

PRAKTIKUM
ALGORITMA DAN STRUKTUR DATA
MODUL 3



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PROGRAM STUDI
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UNIVERSITAS MUHAMMADIYAH SURAKARTA
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1. Membuat fungsi-fungsi

```
#nomer1.py - D:/MATKUL SMT 4/Praktikum ASD/modul 3/nomer1.py (3.8...
File Edit Format Run Options Window Help
#Modul 3 Nicky Juliyatrika Sari L200200101
#Nomer 1
a = [[2, 3], [5, 7]]
b = [[2, 4], [8, 9]]
c = [[3, 4], [5, 9], [1, 2, 5]]

#Memastikan isi dan ukuran matriks sudah sesuai
def cekMatrix(x):
    for i in x:
        if len(i) != len(x):
            return "Isi dan ukuran matriks tidak konsisten"
            break
        else:
            return "isi dan ukuran matriks sudah konsisten"

#Mengambil ukuran Matrix
def ambilUkMatrix(x):
    hasil = len(x), len(x[0])
    return hasil

#Menjumlahkan dua matrix
def jmlMatrix(x, y):
    hasil = []
    for i in range(len(x)):
        new = []
        for j in range(len(x[i])):
            new.append(x[i][j] + y[i][j])
        hasil.append(new)
    return hasil

#Mengalikan dua Matrix
def kaliMatrix(x, y):
    hasil = []
    for i in range(len(x)):
        new = []
        for j in range(len(x[i])):
            new.append(x[i][j] * y[i][j])
        hasil.append(new)
    return hasil

#Menghitung Determinan Matrix
def detMatrix(x):
    hasil = []
    for i in range(len(x)):
        if i == 0:
            ad = x[i][i] * x[i+1][i+1]
        elif i == 1:
            bc = x[i-1][i] * x[i][i-1]
        hasil = (ad - bc)
    return hasil

Python 3.8.6 Shell
File Edit Shell Debug Options Window Help
Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [MSC
v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more inf
ormation.
>>>
===== RESTART: D:/MATKUL SMT 4/Praktikum ASD/modul 3/nome
r1.py =====
>>> cekMatrix(a)
'isi dan ukuran matriks sudah konsisten'
>>> cekMatrix(b)
'isi dan ukuran matriks sudah konsisten'
>>> cekMatrix(c)
'Isi dan ukuran matriks tidak konsisten'
>>> ambilUkMatrix(a)
(2, 2)
>>> ambilUkMatrix(b)
(2, 2)
>>> ambilUkMatrix(c)
(3, 2)
>>> jmlMatrix(a, b)
[[4, 7], [13, 16]]
>>> kaliMatrix(a, b)
[[4, 12], [40, 63]]
>>> detMatrix(a)
-5
>>> detMatrix(b)
-16
>>>
```

2. Terkait matrix dan list comperehension, buatlah(dengan memanfaatkan klist comperehension) fungsi fungsi:

- Untuk membangkitkan matrix berisi 0 semua, dengan diberikan ukuranya. Pemanggilan :`buatNol(m, n)` dan `buatNoll(m)`.pemanggilan terakhir akan memberikan matrix bujur sangkar ukuran $m * m$
- Untuk membangkitkan matrix identitas, dengan diberikan ukurannya. Pemanggilanya `buatIdentitas(m)`

```
nomer2.py - D:/MATKUL SMT 4/Praktikum ASD/modul 3/nomer2.py (3.8.6)
File Edit Format Run Options Window Help
#Modul 3 Nicky Julyatrika Sari L200200101

#Nomer 2a
def buatNol(a, b):
    x = [[0 for i in range(a)] for j in range(b)]
    print(x)

def buatNoll(a):
    x = [[0 for i in range(a)] for j in range(a)]
    print(x)

b = [[2, 3], [1, 2]]

#Nomer 2b
def buatIdentitas(a):
    x = [[1 if j == i
          else 0 for j in range(a) for i in range(a)]]
    print(x)

b = [[0, 1], [9, 8]]

Python 3.8.6 Shell
File Edit Shell Debug Options Window Help
Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [MSC
v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more inf
ormation.
>>>
===== RESTART: D:/MATKUL SMT 4/Praktikum ASD/modul 3/nome
r2.py =====
>>> buatNol(2, 4)
[[0, 0], [0, 0], [0, 0], [0, 0]]
>>> buatNoll(4)
[[0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0]]
>>> buatIdentitas(5)
[[0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0]]
>>> |
```

3. Terkait linked list, buatlah fungsi untuk :

- Mencari data yang isinya tertentu: cari(head,yang dicari)
- Menambah suatu simpul di awal: tambahDepan(head)
- Menambah suatu simpul di akhir: tambahAkhir(head)
- Menyisipkan suatu simpul di mana saja: tambah(head,posisi)
- Menghapus suatu simpul di awal, di akhir, atau di mana saja: hapus(posisi)

```
nomer3.py - D:/MATKUL SMT 4/Praktikum ASD/modul 3/nomer3.py (3.8.6)
File Edit Format Run Options Window Help
#Modul 3 Nicky Julyatrika Sari L200200101
#Nomer 3
class node:
    def __init__(self, data):
        self.data = data
        self.next = None

class LinkedList(object):
    def __init__(self):
        self.head = None

    def printlinkedlist(self):
        head = self.head
        while(head != None):
            print(" " + str(head.data) + ">", end = "")
            head = head.next
        print()

    def cari(self, yangDiCari):
        posisi = 1
        x = self.head
        while(True):
            if x.data != yangDiCari:
                x = x.next
                posisi += 1

            elif x == None:
                print(yangDiCari, "Apakah ada dalam data?")
                return "Data tidak ada"
                break
            else :
                print(yangDiCari, "Apakah ada dalam data?")
                return "Data ada pada simpul ke-" + str(posisi)

Python 3.8.6 Shell
File Edit Shell Debug Options Window Help
Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [
MSC v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more
information.
>>>
===== RESTART: D:\MATKUL SMT 4\Praktikum ASD\modul 3\
nomer3.py =====
12->31->8->20->
12 Apakah ada dalam data?
12->8->20->
>>> |
```

The image shows two side-by-side windows from a Windows operating system.

The left window is titled "nomer3.py - D:\MATKUL SMT 4\Praktikum ASD\modul 3\nomer3.py (3.8.6)". It contains Python code for a linked list. The code defines a `Node` class and a `LinkedList` class. The `LinkedList` class has methods to add nodes at the beginning (`tambahDpn`), at the end (`tambahAkhir`), and at a specific position (`tambah`). The main part of the code creates a `LinkedList` object, adds nodes with values 12, 12, and 12, and then prints the list.

The right window is titled "Python 3.8.6 Shell". It shows the execution of the script. The output is as follows:

```
Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [
MSC v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more
information.
>>>
===== RESTART: D:\MATKUL SMT 4\Praktikum ASD\modul 3\
nomer3.py =====
12->31->8->20->
12 Apakah ada dalam data?
12->8->20->
>>> |
```

```
nomer3.py - D:\MATKUL SMT 4\Praktikum ASD\modul 3\nomer3.py (3.8.6)
File Edit Format Run Options Window Help
    x.next = tambah
    elif posisi == 1:
        tambah.next = self.head
        self.head = tambah
        break
    elif x == None:
        break
    else:
        x = x.next
        sekarang += 1

def hapus(self, posisi):
    sekarang = 1
    x = self.head
    while x != None:
        if posisi == 1:
            x = x.next
            self.head = x
            break
        elif x.next == None and sekarang < posisi:
            break
        elif sekarang == posisi-1:
            x.next = x.next.next
        else:
            x = x.next
            sekarang += 1

    sekarang = 1

def display(self):
    current = self.head
    while current is not None:
        print(current.data, end = " ")
        current = current.next

B = LinkedList()
B.printlinkedlist()
B.tambahDpn(31)
B.tambahDpn(12)
B.tambahAkhir(20)
B.tambah(8, 3)
B.printlinkedlist()
B.cari(12)
B.hapus(2)
B.printlinkedlist()
B.display()
```

4. Terkait doubly linked list, buatlah fungsi untuk
- Mengunjungi dan mencetak data tiap simpul dari depan dan dari belakang.
 - Menambah suatu simpul di awal.

- Menambah suatu simpul di akhir

The image displays two screenshots of a Python IDE (Python 3.8.6 Shell) showing the implementation of a doubly linked list. The first screenshot shows the initial code with the `Node` and `DoubleList` classes, and a method `tambahSimpulAwal` to add a node at the beginning. The second screenshot shows the updated code with a method `tambahSimpulAkhir` to add a node at the end, and the execution output showing the list state after adding nodes at both ends.

```
#Modul 3 Nicky Julyatrika Sari L200200101
#Nomer 4
class Node(object):
    def __init__(self, data, next=None, prev=None):
        self.data = data
        self.next = next
        self.prev = prev

class DoubleList(object):
    def __init__(self):
        self.head = None
    def cetakSemua(self):
        head = self.head
        while head != None:
            print(head.data, end='->')
            if head.next != None:
                head = head.next
            else:
                break
        print()
    def __str__(self):
        while self.head != None:
            print(head.data, end='->')
            if head.next != None:
                head = head.next
            else:
                break
        print()

    def tambahSimpulAwal(self, head):
        x = self.head
        tambah = Node(head)
        if x == None:
            self.head = tambah
        else:
            break
        print()

    def tambahSimpulAkhir(self, head):
        x = self.head
        tambah = Node(head)
        while True:
            if x == None:
                self.head = tambah
                break
            elif x.next == None:
                x.next = tambah
                tambah.prev = x
                break
            else:
                x = x.next

z = DoubleList()
z.cetakSemua()
z.tambahSimpulAwal(9)
z.tambahSimpulAkhir(20)
z.tambahSimpulAkhir(20)
```

Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [MSC v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: D:/MATKUL SMT 4/Praktikum ASD/modul 3/nomer4.py =====
|
9->20->20->
20->20->9->
>>>

Python 3.8.6 (tags/v3.8.6:db45529, Sep 23 2020, 15:52:53) [MSC v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: D:/MATKUL SMT 4/Praktikum ASD/modul 3/nomer4.py =====
9->20->20->
20->20->9->
>>>