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Kelas : A

## **MODUL 3**

### **Collections, Arrays, And Linked Structures**

#### **Soal – Soal Untuk Mahasiswa**

1. Terkait array 2 dimensi

```
1.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/1.py (3.8.2)
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a = [[2,4],
      [6,21]]
b = [[2,67],
      [2,9],
      [1,5,"b",9]]
c = [[3,5,7],[21,87,9]]
d = [[1,2,3],[21,90,3],[6,5,78]]
e = [[1,2],[43,7]]
##Memastikan isi dan ukuran matrixnya konsisten
def cekkonsisten(n):
    x = len(n[0])
    z = 0
    for i in range(len(n)):
        if (len(n[i]) == x):
            z += 1
    if (z == len(n)):
        print("Matrix konsisten")
    else:
        print("Matrix tidak konsisten")

print("NOMOR 1A")
cekkonsisten(a)
cekkonsisten(b)
cekkonsisten(c)
cekkonsisten(d)
def cekinteger(n):
    x = 0
    y = 0
    for i in n:
        for j in i:
            y += 1
            if(str(j).isdigit() == False):
                print("Tidak semua isi matrix angka")
                break
            else:
                x += 1
    if (x == y):
        print("Semua isi matrix adalah angka")
cekinteger(a)
cekinteger(b)
```

Ln: 136 Col: 0

```
1.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/1.py (3.8.2)
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##Mengambil ukuran matrix
def cekordo(n):
    x,y = 0,0
    for i in range(len(n)):
        x += 1
        y = len(n[i])
        print("Memunyai ordo" + str(x) + "x" + str(y))

print("NOMOR 1B")
cekordo(a)
cekordo(b)
cekordo(c)
cekordo(d)

##Menjumlahkan 2 matrix
def jumlah(n,m):
    x,y = 0,0
    for i in range(len(n)):
        x += 1
        y = len(n[i])
    xy = [[0 for j in range(x)] for i in range(y)]

    z = 0
    if(len(n)==len(m)):
        for i in range(len(n)):
            if(len(n[i]) == len(m[i])):
                z+=1
        if(z==len(n) and z==len(m)):
            print("ukuran sama")
            for i in range(len(n)):
                for j in range(len(n[i])):
                    xy[i][j] = n[i][j] + m[i][j]
            print(xy)
        else:
            print("ukuran beda")

print("NOMOR 1C")
jumlah(a,b)
jumlah(a,e)

##Mengkalikan 2 matrix
def kali(n,m):
```

Ln: 136 Col: 0

```
1.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/1.py (3.8.2)
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##Mengkalikan 2 matrix
def kali(n,m):
    aa = 0
    x,y = 0,0
    for i in range(len(n)):
        x+=1
        y = len(n[i])
    v,w = 0,0
    for i in range(len(m)):
        v+=1
        w = len(m[i])

    if(y==v):
        print("bisa dikalikan")
        vwxy = [[0 for j in range(w)] for i in range(x)]
        for i in range(len(n)):
            for j in range(len(m[0])):
                for k in range(len(m)):
                    #print(n[i][k], m[k][j])
                    vwxy[i][j] += n[i][k] * m[k][j]
        print(vwxy)

    else:
        print("tidak memenuhi syarat")
print("NOMOR 1D")
kali(a,e)
kali(b,d)
..
```

```

##Menghitung determinan
def determinan(A, total=0):
    x = len(A[0])
    z = 0
    for i in range(len(A)):
        if (len(A[i]) == x):
            z+=1
    if(z == len(A)):
        if(x==len(A)):
            indices = list(range(len(A)))
            if len(A) == 2 and len(A[0]) == 2:
                val = A[0][0] * A[1][1] - A[1][0] * A[0][1]
                return val
            for fc in indices:
                As = A
                As = As[1:]
                height = len(As)
                for i in range(height):
                    As[i] = As[i][0:fc] + As[i][fc+1:]
                sign = (-1) ** (fc % 2)
                sub_det = determinanHitung(As)
                total += sign * A[0][fc] * sub_det
            else:
                return """tidak bisa dihitung determinannya,
                    karena bukan matrix bujursangkar"""
        else:
            return """tidak bisa dihitung determinannya,
                karena bukan matrix bujursangkar"""
    return total
print("NOMOR 1E")
print(determinan(a))
print(determinan(b))

```

```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>

===== RESTART: E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/1.py =====
>>>
NOMOR 1A
Matrix konsisten
Matrix tidak konsisten
Matrix konsisten
Matrix konsisten
Semua isi matrix adalah angka
Tidak semua isi matrix angka
NOMOR 1B
Mempunyai ordo2x2
Mempunyai ordo3x4
Mempunyai ordo2x3
Mempunyai ordo3x3
NOMOR 1C
ukuran beda
ukuran sama
[[3, 6], [49, 28]]
NOMOR 1D
bisa dikalikan
[[174, 32], [909, 159]]
tidak memenuhi syarat
NOMOR 1E
18
tidak bisa dihitung determinannya, karena bukan matrix bujursangkar
>>> |
```

## 2. Terkait matrix dan list comprehension

```
2.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/2.py (3.8.2)
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## 2a
def buatNol(n,m=None):
    if(m==None):
        m=n
    print("Membuat matriks 0 dengan ordo "+str(n)+"x"+str(m))
    print([[0 for x in range(m)] for y in range(n)])
print("NOMOR 2A")
buatNol(3)
buatNol(4,3)

## 2b
def buatIdentitas(n):
    print("Membuat matriks Identitas dengan ordo"+str(n)+"x"+str(n))
    print([[1 if j==i else 0 for j in range(n)] for i in range(n)])

print("NOMOR 2B")
buatIdentitas(5)
buatIdentitas(3)
```

Ln: 6 Col: 51

```
Python 3.8.2 Shell
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Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/2.py =====
NOMOR 2A
Membuat matriks 0 dengan ordo 3x3
[[0, 0, 0], [0, 0, 0], [0, 0, 0]]
Membuat matriks 0 dengan ordo 4x3
[[0, 0, 0], [0, 0, 0], [0, 0, 0], [0, 0, 0]]
NOMOR 2B
Membuat matriks Identitas dengan ordo5x5
[[1, 0, 0, 0, 0], [0, 1, 0, 0, 0], [0, 0, 1, 0, 0], [0, 0, 0, 1, 0], [0, 0, 0, 0, 1]]
Membuat matriks Identitas dengan ordo3x3
[[1, 0, 0], [0, 1, 0], [0, 0, 1]]
>>> |
```

Ln: 15 Col: 4

### 3. Terkait linked list

```
3.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/3.py (3.8.2)
File Edit Format Run Options Window Help

class Node:
    def __init__(self, data):
        self.data = data
        self.next = None
class LinkedList:
    def __init__(self):
        self.head = None
    def pushAwal(self, new_data):
        new_node = Node(new_data)
        new_node.next = self.head
        self.head = new_node
    def pushAkhir(self, data):
        if (self.head == None):
            self.head = Node(data)
        else:
            current = self.head
            while (current.next != None):
                current = current.next
            current.next = Node(data)
        return self.head
    def tambah(self, data, pos):
        node = Node(data)
        if not self.head:
            self.head = node
        elif pos==0:
            node.next = self.head
            self.head = node
        else:
            prev = None
            current = self.head
            current_pos = 0
            while (current_pos < pos) and current.next:
                prev = current
                current = current.next
                current_pos +=1
            prev.next = node
            node.next = current
        return self.head
    def hapus(self, position):
```

Ln: 84 Col: 0



```
3.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/3.py (3.8.2)
File Edit Format Run Options Window Help

def hapus(self, position):
    if self.head == None:
        return
    temp = self.head
    if position == 0:
        self.head = temp.next
        temp = None
        return
    for i in range(position - 1):
        temp = temp.next
        if temp is None:
            break
    if temp is None:
        return
    if temp.next is None:
        return
    next = temp.next.next
    temp.next = None
    temp.next = next
def cari(self, x):
    current = self.head
    while current != None:
        if current.data == x:
            return "True"
        current = current.next
    return "False"
def display(self):
    current = self.head
    while current is not None:
        print(current.data, end = ' ')
        current = current.next

l1ist = LinkedList()
l1ist.pushAwal(12)
l1ist.pushAwal(13)
l1ist.pushAwal(14)
l1ist.pushAwal(15)
l1ist.pushAwal(3)
l1ist.pushAwal(17)
```

Ln: 84 Col: 0

```
l1ist.pushAwal(17)
l1ist.pushAkhir(18)
l1ist.hapus(0)
l1ist.tambah(1,4)
print(l1ist.cari(13))
print(l1ist.cari(16))
l1ist.display()
|
```

Ln: 84 Col: 0



Python 3.8.2 Shell



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Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32

Type "help", "copyright", "credits" or "license()" for more information.

>>>

==== RESTART: E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3\_L200180010/3.py ===

True

False

3 15 14 13 1 12 18

>>> |

Ln: 8

#### 4. Terkait doubly linked list

```
4.py - E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3_L200180010/4.py (3.8.2)
File Edit Format Run Options Window Help

class Node:
    def __init__(self, data):
        self.data = data
        self.prev = None
class DoublyLinkedList:
    def __init__(self):
        self.head = None
    def menambahAwal(self, new_data):
        print("menambah pada awal", new_data)
        new_node = Node(new_data)
        new_node.next = self.head
        if self.head is not None:
            self.head.prev = new_node
        self.head = new_node
    def menambahAkhir(self, new_data):
        print("menambah pada akhir", new_data)
        new_node = Node(new_data)
        new_node.next = None
        if self.head is None:
            new_node.prev = None
            self.head = new_node
            return
        last = self.head
        while(last.next is not None):
            last = last.next
        last.next = new_node
        new_node.prev = last
        return
    def printList(self, node):
        print("\nDari Depan :")
        while(node is not None):
            print(" % d" %(node.data))
            last = node
            node = node.next
        print("\nDari Belakang :")
        while(last is not None):
            print(" % d" %(last.data))
            last = last.prev
l1list = DoublyLinkedList()
l1list.menambahAwal(2)
```

Ln: 38 Col: 0

```
l1list = DoublyLinkedList()
l1list.menambahAwal(2)
l1list.menambahAwal(1)
l1list.menambahAkhir(3)
l1list.menambahAkhir(4)
l1list.printList(l1list.head)
```

Ln: 38 Col: 0

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32

Type "help", "copyright", "credits" or "license()" for more information.

>>>

===== RESTART: E:/KULIAH/SEMESTER 4/prak algostruk/MODUL 3\_L200180010/4.py =====

menambah pada awal 2

menambah pada awal 1

menambah pada akhir 3

menambah pada akhir 4

Dari Depan :

1

2

3

4

Dari Belakang :

4

3

2

1

>>> |

Ln: 21 Col: 4