In [2]:

```
#1. GCD of two numbers using division method
def gcd(a,b):
    if a%b==0:
        return b
    else:
        return gcd(b,a%b)
a=int(input("enter the value of a:"))
b=int(input("enter the value of b:"))
print("the gcd of %d and %d is %d" %(a,b,gcd(a,b)))
```

```
enter the value of a:10
enter the value of b:40
the gcd of 10 and 40 is 10
```

In [4]:

```
# 2.Find the root using newtons method
approx=0
better=0
num=int(input("enter the value to find the square root:"))
approx=0.5*num
better=0.5*(approx+num/approx)
while approx!=better:
    approx=better
    better=0.5*(approx+num/approx)
print("the square root of %d is %f"%(num,approx))
```

```
enter the value to find the square root:15
the square root of 15 is 3.872983
```

In [37]:

```
# 3.Exponential of number given base and power
def expo(base,power):
    expo_value=1
    for i in range(power):
        expo_value*=base
    return expo_value
b=int(input("Enter Base Value:"))
p=int(input("Enter Power Value:"))
print("The exponentiation of number with Base %d and Power %d is %d" %(b,p,expo(b,p)))
```

```
Enter Base Value:3
Enter Power Value:3
The exponentiation of number with Base 3 and Power 3 is 27
```

In [26]:

```
# 4.Maximum value in a list of number
n=int(input("enter the number of elements:"))
list=[]
for i in range (n):
    list.append(int(input("enter the value at index %d:"%(i))))
print("the maximum number in the given list is %d"%(max(list)))
print("the minimum number in the given list is %d"%(min(list)))
```

```
enter the number of elements:6
enter the value at index 0:10
enter the value at index 1:20
enter the value at index 2:30
enter the value at index 3:40
enter the value at index 4:12
enter the value at index 5:15
the maximum number in the given list is 40
the minimum number in the given list is 10
```

In [31]:

```
# 5.Linear Search
def linear_search(arr,key):
    for i in range(len(arr)):
        if(arr[i]==key):
            return i
    return -1
n=int(input("enter the number of elements you want in a list:"))
list2=[]
for i in range(n):
    list2.append(int(input("enter value at index %d:"%(i))))
x=int(input("enter the number thet you want to search in list:"))
result=linear_search(list2,x)
if result==-1:
    print("The key is not found in list")
else:
    print("The element is found at index :"+str(result))
```

```
enter the number of elements you want in a list:5
enter value at index 0:22
enter value at index 1:33
enter value at index 2:44
enter value at index 3:66
enter value at index 4:77
enter the number thet you want to search in list:77
The element is found at index :4
```

In [33]:

```
# 6.Binary Search
def binary_search(arr,key):
    low=0
    high=len(arr)-1
    while low<=high:
        mid=(low+high)//2
        if arr[mid]==key:
            return mid
        elif a[mid]<key:
            low=mid+1
        else:
            high=mid-1
    return -1
a=[]
n=int(input("enter the number of element you want in the list:"))
for i in range(n):
    a.append(int(input("enter value ascending at index %d:"%(i))))
x=int(input("enter the number thet you want to search in list:"))
result=binary_search(a,x)
if result==-1:
    print("The key is not found in list")
else:
    print("The element is found at index %d"%(result))
```

```
enter the number of element you want in the list:4
enter value ascending at index 0:21
enter value ascending at index 1:22
enter value ascending at index 2:34
enter value ascending at index 3:55
enter the number thet you want to search in list:34
The element is found at index 2
```