

Arrays

In [34]:

```
#Binary Search
arr =[20,30,40,50,60,70]
def binary_seach(arr,left,right):
    x=50
    left = 0
    right=len(arr)
    mid = right//2
    while left<=right:
        if (arr[mid]==x):
            return mid
        elif (arr[mid]<x):
            left = mid+1
        else:
            right = mid-1
print(binary_seach(arr,0,5))
```

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In [35]:

```
#Binary Search with recursion
def binary_re(arr1,x,i,j):

    while i<=j:
        mid = i + (j-i)//2
        if arr[mid]== x:

            return mid

        elif(arr[mid]<x):
            return binary_re(arr1,x,mid+1,j)

        else:
            return binary_re(arr1,x,i,mid -1)

arr1 =[20,30,40,50,60,70,80]
i=0
j= len(arr1) -1
x=50
result = binary_re(arr1,x,i,j)
print(result)
```

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In [36]:

```
def modify_b(arr,left,right):
    while left<right:
        mid = left + (right-left)//2

        if(arr[mid]!="i"):
            return modify_b(arr,mid +1 , right)
        else:
            if(arr[mid-1]!="i"):
                return mid
            else:
                return modify_b(arr,left,mid -1)
```

```
arr2 =[-20,30,1,2,7,0,9,"i","i","i"]
left=0
right = len(arr2) - 1
result = modify_b(arr2,left,right)
print(result)
```

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Exponetial Binary Search

In [37]:

```
def exponential_seach(arr, i , j,x):
    for item in arr(range(0::i**2)):
        mid = i +(j-i)//2

        if arr[mid]==x:
            if arr[mid - 1]!=x:
                return mid
            else:
                return exponential_seach
```

Cell In[37], line 3
for item in arr(range(0::i**2)):

SyntaxError: invalid syntax

In []:

```
#Two_Pointer

def two_pointer(arr,l,r):

    while l<=r:
        if arr[l]+arr[r]==sum_value:
            return arr[l],arr[r]

        elif (arr[l]+arr[r]<sum_value):
            return two_pointer(arr,l+1,r)

        else:
            return two_pointer(arr,l,r-1)

    return -1
```

```
arr3 =[20,40,60,80,90,120]
sum_value=90
l = 0
r = len(arr3) - 1
result = two_pointer(arr3,l,r)
print(result)
```

-1

In []:

```
def first_element(nums : list[int],target = int):
```

In []:

```
In [ ]:  
num1 = [2,3,5,4,2]  
num2 =[2,2]  
k=[]
```

```
for s in num2:  
  
    if s in num1:  
        k.append(s)  
  
j = set(k)  
print(list(j))
```

```
[2]
```

BUY and SELL stock

```
In [2]:  
stock =[1,5,3,6,4,8]  
k =[]  
l = 0  
r = 1
```

```
while r<(len(stock)):  
  
    if stock[l]< stock[r]:  
  
        k.append(stock[r]- stock[l])  
  
    elif stock[l]> stock[r]:  
        l = r  
  
    r +=1  
print(max(k))
```

```
7
```

```
In [ ]:  
#more optimize way to solve
```

Ternary Search

```
In [6]:  
def ternarySearch(arr,l,r,key):  
  
    while l<=r :  
  
        mid1 = l + (r-l)//3  
        mid2 = r - (r-l)//3  
  
        if(arr[mid1]==key):  
            return mid1  
  
        elif(arr[mid2]==key):
```

```

        return mid2

    elif(key<arr[mid1]):
        return ternarySearch(arr,l,mid1-1,key)

    elif(key>arr[mid1]):
        return ternarySearch(arr,mid1+1,r,key)

    elif(key<arr[mid2]):
        return ternarySearch(arr,mid1+1,mid2-1,key)

    elif(key>arr[mid2]):
        return ternarySearch(arr,mid2+1,r,key)

    return -1

arr =[20,22,24,36,48,56,65,69,88,99]
key = 69
l=0
r=len(arr)-1
result = ternarySearch(arr,l,r,key)
print(result)

```

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In []:

2D Array

In [39]:

```

def findTarget(matrix,target):
    row= len(matrix)
    column=len(matrix[0])

    i=0
    j = (row*column)-1

    while i<=j:

        mid = i+ (j-i)//2

        midRow = mid//column
        midColumn = mid % column
        midvalue = matrix[midRow][midColumn]

        if(midvalue==target):

            return "true"

        elif(midvalue>target):

            j=mid-1

        else:
            i= mid+1

    return "false"

matrix = [[1,3,5,7],[10,11,16,20],[23,30,34,60]]

```

```
target = 23
result=findTarget(matrix,target)
print(result)
```

true