In [3]:

```python
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:"))
gcd(a,b)
```

```
enter the value of a:27
enter the value of b:72
```

Out[3]:

```
9
```

In [4]:

```python
approx=0
better=0
num=int(input("enter the value to find square root:"))
approx=0.5*num
better=0.5*(approx+num/approx)
while approx!=better:
    approx=better
    better=0.5*(approx+num/approx)
print(f"the square root of {num} is {approx}")
```

```
enter the value to find square root:16
the square root of 16 is 4.0
```

In [5]:

```python
def expo(b,p):
    expo_value=1
    for i in range(p):
        expo_value=expo_value*b
    return expo_value
print("the exponential value is:%d"%expo(int(input("enter the base value:")),int(input("enter the power value:"))))
```

```
enter the base value:4
enter the power value:3
the exponential value is:64
```

In [6]:

```python
n=int(input("Enter the number of elements you want in list:"))
list1=[]
for i in range(n):
 a=int(input("enter the at Index %d:"%(i)))
 list1.append(a)
print("The maximum number in given list is "+str(max(list1)))
print("The minimum number in given list is %d "%(min(list1)))
```

```
Enter the number of elements you want in list:6
enter the at Index 0:6
enter the at Index 1:16
enter the at Index 2:17
enter the at Index 3:31
enter the at Index 4:36
enter the at Index 5:56
The maximum number in given list is 56
The minimum number in given list is 6
```

In [8]:

```python
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:4
enter value at index 0:10
enter value at index 1:20
enter value at index 2:30
enter value at index 3:40
enter the number thet you want to search in list:20
The element is found at index :1
```

In [9]:

```python
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]15<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:6
enter value ascending at index 0:5
enter value ascending at index 1:10
enter value ascending at index 2:15
enter value ascending at index 3:20
enter value ascending at index 4:25
enter value ascending at index 5:30
enter the number thet you want to search in list:20
The element is found at index 3
```

In [ ]: