

PRAKTIKUM
ALGORITMA DAN STRUKTUR DATA
MODUL 3

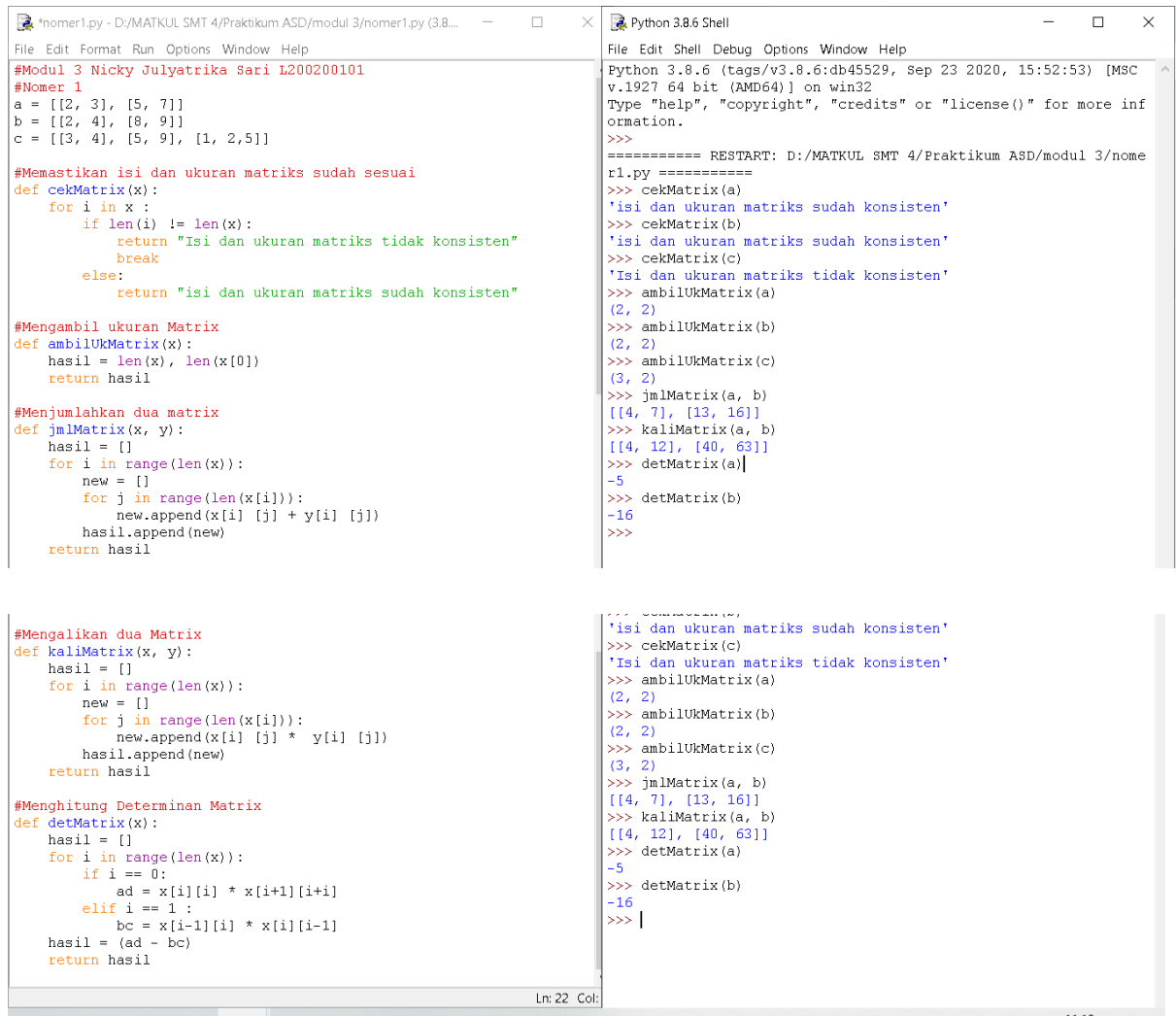


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PROGRAM STUDI
INFORMATIKA
FAKULTAS KOMUNIKASI DAN INFORMATIKA
UNIVERSITAS MUHAMMADIYAH SURAKARTA
TAHUN 2021/2022

1. Membuat fungsi-fungsi



The screenshot shows a Python IDE with two windows. The left window displays a script named 'nomer1.py' with the following code:

```
#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
```

The right window shows the Python 3.8.6 Shell with the following output:

```
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)`

```

#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 (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)

```

#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 (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

    else:
        print(yangDiCari, "Apakah ada dalam data?")
        return "Data ada pada simpul ke-" + str(posisi)
        break

def tambahDpn(self, head):
    tambah = node(head)
    if self.head != None:
        tambah.next = self.head
    self.head = tambah

def tambahAkhir(self, head):
    x = self.head
    tambah = node(head)
    while(True):
        if self.head == None:
            self.head = tambah

        if x.next == None:
            x.next = tambah
            break
        else:
            x = x.next

def tambah(self, head, posisi):
    sekarang = 0
    tambah = node(head)
    x = self.head
    while x != None:
        if sekarang == posisi-2:
            tambah.next = x.next
            x.next = tambah
            break
        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
            break
        else:
            x = x.next
            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

```

```

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->
>>>

```

```

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
            break
        else:
            x = x.next
            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

```

```

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->
>>>

```

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 (likely VS Code) showing the implementation of a doubly linked list. The first screenshot shows the initial code with the following classes and methods:

```
#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 tambahSimpulAwal(self, head):
        x = self.head
        tambah = Node(head)
        if x == None:
            self.head = tambah
```

The second screenshot shows the updated code with the following additions:

```
        else:
            break
        print()

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

    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)
```

The Python 3.8.6 Shell output shows the execution results:

```
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->
>>>
```