PRACTICAL FILE ON

INTODUCTION TO COMPUTERS AND PROGRAMING IN C [ES202]

SUBMITTED TO: DR. RAJNI SEHGAL

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B.Tech. CSE-6

COMPUTER SCIENCE AND ENGINEERING AMITY SCHOOL OF ENGINEERING &TECHNOLOGY AMITY UNIVERSITY, UTTAR PRADESH SESSION- 2020-2021

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Note: Ignore leap year. Test Data : Number of days : 1329-3 years,33 weeks and 3 days (c) Write a C program to check whether a number is even or odd. 7. Write a C program to check whether a given year is Leap year or not 8. (a) Write a C program to check whether a triangle is Equilateral, scalene, or isosceles (b) Write a C program to check whether a triangle is right angles, obtuse, acute triangle 9. Write a C program to covert temperature from Fahrenheit to Celsius and Celsius to Fahrenheit (User must provide the choice of type of temperature) 10. (a) Write a C program to check whether a character is an alphabet, digit (b) Write a C program a program to check whether an alphabet is a vowel or consonant 11. (a) Write a C program to find smallest of two numbers (b) Write a C program to find largest of three numbers 12. Write a program in C to implement Simple Calculator.				

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16. Write a program in C to calculate and print the Electricity bill of a given customer. The customer id and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer. upto 199------------1.20 200-500-------------1.80 Above 500----------2.00 If bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be of Rs. 100/-				
17. A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days, fine is one rupee and above 10 days, fine is 5 rupees. If you return the book after 30 days your				

membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or appropriate message. 18. Write a program to find the factorial of any number. 19. Write a program to print Fibonacci sequence 0 1 1 2 3 5 8 13…… N terms and prints the sum of sequence. 20. Write a program in C to accept an integer numbers and find sum of digits. 21. Write a program in C to accept an integer numbers and find reverse of this number and check this number for palindrome 22. Write a program in C to accept an integer numbers and to check a number is Armstrong or not 23. Write a program in C to accept an integer numbers and to check a number is Perfect or not 24. Write a program to find the sum of following series: **S = 2+4+6+8+…………….N terms.**				

25. Write a program to check a number whether it is prime number or not.				
26. Write a program to find the sum of following series: $1 - 1/2 + 1/3 - 1/4 + 1/5 - \ldots$ up to n terms.				
27. Write a program to find the sum of following series: $1! + 2! + 3! + 4! + \ldots + n!$				
28. Write a program to find the sum of following series: $S = -13 + 33 - 53 + 73 - 93 + 113 - \ldots N$ terms.				
29. Write a program to find the sum of following series: $S = 1/1! + 2/2! + 3/3! + \ldots$ 7 terms.				
30. Write a program to convert binary number to decimal number.				
31. Write a program to find the sum of following series: $S = 14 + 34 + 54 + 74 + \ldots$ 100 terms				
32. Write a program in C to print the following pattern: * * * * * * * * *				

33. Write a program in C to print the following pattern: 1 2 3 1 2 3 1 2 3				
34. Write a program in C to print the following pattern: 1 1 1 2 2 2 3 3 3				
35. Write a program in C to print the following pattern: 3 2 1 3 2 1 3 2 1				
36. Write a program in C to print the following pattern: 3 3 3 2 2 2 1 1 1				
37. Write a program in C to print the following pattern: * * *				

```
  *
    *      *
```

38. Write a program in C to print the following pattern:

```
1

1       2

1       2   3
```

39. Write a program in C to print the following pattern:

```
1

2    2

3   3   3
```

40. Write a program in C to print the following pattern:

```
3

3    2

3   2   1
```

41. Write a program in C to print the following pattern:

```
3

2    2

1   1   1
```

42. Write a program in C to print the following pattern:

```
              *
```

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

43. Write a program in C to print the following pattern:
```
      1
    1 2 1
  1 2 3 2 1
1 2 3 4 3 2 1
```

44. Write a program in C to print the following pattern:
```
        5
      5 4 5
    5 4 3 4 5
  5 4 3 2 3 4 5
5 4 3 2 1 2 3 4 5
```

45. Write a program in C to print the following pattern
```
1
0 1
1 0 1
0 1 0 1
1 0 1 0 1
```

46. Write a program to print all prime numbers <= a given number.

47. Write a program to convert Decimal no to Binary No.

48. Write a program to find product, sum, average, max and min from a list of n numbers.

49. Write a program in C to display the index of

smallest and largest element in 10 integers				
50. Write a program in C to display the index of smallest and largest element in 3 X 4 matrix of integers.				
51. Write a program in C that accepts N*N matrix as input and print transpose of this matrix				
52. Write a program to accept two matrices of some order. (Order must be given by user) find out the sum of these matrices and print the sum of matrices.				
53. Write a program to find out the product/Multiplication of two matrices and print the product matrix. (order of matrices must be given by user)				
54. Write a program to accept two matrices of some order. (Order must be given by user) find out the subtraction of these matrices and print the sum of matrices.				
55. Write a C Program to implement Simple Calculator (Addition, Subtraction, Multiplication, Division) using the concept of function				

56. Write a C Program to swap two values using function				
57. Write a C Program to Calculate the factorial of a number using function				
58. Write a C Program to Calculate the factorial of a number using recursion				

Q1. (a) Write a C program to add two numbers.
    (b) Write a C program to add three numbers.

(a)
```c
#include <stdio.h>

int main()
{
    int n1; int n2; int sum;
    printf("Enter first number:");
    scanf("%d", &n1);
    printf("\n Enter second number:");
    scanf("%d", &n2);
    sum = n1+n2;
    printf("\n The sum of two numbers is %d",sum);


}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter first number:12

 Enter second number:12

 The sum of two numbers is 24>
```

(b)
```c
#include <stdio.h>
int main()
{
    int n1,n2,n3; int sum;
    printf("Enter first number: ");
    scanf("%d", &n1);
    printf("\n Enter second number: ");
    scanf("%d", &n2);
    printf("\n Enter third number: ");
    scanf("%d", &n3);
    sum = n1+n2+n3;
    printf("\n The sum of two numbers is %d",sum);

}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter first number:1

 Enter second number:2

 Enter third number:3

 The sum of two numbers is 6>
```

Q2. (a) Write a C program to find area of circle
(b) Write a C program to calculate simple interest

(a)

```c
#include <stdio.h>


main()
{
    float r; float ar;
    printf("Enter radius:\n");
    scanf("%f", &r);
    ar = 3.14*r*r;
    printf("\n The area of the circle is %f ", ar);



}
```
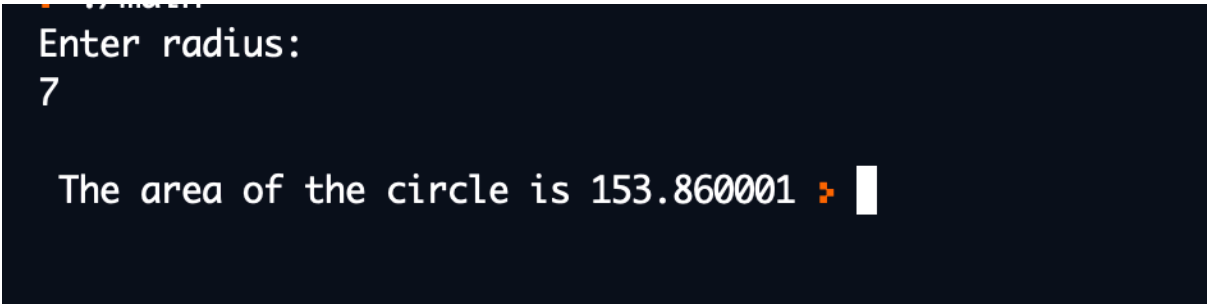

OUTPUT:

```
Enter radius:
7

 The area of the circle is 153.860001 ﹥
```

(b)
```c
#include <stdio.h>
int main()
{
    float p,r,t;
    printf("Enter principle:");
    scanf("%f", &p);
    printf("\nEnter rate:");
    scanf("%f", &r);
    printf("\nEnter time:");
    scanf("%f", &t);
    printf("\n Simple Interest: %.2f",p*r*t/100.0);

}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter principle:100

Enter rate:8

Enter time:2

 Simple Interest: 16.00>
```

Q3. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
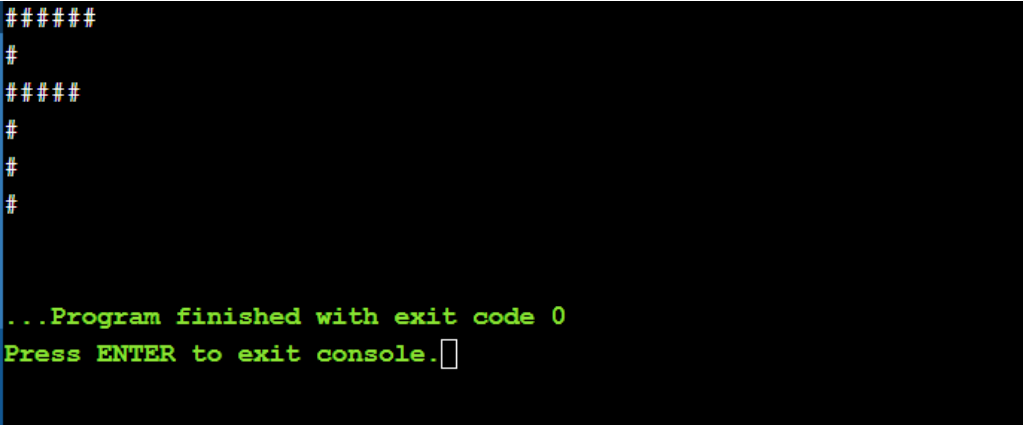
```c
#include <stdio.h>

int main()
{

    printf("######\n#\n#####\n#\n#\n#\n ");


    return 0;

}
```

OUTPUT:

```
######
#
#####
#
#
#

...Program finished with exit code 0
Press ENTER to exit console.
```

Q4. Write a C program that accepts two item's weight (floating points' values) and number of purchase (floating points' values) and calculate the average value of the items.

```c
#include <stdio.h>

int main()
{
   float a,b;
 int n1,n2;
   printf("Enter weight of article 1: ");
   scanf("%f", &a);
   printf("\nEnter weight of article 2: ");
   scanf("%f", &b);
   printf("\nEnter number of article 1: ");
   scanf("%d", &n1);
   printf("\nEnter number of article 2: ");
   scanf("%d", &n2);
   printf("Average: %f",((a*n1)+(b*n2))/(n1+n2));
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter weight of article 1: 12

Enter weight of article 2: 45

Enter number of article 1: 10

Enter number of article 2: 10
Average: 28.500000>
```

Q5. (a) Write a C program to swap two variables using   a third variable.
(b) Write a C program to swap two variables without using a third variable.

(a)
#include <stdio.h>

int main()

{

   int a;int b;int t;

   printf("Enter first number:");

   scanf("%d",&a);

   printf("Enter second number:");

   scanf("%d",&b);

   t = a;

   a = b;

   b = t;

   printf("Exchanged numbers are: %d , %d",a,b);

   return 0;
```

}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter first number:5
Enter second number:8
Exchanged numbers are: 8 , 5> █
```

(b)
```c
#include <stdio.h>

int main()
{
    int a;int b;int t;
    printf("Enter first number:")
    scanf("%d",&a);
    printf("Enter second number:")
    scanf("%d",&b);
a= a+b;
b=a-b;
a=a-b;
    printf("Exchanged numbers are: %d , %d",a,b);
    return 0;
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter first number:5
Enter second number:8
Exchanged numbers are: 8 , 5> █
```

Q6. (a) Write a C program to convert a given integer (in seconds) to hours and minutes.
(b) Write a C program to convert specified days into years, weeks, and days.
Note: Ignore leap year. Test Data: Number of days: 1329-3 years,33 weeks and 3 days
(c) Write a C program to check whether a number is even or odd.

(a)

```c
#include <stdio.h>
int main()
{
    int t,h,m,s;
    printf("Enter time in seconds: ");
    scanf("%d", &t);
    h=(int)(t/3600.0);
    m=(t%3600)/60;
    s=(t%3600)%60;
    printf("%dhr %dmin %dsec",h,m,s);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter time in seconds: 60
0hr 1min 0sec>
```

(b)

```c
#include <stdio.h>
int main()
{
    int t,y,m,d;
    printf("Enter days: ");
    scanf("%d", &t);
    y=(int)(t/365);
    m=(t%365)/7;
    d=(t%365)%7;
    printf("%dyears %dweeks %ddays",y,m,d);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter days: 30
0years 4weeks 2days>
```

(c)
```c
#include <stdio.h>
int main()
{
   int n;
   printf("Enter number: ");
   scanf("%d", &n);
   if(n%2==0)
    printf("%d is an Even number.",n);
   else
    printf("%d is an Odd number.",n);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number: 12
12 is an Even number.>
```

Q7. Write a C program to check whether a given year is Leap year or not.

```c
#include <stdio.h>
int main()
{
    int y;
    printf("Enter year: ");
    scanf("%d", &y);
    if (y % 400 == 0)
        printf("%d is a leap year.", y);
    else if (y % 100 == 0)
        printf("%d is not a leap year.", y);
    else if (y % 4 == 0)
        printf("%d is a leap year.", y);
    else
        printf("%d is not a leap year.", y);

}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter year: 2004
2004 is a leap year.>
```

Q8. (a) Write a C program to check whether a triangle is Equilateral, scalene, or isosceles.
(b) Write a C program to check whether a triangle is right angles, obtuse, acute triangle.

(a)
```c
#include <stdio.h>
int main()
{
   int a,b,c;
   printf("Enter side 1: ");
   scanf("%d", &a);
   printf("Enter side 2: ");
   scanf("%d", &b);
   printf("Enter side 3: ");
   scanf("%d", &c);
   if (a==b&&b==c)
     printf("EQUILATERAL TRIANGLE");
   else if (a==b||b==c)
     printf("ISOCELES TRIANGLE");
   else
     printf("SCALENE TRIANGLE");
```

}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter side 1: 12
Enter side 2: 12
Enter side 3: 8
ISOCELES TRIANGLE> 
```

(b)
```c
#include <stdio.h>
int main()
{
    int a,b,c;
    printf("Enter angle 1: ");
    scanf("%d", &a);
    printf("Enter angle 2: ");
    scanf("%d", &b);
    printf("Enter angle 3: ");
    scanf("%d", &c);
    if(a+b+c==180)
    {
    if (a==90||b==90||c==90)
     printf("RIGHT TRIANGLE");
    else if (a>90||b>90||c>90)
     printf("OBTUSE TRIANGLE");
    else
     printf("ACUTE TRIANGLE");
    }
    else
     printf("TRIANGLE NOT POSSIBLE!");

}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter angle 1: 45
Enter angle 2: 45
Enter angle 3: 90
RIGHT TRIANGLE>
```

Q9. Write a C program to covert temperature from Fahrenheit to Celsius and Celsius to Fahrenheit (User must provide the choice of type of temperature).

```c
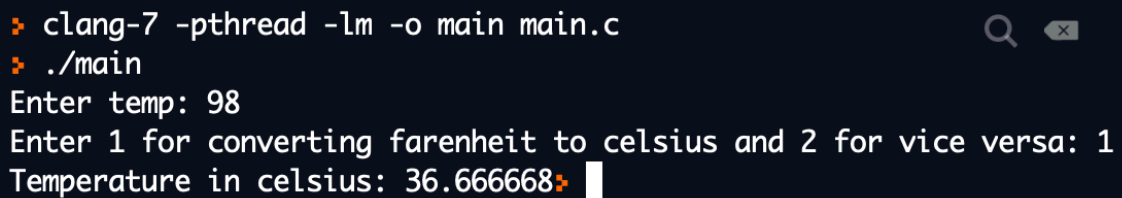#include <stdio.h>
int main()
{
    float t,r;
    int ch;
    printf("Enter temp: ");
    scanf("%f",&t);
    printf("Enter 1 for converting farenheit to celsius and 2 for vice versa: ");
    scanf("%d",&ch);
    if(ch==1)
    {
        r=(t-32)/1.8;
```

```c
        printf("Temperature in celsius: ");
    }
    else if(ch==2)
    {
        r=(1.8*t)+32;
        printf("Temperature in farenheit: ");
    }
    printf("%f",r);
    return 0;
}
```
OUTPUT:


```
> clang-7 -pthread -lm -o main main.c                    Q  ⌫
> ./main
Enter temp: 98
Enter 1 for converting farenheit to celsius and 2 for vice versa: 1
Temperature in celsius: 36.666668> █
```

Q10. (a) Write a C program to check whether a character is an alphabet OR digit.
(b) Write a C program a program to check whether an alphabet is a vowel or consonant.

(a)

```c
#include <stdio.h>
int main()
{
    char c;
    printf("Enter character: ");
    scanf("%c",&c);
    if(c>=65&&c<=90||c>=97&&c<=122)
     printf("It is an alphabet.");
    else if(c>=48&&c<=57)
     printf("It is a digit.");
    else
     printf("It is a special character.");

}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c                    Q  ⌫
> ./main
Enter character: t
It is an alphabet.> ▊
```

(b)

```c
#include <stdio.h>
int main()
{
   char c;
   printf("Enter character: ");
   scanf("%c",&c);
   if(c>=65&&c<=90 || c>=97&&c<=122)
   {
    if(c=='A'||c=='E'||c=='I'||c=='O'||c=='U'||c=='a'||c=='e'||c=='i'||c=='o'||c=='u')
     printf("'%c' is a vowel.",c);
    else
     printf("'%c' is a consonant.",c);
   }
   else
    printf("'%c' IS NOT AN ALPHABET",c);
 }
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter character: t
't' is a consonant.>
```
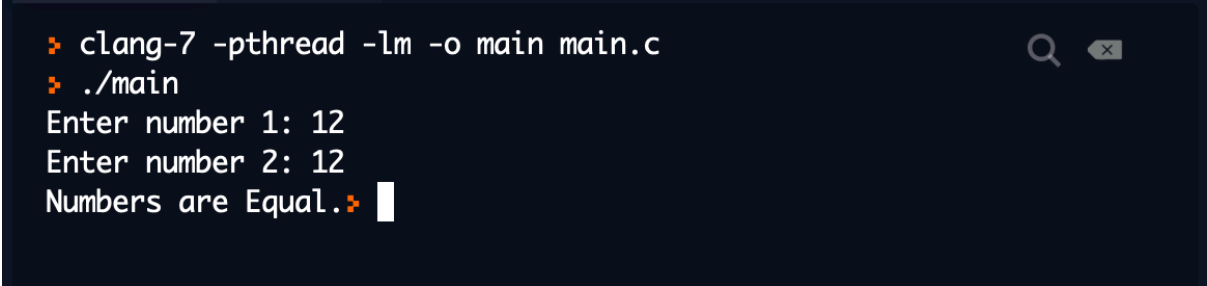
Q11. (a) Write a C program to find smallest of two numbers.
(b) Write a C program to find largest of three numbers.

(a)

```c
#include <stdio.h>
int main()
{
    int n1,n2;
    printf("Enter number 1: ");
    scanf("%d",&n1);
    printf("Enter number 2: ");
    scanf("%d",&n2);
    if(n1<n2)
     printf("%d is smaller among the two numbers.",n1);
    else if(n2<n1)
     printf("%d is smaller among the two numbers.",n2);
```

```
  else
    printf("Numbers are Equal.");
  }
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c          Q  ⌫
> ./main
Enter number 1: 12
Enter number 2: 12
Numbers are Equal.>
```

(b)

```c
#include <stdio.h>
int main()
{
  int n1,n2,n3;
  printf("Enter number 1: ");
  scanf("%d",&n1);
  printf("Enter number 2: ");
  scanf("%d",&n2);
  printf("Enter number 3: ");
  scanf("%d",&n3);
  if(n1>n2&&n1>n3)
   printf("%d is the greatest among the three numbers.",n1);
  else if(n2>n1&&n2>n3)
   printf("%d is the greatest among the three numbers.",n2);
  else if(n3>n1&&n3>n2)
   printf("%d is the  greatest among the three numbers.",n3);
  else
   printf("Numbers are equal.");
  }
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c          🔍  ⌫
> ./main
Enter number 1: 12
Enter number 2: 45
Enter number 3: 23
45 is the greatest among the three numbers.> ▮
```

Q12. Write a program in C to implement Simple Calculator.

```c
#include <stdio.h>
int main()
{
    char op;
    double a,b;
    printf("Enter an operator (+, -, *,/): ");
    scanf("%c", &op);
    printf("Enter two operands: ");
    scanf("%lf %lf", &a, &b);

    switch (op)
    {
    case '+': printf("%.2lf + %.2lf = %.2lf", a, b, a + b);
          break;
    case '-': printf("%.2lf - %.2lf = %.2lf", a, b, a - b);
          break;
    case '*': printf("%.2lf * %.2lf = %.2lf", a, b, a * b);
          break;
    case '/': printf("%.2lf / %.2lf = %.2lf", a, b, a / b);
          break;
```

```
    default : printf("Error! operator is not correct");
    }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter an operator (+, -, *,/): +
Enter two operands: 12
45
12.00 + 45.00 = 57.00>
```

Q13. WAP to calculate the root of a Quadratic Equation.

```
#include <math.h>
#include <stdio.h>
#include <stdlib.h>
void main()
{
  int a,b,c;
  printf("Enter value of a: ");
  scanf("%d",&a);
  printf("Enter value of b: ");
  scanf("%d",&b);
  printf("Enter value of c: ");
  scanf("%d",&c);
  if (a == 0)
    {
      printf("Invalid");
      return;
    }

    int d = b * b - 4 * a * c;
```

```c
    double sqrt_val = sqrt(abs(d));

    if (d > 0)
    {
        printf("Roots are real and different \n");
        printf("%f\n%f", (double)(-b + sqrt_val) / (2 * a),
               (double)(-b - sqrt_val) / (2 * a));
    }
    else if (d == 0)
    {
        printf("Roots are real and same \n");
        printf("%f", -(double)b / (2 * a));
    }
    else
    {
        printf("Roots are complex \n");
        printf("%f + i%f\n%f - i%f", -(double)b / (2 * a),
               sqrt_val, -(double)b / (2 * a), sqrt_val);
    }
}
```
OUTPUT:

```
Enter value of a: 1
Enter value of b: 2
Enter value of c: 1
Roots are real and same
-1.000000exit status 9
```

Q14. WAP to accept a coordinate point in a XY coordinate system and determine in which quadrant the coordinate point lies.

```c
#include<stdio.h>
void main()
{
    int a,b;
    printf("enter the co-ordinates\n");
    printf("Enter value: ");
    scanf("%d",&a);
    printf("Enter value: ");
    scanf("%d",&b);
    int *ptr1=&a;
    int *ptr2=&b;
    if(*ptr1>=0)
    {
        if(*ptr2>=0)
        {
            printf("first quadrant");
        }
        else
        {
```

```c
            printf("fourth quadrant");
        }
    }
    else
    {
        if(*ptr2>=0)
        {
            printf("second quadrant");
        }
        else
        {
            printf("third quadrant");
        }
    }
}
```

OUTPUT:

```
> ./main
enter the co-ordinates
Enter value: 12
Enter value: 12
first quadrantexit status 14
>
```

Q15. Write a program to find gross salary of employee if DA is 40% of basic Salary and HRA is 20% of basic salary. Basic salary will be entered as input by keyboard.

```c
#include <math.h>
void main()
{
  float bs;
  printf("Enter basic salary: ");
  scanf("%f",&bs);
  printf("Gross salary: %.2f",(bs+.4*bs+.2*bs));
}
```

OUTPUT:

```
> ./main
Enter basic salary: 1000
Gross salary: 1600.00exit status 21
```

Q16. Write a program in C to calculate and print the Electricity bill of a given customer. The customer id and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer.
up to 199------------1.20
200-500-------------1.80
Above 500----------2.00
If bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be of Rs. 100/-

```c
#include <math.h>
void main()
{
 char cid[30];float u,b;
 printf("Enter Customer ID: ");
 scanf("%s",&cid);
 printf("Enter number of units consumed: ");
 scanf("%f",&u);
 if(u<200)
  b=u*1.20;
 else if(u<500)
  b=(199*1.20)+(u-199)*1.80;
 else
  b=(199*1.20)+(301*1.50)+(u-500)*2.00;
 if(b<100)
  printf("BILL\nCUSTOMER ID: %s\nTotal Bill Amount: 100",cid);
```

```
  else if(b>400)
    printf("BILL\nCUSTOMER ID: %s\nTotal Bill Amount: %.2f",cid,1.15*b);
  else
  printf("BILL\nCUSTOMER ID: %s\nTotal Bill Amount: %.2f",cid,b);
}
```

OUTPUT:

```
 ./main
Enter Customer ID: 1234
Enter number of units consumed: 12
BILL
CUSTOMER ID: 1234
Total Bill Amount: 100exit status 45
```

Q17. A library charges a fine for every book returned late. For first 5 days the fine is 50 paisa, for 6-10 days, fine is one rupee and above 10 days, fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or appropriate message.

```
#include <math.h>
void main()
{
  int d;
  printf("Enter number of days late: ");
  scanf("%d",&d);
  if(d<=5)
    printf("Your fine is %.2f.",d*.50);
  else if(d<=10)
    printf("Your fine is %.2f.",2.50+(d-5)*1.00);
  else
    printf("Your fine is %.2f.",7.50+(d-10)*5);
  if(d>30)
    printf("\nYOUR MEMBERSHIP IS CANCELLED!");
}
```

OUTPUT:

```
3 warnings generated.
> ./main
Enter number of days late: 12
Your fine is 17.50.exit status 19
>
```

Q18. Write a program to find the factorial of any number.

#include <stdio.h>

int main(void) {
 int n;int f=1;
 printf("Enter number:");
 scanf("%d",&n);
 for(int i=n;i>0;--i)
  f*=i;
 printf("The factorial of %d is %d.",n,f) ;
 return 0;
}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number:5
The factorial of 5 is 120.>
```

Q19. Write a program to print Fibonacci sequence
0 1 1 2 3 5 8 13…… N terms and prints the sum of sequence.

```c
#include <stdio.h>

int main(void) {
 int n,n1=0,n2=1,n3,sum=1;
 printf("Enter number of terms to be displayed:\n");
 scanf("%d",&n);

 printf("%d,%d",n1,n2);
 for(int i=2;i<n;++i)
 {
  n3=n1+n2;
  sum+=n3;
  printf(",%d",n3);
  n1=n2;
  n2=n3;
 }
printf("\nSum of these numbers: %d",sum);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number of terms to be displayed:
10
0,1,1,2,3,5,8,13,21,34
Sum of these numbers: 88> █
```

Q20. Write a program in C to accept an integer numbers and find sum of digits.

```c
#include <stdio.h>
int sum=0;
int SoD(int n)
{
 if(n!=0)
 {
    sum+=n%10;
    SoD(n/10);
  }
    return sum;
 }

void main()
{
  int n;
```
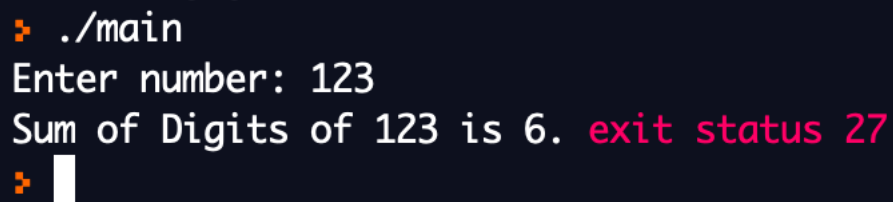
```c
    printf("Enter number: ");
    scanf("%d",&n);
    printf("Sum of Digits of %d is %d. ",n,SoD(n));


}
```

OUTPUT:

Q21. Write a program in C to accept an integer numbers and find reverse of this number and check this number for palindrome.

```c
#include <stdio.h>
int reverse(int n)
{
static int sum=0,rem;
 if(n!=0)
 {
    rem=n%10;
    sum=sum*10+rem;
    reverse(n/10);
  }
    return sum;
 }

void main()
```

```c
{
 int n;
 printf("Enter number: ");
  scanf("%d",&n);
  if(n==reverse(n))
   printf("%d is a Palindrome number.",n);
  else
   printf("%d is not a Palindrome number.",n);
}
```

OUTPUT:

```
Enter number: 121
121 is a Palindrome number.exit status 27
>
```

Q22. Write a program in C to accept an integer numbers and to check a number is Armstrong or not.

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

int main() {
  int n, t, r, a = 0;
  float ans = 0.0;
  printf("Enter an integer: ");
  scanf("%d", &n);
  t=n;
  for (t = n; t != 0; ++a)
    t /= 10;

 for (t = n; t != 0; t /= 10)
  {
    r = t % 10;
    ans += pow(r, a);
  }
  if ((int)ans == n)
```
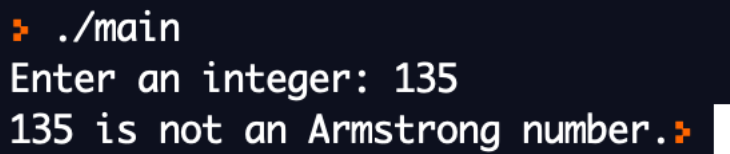
```
    printf("%d is an Armstrong number.", n);
   else
    printf("%d is not an Armstrong number.", n);
   return 0;
}
```

OUTPUT:

```
> ./main
Enter an integer: 135
135 is not an Armstrong number.>
```

Q23. Write a program in C to accept an integer numbers and to check a number is Perfect or not.

```
#include <stdio.h>
int main()
{
  int n,r, sum= 0;
  printf("Enter number: ");
  scanf("%d", &n);
 for (int i=1;i<=n/2;++i)
  if(n%i==0)
     sum+=i;
 if(sum==n)
  printf("%d is a Perfect Number.",n);
 else
  printf("%d is not a Perfect Number",n);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number: 145
145 is not a Perfect Number>
```

Q24. Write a program to find the sum of following series:
S = 2+4+6+8+……………N terms.


```c
#include <stdio.h>
int main()
{
  int n,sum= 0;
  printf("Enter number of terms to be added : ");
  scanf("%d", &n);
 for (int i=0,k=2;i<n;++i,k+=2)
  sum+=k;
 printf("Sum of the series: %d",sum);
}
```


OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number of terms to be added : 10
Sum of the series: 110>
```

Q25. Write a program to check a number whether it is prime number or not.

```c
#include <stdio.h>

int main(void) {
  int n;int f=0;
  printf("Enter number:");
  scanf("%d",&n);
  for(int i=2;i<=n/2;++i)
  {
    if(n%i==0)
    f=1;
```

```
  }
  if(f==0)
   printf("%d is a Prime number.",n);
  else
   printf("%d is not a Prime number.",n);


}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number:11
11 is a Prime number.>
```

Q26. Write a program to find the sum of following series:
1 – 1/2 + 1/3 – 1/4 + 1/5 - …… up to n terms.

```
#include <stdio.h>
int main ()
{
  int n;float sum= 0.0;
  printf("Enter number of terms to be added : ");
  scanf("%d", &n);
 for (int i=1;i<=n;++i)
  {
   if(i%2==0)
    sum-=1.0/i;
   else
    sum+=1.0/i;
  }
  printf("Sum of the series: %f",sum);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number of terms to be added : 20
Sum of the series: 0.668771>
```

Q27. Write a program to find the sum of following series:
1! + 2! + 3! + 4! + ….. + n!

```c
#include <stdio.h>
int fact(int a)
{
  if(a==0||a==1)
    return 1;
  else
    return a*fact(a-1);
}
int main()
{
  int n,sum= 0.0;
  printf("Enter number of terms to be added : ");
  scanf("%d", &n);
  for (int i=1;i<=n;++i)
  {
    sum+=fact(i);
  }
```

```
    printf("Sum of the series: %d",sum);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number of terms to be added : 10
Sum of the series: 4037913> █
```

Q28. Write a program to find the sum of following series:
$S = -1^3 + 3^3 - 5^3 + 7^3 – 9^3 + 11^3 -$ ……. N terms.

```c
#include <stdio.h>

int main()
{
  int n,sum= 0;
  printf("Enter number of terms to be added : ");
  scanf("%d", &n);
 for (int i=1,k=1;i<=n;++i,k+=2)
 {
   if(i%2!=0)
    sum-=k*k*k;
   else
    sum+=k*k*k;
 }
  printf("Sum of the series: %d",sum);
}
```

OUTPUT:

```
clang-7 -pthread -lm -o main main.c
./main
Enter number of terms to be added : 10
Sum of the series: 3970
```

Q29. Write a program to find the sum of following series:
S = 1/1! + 2/2! + 3/3! + ………….. n terms.

```c
#include <stdio.h>
float fact(int a)
{
 if(a==0||a==1)
  return 1.0;
 else
  return a*fact(a-1);
}
int main()
{
  int n;float sum= 0.0;
  printf("Enter number of terms to be added : ");
  scanf("%d", &n);
 for (int i=1;i<=n;++i)
 {
   sum+=i/fact(i);
 }
```

```c
    printf("Sum of the series: %f",sum);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number of terms to be added : 10
Sum of the series: 2.718282>
```

Q30. Write a program to convert binary number to decimal number.

```c
#include <stdio.h>
#include <math.h>
int main()
{
  char c[100];int n=-1,dec=0,k=0;
  printf("Enter number in Binary: ");
  scanf("%s", &c);
 for (int i=0;i<100;++i)
  {
    if(c[i]=='\0')
      break;
    else
      ++n;
  }

  for(int i=n;i>=0;--i)
   dec+=(c[i]-48)*(int)pow(2,k++);
   printf("The Decimal equivalent of the entered binary is: %d",dec);
}
```

OUTPUT:

```
>  ./main
Enter number in Binary: 11
The Decimal equivalent of the entered binary is: 3>
```

Q31. Write a program to find the sum of following series:
$S = 1^4 + 3^4 + 5^4 + 7^4 +$ ……………. 100 terms

```c
#include <stdio.h>

int main()
{
  int sum= 0;

  for (int i=1,k=1;i<=100;++i,k+=2)
     sum+=k*k*k*k;
  printf("Sum of the series: %d",sum);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Sum of the series: 1932562308>
```

Q32. Write a program in C to print the given pattern.
```
*       *       *
*       *       *
*       *       *
```

```c
#include <stdio.h>

int main()
{
  for(int i=0;i<3;++i)
  {
    for(int j=0;j<3;++j)
     printf("*\t");
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
*    *    *
*    *    *
*    *    *
>
```

Q33. Write a program in C to print the given pattern.
```
1       2       3
1       2       3
1       2       3
```

```c
#include <stdio.h>

int main()
{
  for(int i=0;i<3;++i)
  {
    for(int j=1;j<=3;++j)
     printf("%d\t",j);
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
1    2    3
1    2    3
1    2    3
>
```

Q34. Write a program in C to print the given pattern.
1   1   1
2   2   2
3   3   3

```c
#include <stdio.h>

int main()
{
  for(int i=1;i<=3;++i)
  {
    for(int j=1;j<=3;++j)
     printf("%d\t",i);
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
1    1    1
2    2    2
3    3    3
>
```

Q35. Write a program in C to print the given pattern.

```
3        2        1
3        2        1
3        2        1
```

```c
#include <stdio.h>

int main()
{
  for(int i=1;i<=3;++i)
  {
    for(int j=3;j>=1;--j)
     printf("%d\t",j);
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
3    2    1
3    2    1
3    2    1
>
```

Q36. Write a program in C to print the given pattern.

3	3	3
2	2	2
1	1	1

```c
#include <stdio.h>

int main()
{
  for(int i=3;i>=1;--i)
  {
    for(int j=3;j>=1;--j)
     printf("%d\t",i);
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
3   3   3
2   2   2
1   1   1
>
```

Q37. Write a program in C to print the given pattern.

```
.
.       .
.       .       .
```

#include <stdio.h>

int main()
{
  for(int i=1;i<=3;++i)
  {
    for(int j=1;j<=i;++j)
     printf("*\t");
     printf("\n");
  }
}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
*
*    *
*    *    *
>
```

Q38. Write a program in C to print the given pattern.

```
1
1        2
1        2        3
```

```c
#include <stdio.h>

int main()
{
  for(int i=1;i<=3;++i)
  {
    for(int j=1;j<=i;++j)
     printf("%d\t",j);
    printf("\n");
  }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
1
1   2
1   2   3
>
```

Q39. Write a program in C to print the given pattern.

```
1
2          2
3          3          3
```

#include <stdio.h>

int main()
{
  for(int i=1;i<=3;++i)
  {
    for(int j=1;j<=i;++j)
     printf("%d\t",i);
    printf("\n");
  }
}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
1
2   2
3   3   3
>
```

Q40. Write a program in C to print the given pattern.

```
3
3           2
3           2           1
```

#include <stdio.h>

int main()
{
  for(int i=3;i>=1;--i)
  {
    for(int j=3;j>=i;--j)
     printf("%d\t",j);
    printf("\n");
  }
}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
3
3   2
3   2   1
>
```

Q41. Write a program in C to print the given pattern.
```
3
2           2
1           1           1
```

#include <stdio.h>

int main()
{
  for(int i=3;i>=1;--i)
  {
    for(int j=3;j>=i;--j)
     printf("%d\t",i);
    printf("\n");
  }
}

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
3
2   2
1   1   1
>
```

Q42. Write a program in C to print the given pattern.

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

```
#include <stdio.h>
int main()
{
  int i, s, k = 0;
  for (i = 1; i <= 5; ++i, k = 0)
  {
    for (s = 1; s <= 5 - i; ++s)
    {
      printf("\t");
    }
    while (k != 2 * i - 1) {
      printf("*\t");
      ++k;
    }
    printf("\n");
```

```
    }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
                *
            *   *   *
        *   *   *   *   *
      *   *   *   *   *   *   *
   *   *   *   *   *   *   *   *   *
>
```

Q43. Write a program in C to print the given pattern.

```
                        1
                1       2       1
            1       2       3       2       1
        1       2       3       4       3       2       1
```

```c
#include <stdio.h>

void main()
{
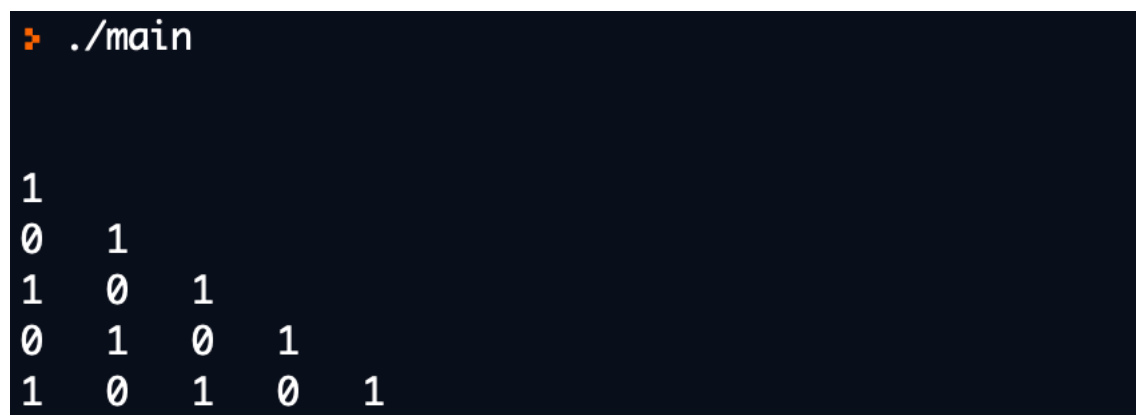  int i,j;
  for(i=0;i<=5;i++)
  {
    for(j=1;j<=5-i;j++)
        printf("\t");
    for(j=1;j<=i;j++)
      printf("%d\t",j);
    for(j=i-1;j>=1;j--)
```

```
        printf("%d\t",j);
    printf("\n");
    }
}
```

OUTPUT:

```
1 warning generated.
> ./main

                1
            1   2   1
        1   2   3   2   1
    1   2   3   4   3   2   1
1   2   3   4   5   4   3   2   1
```

Q44. Write a program in C to print the given pattern.

```
                        5
                5       4       5
            5   4       3       4       5
        5   4   3       2       3   4       5
    5   4   3   2       1       2   3   2   1
```

#include <stdio.h>

void main()

```
  {
    int i=1,j,k,l,m;
    for(i=1,m=5; i<=5,m>=1; i++,m--)

    {
        for(j=5-i; j>=1; j--)
         printf("\t");
        for(k=5; k>=6-i; k--)
```

```
        printf("%d\t",k);
        for(l=m+1; l<=5;l++)
         printf("%d\t",l);
        printf("\n");


      }
}
```

OUTPUT:

45. Write a program in C to print the given pattern.

```
1
0       1
1       0       1
0       1       0       1
1       0       1       0       1
```

```c
#include <stdio.h>

void main()
{
  int i,j;
  for(i=0;i<=6;i++)
 {
 for(j=1;j<i;j++)
  {
  if((i+j)%2==0)
   {
  printf("0\t");
   }
```

```c
 else
 {
 printf("1\t");
 }
 }
 printf("\n");
 }
}
```

OUTPUT:

```
> ./main


1
0   1
1   0   1
0   1   0   1
1   0   1   0   1
```

Q46.Write a program to print all prime numbers <= a given number.

```c
#include <stdio.h>
#include <stdbool.h>
bool prime(int n)
{
   int f=0;
   for(int i=2;i<=n/2;++i)
   {
    if(n%i==0)
    f=1;
   }
  if(f==0)
   return true;
 else
   return false;

}

int main()
```
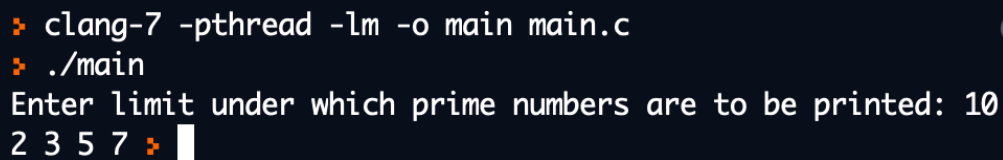
```
{
    int n;
    printf("Enter limit under which prime numbers are to be printed: ");
    scanf("%d",&n);
   for(int i=2;i<=n;++i)
    {
       if(prime(i))
        printf("%d ",i);
    }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c            Q  ⌫
> ./main
Enter limit under which prime numbers are to be printed: 10
2 3 5 7 > ▮
```

Q47. Write a program to convert Decimal number to Binary Number.
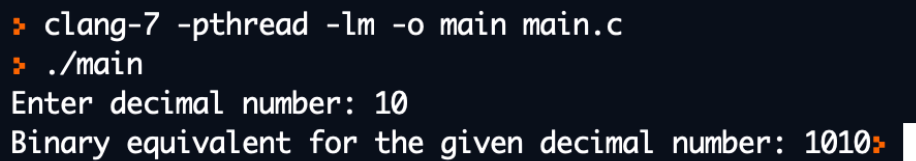
```
#include <stdio.h>
int main()
{
    int n;
    printf("Enter decimal number: ");
    scanf("%d",&n);
    int bin[32];
    int i = 0;
    while (n > 0)
    {
        bin[i] = n % 2;
        n = n / 2;
        i++;
    }
    printf("Binary equivalent for the given decimal number: ");
    for (int j = i - 1; j >= 0; j--)
```

```c
        printf("%d",bin[j]);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c          Q  ⌫
> ./main
Enter decimal number: 10
Binary equivalent for the given decimal number: 1010> █
```

Q48. Write a program to find product, sum, average, max and min from a list of n numbers.

```c
#include <stdio.h>
int main()
{
    int n,p=1;float s=0.0;
    printf("How many elements you want to enter: ");
    scanf("%d",&n);
    int arr[n];
    for(int i=0;i<n;++i)
    {
        printf("Enter element %d: ",i+1);
        scanf("%d",&arr[i]);
        p*=arr[i];
        s+=arr[i];
    }
    for (int c = 0 ; c < n - 1; c++)
    {
        for (int d = 0 ; d < n - c - 1; d++)
        {
```

```c
    if (arr[d] > arr[d+1])
     {
      int swap      = arr[d];
      arr[d]   = arr[d+1];
      arr[d+1] = swap;
     }
   }
 }
   printf("Product of elements: %d\nSum of elements: %d\nAverage of elements:
%f\nMaximum Value: %d\nMinimum Value: %d",p,(int)s,s/n,arr[n-1],arr[0]);
}
```

OUTPUT:

```
How many elements you want to enter: 2
Enter element 1: 12
Enter element 2: 9
Product of elements: 108
Sum of elements: 21
Average of elements: 10.500000
Maximum Value: 12
Minimum Value: 9▶ █
```

Q49. Write a program in C to display the index of smallest and largest element in 10 integers.

```c
#include <stdio.h>
int main()
{
 int a[10];
 for(int i=0;i<10;++i)
 {
    printf("Enter element %d: ",i);
    scanf("%d",&a[i]);
 }
 int s=0,h=0;
 for(int i=1;i<10;++i)
 {
    if(a[i]>a[h])
      h=i;
    else if(a[i]<a[s])
      s=i;
 }
 printf("Index of highest number: %d\nIndex for lowest number: %d",h,s);
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c                    Q  [x]
> ./main
Enter element 0: 10
Enter element 1: 21
Enter element 2: 12
Enter element 3: 35
Enter element 4: 123
Enter element 5: 483
Enter element 6: 1074
Enter element 7: 297
Enter element 8: 32097
Enter element 9: 287
Index of highest number: 8
Index for lowest number: 0>
```

Q50. Write a program in C to display the index of smallest and largest element in 3 X 4 matrix of integers.

```c
#include <stdio.h>
void main()
{
int a[3][4];
for(int i=0;i<3;++i)
{
 for(int j=0;j<4;++j)
 {
  printf("Enter element: ");
  scanf("%d",&a[i][j]);
 }
}
int h=0, hh=0, s=0, ss=0;
for(int i=0;i<3;++i)
{
 for(int j=0;j<4;++j)
 {
  if(a[i][j]>a[h][hh])
```

```c
     {h=i;hh=j;}
   else if(a[i][j]<a[h][hh])
    {s=i;ss=j;}
  }
 }
 printf("Index of highest number: (%d,%d)\nIndex of smallest number: (%d,%d)",h,hh,s,ss);
}
```
OUTPUT:

Q51. Write a program in C that accepts N*N matrix as input and print transpose of this matrix.

```c
#include <stdio.h>
void main()
{
 int n;
 printf("Enter size: ");
 scanf("%d",&n);
 int a[n][n];
 for(int i=0;i<n;++i)
 {
  for(int j=0;j<n;++j)
  {
   printf("Enter element: ");
   scanf("%d",&a[i][j]);
  }
 }
 printf("TRANSPOSE OF THE MATRIX IS:\n");
 for(int i=0;i<n;++i)
 {
  for(int j=0;j<n;++j)
```

```c
    printf("%d\t",a[j][i]);
   printf("\n");
 }
}
```

OUTPUT:

```
 ./main
Enter size: 3
Enter element: 1
Enter element: 2
Enter element: 3
Enter element: 4
Enter element: 5
Enter element: 6
Enter element: 7
Enter element: 8
Enter element: 9
TRANSPOSE OF THE MATRIX IS:
1   4   7
2   5   8
3   6   9
```

Q52. Write a program to accept two matrices of some order. (Order must be given by user) find out the sum of these matrices and print the sum of matrices.

```c
#include <stdio.h>
void main()
{
 int m,n;
 printf("Enter size: ");
 scanf("%d %d",&m,&n);
 int a[m][n],b[m][n];
 printf("ENTER ELEMENTS FOR MATRIX 1\n");
 for(int i=0;i<m;++i)
 {
  for(int j=0;j<n;++j)
  {
   printf("Enter element : ");
   scanf("%d",&a[i][j]);
  }
 }
 printf("\nENTER ELEMENTS FOR MATRIX 2\n");
```

```c
    for(int i=0;i<m;++i)
    {
    for(int j=0;j<n;++j)
     {
     printf("Enter element : ");
     scanf("%d",&b[i][j]);
     }
    }
 printf("SUM OF THE MATRICES IS:\n");
 for(int i=0;i<m;++i)
 {
  for(int j=0;j<n;++j)
   printf("%d\t",a[i][j]+b[i][j]);
  printf("\n");
 }
}
```

OUTPUT:

```
> ./main
Enter size: 3
3
ENTER ELEMENTS FOR MATRIX 1
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Enter element : 6
Enter element : 7
Enter element : 8
Enter element : 9

ENTER ELEMENTS FOR MATRIX 2
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4
Enter element : 5
Enter element : 6
Enter element : 7
Enter element : 8
Enter element : 9
SUM OF THE MATRICES IS:
2   4   6
8   10  12
14  16  18
```

Q53. Write a program to find out the product/Multiplication of two matrices and print the product matrix. (order of matrices must be given by user).

#include <stdio.h>

```c
void main()
{
int m,n;
printf("Enter size: ");
scanf("%d %d",&m,&n);
int a[m][n],b[m][n],c[m][n];
printf("ENTER ELEMENTS FOR MATRIX 1\n");
for(int i=0;i<m;++i)
 {
 for(int j=0;j<n;++j)
  {
  printf("Enter element : ");
  scanf("%d",&a[i][j]);
  }
 }
 printf("\nENTER ELEMENTS FOR MATRIX 2\n");
 for(int i=0;i<m;++i)
 {
 for(int j=0;j<n;++j)
  {
  printf("Enter element : ");
  scanf("%d",&b[i][j]);
  }
 }
 for(int i=0;i<m;++i)
 {
 for(int j=0;j<n;++j)
   {
    c[i][j]=0;
    for(int k=0;k<n;++k)
     c[i][j]+=a[i][k]*b[k][j];
   }
 }
 printf("\nPRODUCT OF THE MATRICES:\n");
 for(int i=0;i<m;++i)
  {
  for(int j=0;j<n;++j)
    printf("%d\t",c[i][j]);
  printf("\n");
  }
}
OUTPUT:
```

```
> ./main
Enter size: 2
2
ENTER ELEMENTS FOR MATRIX 1
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4

ENTER ELEMENTS FOR MATRIX 2
Enter element : 5
Enter element : 6
Enter element : 7
Enter element : 8

PRODUCT OF THE MATRICES:
19  22
43  50
```

Q54. Write a program to accept two matrices of some order. (Order must be given by user) find out the subtraction of these matrices and print the sum of matrices.

```c
#include <stdio.h>
void main()
{
int m,n;
printf("Enter size: ");
scanf("%d %d",&m,&n);
int a[m][n],b[m][n];
printf("ENTER ELEMENTS FOR MATRIX 1\n");
for(int i=0;i<m;++i)
{
for(int j=0;j<n;++j)
{
printf("Enter element : ");
scanf("%d",&a[i][j]);
}
}
printf("\nENTER ELEMENTS FOR MATRIX 2\n");
for(int i=0;i<m;++i)
{
for(int j=0;j<n;++j)
{
printf("Enter element : ");
scanf("%d",&b[i][j]);
}
}
printf("DIFFERENCE OF THE MATRICES IS:\n");
for(int i=0;i<m;++i)
{
for(int j=0;j<n;++j)
printf("%d\t",a[i][j]-b[i][j]);
printf("\n");
}
}
```

OUTPUT:

```
> ./main
Enter size: 2
2
ENTER ELEMENTS FOR MATRIX 1
Enter element : 1
Enter element : 2
Enter element : 3
Enter element : 4

ENTER ELEMENTS FOR MATRIX 2
Enter element : 5
Enter element : 6
Enter element : 7
Enter element : 8
DIFFERENCE OF THE MATRICES IS:
-4  -4
-4  -4
```

Q55. Write a C Program to implement Simple Calculator (Addition, Subtraction, Multiplication, Division) using the concept of function.

```c
#include <stdio.h>
void add(double a,double b)
{
  printf("%.2lf + %.2lf = %.2lf", a, b, a + b);
}
void sub(double a,double b)
{
  printf("%.2lf - %.2lf = %.2lf", a, b, a - b);
}
void pro(double a,double b)
{
 printf("%.2lf * %.2lf = %.2lf", a, b, a * b);
}
void div(double a,double b)
{
  printf("%.2lf / %.2lf = %.2lf", a, b, a / b);
}
int main()
 {
   char op;
   double a,b;
   printf("Enter an operator (+, -, *,/): ");
   scanf("%c", &op);
   printf("Enter two operands: ");
   scanf("%lf %lf", &a, &b);

   switch (op)
   {
   case '+': add(a,b);
         break;
   case '-': sub(a,b);
         break;
   case '*': pro(a,b);
         break;
   case '/': div(a,b);
         break;
   default : printf("Error! operator is not correct");
   }
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter an operator (+, -, *,/): -
Enter two operands: 23
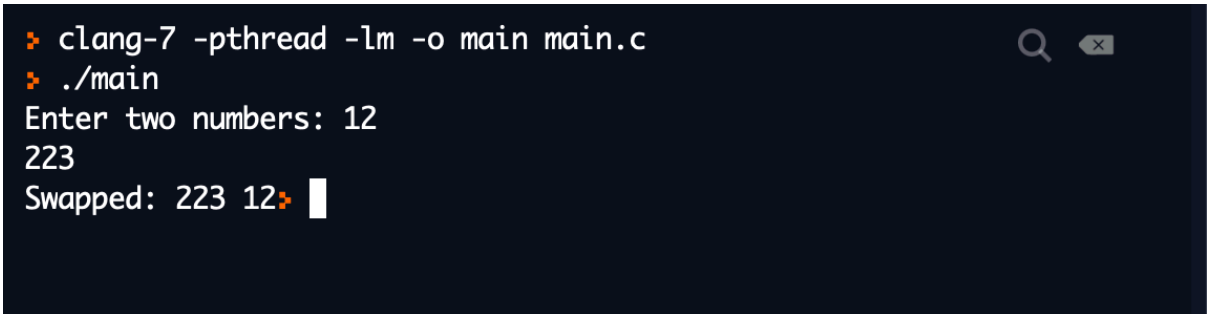45
23.00 - 45.00 = -22.00>
```

Q56. Write a C Program to swap two values using function.

```c
#include <stdio.h>
void swap(int a,int b)
{
 a=a+b;
 b=a-b;
 a=a-b;
 printf("Swapped: %d %d",a,b);
 }
int main(void) {
 int a,b;
 printf("Enter two numbers: ");
 scanf("%d",&a);
 scanf("%d",&b);
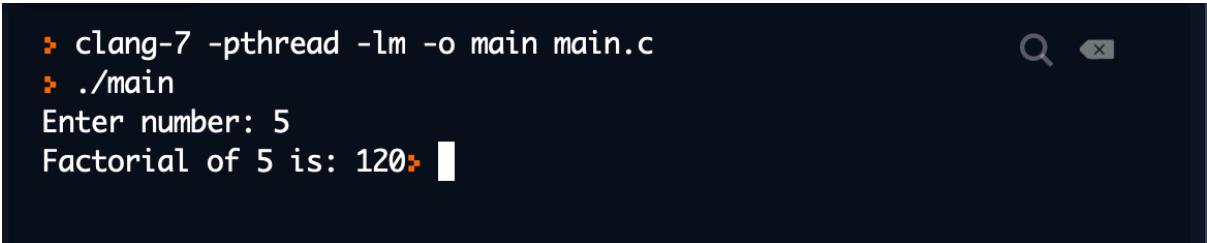 swap(a,b);
 return 0;
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c          Q  ⌫
> ./main
Enter two numbers: 12
223
Swapped: 223 12>
```

Q57. Write a C Program to Calculate the factorial of a number using function.

```c
#include <stdio.h>
int fact(int n)
{
  int f=1;
if(n==0||n==1)
 return 1;
else
 {
  for(int i=n;i>0;--i)
   f*=i;
  return f;
 }
}
int main()
 {
   int n;
   printf("Enter number: ");
   scanf("%d",&n);
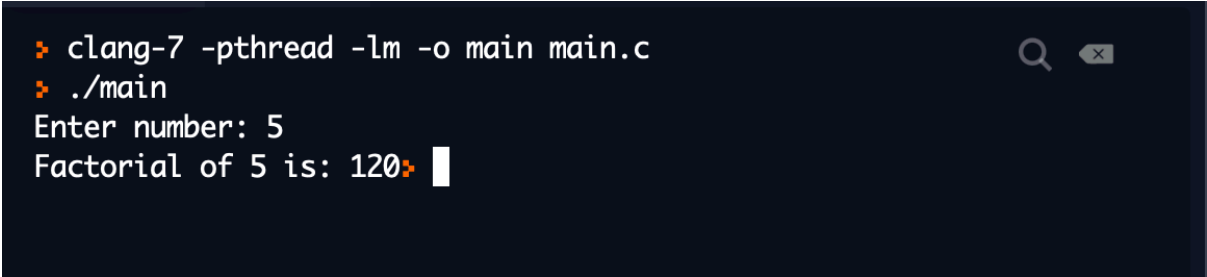   printf("Factorial of %d is: %d",n,fact(n));
}
```

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number: 5
Factorial of 5 is: 120>
```

Q58. Write a C Program to Calculate the factorial of a number using recursion.

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

OUTPUT:

```
> clang-7 -pthread -lm -o main main.c
> ./main
Enter number: 5
Factorial of 5 is: 120>
```