Day-1(15-04-2024)

```c
#include<stdio.h>
void main()
{
  // Print Hello World
  printf("Hello World!"); //Hello World

 // Taking width and no of decimal points from user and printing answer accordingly
  #include<stdio.h>
  void main()
  {
  int a,b;
  scanf("%d%d",&a,&b);
  printf("%*.*f",a,b,9/7.0);
  }
 /*
 5 1
 _____1.3
 */

  //int and float
  int a = 5,b=6;
  float x = 5.2. Bbbb    5;
  printf("a=%d \n",a); //5
  printf("x=%f \n",x); //5.250000
  printf("x=%d \n",x); //0
  printf("a=%f \n",a); //5.00000
     printf("%d \n",5/3); //1
  printf("%f \n",7/3.0); //2.333333

  //width and decimal places
  printf("%d \n",a); //5
  printf("%5d \n",a); //_____5
  printf("%-5d \n",a); //5_____
  printf("%.3d \n",a); //5.000
  printf("%.7f \n",x); //5.2506749
  printf("%10.2f",x); //__________5.25
```

```
    //format specifiers and o/p variables
    float c = 5.2543456323;
    printf("%f",c); //5.254346(round off to 6 digits)
    printf("%d %d",a); //5 76545-Garbage value
    printf("%d",a,b); //5
}
```

Day-2(16-04-2024)

```
#include<stdio.h>
void main()
{
    int a=5,b=6;
    printf("%d %d \n",a,b); //5 6
    printf("%u %u \n",&a,&b); //1000 996-address

    //Program-1: Swapping Two Numbers
    int n1 = 100, n2 = 200;
    int temp;
    temp = n1;
    n1 = n2;
    n2 = temp;
    printf("After Swapping: %d and %d",n1,n2);

    //Arithmetic Operators
    printf("%d \n",5+6); //11
    printf("%d \n",5-6); //-1
    printf("%d \n",5*6); //30
    printf("%d \n",5/6); //0
    printf("%d \n",5%6); //5
    // printf("%d \n",4%4.7); //error

    //Displaying individual digits of a number
    int h = 143;
    printf("%d \n",h%10); //3
    printf("%d \n",(h/10)%10); //4
    printf("%d \n",(h/100)%10); //1
```

```c
    //Sum of first and last two digit number of a number
    int n3 = 12345;
    printf("%d \n",(n3/1000)+(n3%100)); //12+45=57

    //Avg of 3 no's
    printf("%f \n",(4+4+3)/3.0); //3.666667

    //Simple Interest
    printf("%f \n",(45265.0*3.5*4.5)/100.0);
}
```

Day-2-HW

```c
//Deriving years,months,weeks and days from given no of days
#include<stdio.h>
void main()
{
    int nofd;
    int years,months,weeks,days;
    printf("Enter no.of days:");
    scanf("%d",&nofd);
    years=days/365;
   days=days%365;
   months=days/30;
   days=days%30;
   weeks=days/7;
   days=days%7;
   printf("No of years: %d\n",years);
   printf("No of months: %d\n",months);
   printf("No of weeks: %d\n",weeks);
   printf("No of days: %d\n",days);
}

   //Output
   //Enter no.of days:4253
   //No of years:11
  //No of months:7
  //No of weeks:4
  //No of days:0
```

```c
//Distance between two points
#include<stdio.h>
#include<math.h>
void main()
{
   float d11,d12;
   float d21,d22;
   float dist;
   printf("Enter coordinates of 1st point:");
   scanf("%f%f",&d11,&d12);
   printf("Enter coordinates of 2nd point:");
   scanf("%f%f",&d21,&d22);
   dist = sqrt(((d11-d21)*(d11-d21)+(d12-d22)*(d12-d22)));
   printf("Distance between two points is:%f",dist);
}

/*
//OUTPUT
Enter coordinates of 1st point:4.2 5.2
Enter coordinates of 2nd point:6.3 5
Distance between two points is:2.109503
*/
```

Day-3(18-04-2024)

```c
#include<stdio.h>
#include<math.h>
void main()
{
   // Herons formula
   int a,b,c;
   float si,res;
   printf("Enter sides of triangle:");
   scanf("%d%d%d",&a,&b,&c);
   si = (a+b+c)/2.0;
   printf("Area:%.2f",res);
   res = sqrt(si*(si-a)*(si-b)*(si-c));
   // Convert seconds into hours,minutes and seconds
   int s,h,m;
   printf("Enter no of seconds");
```

```
  scanf("%d",&s);
  h = s/3600;
  s = s%3600;
  m = s/60;
  s = s%60;
  printf("%dhourse %dminutes %dseconds",h,m,s);

 // Relational Operators
 printf("%d \n",5<6);
 printf("%d \n",5<=6);
 printf("%d \n",5>6);
 printf("%d \n",5>=6);
 printf("%d \n",5==6);
 printf("%d \n",5!=6);

 //Logical operators
 printf("%d \n",(5>6)&&(5!=6));
 printf("%d \n",(5<6)||(5==6));
 printf("%d \n",!(5<6)&&(5!=6));

 //Assignment and shorthand assignment operators
  int n = 5;
  printf("%d\n",n);
  n+=5;
  printf("%d\n",n);
  n-=5;
  printf("%d\n",n);
  n*=5;
  printf("%d\n",n);
  n/=5;
  printf("%d\n",n);
  n%=5;
  printf("%d\n",n);

  //Increment and decrement operators
  int v=7,w=9;
  printf("%d\n",v++);
  printf("%d\n",v);
  printf("%d\n",++v);
  printf("%d\n",w--);
  printf("%d\n",--w);
}
```

Day-3-HW

```c
//Conditional operators
#include <stdio.h>
void main() {
   //greatest of three numbers
   int num1,num2,num3;
   printf("enter three numbers:");
   scanf("%d",&num1);
   scanf("%d",&num2);
   scanf("%d",&num3);
   int result= (num1>num2) && (num1>num3) ? num1 : (num2>num1) && (num2>num3) ? num2:
num3;
   printf("Greatest number is %d\n",result);

   //even or odd
   int num4;
   printf("\nEnter a number:");
   scanf("%d",&num4);
   (num4 % 2 == 0) ? printf("Even") : printf("Odd");
}
```

Day-4(19-04-2024)

```c
#include<stdio.h>
void main()
{
   //conditional operators
   //smallest number
   int a,b;
   printf("Enter two numbers:");
   scanf("%d%d",&a,&b);
   printf("%d is smallest.",(a<b)?a:b);

   //Bitwise operators
   int b1,b2;
   printf("Enter two numbers:");
   scanf("%d%d",&b1,&b2);
```

```
    printf("Bitwise AND Result:%d",b1&b2);
    printf("\Bitwise OR Result:%d",b1|b2);
    printf("\Bitwise XOR Result:%d",b1^b2);
    printf("\nLeft shift of %d is %d",b1,b1<<1);
    printf("\nRight shift of %d is %d",b1,b1>>1);
    printf("\nCompliment value of %d is %d",b2,~b2);
}
```

```
#include<stdio.h>
void main()
{
    //RTC BILL
    int exp,del,sudel,choice,n;
    float gst,tollc,cost,t_bill;
    printf("Types of Buses:\n");
    printf("1.Express - 300\n");
    printf("2.Delux - 500\n");
    printf("3.Super Delux - 750\n");
    printf("Enter choice:");
    scanf("%d",&choice);
    printf("\nEnter no of tickets:");
    scanf("%d",&n);
    if(n<6)
    {
        if(choice == 1)
        {
            cost = 300*n;
            goto totalbill;
        }
        else if(choice == 2)
        {
            cost = 500*n;
            goto totalbill;
        }
        else if(choice == 3)
        {
            cost = 750*n;
            goto totalbill;
        }
        else{
            printf("Invalid choice\n");
```

```
    }
  totalbill:
  gst = cost*0.05;
  tollc = cost*0.02;
  t_bill = cost+gst+tollc;
  printf("Tickets cost:%.2f\n",cost);
  printf("GST Cost:%.2f\n",gst);
  printf("Toll charges:%.2f\n",tollc);
  printf("Total Bill:%.2f\n",t_bill);
  }
  else
  {
     printf("A person is allowed to book 6 tickets at max.\n");
  }

}
```

Day-4-HW

```
#include<stdio.h>
void main()
{  //Electricity Bill
  int units;
  float gst,cc,cost,bill;
  printf("Enter no of units:");
  scanf("%d",&units);

  if(units<=50)
     cost = units*3;
  else if(units>50 && units<=100)
     cost = 150+(units-50)*4;
  else if(units>100 && units<=200)
     cost = 150+200+(units-100)*5.5;
  else if(units>200 && units<=300)
     cost = 150+200+550+(units-200)*7.5;
  else
     cost = 150+200+550+750+(units-300)*9;

  gst = cost*0.05;
  cc = cost*0.02;
```

```
    bill = cost+gst+cc;
    printf("Cost:%.2f\n",cost);
    printf("GST:%.2f\n",gst);
    printf("Customer Charges:%.2f\n",cc);
    printf("Total Electricity Bill: %.2f\n",bill);
}
```

Day-5(22-04-2024)

```
#include<stdio.h>
void main()
{
    //ATM Withdraw
    int amount,five,two,one;
    printf("Enter amount to withdraw");
    scanf("%d",&amount);
    if(amount%100==0)
    {
    five = amount/500;
    amount=amount%500;
    two=amount/200;
    amount=amount%200;
    one=amount/100;
        if (five>0)
        {
            printf("500 Notes-%d\n",five);
        }
        if(two>0)
        {
            printf("200 Notes-%d\n",two);
        }
        if(one>0)
        {
            printf("100 Notes-%d\n",one);
        }
    }
    else
    {
        printf("Enter only multiples of 100");
    }
}
```

```c
#include<stdio.h>
void main()
{
   //Converting lowercase to uppercase and uppercase to lowercase
   char a;
   scanf("%c",&a);
   if(a<=90)
   {
      printf("%c",a+32);
   }
   else{
      printf("%c",a-32);
   }

   /*output
   i/p-a
   o/p-A

   i/p-D
   o/p-d
   */

   //Character type identifier
   char ip;
   printf("Enter any charcter:");
   scanf("%c",&ip);
   if((ip>=65 && ip<=90) || (ip>=97 && ip<=122))
      printf("your entered character-%c is an alphabet",ip);
   else if(ip>=48 && ip<=57)
      printf("your entered character-%c is a number",ip);
   else
      printf("your entered character-%c is a special character",ip);
}
//output
//ip-A
//op-alphabet
//ip-&
//op-special character
//ip-8
//op-number
```

```c
#include<stdio.h>
void main()
{
    //Loops
    //No of digits in a number
    int num;
    int count=0;
    printf("Enter a number:");
    scanf("%d",&num); //52364
    while(num>0)
    {
        num=num/10;
        count++;
    }
    printf("No of digits in the given number:%d\n",count); //5

    //Sum of digits in a number
    int a;
    int sum=0;
    printf("Enter a number:");
    scanf("%d",&a); //52364
    while(a>0)
    {
        sum += a%10;
        a=a/10;
    }
    printf("Sum of digits in the given number:%d\n",sum); //20
}
```

Day-5-HW

```c
#include<stdio.h>
void main()
{
    //Tax Calculation
    int money;
    float tax;
    printf("Enter your money:");
    scanf("%d",&money);
    if (money<=250000)
    {
```

```
        tax = 0;
    }
    else if(money>250000 && money<=500000)
    {
        money -= 250000;
        tax = money*0.05;
    }
    else if(money>500000 && money<=750000)
    {
        money -= 500000;
        tax = 250000*0.05+money*0.1;
    }
    else if(money>750000 && money<=1000000)
    {
        money -= 750000;
        tax = 250000*0.05+250000*0.1+money*0.2;
    }
    else
    {
        money -= 1000000;
        tax = 250000*0.05+250000*0.1+250000*0.2+money*0.3;
    }
    printf("Your Tax is-%.2f\n",tax);
}
```

Day-6+Day-6-HW+Practice Questions(23-04-2024)

```
#include<stdio.h>
void main()
{
    //Diff btw sum of even and odd digits of a number
    int num,digit;
    int esum=0,osum=0;
    printf("Enter a number:");
    scanf("%d",&num);
    while(num>0)
    {
        digit =num%10;
        if(digit%2==0)
```

```
            esum+=digit;
        else
            osum+=digit;
        num=num/10;
    }
    printf("Diff btw esum and osum is:%d",esum-osum);

    //printf factorial if it is even and cube of it if odd
    int num1,digit1,ocube;
    int fact=1;
    printf("Enter a number:");
    scanf("%d",&num1);
    while(num1>0)
    {
        digit1 =num1%10;
        if(digit1%2==0)
        {
            for(int i=1;i<=digit1;i++)
                fact *= i;
            printf("%d-%d\n",digit1,fact);
            fact=1;
        }
        else
            printf("%d-%d\n",digit1,digit1*digit1*digit1);
        num1=num1/10;
    }
}

#include<stdio.h>
#include<math.h>
int main()
{
    //Disarium number
    int num,temp,digit;
    int count=0,sum=0;
    printf("Enter a number:");
    scanf("%d",&num);
    temp=num;
    while(num>0)
    {
        num=num/10;
        count++;
```

```
    }
    num=temp;
    while(num>0)
    {
        digit=num%10;
        sum+=pow(digit,count);
        num=num/10;
        if(count==1&&digit==1)
            sum+=1;
        count--;
    }
    if(sum==temp)
        printf("%d is a disarium number\n",temp);
    else
        printf("%d is not a disarium number\n",temp);


    //Armstrong number
    int anum,atemp,adigit;
    int acount=0,asum=0;
    printf("Enter a number:");
    scanf("%d",&anum);
    atemp=anum;
    while(anum>0)
    {
        anum=anum/10;
        acount++;
    }
    anum=atemp;
    while(anum>0)
    {
        adigit=anum%10;
        asum+=pow(adigit,acount);
        anum=anum/10;
    }
    printf("%d",asum);
    if(asum==atemp)
        printf("%d is a Armstrong number\n",atemp);
    else
        printf("%d is not a Armstrong number\n",atemp);
    return 1;
}
```

```c
#include<stdio.h>
void main()
{
   //Strong number
   int num,digit,f,sum;
   printf("Enter a number:");
   scanf("%d",&num);
   int temp=num;
   while(num!=0)
   {
      digit=num%10;
      f=1;
      for(int i=1;i<=digit;i++)
         f=f*i;
      sum += f;
      num /= 10;
   }
   if(sum==temp)
      printf("%d is strong number.",temp);
   else
      printf("%d is not a strong number.",temp);

   //perform sum of two no.s until user stop
   int a,b;
   char op;
   do
   {
   printf("Enter two numbers:");
   scanf("%d%d",&a,&b);
   printf("sum:%d\n",a+b);
   printf("Do you want to continue(y/s):");
   scanf(" %c",&op);//there should be space to tell compiler that it is not the end
   } while (op=='y');
}
```

```c
//ATM withdraw,deposit,balance
#include<stdio.h>
#include<stdlib.h>
void main()
```

```c
{
   int option;
   char choice;
   float bal=5000, amount;
   do
   {
   printf(" welcome to GIST ATM \n");
   printf("1. Balance \n");
   printf("2. Deposit \n");
   printf("3. Withdraw \n");
   printf("4. Exit \n");
   printf("Enter your choice: ");
   scanf("%d", &option);
   switch (option)
   {
      case 1: printf("Your account balance:%.2f.\n",bal);
              break;
      case 2: printf("Enter amount to deposit:");
              scanf("%f",&amount);
              bal += amount;
              printf("%.2f amount is deposited successfully.\n",amount);
              printf("New balance is:%.2f.\n",bal);
              break;
      case 3: printf("Enter amount to withdraw:");
              scanf("%f",&amount);
              bal -= amount;
              printf("%.2f amount is debited successfully.\n",amount);
              printf("New balance is:%.2f.\n",bal);
              break;
      case 4: exit(0);
      default: printf("Choose valid option.\n");
               break;
   }
   printf("Do you want to perform another transaction(y/n):");
   scanf(" %c",&choice);
   }while(choice=='y'||choice=='Y');
}
```

Day-7(24-04-2024)

```c
#include<stdio.h>
void main()
{
   //Perfect number in a range
   int start,stop;
   printf("Enter start value:");
   scanf("%d",&start);
   printf("Enter stop value:");
   scanf("%d",&stop);
   for(int i=start;i<=stop;i++)
   {
      int sum=0;
      for(int j=1;j<=i/2;j++)
         {
            if(i%j==0)
               sum+=j;
         }
      if(i==sum)
         printf("%d ",i);
   }

   //prime no's in given range
   int pst,pso;
   printf("\nEnter start value:");
   scanf("%d",&pst);
   printf("Enter stop value:");
   scanf("%d",&pso);
   for(int k=pst;k<=pso;k++)
   {
      int count=0;
      for(int l=1;l<=k;l++)
      {
         if(k%l==0)
            count++;
      }
      if(count==2)
         printf("%d ",k);
   }
}
```

Day-7

```
// PATTERNS

1)

* * * *
* * * *
* * * *
* * * *

#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=n;j++){
            printf("* ");
        }
        printf("\n");
    }
}

2)

*
* *
* * *
* * * *

#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=i;j++){
            printf("* ");
        }
        printf("\n");
    }
}
```

3)

```
A
B B
C C C
D D D D
```

```
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=i;j++){
            printf("%c ",i+64);
        }
        printf("\n");
    }
}
```

4)

```
1
2 4
3 5 7
6 8 10 12
9 11 13 15 17
```

```
#include <stdio.h>
void main() {
    int n,i,j;
    int e=0,o=1;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        if(i%2==0){
            for(j=1;j<=i;j++){
                e+=2;
                printf("%d ",e);
            }
        }
        else{
            for(j=1;j<=i;j++){
                printf("%d ",o);
                o+=2;
```

```
            }

            }
            printf("\n");
    }
}


5)

* * * *
* * *
* *
*

#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=i;j<=n;j++){
            printf("* ");
        }
        printf("\n");
    }
}

6)

      *
    * *
  * * *
* * * *

#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf(" ");
        }
```

```
        for(j=1;j<=i;j++){
            printf("*");
        }
        printf("\n");
    }
}
```

7)

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

```
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }

        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }

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

8)

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

```
#include <stdio.h>
void main() {
    int n,i,j;
```

```
    scanf("%d",&n);
    for(i=n;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }

        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }

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

Day-7-Practice Questions

```
#include<stdio.h>
#include<math.h>
void main()
{
  //Decimal to binary conversion
  int num,bn,rem,i=0;
  scanf("%d",&num);
  while(num>0)
  {
     rem=num%2;
     bn+=rem*pow(10,i);
     num/=2;
     i++;
  }
  printf("%d",bn);
}
//ip-5
//op-101

// Program to find the sum of series 1^1+2^2+3^3...+N^N
#include<stdio.h>
#include<math.h>
void main()
```

```
{
    int num;
    long long sum=0;
    scanf("%d",&num);
    for(int i=1;i<=num;i++)
    {
        sum+=pow(i,i);
    }
    printf("Sum of the series 1^1 + 2^2 + 3^3 +....+ %d^%d = %lld",num,num,sum);
}
//ip-7
//op-Sum of the series 1^1 + 2^2 + 3^3 +....+ 7^7 = 873612
```

//Program to find sum of series 1!+2!+3!...+n!

```
#include<stdio.h>
#include<math.h>
void main()
{
    int num,fact,temp;
    long long sum=0;
    scanf("%d",&num);
    temp=num;
    for(int i=1;i<=num;i++)
    {
        fact=1;
        for(int j=1;j<=i;j++)
        {
            fact*=j;
        }
        sum+=fact;
    }
    printf("Sum of the series 1! + 2! + 3! +....+ %d! = %lld",num,sum);
}
//output
//5
//Sum of the series 1! + 2! + 3! +....+ 5! = 153
```

//Check whether a given number is Friendly pair or not

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

```
    int a,b;
    int asum,bsum=0;
    scanf("%d%d",&a,&b);
    for(int i=1;i<=a;i++)
    {
        if(a%i==0)
        {
            asum+=i;
        }
    }
    for(int j=1;j<=b;j++)
    {
        if(b%j==0)
        {
            bsum+=j;
        }
    }
    if(asum/a==bsum/b)
        printf("%d and %d form a friendly pair.",a,b);
    else
        printf("%d and %d donot form a friendly pair.",a,b);
}
//output
//6 9
//6 and 9 do not form a friendly pair.
```

```
//Magic number
/*
 1729 The sum of the given number = 19
 The reverse of the number = 91
 The product of 19 and 91 = 1729
 1729 is a Magic Number.*/
#include<stdio.h>
void main()
{
    int n,temp,rem,rev,prod,digit;
    int rnum=0,sum=0,rsum=0;
    scanf("%d",&n);
    temp=n;
    while(n>0)
    {
```

```
        digit=n%10;
        sum+=digit;
        n/=10;
    }
    int stemp=sum;
    while(sum>0)
    {
        rem=sum%10;
        rev=rev*10+rem;
        sum/=10;
    }
    prod=stemp*rev;
    if(temp==prod)
    {
        printf("%d is a magic number.",temp);
    }
    else
     {
        printf("%d is not a magic number.",temp);
     }
}

/*
1729
1729 is a magic number.

325
325 is not a magic number.
*/
```

```
//LCM of two numbers.
#include<stdio.h>
void main()
{
    int num1,num2;
    long lcm;
    printf("Enter two numbers:");
    scanf("%d",&num1);
    scanf("%d",&num2);
    for(int i=num1;i<=num1*num2;i++)
    {
```

```
        if(i%num1==0 && i%num2==0)
        {
            lcm=i;
            break;
        }
    }
    printf("LCM of %d and %d is %ld.",num1,num2,lcm);
}
//Enter two numbers:95 88
//LCM of 95 and 88 is 8360.
```

```
//Spy number or not
#include<stdio.h>
void main()
{
    int num,digit,sum=0,prod=1;
    printf("Enter a number:");
    scanf("%d",&num);
    int temp=num;
    while(num>0)
    {
        digit=num%10;
        sum+=digit;
        prod*=digit;
        num/=10;
    }
    if(sum==prod)
        printf("%d is a spy number.",temp);
    else
        printf("%d is not a spy number.",temp);
}

//Enter a number:132
//132 is a spy number.
```

```
//Binary to decimal
#include<stdio.h>
#include<math.h>
void main()
{
```

```
    int num,digit,temp,dec=0,i=0;
    scanf("%d",&num);
    temp=num;
    while(num>0)
    {
        digit=num%10;
        dec+=digit*pow(2,i);
        num/=10;
        i+=1;
    }
    printf("Decimal equivalent of %d is %d.",temp,dec);
}
//101
//Decimal equivalent of 101 is 5.
```

```
//Octal to binary
#include<stdio.h>
#include<math.h>
void main()
{
    int num,b=0,d=0,i=0,j=0,base=1,digit,temp,dup;
    scanf("%d",&num);
    dup=num;
    while(num>0)
    {
        digit=num%10;
        d+=digit*pow(8,i);
        num/=10;
        i++;
    }
    while(d>0)
    {
        temp=d%2;
        b+=temp*pow(10,j);
        d/=2;
        j++;
    }
    printf("Binary equivalent of %d is %d",dup,b);
}

//56
//Binary equivalent of 56 is 101110
```

Day-8(25-04-2024)

```
//Patterns
1)
          *
        * * *
      * * * * *
    * * * * * * *
  * * * * * * * * *
    * * * * * * *
      * * * * *
        * * *
          *
-----------------------------------------------
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }
        printf("\n");
    }
    for(i=n-1;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }
        printf("\n");
    }
}

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

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

```
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=1;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf("%d ",i);
        }
        printf("\n");
    }
    for(i=n-1;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf("%d ",i);
        }
        printf("\n");
    }
}
```

3)

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

```c
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=n;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }
        printf("\n");
    }
    for(i=1;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf(" *");
        }
        printf("\n");
    }
    }
```

4)

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

```c
#include <stdio.h>
void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=n;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
```

```
        }
        for(j=1;j<=2*i-1;j++){
            printf(" %d",i);
        }
        printf("\n");
    }
    for(i=2;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }
        for(j=1;j<=2*i-1;j++){
            printf(" %d",i);
        }
        printf("\n");
    }
    }
```

```
//Diamond pattern
#include <stdio.h>
void main() {
   //Pattern
   int n,i,j;
   printf("Enter no.of rows:");
   scanf("%d",&n);
   for(i=1;i<=n;i++)
   {
      for(j=1;j<=n-i;j++)
      {
         printf("  ");
      }
      for(j=1;j<=2*i-1;j++)
      {
         printf("%d ",i);
      }
      printf("\n");
   }
   for(i=n-1;i>=1;i--)
   {
      for(j=1;j<=n-i;j++)
      {
         printf("  ");
```

```
        }
        for(j=1;j<=2*i-1;j++)
        {
            printf("%d ",i);
        }
        printf("\n");
    }
}

// HourGlass pattern
#include <stdio.h>

void main() {
    int n,i,j;
    scanf("%d",&n);
    for(i=n;i>=1;i--){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }

        for(j=1;j<=2*i-1;j++){
            printf(" %d",i);
        }

        printf("\n");
    }
    for(i=2;i<=n;i++){
        for(j=1;j<=n-i;j++){
            printf("  ");
        }

        for(j=1;j<=2*i-1;j++){
            printf(" %d",i);
        }

        printf("\n");
    }

    }
```

Day-8-Arrays

```
//Creating arrays by taking user input of array size, elements and printing them in reverse order
#include <stdio.h>
void main() {
   int n,i;
   printf("Enter size of array:");
   scanf("%d",&n);
   int a[n];
   printf("Enter array elements:\n");
   for(i=0;i<n;i++)
   {
      printf("Enter a[%d]:",i);
      scanf("%d",&a[i]);
   }
   printf("Array element addresses:");
   for(i=0;i<n;i++)
   {
      printf("%u ",&a[i]);
   }
   printf("Array elements in reverse order are:\n");
   for(i=n-1;i>=0;i--)
   {
      printf("a[%d]: %d",i,a[i]);
      printf("\n");
   }
}
/*
Enter size of array:5
Enter array elements:
Enter a[0]:3
Enter a[1]:6
Enter a[2]:4
Enter a[3]:9
Enter a[4]:5
Array element addresses:1996644672 1996644676 1996644680 1996644684 1996644688
Array elements in reverse order are:
a[4]: 5
a[3]: 9
a[2]: 4
```

```
a[1]: 6
a[0]: 3
*/

//Taking no.of subjects,their marks and finding percentage using arrays
#include <stdio.h>
void main() {
    int n,i;
    float sum=0;
    printf("Enter no of subjects:");
    scanf("%d",&n);

    int a[n];
    printf("Enter subject marks:\n");
    for(int i=0;i<n;i++)
    {
        printf("subject-%d:",i+1);
        scanf("%d",&a[i]);
        sum+=a[i];
    }
    printf("Percentage: %.2f",sum/n);
}

/*
Enter no of subjects:4
Enter subject marks:
subject-1:99
subject-2:88
subject-3:77
subject-4:89
Percentage: 88.25
*/


// Largest,smallest and sum of elements using arrays
#include <stdio.h>
void main() {
    int n,i;
    float sum=0;
    printf("Enter no of numbers:");
    scanf("%d",&n);
```

```
    int small,large;
    int a[n];
    printf("Enter numbers:\n");
    for(int i=0;i<n;i++)
    {
        printf("Number-%d:",i+1);
        scanf("%d",&a[i]);
    }
    small=a[0];
    large=a[0];
    for(int i=0;i<n;i++)
    {
        if(small>a[i])
            {
                small=a[i];
            }
        if(large<a[i])
        {
            large=a[i];
        }
    }
    printf("Smallest is:%d\n",small);
    printf("Largest is:%d\n",large);
    printf("Sum is %d\n",small+large);
}

/*
Enter no of numbers:4
Enter numbers:
Number-1:23
Number-2:54
Number-3:66
Number-4:12
Smallest is:12
Largest is:66
Sum is 78
*/
```

Day-8-HW

```c
//Finding second largest number in given array
#include<stdio.h>
void main(){
   int n,i,l,sl;
   printf("Enter the size of array: ");
   scanf("%d",&n);
   int a[n];
   printf("Enter the elements of array: ");
   for(i=0;i<n;i++){
      scanf("%d",&a[i]);
   }
   printf("The elements of array are:");
   for(i=0; i<n; i++){
      printf("%d ",a[i]);
   }
   l=a[0],sl=a[1];
   for(i=0;i<n;i++){
      if(a[i] > l){
         sl = l;
         l = a[i];
      }
      else if(a[i]> sl && a[i] != l){
         sl=a[i];
      }
   }
   printf("\nSecond Largest is %d \n",sl);
   printf("Largest is %d \n",l);
}
/*
Enter the size of array: 5
Enter the elements of array: 12 6 3 5 2
The elements of array are:12 6 3 5 2
Second Largest is 6
Largest is 12
*/
```

Day-9(26-04-2024)

```c
#include <stdio.h>
void main() {
    //Retrieve the position of specified element in an array
    int size;
    printf("Enter size of array:");
    scanf("%d",&size);

    int a[size];
    printf("Enter Element values:\n");
    for(int i=0;i<size;i++)
    {
        printf("Element-%d:",i+1);
        scanf("%d",&a[i]);
    }
    printf("Enter element to be searched:");
    int value,flag=0;
    scanf("%d",&value);
    for(int i =0;i<size;i++)
    {
        if(a[i]==value)
        {
            printf("Element %d is found at position %d.",value,i+1);
            flag=1;
            break;
        }
    }
    if(flag==0)
    {
        printf("Element is not found.");
    }
}
/*
Enter size of array:4
Enter Element values:
Element-1:25
Element-2:36
Element-3:41
Element-4:55
Enter element to be searched:10
```

```
Element is not found
Enter element to be searched:36
Element 36 is found at position 2.
*/
```

```
//Removing duplicate elements and printing remaining elements
#include <stdio.h>
void main() {
    int size;
    printf("Enter size of array:");
    scanf("%d",&size);

    int a[size];
    printf("Enter Element values:\n");
    for(int i=0;i<size;i++)
    {
        printf("Element-%d:",i+1);
        scanf("%d",&a[i]);
    }
    printf("Array after removing duplicate elements are...\n");
    for(int i =0;i<size;i++)
    {
        int dup=0;
        for(int j=i+1;j<size;j++)
        {
            if(a[i]==a[j])
            {
                dup=1;
                continue;
            }
        }
        if(dup==0)
            printf("%d\n",a[i]);
    }
}
/*
Enter size of array:4
Enter Element values:
Element-1:23
Element-2:45
Element-3:63
```

```
Element-4:23
Array after removing duplicate elements are...
45
63
23
*/
```

```
//Creating array and taking elements from user and printing them
#include <stdio.h>
void main() {
   int row,column;
   printf("Enter size of row:");
   scanf("%d",&row);
   printf("Enter size of column:");
   scanf("%d",&column);

   int a[row][column];
   for(int i=0;i<row;i++)
   {
      for(int j = 0;j<column;j++)
      {
         printf("a[%d][%d]-",i,j);
         scanf("%d",&a[i][j]);
      }
   }
   printf("Array elements are...\n");
   for(int i=0;i<row;i++)
   {
      for(int j = 0;j<column;j++)
      {
         printf("%d ",a[i][j]);
      }
      printf("\n");
   }
}
```

```
//Transpose of a Matrix
#include <stdio.h>
void main() {
   int row,column;
   printf("Enter size of row:");
```

```
    scanf("%d",&row);
    printf("Enter size of column:");
    scanf("%d",&column);

    int a[row][column];
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    printf("Array elements are..\n");
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            printf("%d ",a[i][j]);
        }
        printf("\n");
    }
    printf("Transpose matrix is...\n");
    for(int i=0;i<column;;i++)
    {
       for(int j = 0;j<row;j++)
        {
            printf("%d ",a[j][i]);
        }
        printf("\n");
    }
}
/*
Enter size of row:3
Enter size of column:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
```

```
a[2][1]-8
a[2][2]-9
Array elements are..
1 2 3
4 5 6
7 8 9
Transpose matrix is...
1 4 7
2 5 8
3 6 9
*/
```

```
//Trace of a Matrix
#include <stdio.h>
void main() {
    int row,column;
    printf("Enter size of row:");
    scanf("%d",&row);
    printf("Enter size of column:");
    scanf("%d",&column);

    int trace=0;
    int a[row][column];
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }

    printf("Trace of matrix is...");
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            if(i==j)
            {
                trace+=a[i][j];
            }
        }
```

```
    }
    printf("%d",trace);
}

/*
Enter size of row:3
Enter size of column:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Trace of matrix is...15
*/
```

Day-9-HW

```
//Addition of two matrices
#include <stdio.h>
void main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);

    int a[arow][acolumn];
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    printf("A-Matrix elements are...\n");
```

```
for(int i=0;i<arow;i++)
{
   for(int j = 0;j<acolumn;j++)
    {
        printf("%d ",a[i][j]);
    }
    printf("\n");
}
int brown column;
printf("Enter size of row B:");
scanf("%d",&brow);
printf("Enter size of column of B:");
scanf("%d",& column);

int b[brow][bcolumn];
for(int i=0;i<brow;i++)
{
   for(int j = 0;j<bcolumn;j++)
    {
        printf("b[%d][%d]-",i,j);
        scanf("%d",&b[i][j]);
    }
}
printf("B-Matrix elements are...\n");
for(int i=0;i<brow;i++)
{
   for(int j = 0;j<bcolumn;j++)
    {
        printf("%d ",b[i][j]);
    }
    printf("\n");
}
int c[brow][bcolumn];
printf("Sum of two matrices are:\n");
for(int i=0;i<brow;i++)
{
   for(int j = 0;j<bcolumn;j++)
    {
        c[i][j]=a[i][j]+b[i][j];
    }
}
for(int i=0;i<brow;i++)
```

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

/*
Enter size of row of A:2
Enter size of column of A:2
a[0][0]-1
a[0][1]-2
a[1][0]-3
a[1][1]-4
A-Matrix elements are...
1 2
3 4
Enter size of row B:2
Enter size of column of B:2
b[0][0]-1
b[0][1]-2
b[1][0]-3
b[1][1]-4
B-Matrix elements are...
1 2
3 4
Sum of two matrices are:
2 4
6 8
*/
```

//Product of two matrices

```
#include <stdio.h>
void main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);
```

```
int a[arow][acolumn];
for(int i=0;i<arow;i++)
{
   for(int j = 0;j<acolumn;j++)
    {
        printf("a[%d][%d]-",i,j);
        scanf("%d",&a[i][j]);
    }
}
printf("A-Matrix elements are...\n");
for(int i=0;i<arow;i++)
{
   for(int j = 0;j<acolumn;j++)
    {
        printf("%d ",a[i][j]);
    }
    printf("\n");
}
int brow,bcolumn;
printf("Enter size of row B:");
scanf("%d",&brow);
printf("Enter size of column of B:");
scanf("%d",&bcolumn);

int b[brow][bcolumn];
for(int i=0;i<brow;i++)
{
   for(int j = 0;j<bcolumn;j++)
    {
        printf("b[%d][%d]-",i,j);
        scanf("%d",&b[i][j]);
    }
}
printf("B-Matrix elements are...\n");
for(int i=0;i<brow;i++)
{
   for(int j = 0;j<bcolumn;j++)
    {
        printf("%d ",b[i][j]);
    }
    printf("\n");
}
```

```
    int c[brow][bcolumn];

    printf("Product of two matrices are:\n");
    for(int i=0;i<brow;i++)
    {
       for(int j = 0;j<bcolumn;j++)
        {
            int prod=0;
            for(int k=0;k<brow;k++)
            {
            prod+=a[i][k]*b[k][j];
            }
            c[i][j]=prod;
        }
    }
    for(int i=0;i<brow;i++)
    {
       for(int j = 0;j<bcolumn;j++)
        {
            printf("%d ",c[i][j]);
        }
        printf("\n");
    }
}

/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]-2
a[0][1]-3
a[0][2]-4
a[1][0]-3
a[1][1]-5
a[1][2]-6
a[2][0]-4
a[2][1]-5
a[2][2]-3
A-Matrix elements are...
2 3 4
3 5 6
4 5 3
Enter size of row B:3
```

```
Enter size of column of B:3
b[0][0]-1
b[0][1]-2
b[0][2]-1
b[1][0]--1
b[1][1]-2
b[1][2]-1
b[2][0]-3
b[2][1]-2
b[2][2]-1
B-Matrix elements are...
1 2 1
-1 2 1
3 2 1
Product of two matrices are:
11 18 9
16 28 14
8 24 12
*/
```

Day-10(29-04-2024)

```c
//Display elements present at prime indices
#include <stdio.h>

int main() {
   int n,i;
    printf("Enter size of array:");
    scanf("%d",&n);
    int a[n];
    printf("Enter array elements:\n");
    for(int i=0;i<n;i++){
        printf("Enter a[%d]:",i);
        scanf("%d",&a[i]);
    }
    for(int i=1;i<n;i++)
    {
        int count=0;
        for(int j=1;j<=n;j++)
        {
```

```
        if(i%j==0)
        {
            count++;
        }
      }
      if(count==2)
      {
         printf("Element present at prime index-%d is %d \n",i,a[i]);
      }
   }

   return 0;
}

/*
Enter size of array:8
Enter array elements:
Enter a[0]:22
Enter a[1]:33
Enter a[2]:55
Enter a[3]:44
Enter a[4]:66
Enter a[5]:99
Enter a[6]:88
Enter a[7]:77
Element present at prime index-2 is 55
Element present at prime index-3 is 44
Element present at prime index-5 is 99
Element present at prime index-7 is 77
*/

//Displaying only even elements present in an array
#include <stdio.h>
int main() {
  int n,i;
   printf("Enter size of array:");
   scanf("%d",&n);
   int a[n];
   printf("Enter array elements:\n");
   for(int i=0;i<n;i++){
      printf("Enter a[%d]:",i);
      scanf("%d",&a[i]);
```

```
    }
    for(int i=0;i<n;i++)
    {
        if(a[i]%2==0)
            printf("Even Element is:%d\n",a[i]);
    }

    return 0;
}
/*
Enter size of array:5
Enter array elements:
Enter a[0]:2
Enter a[1]:3
Enter a[2]:4
Enter a[3]:6
Enter a[4]:22
Even Element is:2
Even Element is:4
Even Element is:6
Even Element is:22
*/
```

```
//Sum of all diagonal elements in a matrix
#include <stdio.h>
int main() {
    int row,column;
    printf("Enter size of row of A:");
    scanf("%d",&row);
    printf("Enter size of column of A:");
    scanf("%d",&column);

    int a[row][column];
    for(int i=0;i<row;i++)
    {
        for(int j = 0;j<column;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
```

```
    int sum=0;
    for(int i=0;i<row;i++)
    {
        for(int j=0;j<column;j++)
        {
            if(i==j || i+j==row-1)
                sum+=a[i][j];
        }
    }
    printf("Sum of diagonal elements are %d",sum);
    return 0;
}
/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Sum of diagonal elements are 25
*/
```

```
//Sum of corner elements
#include <stdio.h>
int main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);

    int a[arow][acolumn];
    for(int i=0;i<arow;i++)
    {
        for(int j = 0;j<acolumn;j++)
```

```
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    int sum=a[0][0]+a[arow-1][0]+a[arow-1][acolumn-1]+a[0][arow-1];
    printf("Sum of corner elements is %d",sum);
    return 0;
}
/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Sum of corner elements is 20
*/
```

Day-10-HW

```
//Sum of border elements of a matrix
#include <stdio.h>
int main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);

    int a[arow][acolumn];
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            printf("a[%d][%d]-",i,j);
```

```
            scanf("%d",&a[i][j]);
        }
    }

    int sum=0;
    for(int i=0;i<arow;i++)
    {
        for(int j=0;j<acolumn;j++)
        {
            if(i==0 || i==arow-1)
                sum+=a[i][j];
            if(j==0 || j==acolumn-1)
                sum+=a[i][j];
        }
    }
    sum-=a[0][0]+a[arow-1][0]+a[arow-1][acolumn-1]+a[0][arow-1];
    printf("Sum of Border elements are %d",sum);
    return 0;
}
/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Sum of Border elements are 40
*/
```

```
//Finding Sum of even digits in a matrix
#include <stdio.h>
int main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
```

```
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);
    int a[arow][acolumn];
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    int sum=0;
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            if(a[i][j]%2==0)
                sum+=a[i][j];
        }
    }
    printf("Sum of even digits in a matrix is %d",sum);
    return 0;
}
/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]--2
a[1][2]-6
a[2][0]-9
a[2][1]-7
a[2][2]-8
Sum of even digits in a matrix is 18 */
//Finding Largest element in matrix
#include <stdio.h>
int main() {
    int arow,acolumn;
    printf("Enter size of row of A:");
    scanf("%d",&arow);
```

```
    printf("Enter size of column of A:");
    scanf("%d",&acolumn);
    int a[arow][acolumn];
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    int large=a[0][0];
    for(int i=0;i<arow;i++)
    {
       for(int j = 0;j<acolumn;j++)
        {
            if(large<a[i][j])
                large=a[i][j];
        }
    }
    printf("Largest element in matrix is %d",large);
    return 0;
}
/*
Enter size of row of A:3
Enter size of column of A:3
a[0][0]- -22
a[0][1]- -36
a[0][2]- -1
a[1][0]- -256
a[1][1]- -42
a[1][2]- -63
a[2][0]- -45
a[2][1]- -63
a[2][2]- -52
Largest element in matrix is -1 */
// Sum of elements of individual rows
#include <stdio.h>
void main() {
    int row,column;
    printf("Enter size of row of A:");
    scanf("%d",&row);
```

```
    printf("Enter size of column of A:");
    scanf("%d",&column);
    int a[row][column];
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    for(int i=0;i<row;i++)
    {
        int sum=0;
        for(int j=0;j<column;j++)
        {
            sum+=a[i][j];
        }
        printf("Sum of elements of row-%d is %d.\n",i+1,sum);
    }
}
/*Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Sum of elements of row-1 is 6.
Sum of elements of row-2 is 15.
Sum of elements of row-3 is 24.
*/
// Sum of elements of individual columns
#include <stdio.h>
void main() {
    int row,column;
    printf("Enter size of row of A:");
    scanf("%d",&row);
```

```
    printf("Enter size of column of A:");
    scanf("%d",&column);
    int a[row][column];
    for(int i=0;i<row;i++)
    {
       for(int j = 0;j<column;j++)
        {
            printf("a[%d][%d]-",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    for(int i=0;i<row;i++)
    {
        int sum=0;
        for(int j=0;j<column;j++)
        {
            sum+=a[j][i];
        }
        printf("Sum of elements of column-%d is %d.\n",i+1,sum);
    }
}
/*Enter size of row of A:3
Enter size of column of A:3
a[0][0]-1
a[0][1]-2
a[0][2]-3
a[1][0]-4
a[1][1]-5
a[1][2]-6
a[2][0]-7
a[2][1]-8
a[2][2]-9
Sum of elements of column-1 is 12.
Sum of elements of column-2 is 15.
Sum of elements of column-3 is 18.
*/
```

Day-11(30-04-2024)

Functions

```
// Function without prototype declaration
```

```c
#include <stdio.h>
void student() //called function
{
   printf("Name: John");
   printf("Roll number: 123");
   printf("Marks:100");
}
void main() {
   student(); //Calling function
}
```

// Function with prototype declaration

```c
#include <stdio.h>
void student();//prototype declaration
void main() {
   student(); //Calling function
}
void student() //called function
{
   printf("Name: John");
   printf("Roll number: 123");
   printf("Marks:100");
}
```

// Average of three numbers using function

```c
#include <stdio.h>
void average(float a,float b,float c); //prototype
void main() {
   float a,b,c;
   printf("Enter a,b,c values:");
   scanf("%f%f%f",&a,&b,&c);
   average(a,b,c); //Calling function //Actual Parameters //Variables
}
void average(float a,float b,float c) //called function //Formal Parameters
{
   float avg;
   avg = (a+b+c)/3;
   printf("Average is:%.2f.",avg);
}
//Average is:3.07.
```

Function types

```c
// Without parameters without return value
#include <stdio.h>
void func();
void main() {
   func();
}
void func()
{
   int a=10,b=20;
   printf("a=%d b=%d",a,b);
}

// With parameters without return value
#include <stdio.h>
void func(int x, int y);
void main() {
   int a=10,b=20;
   func(a,b);
}
void func(int x, int y)
{
   printf("a=%d b=%d",x,y);
}


// With parameters with return value
#include <stdio.h>
int func(int x, int y);
void main() {
   int a=10,b=20;
   printf("a=%d b=%d\n",a,b);
   int z = func(a,b);
   printf("a+b=%d",z);
}
int func(int x, int y)
{
   return x+y;
}
```

```c
// Without parameters with return value
#include <stdio.h>
int func();
void main() {
   int z = func();
   printf("a+b=%d",z);
}
int func()
{
   int a=10,b=20;
   printf("a=%d b=%d\n",a,b);
   return a+b;
}
```

Day-11-HW

```c
//Magic number using functions
#include<stdio.h>
void magic();
void main()
{
   magic();
}
void magic()
{
   int n,temp,rem,rev,prod,digit;
   int rnum=0,sum=0,rsum=0;
   printf("Enter a number:");
   scanf("%d",&n);
   temp=n;
   while(n>0)
   {
      digit=n%10;
      sum+=digit;
      n/=10;
   }
   int stemp=sum;
   while(sum>0)
   {
      rem=sum%10;
      rev=rev*10+rem;
```

```
        sum/=10;
    }
    prod=stemp*rev;
    if(temp==prod)
    {
        printf("%d is a magic number.",temp);
    }
    else
     {
        printf("%d is not a magic number.",temp);
     }
}

//Enter a number:1729
//1729 is a magic number.


//Decimal to octal conversion
#include<stdio.h>
#include<math.h>
void dto();
void main()
{
    dto();
}
void dto()
{
    int num,oc,rem,i=0;
    printf("Enter a number:");
    scanf("%d",&num);
    while(num>0)
    {
        rem=num%8;
        oc+=rem*pow(10,i);
        num/=8;
        i++;
    }
    printf("Octal equivalent is..%d",oc);
}
//Enter a number:33
//Octal equivalent is..41
```

Day-12(01-05-2024)

```c
// Strong number or not using functions
#include <stdio.h>
int stn(int num);
int main() {
   int num;
   printf("Enter a number:");
   scanf("%d",&num);
   if(stn(num)==num)
      printf("is a strong number.");
   else
      printf("is not a strong number.");
}
int stn(int num){
   int digit,f,sum=0;
   while(num!=0)
   {
      digit=num%10;
      f=1;
      for(int i=1;i<=digit;i++)
         f=f*i;
      sum += f;
      num /= 10;
   }
   return sum;
}
//Enter a number:145
//is a strong number.

//Finding largest digit in a number using functions
#include <stdio.h>
int stn(int num);
int main() {
   int num;
   printf("Enter a number:");
   scanf("%d",&num);
   printf("Largest digit is %d",stn(num));
}
int stn(int num){
   int large=0;
```

```
    while(num!=0)
    {
        int digit=num%10;
        if(digit>large)
            large=digit;
        num/=10;
    }
    return large;
}
//Enter a number:14889
//Largest digit is 9
```

```
// Given matrix to upper triangular matrix
#include<stdio.h>
void upper_triangular(int a[][3],int r,int c);
void main()
{
    int r,c,i,j;
    printf("Enter order of matrix:");
    scanf("%d%d",&r,&c);
    int a[r][c];
    printf("Enter your matrix:\n");
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            scanf("%d",&a[i][j]);
        }
    }
    upper_triangular(a,r,c);
}
void upper_triangular(int a[][3],int r,int c){
    int i,j;
    int sum=0;
    printf("Upper triangular matrix is..\n");
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            if(i>j){
                printf("%d ",0);
                sum+=a[i][j];}
            else{
                printf("%d ",a[i][j]);
            }
```

```
        }

        printf("\n");
    }
    printf("Sum of elements present at upper triangular matrix is %d",sum);
}
/*
Enter order of matrix:3 3
Enter your matrix:
1 2 3 4 5 6 7 8 9
Upper triangular matrix is..
1 2 3
0 5 6
0 0 9Sum of elements present at upper triangular matrix is 19
*/

// Given matrix to lower triangular matrix
#include<stdio.h>
void lower_triangular(int a[][3],int r,int c);
void main()
{
    int r,c,i,j;
    printf("Enter order of matrix:");
    scanf("%d%d",&r,&c);
    int a[r][c];
    printf("Enter your matrix:\n");
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            scanf("%d",&a[i][j]);
        }
    }
    lower_triangular(a,r,c);
}
void lower_triangular(int a[][3],int r,int c){
    int i,j;
    int sum=0;
    printf("Lower triangular matrix is..\n");
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            if(i<j){
                printf("%d ",0);
                sum+=a[i][j];}
```

```
            else{
                printf("%d ",a[i][j]);
            }
        }
    printf("\n");
    }
    printf("Sum of elements present at lower triangular matrix is %d",sum);
}
/*
Enter order of matrix:3 3
Enter your matrix:
1 2 3 4 5 6 7 8 9
Lower triangular matrix is..
1 0 0
4 5 0
7 8 9
Sum of elements present at lower triangular matrix is 11
*/
```

```
//Check if given matrix is sparse matrix or not
#include <stdio.h>
void sparse(int a[][3],int r,int c);
int main() {
    int r,c,i,j;
    printf("Enter order of matrix:");
    scanf("%d%d",&r,&c);
    int a[r][c];
    printf("Enter your elements:");
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            scanf("%d",&a[i][j]);
        }
    }
    sparse(a,r,c);
    return 0;
}
void sparse(int a[][3],int r,int c){
    int i,j,count=0;
    for(i=0;i<r;i++){
        for(j=0;j<c;j++){
            if(a[i][j]==0){
```

```
            count++;
        }
      }
   }
   if(count>(r+c)/2)
        printf("Sparse Matrix.");
     else
        printf("Not a sparse matrix.");
}
/*Enter order of matrix:3 3
Enter your elements:1 2 3 0 0 0 5 0 0
Sparse Matrix.*/
```

```
//Finding the index of specified element in an array
#include <stdio.h>
int linear(int a[],int size);
int main() {
   int n,i,index;
   printf("Enter size of array:");
   scanf("%d",&n);
   int a[n];
   printf("Enter your elements:");
   for(i=0;i<n;i++){
        scanf("%d",&a[i]);
      }
   index=linear(a,n);
   if(index>=0)
      printf("Element is found at inex:%d.",index);
   else
      printf("Element is not found.");
   return 0;
}
int linear(int a[],int size){
   int num,i;
   printf("Enter element to be searched:");
   scanf("%d",&num);
   for(i=0;i<size;i++){
        if(num==a[i]){
           return i;
        }
      }
```

```
    return -1;
}
/*
Enter size of array:3
Enter your elements:22 66 88
Enter element to be searched:12
Element is not found.
*/
```

Day-13(02-05-2024)

```
// Call by value implementation
#include <stdio.h>
void swap(int a,int b);
int main() {
    int a,b;
    printf("Enter a and b values:\n");
    scanf("%d%d",&a,&b); //10 20
    printf("Before in main:a=%d b=%d\n",a,b); //10 20
    swap(a,b);
    printf("After in main:a=%d b=%d\n",a,b); //10 20
    return 0;
}
void swap(int a,int b){
    int temp;
    printf("Before in swap:a=%d b=%d\n",a,b); //10 20
    temp=a;
    a=b;
    b=temp;
    printf("After in swap:a=%d b=%d\n",a,b); //20 10
}
```

```
// Call by reference implementation
#include <stdio.h>
void swap(int *p,int *q);
int main() {
    int a,b;
    printf("Enter a and b values:\n");
    scanf("%d%d",&a,&b); //10 20
```

```
    printf("Before in main:a=%d b=%d\n",a,b); //10 20
    swap(&a,&b);
    printf("After in main:a=%d b=%d\n",a,b); //20 10
    return 0;
}
void swap(int *p,int *q){
    int temp;
    printf("Before in swap:a=%d b=%d\n",*p,*q); //10 20
    temp=*p;
    *p=*q;
    *q=temp;
    printf("After in swap:a=%d b=%d\n",*p,*q); //20 10
}
```

```
//ATM withdraw,deposit,balance using functions and global variables
#include<stdio.h>
#include<stdlib.h>
float bal=5000, amount; //Global variables
void balance(){
    printf("Your account balance is: %.2f \n",bal);
}
void deposit(){
    printf("Enter amount to deposit:");
    scanf("%f",&amount);
    bal += amount;
    printf("%.2f amount is deposited successfully.\n",amount);
    printf("New balance is:%.2f.\n",bal);
}
void withdraw(){
    printf("Enter amount to withdraw:");
    scanf("%f",&amount);
    bal -= amount;
    printf("%.2f amount is debited successfully.\n",amount);
    printf("New balance is:%.2f.\n",bal);
}
void main()
{
    int option;
    char choice;
    do
    {
```

```
    printf(" ***welcome to GIST ATM***\n");
    printf("1. Balance \n");
    printf("2. Deposit \n");
    printf("3. Withdraw \n");
    printf("4. Exit \n");
    printf("Enter your option: ");
    scanf("%d", &option);
    switch (option)
    {
        case 1: balance();
                break;
        case 2: deposit();
                break;
        case 3: withdraw();
                break;
        case 4: exit(0);
        default: printf("Choose valid option.\n");
                 break;
    }
    printf("Do you want to perform another transaction(y/n):");
    scanf(" %c",&choice);
    }while(choice=='y'||choice=='Y');
}
```

```
//Global and Local variables
#include<stdio.h>
int a=8,b;
void main()
{
    int c=9,d;
    b = a+c;
    d = a-c;
    printf("a=%d c=%d\n",a,c); //a=8 c=9
    printf("b=%d d=%d\n",b,d); //b=17 d=-1
}
//Factorial using recursion
#include<stdio.h>
int factorial(int n){
    if(n==0||n==1)
        return 1;
    else
        return factorial(n-1)*n;
```

```
}
void main()
{
   int n,fact;
   printf("Enter a number:");
   scanf("%d",&n);
   fact=factorial(n);
   printf("Factorial is %d\n",fact);
}
//Enter a number:4
//Factorial is 24
```

```
//FInding no of 2 wheelers and 4 wheelers
#include<stdio.h>
void main(){
   int v,t;
   printf("Enter no of vehicles and tyres:");
   scanf("%d%d",&v,&t);
   int two,four;
   four=(t-2*v)/2;
   two=v-four;
   if(four*4+two*2==t)
      printf("TW = %d FW = %d",two,four);
   else
      printf("Invalid Input");
}
//Enter no of vehicles and tyres:200 540
//TW = 130 FW = 70
```

```
//Finding GCD using recursion
#include <stdio.h>
int gcd(int a, int b){
   if(b!=0)
      return gcd(b,a%b);
   else
      return a;
}
int main() {
   int num1,num2,i;
```

```
    printf("Enter two numbers:");
    scanf("%d%d",&num1,&num2);
    printf("GCD is %d",gcd(num1,num2));
    return 0;
}
//Enter two numbers:24 32
//GCD is 8
```

// GCD of two numbers without recursion

```
#include <stdio.h>
int main() {
    int n1,n2,gcd=1;
    printf("Enter two numbers:");
    scanf("%d%d",&n1,&n2);
    for(int i=1;i<n1*n2;i++){
        if(n1%i==0 && n2%i==0){
            gcd=i;
        }
    }
    printf("GCD is %d",gcd);
    return 0;
}
//Enter two numbers:24 32
//GCD is 8
```

// Pointers

```
#include <stdio.h>
int main() {
    int a=10;
    int *ptr;
    ptr=&a;
    printf("%d\n",a);//Value of a
    printf("%d\n",&a);//Address of a
    printf("%d\n",ptr);//address of a i.e.,value of pointer
    printf("%d\n",*ptr);//value present in address of a i.e,value of a
    printf("%d\n",*(&a));//" "
    printf("%d\n",&ptr);//address of pointer
    return 0;
}
```

```c
// Addition of two numbers using Pointers
#include <stdio.h>
int main() {
   int a=10,b=20;
   int *p1=&a,*p2=&b;
   int c=*p1+*p2;
   printf("%d",c);
   return 0;
}

// Addition of two numbers using functions and pointers
#include <stdio.h>
int add(int *p,int *q){
   return *p+*q;
}
int main() {
   int a=10,b=20;
   printf("%d",add(&a,&b));
   return 0;
}
```

Day-15(04-05-2024)

```c
// Reverse of a given number using pointers and functions
#include <stdio.h>
int reverse(int *ptr){
   int rev=0,rem;
   while(*ptr!=0){
      rem=*ptr%10;
      rev=rev*10+rem;
      *ptr/=10;
   }
   return rev;
}
int main() {
   int num;
   scanf("%d",&num);
   printf("Reverse number is..%d",reverse(&num));
   return 0;
```

```
}
//123
//Reverse number is..321
```

```
//Reverse of a number using function pointer
#include <stdio.h>
int sum(int num){
   int rev=0,rem;
   while(num!=0){
      rem=num%10;
      rev=rev*10+rem;
      num/=10;
   }
   return rev;
}
int main() {
   int (*fp)(int);
   fp=&sum;
   int num;
   scanf("%d",&num);
   int s=fp(num);
   printf("Reverse is %d",s);
   return 0;
}
//123
//Reverse is 321

//Sum of a number using function pointer
#include <stdio.h>
int sum(int x,int y){
   return x+y;
}
int main() {
   int (*fp)(int,int);
   fp=&sum;
   int s=fp(10,15);
   printf("Sum is %d",s);
   return 0;
}
//Sum is 25
```

Extra Programs

```c
//Find no of Two Wheelers and Four Wheelers from given no of vehicles and tyres
#include<stdio.h>
void main(){
   int v,t;
   printf("Enter no of vehicles and tyres:");
   scanf("%d%d",&v,&t);
   int two,four;
   four=(t-2*v)/2;
   two=v-four;
   if(four*4+two*2==t)
      printf("TW = %d FW = %d",two,four);
   else
      printf("Invalid Input");
}
/*
Enter no of vehicles and tyres:200 534
TW = 133 FW = 67

Enter no of vehicles and tyres:10 29
Invalid Input
*/
```

```c
//Sum of first n natural numbers using recursion
#include <stdio.h>
int sumn(int n){
   if(n==1)
      return 1;
   else
      return n+sumn(n-1);
}
int main() {
   int n;
   printf("Enter n value:");
   scanf("%d",&n);
   printf("Sum is...%d",sumn(n));
   return 0;
}
//Enter n value:10
```

```
//Sum is...55

//Swap two numbers using arithmetic operations
#include <stdio.h>
int main() {
   int a,b;
   printf("Enter a and b values:");
   scanf("%d%d",&a,&b);
   printf("Before swapping a=%d and b=%d.\n",a,b);
   a=a+b;
   b=a-b;
   a=a-b;
   printf("After swapping a=%d and b=%d.",a,b);
   return 0;
}
//Enter a and b values:10 20
//Before swapping a=10 and b=20.
//After swapping a=20 and b=10.

//Sum of digits of a number using recursion
#include <stdio.h>
int sumd(int num){
   if(num==0)
      return 0;
   else
      return num%10+sumd(num/10);
}
int main() {
   int num;
   printf("Enter a number:");
   scanf("%d",&num);
   printf("SUm of digits is...%d.",sumd(num));
   return 0;
}
//Enter a number:101
//Sum of digits is...2.
//Find roots of a quadratic equation
#include <stdio.h>
#include <math.h>
int main()
{
float a,b,c;
```

```c
float D,root1, root2;
printf("Enter coefficient values(a,b,c):");
scanf("%f %f %f",&a,&b,&c);
D = b*b-4*a*c;
if (D>0){
    root1=(-b+sqrt(D))/(2*a);
    root2=(-b-sqrt(D))/(2*a);
    printf("Root1-%.2f Root2-%.2f", root1, root2);
}
else if(D==0){
    root1 = root2 = -b/(2*a);
    printf("Root1 & Root2-%.2f\n", root1);
}
else{
    float r = -b/(2*a);
    float im = sqrt(-D)/(2*a);
    printf("Root1-%.2f+%.2fi Root2-%.2f-%.2fi\n",r,im,r,im);
}
return 0;
}
//Enter coefficient values(a,b,c):4 -2 -12
//Root1-2.00 Root2--1.50
```

//Find the type of triangle from given sides

```c
#include <stdio.h>
int main()
{
int a,b,c;
printf("Enter length of three sides...");
scanf("%d %d %d",&a,&b,&c);
if (a==b && b==c)
    printf("Triangle is equilateral.\n");
else if(a!=b && b!=c && a!=c)
    printf("Triangle is scalene.\n");
else
    printf("Triangle is isosceles.\n");
return 0;
}
//Enter length of three sides...12 15 12
//Triangle is isosceles.
```

```c
//Find the index of most significant bit of given number
#include <stdio.h>
void main()
{
int num;
printf("Enter a value:");
scanf("%d",&num);
int msb=0;
while(num>0)
{
msb+=1;
num=num/2;
}
printf("Index of Most significant bit is %d",msb-1);
}
//Enter a value:15
//Index of Most significant bit is 3
```

```python
/*
#Derive second smallest number from the digits of given number
num=input("Enter a number:")
lis=[]
for i in num:
    lis.append(int(i))
lis.sort()
k=len(lis)
a=lis[k-1]
b=lis[k-2]
lis [k-1]=b
lis[k-2]=a
ans=0
for i in lis:
    ans+=i*10**(k-1)
    k-=1
print("Second smallest number is {}".format(ans))

Output:
Enter a number:264153
Second smallest number is 123465
*/
```