MODUL PRAKTIKUM

ALGORITMA DAN STRUKTUR DATA

INF1008

Penyusun :

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Praktikum 10:
Sorting

Pokok Bahasan:

- ❖ Sorting
- ❖ Teknik-Teknik Sorting

Tujuan Pembelajaran:

- ✓ Memahami implementasi algoritma Sorting dengan menggunakan teknik-teknik Sorting.
- ✓ Memahami perbedaan algoritma masing-masing teknik Sorting.

Bubble Sort:

Percobaan & Latihan 10.1

Jalankan kedua program berikut!

```
1  def bubbleSort(alist):
2      for passnum in range(len(alist)-1,0,-1):
3          for i in range(passnum):
4              if alist[i]>alist[i+1]:
5                  temp = alist[i]
6                  alist[i] = alist[i+1]
7                  alist[i+1] = temp
8
9  alist = [54,26,93,17,77,31,44,55,20]
10 bubbleSort(alist)
11 print(alist)
12
```

```
1  def shortBubbleSort(alist):
2      exchanges = True
3      passnum = len(alist)-1
4      while passnum > 0 and exchanges:
5         exchanges = False
6         for i in range(passnum):
7             if alist[i]>alist[i+1]:
8                 exchanges = True
9                 temp = alist[i]
10                alist[i] = alist[i+1]
11                alist[i+1] = temp
12        passnum = passnum-1
13
14 alist=[20,30,40,90,50,60,70,80,100,110]
15 shortBubbleSort(alist)
16 print(alist)
```

Soal :

a) Berikan tampilan output dari kedua program diatas!
b) Jelaskan perbedaan algoritma kedua fungsi pada program diatas!
c) Algoritma mana yang terbaik dari kedua fungsi tersebut? Jelaskan alasannya!

Selection Sort:

Percobaan & Latihan 10.2

Jalankan program berikut!

```
1  def selectionSort(alist):
2     for fillslot in range(len(alist)-1,0,-1):
3         positionOfMax=0
4         for location in range(1,fillslot+1):
5             if alist[location]>alist[positionOfMax]:
6                 positionOfMax = location
7
8         temp = alist[fillslot]
9         alist[fillslot] = alist[positionOfMax]
10        alist[positionOfMax] = temp
11
12 alist = [54,26,93,17,77,31,44,55,20]
13 selectionSort(alist)
14 print(alist)
```

Soal :

a) Berikan tampilan output dari program diatas!
b) Berikan penjelasan dari baris ke-2 hingga ke-10!

Insertion Sort:

Percobaan & Latihan 10.3

Jalankan program berikut!

```
1  def insertionSort(alist):
2     for index in range(1,len(alist)):
3
4       currentvalue = alist[index]
5       position = index
6
7       while position>0 and alist[position-1]>currentvalue:
8           alist[position]=alist[position-1]
9           position = position-1
10
11      alist[position]=currentvalue
12
13 alist = [54,26,93,17,77,31,44,55,20]
14 insertionSort(alist)
15 print(alist)
```

Soal :

a) Berikan tampilan output dari program diatas!
b) Berikan penjelasan dari baris ke-2 hingga ke-11!

Shell Sort:

Percobaan & Latihan 10.4

Jalankan program berikut!

```
1  def shellSort(alist):
2      sublistcount = len(alist)//2
3      while sublistcount > 0:
4
5        for startposition in range(sublistcount):
6          gapInsertionSort(alist,startposition,sublistcount)
7
8        print("After increments of size",sublistcount,
9                                      "The list is",alist)
10
11       sublistcount = sublistcount // 2
12
13 def gapInsertionSort(alist,start,gap):
14     for i in range(start+gap,len(alist),gap):
15
16         currentvalue = alist[i]
17         position = i
18
19         while position>=gap and alist[position-gap]>currentvalue:
20             alist[position]=alist[position-gap]
21             position = position-gap
22
23         alist[position]=currentvalue
24
25 alist = [54,26,93,17,77,31,44,55,20]
26 shellSort(alist)
27 print(alist)
```

Soal :

a) Berikan tampilan output dari program diatas!
b) Jelaskan kedua fungsi pada program diatas!
c) Pada baris ke-11 terdapat variabel “sublistcount”, jelaskan untuk apa variabel tersebut!

Merge Sort:

Percobaan & Latihan 10.5

Jalankan program berikut!

```python
def mergeSort(alist):
    print("Splitting ",alist)
    if len(alist)>1:
        mid = len(alist)//2
        lefthalf = alist[:mid]
        righthalf = alist[mid:]

        mergeSort(lefthalf)
        mergeSort(righthalf)

        i=0
        j=0
        k=0
        while i < len(lefthalf) and j < len(righthalf):
            if lefthalf[i] < righthalf[j]:
                alist[k]=lefthalf[i]
                i=i+1
            else:
                alist[k]=righthalf[j]
                j=j+1
            k=k+1

        while i < len(lefthalf):
            alist[k]=lefthalf[i]
            i=i+1
            k=k+1

        while j < len(righthalf):
            alist[k]=righthalf[j]
            j=j+1
            k=k+1
    print("Merging ",alist)

alist = [54,26,93,17,77,31,44,55,20]
mergeSort(alist)
print(alist)
```

Soal :

a) Berikan tampilan output dari program diatas!
b) Analisa hasil program diatas menggunakan jumlah item dalam “alist”, jumlah splitting dan merging yang dilakukan!
c) Lakukanlah uji coba dengan jumlah item “alist” yang berbeda, kemudian analisa hasil jumlah splitting dan merging-nya!

Quick Sort:

Percobaan & Latihan 10.6

Jalankan program berikut!

```python
def quickSort(alist):
   quickSortHelper(alist,0,len(alist)-1)

def quickSortHelper(alist,first,last):
   if first<last:

       splitpoint = partition(alist,first,last)

       quickSortHelper(alist,first,splitpoint-1)
       quickSortHelper(alist,splitpoint+1,last)


def partition(alist,first,last):
   pivotvalue = alist[first]

   leftmark = first+1
   rightmark = last

   done = False
   while not done:

       while leftmark <= rightmark and alist[leftmark] <= pivotvalue:
           leftmark = leftmark + 1

       while alist[rightmark] >= pivotvalue and rightmark >= leftmark:
           rightmark = rightmark -1

       if rightmark < leftmark:
           done = True
       else:
           temp = alist[leftmark]
           alist[leftmark] = alist[rightmark]
           alist[rightmark] = temp

   temp = alist[first]
   alist[first] = alist[rightmark]
   alist[rightmark] = temp


   return rightmark

alist = [54,26,93,17,77,31,44,55,20]
quickSort(alist)
print(alist)
```

Soal :

a) Berikan tampilan output dari program diatas!
b) Berikan penjelasan ketiga fungsi dari program diatas!

Laporan Resmi:

1. Buatlah summary dan analisa dari **Percobaan & Latihan** pada pratikum ini.
2. Berikan kesimpulan dari praktikum ini.