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Modul 5: sorting (jupyter notebook)

In [24]:
```
class Manusia(object):
    keadaan='lapar'
    def __init__(self,nama):
        self.nama=nama
    def ucapkanSalam(self):
        print("Salam, Namaku ",self.nama)
    def makan(slf,s):
        print("saya baru saja makan ",s)
        self.keadaan='kenyang'
    def olahraga(self,k):
        print('saya barusaja latihan ',k)
        self.keadaan='lapar'
    def mengalikanDenganDua(self,n):
        return n*2

class Mahasiswa(Manusia):
    def __init__(self,nama,NIM,kota,us):
        self.nama       = nama
        self.NIM        = NIM
        self.kotaTinggal= kota
        self.uangSaku   = us
        self.listKul    = []
    def __str__(self):
        return "{}, NIM {}. Tinggal di {}. Uang saku Rp {} tiap bulannya".format(self.nama,self.NIM,self.kotaTinggal,se
    def ambilNIM        (self):
        return self.NIM
    def ambilUangSaku   (self):
        return self.uangSaku
    def ambilNama       (self):
        return self.nama

class MhsTIF(Mahasiswa):
    def katakanPy(self):
        print('Python is cool.')
```

In [25]:
```
#test object
c0  = MhsTIF("Ika"    ,10 ,"Sukoharjo"  ,240000)
c1  = MhsTIF("Budi"   ,51 ,"Sragen"     ,235000)
c2  = MhsTIF("Ahmad"  ,2  ,"Surakarta"  ,250000)
c3  = MhsTIF("Chandra",18 ,"Surakarta"  ,235000)
c4  = MhsTIF("Eka"    ,4  ,"Boyolali"   ,240000)
c5  = MhsTIF("Fandi"  ,31 ,"Salatiga"   ,250000)
c6  = MhsTIF("Deni"   ,13 ,"Klaten"     ,245000)
c7  = MhsTIF("Galuh"  ,5  ,"Wonogiri"   ,245000)
c8  = MhsTIF("Janto"  ,23 ,"Klaten"     ,245000)
c9  = MhsTIF("Hasan"  ,64 ,"Karanganyar",270000)
c10 = MhsTIF("Khalid" ,29 ,"Porwodadi"  ,265000)

Daftar=[c0,c1,c2,c3,c4,c5,c6,c7,c8,c9,c10]
```

In [26]:
```
def sortingMHS(listing):
    for i in range ( len ( listing ) - 1 ) :
        for i in range ( len ( listing ) - 1 ) :
            if listing[i].ambilNIM() > listing[i+1].ambilNIM() :
                listing[i],listing[i+1]=listing[i+1],listing[i]
    return listing

k=sortingMHS(Daftar)
print(*k, sep="\n")
```

```
Ahmad, NIM 2. Tinggal di Surakarta. Uang saku Rp 250000 tiap bulannya
Eka, NIM 4. Tinggal di Boyolali. Uang saku Rp 240000 tiap bulannya
Galuh, NIM 5. Tinggal di Wonogiri. Uang saku Rp 245000 tiap bulannya
Ika, NIM 10. Tinggal di Sukoharjo. Uang saku Rp 240000 tiap bulannya
Deni, NIM 13. Tinggal di Klaten. Uang saku Rp 245000 tiap bulannya
Chandra, NIM 18. Tinggal di Surakarta. Uang saku Rp 235000 tiap bulannya
Janto, NIM 23. Tinggal di Klaten. Uang saku Rp 245000 tiap bulannya
Khalid, NIM 29. Tinggal di Porwodadi. Uang saku Rp 265000 tiap bulannya
Fandi, NIM 31. Tinggal di Salatiga. Uang saku Rp 250000 tiap bulannya
Budi, NIM 51. Tinggal di Sragen. Uang saku Rp 235000 tiap bulannya
Hasan, NIM 64. Tinggal di Karanganyar. Uang saku Rp 270000 tiap bulannya
```

In [27]:
```
def gabungListUrut(a,b):
    la= len(a)
    lb= len(b)
    c = []
    i = 0
    j = 0
    while i<la and j<lb:
        if a[i] < b[j]:
            c.append(a[i])
            i+=1
        else:
            c.append(b[j])
            j+=1
    if i<la:
        c+=a[i:]
    else:
        c+=b[j:]
    return c

A = [1,2,5,6,9]
B = [3,4,7,8]
#satukanListUrut(B,A)
gabungListUrut(B,A)
```

Out[27]:
```
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

In [28]:
```
def bubblesort(A):
    for i in range(len(A)-1):
        for j in range(len(A)-1):
            if A[j]>A[j+1]:
                A[j],A[j+1]=A[j+1],A[j]
    return A
bubblesort([0,8,6,3,4,2,1,7,9])
```

Out[28]:
```
[0, 1, 2, 3, 4, 6, 7, 8, 9]
```

In [29]:
```
def insertionsort(A):
    for i in range(1,len(A)):
        nilai,pos=A[i],i
        while pos > 0 and nilai < A[pos -1]:
            A[pos] = A[pos - 1]
            pos    = pos -1
        A[pos] = nilai
    return A
insertionsort([0,8,6,3,4,2,1,7,9])
```

Out[29]:
```
[0, 1, 2, 3, 4, 6, 7, 8, 9]
```

In [30]:
```
def selectionsort(A):
    n= len(A)
    for i in range(n-1):
        posisiterkecil = i
        for j in range(posisiterkecil+1,n):
            if A[j] < A[posisiterkecil]:
                posisiterkecil = j
        if posisiterkecil != i:
            A[i],A[posisiterkecil]=A[posisiterkecil],A[i]
    return A
selectionsort([0,8,6,3,4,2,1,7,9])
```

Out[30]:
```
[0, 1, 2, 3, 4, 6, 7, 8, 9]
```

In [31]:
```
from time import time
from random import shuffle
k=list(range(1,6001))
shuffle(k)
k1=k[:]
k2=k[:]
k3=k[:]
print("================= Sorting {} data ====================".format(len(k)))
aw=time();bubblesort   (k1) ;ak=time()  ;print("Bubble sort    : ",(ak-aw),"s")
aw=time();insertionsort(k2) ;ak=time()  ;print("Insertion sort : ",(ak-aw),"s")
aw=time();selectionsort(k3) ;ak=time()  ;print("Selection sort : ",(ak-aw),"s")
```

```
================= Sorting 6000 data ====================
Bubble sort    :  22.23869800567627 s
Insertion sort :  8.813241958618164 s
Selection sort :  6.1175572872161865 s
```