**Definition of HCF (Highest common factor):**

HFC is also called greatest common divisor (gcd). HCF of two numbers is a largest positive numbers which can divide both numbers without any remainder.  For example HCF of two numbers 4 and 8 is 2 since 2 is the largest positive number which can dived 4 as well as 8 without a remainder.

**Logic of HCF or GCD of any two numbers:**

In HCF we try to find any largest number which can divide both the number.

For example: HCF or GCD of 20 and 30

Both number 20 and 30 are divisible by 1, 2,5,10.

HCF=max (1, 2, 3, 4, 10) =10

Logic for writing program:

It is clear that any number is not divisible by greater than number itself. In case of more than one numbers, a possible maximum number which can divide all of the numbers must be minimum of all of that numbers.

For example: 10, 20, and 30

Min (10, 20, 30) =10 can divide all there numbers. So we will take one for loop which will start form min of the numbers and will stop the loop when it became one, since all numbers are divisible by one. Inside for loop we will write one if conditions which will check divisibility of both the numbers.

Program:

**Write a c program for finding gcd (greatest common divisor) of two given numbers**

#include<stdio.h>

int main(){

    int x,y,m,i;

    printf("Insert any two number: ");

    scanf("%d%d",&x,&y);

    if(x>y)

         m=y;

    else

         m=x;

    for(i=m;i>=1;i--){

         if(x%i==0&&y%i==0){

             printf("\nHCF of two number is : %d",i) ;

             break;

         }

    }

    return 0;

}

Other logic :**HCF (Highest common factor)  program with two numbers in c**

#include<stdio.h>

int main(){

int n1,n2;

printf("\nEnter two numbers:");

scanf("%d %d",&n1,&n2);

while(n1!=n2){

if(n1>=n2-1)

n1=n1-n2;

else

n2=n2-n1;

}

printf("\nGCD=%d",n1);

return 0;

}

**HCF  program with multiple numbers in c**

#include<stdio.h>

int main(){

    int x,y=-1;

    printf("Insert numbers. To exit insert zero: ");

    while(1){

         scanf("%d",&x);

         if(x<1)

             break;

         else if(y==-1)

             y=x;

         else if (x<y)

             y=gcd(x,y);

         else

             y=gcd(y,x);

    }

    printf("GCD is %d",y);

    return 0;

}

int gcd(int x,int y){

    int i;

    for(i=x;i>=1;i--){

         if(x%i==0&&y%i==0){

             break;

         }

    }

    return i;

}