:
5
8
Sum= 13
```

4. Program to Convert Celsius temperature to Fahrenheit temperature

```
#include<stdio.h>
int main()
{
        float f,c;
        printf("Enter the temperature in Celsius= ");
        scanf("%f",&c);
        f=(c*9/5)+32;
        printf("Temperature in Fahrenheit= %.2f\n",f);
        return 0;
}
```

Output of the program

```
Enter the temperature in Celsius= 37
Temperature in Fahrenheit= 98.60
```

5. Program to find Area and Perimeter of circle

```
#include<stdio.h>
int main()
{
        float r,area,perimeter;
        printf("Enter the radius of circle: ");
        scanf("%f",&r);
        area=3.14*r*r;
        perimeter=2*3.14*r;
        printf("Area of the circle: %.2f\n",area);
        printf("Perimeter of the circle: %.2f\n",perimeter);
        return 0;
}
```

Output of the program

```
Enter the radius of circle: 5
Area of the circle: 78.50
Perimeter of the circle: 31.40
```

6. Program to swap two numbers without using a third variable

```
#include <stdio.h>
int main()
{
        int a,b;
        printf("Enter the value of a and b: ");
        scanf("%d%d",&a,&b);
        a=a+b;
        b=a-b;
        a=a-b;
        printf("Value of a is %d and b is %d\n",a,b);
}
```

Output of the program

```
Enter the value of a and b: 5 10
Value of a is 10 and b is 5
```

7. Program to find whether the number is even or odd

```
#include<stdio.h>
int check(int a);
int main()
{
        int num;
        printf("Enter the number: ");
        scanf("%d",&num);
        int s=check(num);
        return 0;
}
int check(int a)
{
        int s1=a%2;
        if(s1==0)
        printf("Number is even\n");
        else
        printf("Number is odd\n");
        return s1;
}
```

Output of the program

```
Enter the number: 5
Number is odd
```

8. Program to find the Factorial of an number

```
#include<stdio.h>
int main()
{
        int n,i,p=1;
        printf("Enter the number: ");
        scanf("%d",&n);
        for(i=1;i<=n;i++)
        {
                p=p*i;
        }
        printf("Factorial of %d is %d\n",n,p);
        return 0;
}
```

Output of the Program

```
Enter the number: 5
Factorial of 5 is 120
```

9. Program to Reverse a number

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

Output of the Program

```
Enter the number: 586
Reverse of 586 is 685
```

10. Program to play Fizzbuzz

```
#include<stdio.h>
void main()
{
        int a,i;
        printf("Enter the limit: ");
        scanf("%d",&a);
        for(i=1;i<=a;i++)
        {
                if(i%3==0&&i%5!=0)
                printf("fizz\n");
                if(i%5==0&&i%3!=0)
                printf("buzz\n");
                if(i%3==0&&i%5==0)
                printf("fizzbuzz\n");
                if(i%3!=0&&i%5!=0)
                printf("%d\n",i);
        }
        return 0;
}
```

Output of the program

```
Enter the limit: 15
1
2
fizz
4
buzz
fizz
7
8
fizz
buzz
11
fizz
13
14
fizzbuzz
```

11. Program to find the days of week using Switch Case

```
#include<stdio.h>
int main()
{
    int number;
    printf("Enter an number to print days of the week  (1, 2, 3, 4, 5, 6, 7): ");
    scanf("%d", &number);
    switch(number)
    {
        case 1:
            puts("Monday");
            break;
        case 2:
            puts("Tuesday");
            break;
        case 3:
            puts("Wednesday");
            break;
        case 4:
            puts("Thursday");
            break;
        case 5:
            puts("Friday");
            break;
        case 6:
            puts("Saturday");
            break;
        case 7:
            puts("Sunday");
            break;
        default:
            printf("Error! keyword is not correct\n");
    }

    return 0;
}
```

Output of a program

```
Enter an number to print days of the week  (1, 2, 3, 4, 5, 6, 7): 5
Friday
```

12. Program to make a simple calculator using Switch case

```
# include <stdio.h>
int main() {
    char operator;
    double a,b;
    printf("Enter an operator (+, -, *,/): ");
    scanf("%c", &operator);
    printf("Enter two operands: \n");
    scanf("%lf %lf",&a, &b);
    switch(operator)
    {
        case '+':
            printf("%.2f + %.2f = %.2f\n",a, b, a + b);
            break;
        case '-':
            printf("%.2f - %.2f = %.2f\n",a, b, a - b);
            break;
        case '*':
            printf("%.2f * %.2f = %.2f\n",a, b, a * b);
            break;
        case '/':
            printf("%.2f / %.2f = %2f\n",a, b, a / b);
            break;
        default:
            printf("Error! operator is not correct\n");
    }

    return 0;
}
```

Output of the Program

```
Enter an operator (+, -, *,/): *
Enter two operands:
5
7
5.00 * 7.00 = 35.00
```

13. Program to check Leap year

```
#include<stdio.h>
int main()
{
        int y;
        printf("Enter the year= ");
        scanf("%d",&y);
        if(y%4==0)
        printf("It is a leap year\n");
        else
        printf("It is not a leap year\n");
        return 0;
}
```

Output of the program

```
Enter the year= 2000
It is a leap year
```

14. Program to check Prime number

```
#include<stdio.h>
int main()
{
        int a,i,c=0;
        printf("Enter the number\n");
        scanf("%d",&a);
        for(i=1;i<=a;i++)
        {
                if(a%i==0)
                c++;
        }
        if(c==2)
        printf("Number is prime\n");
        else
        printf("Number is not prime\n");
        return 0;
}
```

Output of the program

```
Enter the number
5
Number is prime
```

15. Program to check Palindrome number

```
#include<stdio.h>
int main()
{
        int n,t,a,b=0;
        printf("Enter the number\n");
        scanf("%d",&n);
        t=n;
        while(n!=0)
        {
                a=n%10;
                b=b*10+a;
                n=n/10;
        }
        if(b==t)
        printf("Number is palindrome\n");
        else
        printf("Number is not palindrome\n");
        return 0;
}
```

Output of the Program

```
Enter the number
121
Number is palindrome
```

16. Program to check Palindrome word

```
#include<stdio.h>
#include<string.h>
int main()
{
        char a[100],b[100],c[100];
        printf("Enter the word: ");
        scanf("%s",a);
        strcpy(c,a);
        int l=strlen(a);
        for(int i=1;i<=l;i++)
        b[i]=a[l-i];
        if(strcmp(b,c)==0)
        printf("Word is Palindrome\n");
        else
        printf("Word is not Palindrome\n");
}
```

Output of the program

```
Enter the word: madam
Word is Palindrome
```

17. Program to print Fibonnacci Series

```
#include <stdio.h>
int main()
{
        int n,a=0,b=1,c=0,i;
        printf("Enter ther limit of series ");
        scanf("%d",&n);
        printf("%d %d ",a,b);
        for(i=2;i<=n;i++)
        {
                c=a+b;
                printf("%d ",c);
                a=b;
                b=c;
        }
        printf("\n");
        return 0;
}
```

Output of the program

```
Enter ther limit of series 15
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610
```

18. Program to enter elements and display a 1D array

```
#include<stdio.h>
int main()
{
        int a[100],n;
        printf("Enter the limit of array: ");
        scanf("%d",&n);
        printf("Enter the elements for array:\n");
        for(int i=1;i<=n;i++)
        scanf("%d",&a[i]);
        printf("Array\n");
        for(int i=1;i<=n;i++)
        printf("%d ",a[i]);
        printf("\n");
        return 0;
}
```

Output of the program

```
Enter the limit of array: 5
Enter the elements for array:
2
2
4
5
7
Array
2 2 4 5 7
```

19. Program to enter elements and display a 2D array

```
#include<stdio.h>
int main()
{
        int a[3][3];
        printf("Enter the value for 3*3 matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&a[i][j]);
        }
        printf("Matrix A\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
}
```

Output of the program

```
Enter the value for 3*3 matrix
5
2
1
4
5
7
5
8
9
Matrix A
5       2       1
4       5       7
5       8       3
```

20. Program to Add two matrices

```
#include <stdio.h>
int main()
{
        int a[3][3],b[3][3],c[3][3];
        printf("Enter the value for first matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&a[i][j]);
        }
        printf("Enter the value for second matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&b[i][j]);
        }
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                c[i][j]=a[i][j]+b[i][j];
        }
        printf("First Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        printf("Second Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",b[i][j]);
                printf("\n");
        }
        printf("Result of Addition of Two Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",c[i][j]);
                printf("\n");
        }
}
```

Output of the program

```
Enter the value for first matrix
5
2
3
6
4
1
2
5
7
Enter the value for second matrix
4
5
1
7
8
6
5
1
2
First Matrix
5       2       3
6       4       1
2       5       7
Second Matrix
4       5       1
7       8       6
5       1       2
Result of Addition of Two Matrix
9       7       4
13      12      7
7       6       9
```

21. Program to find Transpose of a matrix

```
#include <stdio.h>
int main()
{
        int a[3][3],b[3][3],c[3][3];
        printf("Enter the value for matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&a[i][j]);
        }
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                c[j][i]=a[i][j];
        }
        printf("First Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        printf("Result of Transpose of Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",c[i][j]);
                printf("\n");
        }
}
```

Output of the program

```
Enter the value for matrix
2
5
4
7
8
9
6
4
5
Matrix
2       5       4
7       8       9
6       4       5
Result of Transpose of Matrix
2       7       6
5       8       4
4       9       5
```

22. Program to find Substraction of two matrices

```
#include <stdio.h>
int main()
{
        int a[3][3],b[3][3],c[3][3];
        printf("Enter the value for first matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&a[i][j]);
        }
        printf("Enter the value for second matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&b[i][j]);
        }
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                c[i][j]=a[i][j]-b[i][j];
        }
        printf("First Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        printf("Second Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",b[i][j]);
                printf("\n");
        }
        printf("Result of Subtraction of Two Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",c[i][j]);
                printf("\n");
        }
}
Output of the program
Enter the value for first matrix
5
2
1
4
7
```

```
8
6
5
4
Enter the value for second matrix
2
1
7
5
4
7
6
3
1
First Matrix
5       2       1
4       7       8
6       5       4
Second Matrix
2       1       7
5       4       7
6       3       1
Result of Subtraction of Two Matrix
3       1       -6
-1      3       1
0       2       3
```

23. Program to find multiplication of two matrices

```
#include <stdio.h>
int main()
{
        int a[3][3],b[3][3],c[3][3],sum;
        printf("Enter the value for first matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&a[i][j]);
        }
        printf("Enter the value for second matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                scanf("%d",&b[i][j]);
        }
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                {
                        sum=0;
                        for(int k=1;k<=3;k++)
                        sum=sum+a[i][k]*b[k][j];
                        c[i][j]=sum;
                }
        }
        printf("First Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",a[i][j]);
                printf("\n");
        }
        printf("Second Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",b[i][j]);
                printf("\n");
        }
        printf("Result of Multiplication of Two Matrix\n");
        for(int i=1;i<=3;i++)
        {
                for(int j=1;j<=3;j++)
                printf("%d\t",c[i][j]);
                printf("\n");
        }
}
```

Output of the program

```
Enter the value for first matrix
2
3
4
5
1
4
7
2
3
Enter the value for second matrix
2
3
1
4
5
2
3
4
5
First Matrix
2       3       4
5       1       4
7       2       3
Second Matrix
2       3       1
4       5       2
3       4       5
Result of Multiplication of Two Matrix
28      37      28
26      36      27
31      43      26
```

24. Program to find square of a number using function

```
#include<stdio.h>
int square(int x);
int main()
{
        int n,s;
        printf("Enter the number: ");
        scanf("%d",&n);
        s=square(n);
        printf("Square of %d= %d\n",n,s);
}
int square(int x)
{
        int s=x*x;
        return s;
}
```

Output of the program

```
Enter the number: 5
Square of 5= 25
```

25. Program to swap two numbers using call by value

```
#include <stdio.h>
void swap(int, int);
int main()
{
        int x, y;
        printf("Enter the value of x and y\n");
        scanf("%d%d",&x,&y);
        printf("Before Swapping\nx = %d\ny = %d\n", x, y);
        swap(x, y);
        printf("After Swapping\nx = %d\ny = %d\n", x, y);
        return 0;
}
void swap(int a, int b)
{
        int temp;
        temp = b;
        b = a;
        a = temp;
}
```

Output of the program

```
Enter the value of x and y
5
3
Before Swapping
x = 5
y = 3
After Swapping
x = 5
y = 3
```

26. Program to swap two numbers using call by reference

```
#include <stdio.h>
void swap(int * num1, int * num2);
int main()
{
        int num1, num2;
        printf("Enter two numbers: ");
        scanf("%d%d", &num1, &num2);
        printf("Before swapping in main n");
        printf("Value of num1 = %d \n", num1);
        printf("Value of num2 = %d \n\n", num2);
        swap(&num1, &num2);
        printf("After swapping in main n");
        printf("Value of num1 = %d \n", num1);
        printf("Value of num2 = %d \n\n", num2);
        return 0;
}
void swap(int * num1, int * num2)
{
        int temp;
        temp = *num1;
        *num1= *num2;
        *num2= temp;
}
```

Output of the program

```
Enter two numbers: 5
3
Before swapping in main nValue of num1 = 5
Value of num2 = 3

After swapping in main nValue of num1 = 3
Value of num2 = 5
```

27. Program to find Factorial of a number using recursion

```
#include <stdio.h>
int factorial(int n);
int main()
{
        int n;
        printf("Enter the number: ");
        scanf("%d", &n);
        printf("Factorial of %d = %ld\n", n,factorial(n));
        return 0;
}
int factorial(int n)
{
        if (n>=1)
        return n*factorial(n-1);
        else
        return 1;
}
```

Output of the program

```
Enter the number: 5
Factorial of 5 = 120
```

28. Program to print Fibonnicci Series using recursion

```
#include<stdio.h>
int Fibonacci(int);
int main()
{
        int n,i=0;
        printf("Enter the limit: ");
        scanf("%d",&n);
        printf("Fibonacci series\n");
        for(int j=0;j<=n;j++)
        {
                printf("%d ",Fibonacci(i));
                i++;
        }
        printf("\n");
        return 0;
}
int Fibonacci(int n)
{
        if(n==0)
        return 0;
        else if(n==1)
        return 1;
        else
        return ( Fibonacci(n-1) + Fibonacci(n-2) );
}
```

Output of the program

```
Enter the limit: 15
Fibonacci series
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610
```

29. Program to enter elements in a structure and display them

```
#include <stdio.h>
struct patient
{
        char name[10];
        float age;
        char gender;
};
int main()
{
        struct patient p;
        printf("Enter the name: ");
        scanf("%s",p.name);
        printf("Enter the age: ");
        scanf("%f",&p.age);
        printf("Enter the gender: ");
        scanf(" %c",&p.gender);
        printf("%s of age %.2f of gender %c is having liver disease\n",p.name,p.age,p.gen
        return 0;
}
```

Output of the program

```
Enter the name: Manik
Enter the age: 43
Enter the gender: M
Manik of age 43.00 of gender M is having liver disease
```