PRAKTIKUM
ALGORITMA DAN STRUKTUR DATA
(Algorithm and Data Structure)

LAPORAN TUGAS
MODUL 3

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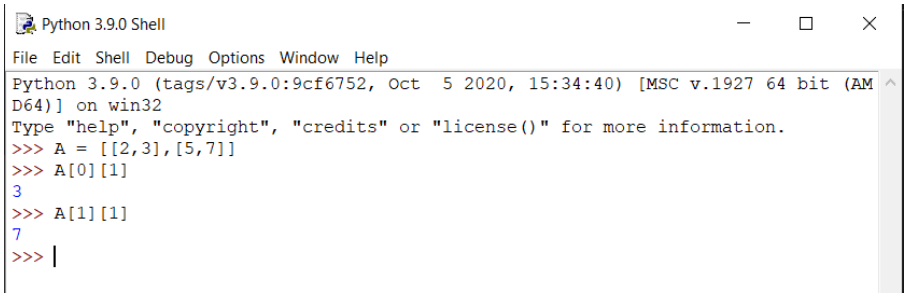
PROGRAM STUDI INFORMATIKA

FAKULTAS KOMUNIKASI DAN INFORMATIKA

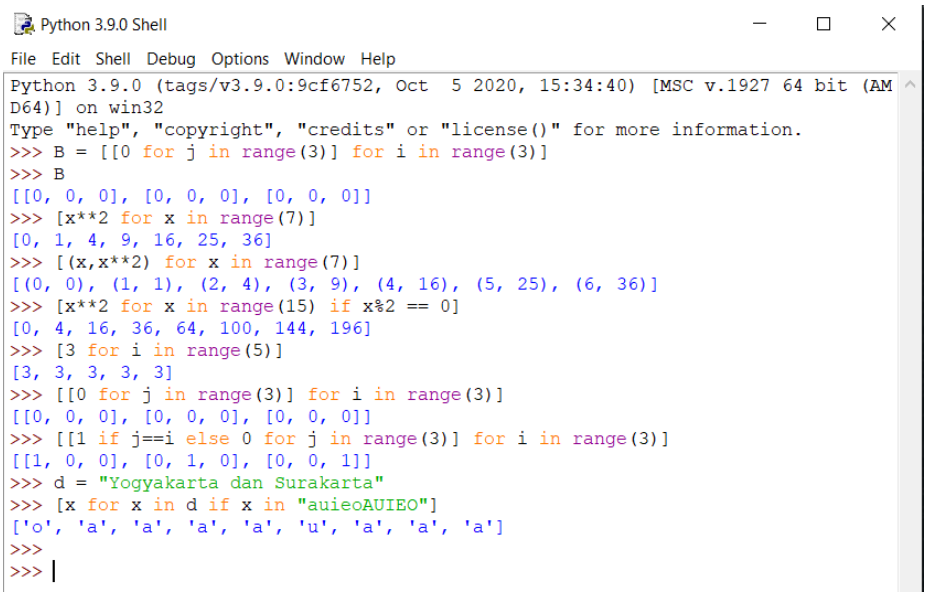
UNIVERSITAS MUHAMMADIYAH

SURAKARTA

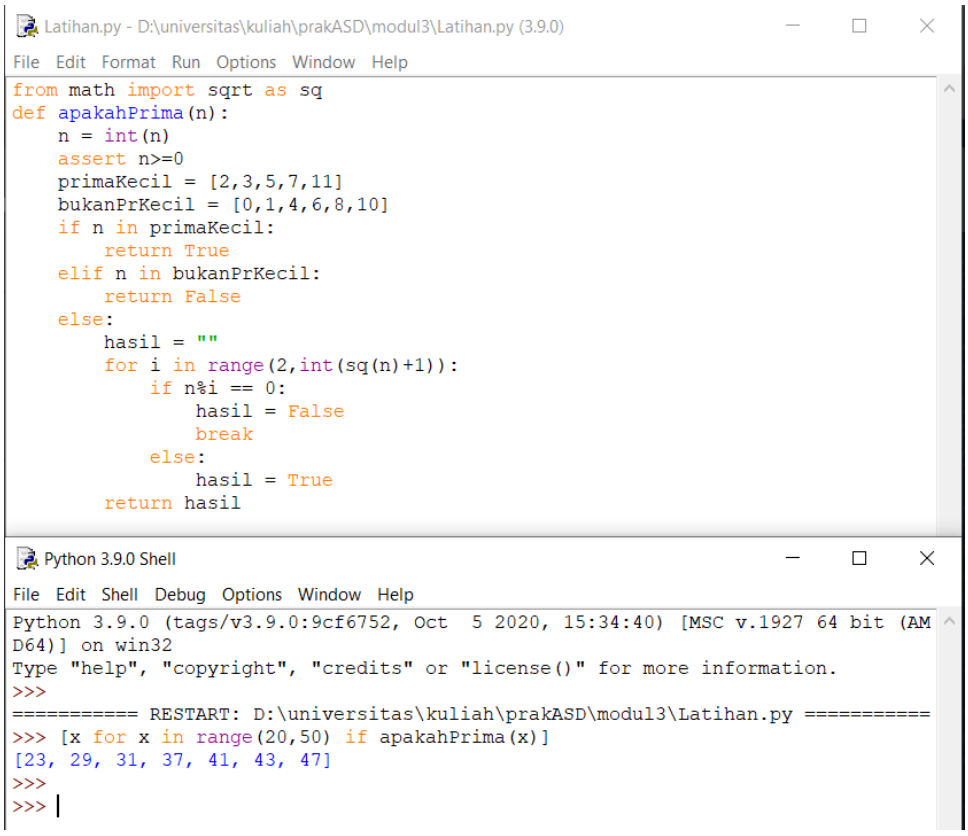
Latihan 3.1



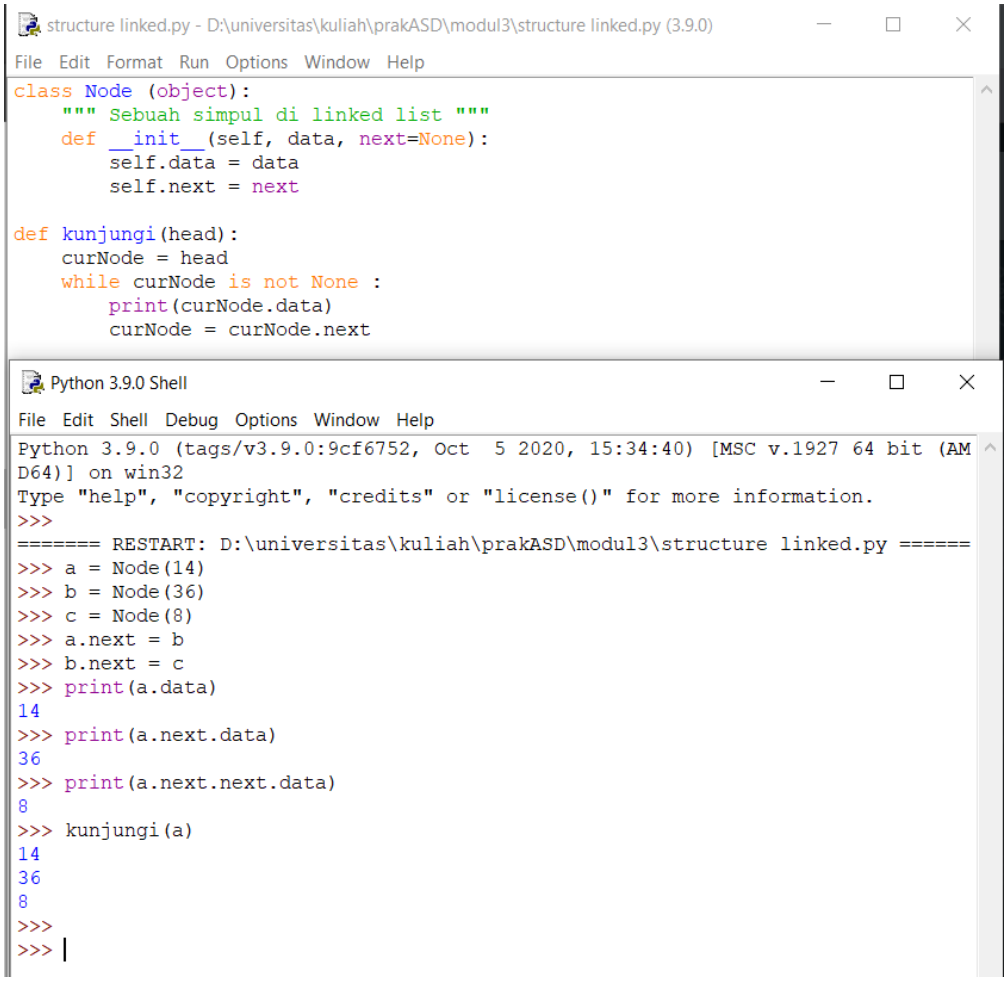
Latihan 3.2



Latihan 3.3



Structures Linked List

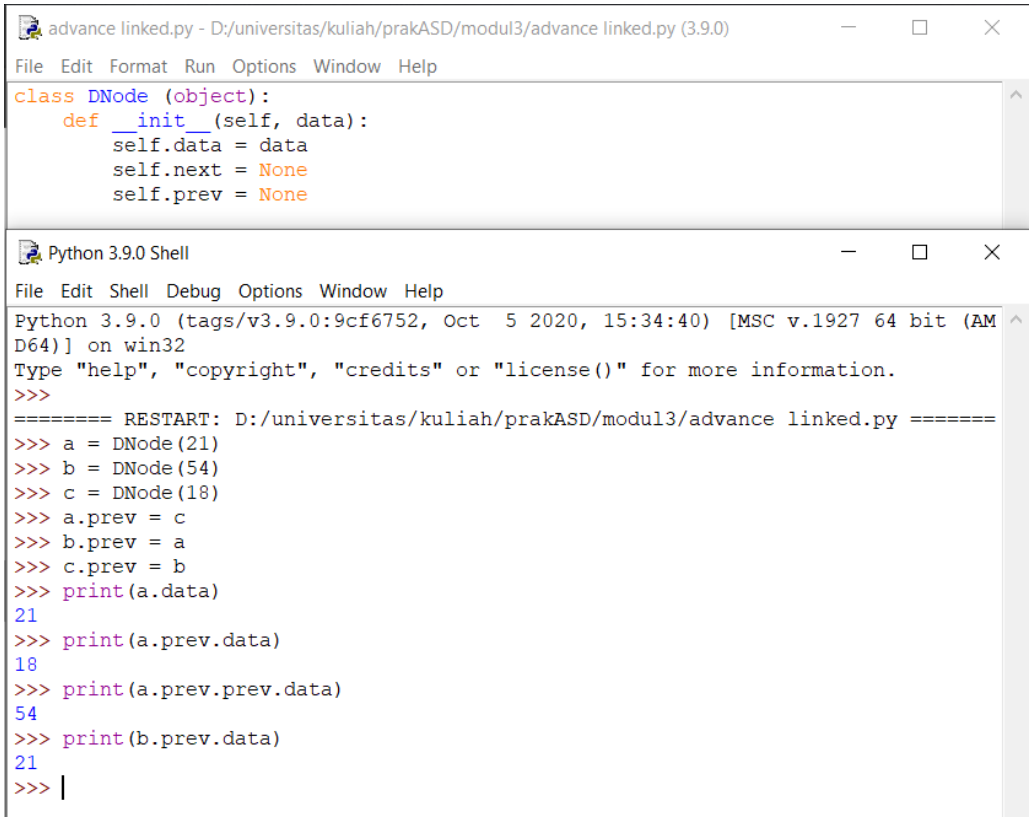


```
structure linked.py - D:\universitas\kuliah\prakASD\modul3\structure linked.py (3.9.0)
File  Edit  Format  Run  Options  Window  Help
class Node (object):
    """ Sebuah simpul di linked list """
    def __init__(self, data, next=None):
        self.data = data
        self.next = next

def kunjungi(head):
    curNode = head
    while curNode is not None :
        print(curNode.data)
        curNode = curNode.next
```

```
Python 3.9.0 Shell
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
======= RESTART: D:\universitas\kuliah\prakASD\modul3\structure linked.py ======
>>> a = Node(14)
>>> b = Node(36)
>>> c = Node(8)
>>> a.next = b
>>> b.next = c
>>> print(a.data)
14
>>> print(a.next.data)
36
>>> print(a.next.next.data)
8
>>> kunjungi(a)
14
36
8
>>>
>>>
```

Advance Linked List



```
advance linked.py - D:/universitas/kuliah/prakASD/modul3/advance linked.py (3.9.0)
File  Edit  Format  Run  Options  Window  Help
class DNode (object):
    def __init__(self, data):
        self.data = data
        self.next = None
        self.prev = None
```

```
Python 3.9.0 Shell
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
======== RESTART: D:/universitas/kuliah/prakASD/modul3/advance linked.py =======
>>> a = DNode(21)
>>> b = DNode(54)
>>> c = DNode(18)
>>> a.prev = c
>>> b.prev = a
>>> c.prev = b
>>> print(a.data)
21
>>> print(a.prev.data)
18
>>> print(a.prev.prev.data)
54
>>> print(b.prev.data)
21
>>>
```

Tugas 1a

soal1.py - D:\universitas\kuliah\prakASD\modul3\soal1.py (3.9.0)

File Edit Format Run Options Window Help

```
class matriks (object):
    def cetakmatriks(self, matriks):
        for i in matriks:
            print(i)
    def cekkonsisten(self, matriks):
        if len(matriks[0]) == len(matriks):
            print ("matriks konsisten")
        else:
            print ("matriks tidak konsisten")

A = [[1,2],[3,4],[5,6]]
B = [[7,8],[9,10]]
C = [[3,6],[5,2]]

x = matriks()
x.cetakmatriks(A)
print(x.cekkonsisten(A))
y = matriks()
y.cetakmatriks(B)
print(y.cekkonsisten(B))
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal1.py ============
[1, 2]
[3, 4]
[5, 6]
matriks tidak konsisten
None
[7, 8]
[9, 10]
matriks konsisten
None
>>>
```

Tugas 1b

soal1.py - D:\universitas\kuliah\prakASD\modul3\soal1.py (3.9.0)

File Edit Format Run Options Window Help

```
def ordo(matriks):
    return("Ordo matriks = "+str(len(matriks))+" x "+str(len(matriks[0])))
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal1.py ============
>>> ordo(A)
'Ordo matriks = 3 x 2'
>>> ordo(B)
'Ordo matriks = 2 x 2'
>>> ordo(C)
'Ordo matriks = 2 x 2'
>>>
```

Tugas 1c

soal1.py - D:\universitas\kuliah\prakASD\modul3\soal1.py (3.9.0)

File Edit Format Run Options Window Help

```
def jumlah(matriks1, matriks2):
    if ordo(matriks1) == ordo(matriks2):
        for x in range (0, len(matriks1)):
            for y in range (0, len(matriks1[0])):
                print (matriks1[x][y] + matriks2[x][y],' '),
            print()
    else:
        print("Matriks tidak sesuai")
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal1.py ============
>>> jumlah(A,B)
Matriks tidak sesuai
>>> jumlah(B,C)
10
14

14
12

>>> jumlah(A,C)
Matriks tidak sesuai
>>>
```

Tugas 1d

soal1.py - D:\universitas\kuliah\prakASD\modul3\soal1.py (3.9.0)

File Edit Format Run Options Window Help

```
def kali(m,n):
    a =0
    x,y = 0,0
    for i in range(len(m)):
        x += 1
        y = len(m[1])
    v,w = 0,0
    for i in range(len(n)):
        v += 1
        w = len(n[1])
    if (y == v):
        print("Bisalah dikalikan")
        vwxy = [[0 for j in range(w)] for i in range(x)]
        for i in range(len(m)):
            for j in range(len(n[0])):
                for k in range(len(n)):
                    vwxy[i][j] += m[i][k] * n[k][j]
        print(vwxy)
    else:
        print("Tidak memenuhi Syarat boss")

kali(A,B)
kali(B,C)
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal1.py ============
Bisalah dikalikan
[[25, 28], [57, 64], [89, 100]]
Bisalah dikalikan
[[61, 58], [77, 74]]
>>>
```

Tugas 1e

soal1.py - D:\universitas\kuliah\prakASD\modul3\soal1.py (3.9.0)

File Edit Format Run Options Window Help

```
def determinan(p, total=0):
    x = len(p[0])
    z = 0
    for i in range(len(p)):
        if (len(p[i]) == x):
            z+=1
    if (z == len(p)):
        if (x == len(p)):
            indices = list(range(len(p)))
            if len(p) == 2 and len(p[0]) == 2:
                val = p[0][0] * p[1][1] - p[1][0] * p[0][1]
                return val
            for fc in indices:
                pq = p
                pq = pq[1:]
                height = len(pq)
                for i in range (height):
                    pq[i] = pq[i][0:fc] + pq[i][fc+1:]
                sign = (-1) ** (fc%2)
                sub_det = determinanHitung(pq)
                total += sign * A[0][fc] * sub_det
        else:
            return "Tidak bisa dihitung boss, bukan matriks bujur sangkar"
    else:
        return "Tidak bisa dihitung boss, bukan matriks bujur sangkar"
    return total
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal1.py ============
>>> determinan(A)
'Tidak bisa dihitung boss, bukan matriks bujur sangkar'
>>> determinan(B)
-2
>>> determinan(C)
-24
>>>
```

Tugas 2a

```
soal2.py - D:\universitas\kuliah\prakASD\modul3\soal2.py (3.9.0)
File  Edit  Format  Run  Options  Window  Help
def Nol(n, m=None):
    if(m==None):
        m = n
    print ("Matriks 0 dengan Ordo "+str(n)+"x"+str(m))
    print ([[0 for j in range(m)] for i in range (n)])
```

```
Python 3.9.0 Shell
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal2.py ============
>>> Nol(4,3)
Matriks 0 dengan Ordo 4x3
[[0, 0, 0], [0, 0, 0], [0, 0, 0], [0, 0, 0]]
>>> Nol(4)
Matriks 0 dengan Ordo 4x4
[[0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0], [0, 0, 0, 0]]
>>>
```

Tugas 2b

```
soal2.py - D:\universitas\kuliah\prakASD\modul3\soal2.py (3.9.0)
File  Edit  Format  Run  Options  Window  Help
def Identitas(n):
    print("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)])
```

```
Python 3.9.0 Shell
File  Edit  Shell  Debug  Options  Window  Help
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: D:\universitas\kuliah\prakASD\modul3\soal2.py ============
>>> Identitas(4)
Matriks Identitas dengan Ordo 4x4
[[1, 0, 0, 0], [0, 1, 0, 0], [0, 0, 1, 0], [0, 0, 0, 1]]
>>> Identitas(3)
Matriks Identitas dengan Ordo 3x3
[[1, 0, 0], [0, 1, 0], [0, 0, 1]]
>>>
```

Tugas 3

soal3.py - D:\universitas\kuliah\prakASD\modul3\soal3.py (3.9.0)

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 tambahDepan(self, new_data):
        new_node = Node(new_data)
        new_node.next = self.head
        self.head = new_node
    def tambahAkhir (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, post):
        node = Node(data)
        if not self.head:
            self.head = node
        elif post == 0:
            node.next = self.head
            self.head = node
        else:
            prev = None
            current = self.head
            current_post = 0
            while(current_post < post)and current.next:
                prev = current
                current = current.next
                current_post +=1
            prev.next = node
            node.next = current
        return self.head
    def hapus(self, posisi):
        if self.head == None:
            return
        temp = self.head
        if posisi == 0:
            self.head = temp.next
            temp = None
            return
        for i in range (posisi - 1):
            temp = temp.next
            if temp is None:
                break
            if temp is None:
                return
            if temp.next is None:
                return
        temp.next = None
        temp.next = next
    def cari(self,x):
        current = self.head
        while current != None:
            if current.data == x:
                print(x, "Apakah ada dalam data?")
                return True
            current = current.next
        print(x, "Apakah ada dalam data?")
        return False
    def display(self):
        current = self.head
        while current is not None:
            print(current.data, end = ' ')
            current = current.next

A = LinkedList()
A.tambahDepan(32)
A.tambahDepan(12)
A.tambahDepan(24)
A.tambahDepan(57)
A.tambahAkhir(18)
A.hapus(0)
A.tambah(3,5)
print(A.cari(12))
print(A.cari(13))
A.display()
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: D:\universitas\kuliah\prakASD\modul3\soal3.py ==========
12 Apakah ada dalam data?
True
13 Apakah ada dalam data?
False
24 12 32 3 18
>>>
```

Tugas 4

soal4.py - D:\universitas\kuliah\prakASD\modul3\soal4.py (3.9.0)

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 awal(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 akhir(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

d = DoublyLinkedList()
d.awal(32)
d.awal(23)
d.akhir(12)
d.akhir(21)
d.printList(d.head)
```

Python 3.9.0 Shell

File Edit Shell Debug Options Window Help

```
Python 3.9.0 (tags/v3.9.0:9cf6752, Oct  5 2020, 15:34:40) [MSC v.1927 64 bit (AM
D64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: D:\universitas\kuliah\prakASD\modul3\soal4.py ==========
Menambah pada awal  32
Menambah pada awal  23
Menambah pada akhir  12
Menambah pada akhir  21

Dari Depan :
23
32
12
21

Dari Belakang :
21
12
32
23
>>>
```