

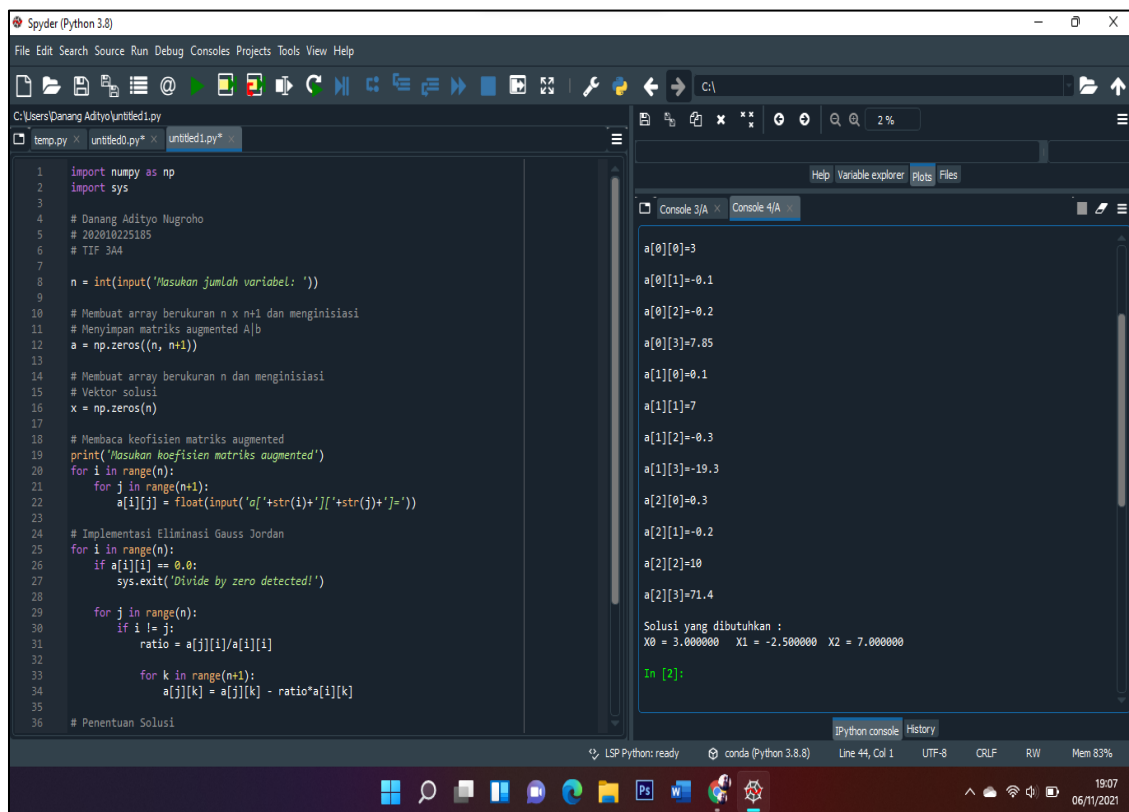
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Kelas : TIF 3A4

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Praktikum (2)

➤ GaussJordan



```

1 import numpy as np
2 import sys
3
4 # Danang Adityo Nugroho
5 # 202010225185
6 # TIF 3A4
7
8 n = int(input("Masukan jumlah variabel: "))
9
10 # Membuat array berukuran n x n+1 dan menginisiasi
11 # Menyimpan matriks augmented A|b
12 a = np.zeros((n, n+1))
13
14 # Membuat array berukuran n dan menginisiasi
15 # Vektor solusi
16 x = np.zeros(n)
17
18 # Membaca koefisien matriks augmented
19 print("Masukan koefisien matriks augmented")
20 for i in range(n):
21     for j in range(n+1):
22         a[i][j] = float(input("a["+str(i)+"]["+str(j)+"]="))
23
24 # Implementasi Eliminasi Gauss Jordan
25 for i in range(n):
26     if a[i][i] == 0.0:
27         sys.exit("Divide by zero detected!")
28
29     for j in range(n):
30         if i != j:
31             ratio = a[j][i]/a[i][i]
32
33             for k in range(n+1):
34                 a[j][k] = a[j][k] - ratio*a[i][k]
35
36 # Penentuan Solusi
  
```

```

a[0][0]=3
a[0][1]=-0.1
a[0][2]=-0.2
a[0][3]=7.85
a[1][0]=0.1
a[1][1]=7
a[1][2]=-0.3
a[1][3]=-19.3
a[2][0]=0.3
a[2][1]=-0.2
a[2][2]=10
a[2][3]=71.4

Solusi yang dibutuhkan :
X0 = 3.000000 X1 = -2.500000 X2 = 7.000000

In [2]:
  
```

Coding GaussJordan :

```
import numpy as np
```

```
import sys
```

```
# Danang Adityo Nugroho
```

```
# 202010225185
```

```
# TIF 3A4
```

```

n = int(input('Masukan jumlah variabel: '))

# Membuat array berukuran n x n+1 dan menginisiasi
# Menyimpan matriks augmented A|b
a = np.zeros((n, n+1))

# Membuat array berukuran n dan menginisiasi
# Vektor solusi
x = np.zeros(n)

# Membaca koefisien matriks augmented
print('Masukan koefisien matriks augmented')
for i in range(n):
    for j in range(n+1):
        a[i][j] = float(input('a['+str(i)+'']['+str(j)+'']='))

# Implementasi Eliminasi Gauss Jordan
for i in range(n):
    if a[i][i] == 0.0:
        sys.exit('Divide by zero detected!')

    for j in range(n):
        if i != j:
            ratio = a[j][i]/a[i][i]

            for k in range(n+1):
                a[j][k] = a[j][k] - ratio*a[i][k]

# Penentuan Solusi

```

```
for i in range(n):
```

```
    x[i] = a[i][n]/a[i][i]
```

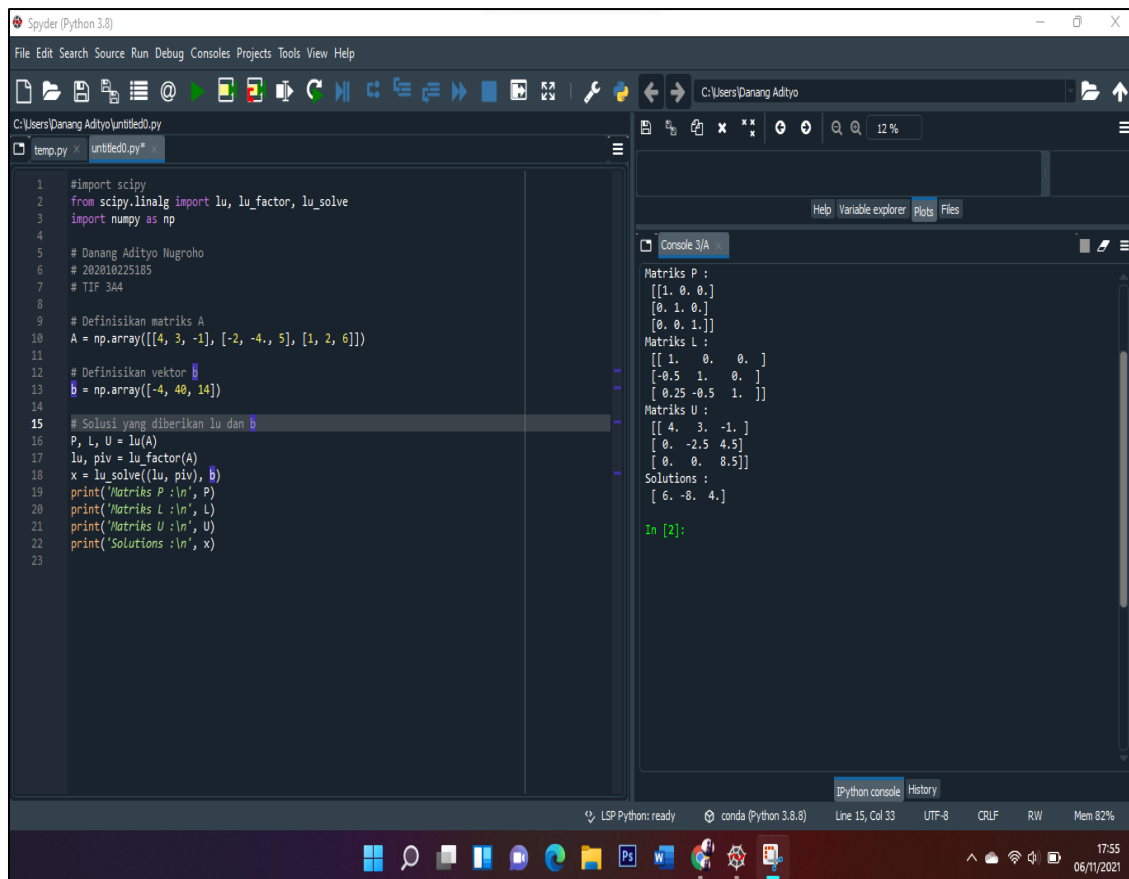
```
# Menampilkan Solusi
```

```
print("\nSolusi yang dibutuhkan : ")
```

```
for i in range(n):
```

```
    print('X%d = %0.6f' % (i, x[i]), end='\t')
```

➤ *Faktorisasi Matriks LU*



The screenshot shows the Spyder Python IDE interface. The editor on the left contains a Python script for LU factorization. The console on the right displays the output of the script, showing the matrices P, L, U, and the solution x.

```
1 #import scipy
2 from scipy.linalg import lu, lu_factor, lu_solve
3 import numpy as np
4
5 # Danang Adityo Nugroho
6 # 202010225185
7 # TIF 3A4
8
9 # Definiskan matriks A
10 A = np.array([[4, 3, -1], [-2, -4, 5], [1, 2, 6]])
11
12 # Definiskan vektor b
13 b = np.array([-4, 40, 14])
14
15 # Solusi yang diberikan lu dan b
16 P, L, U = lu(A)
17 lu, piv = lu_factor(A)
18 x = lu_solve((lu, piv), b)
19 print('Matriks P :\n', P)
20 print('Matriks L :\n', L)
21 print('Matriks U :\n', U)
22 print('Solutions :\n', x)
```

Console Output:

```
Matriks P :
[[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
Matriks L :
[[1. 0. 0.]
 [-0.5 1. 0.]
 [0.25 -0.5 1.]]
Matriks U :
[[4. 3. -1.]
 [0. -2.5 4.5]
 [0. 0. 8.5]]
Solutions :
[ 6. -8.  4.]
In [2]:
```

➤ *Coding Faktorisasi Matriks LU*

```
#import scipy
```

```
from scipy.linalg import lu, lu_factor, lu_solve
```

```
import numpy as np
```

```
# Danang Adityo Nugroho
```

```
# 202010225185
```

```
# TIF 3A4
```

```
A = np.array([[4, 3, -1], [-2, -4., 5], [1, 2, 6]])
```

```
# Definisikan vektor b
```

```
b = np.array([-4, 40, 14])
```

Solusi yang diberikan lu dan b

$$P, L, U = \text{lu}(A)$$
$$\text{lu, piv} = \text{lu_factor}(\mathbf{A})$$

```
x = lu_solve((lu, piv), b)
```

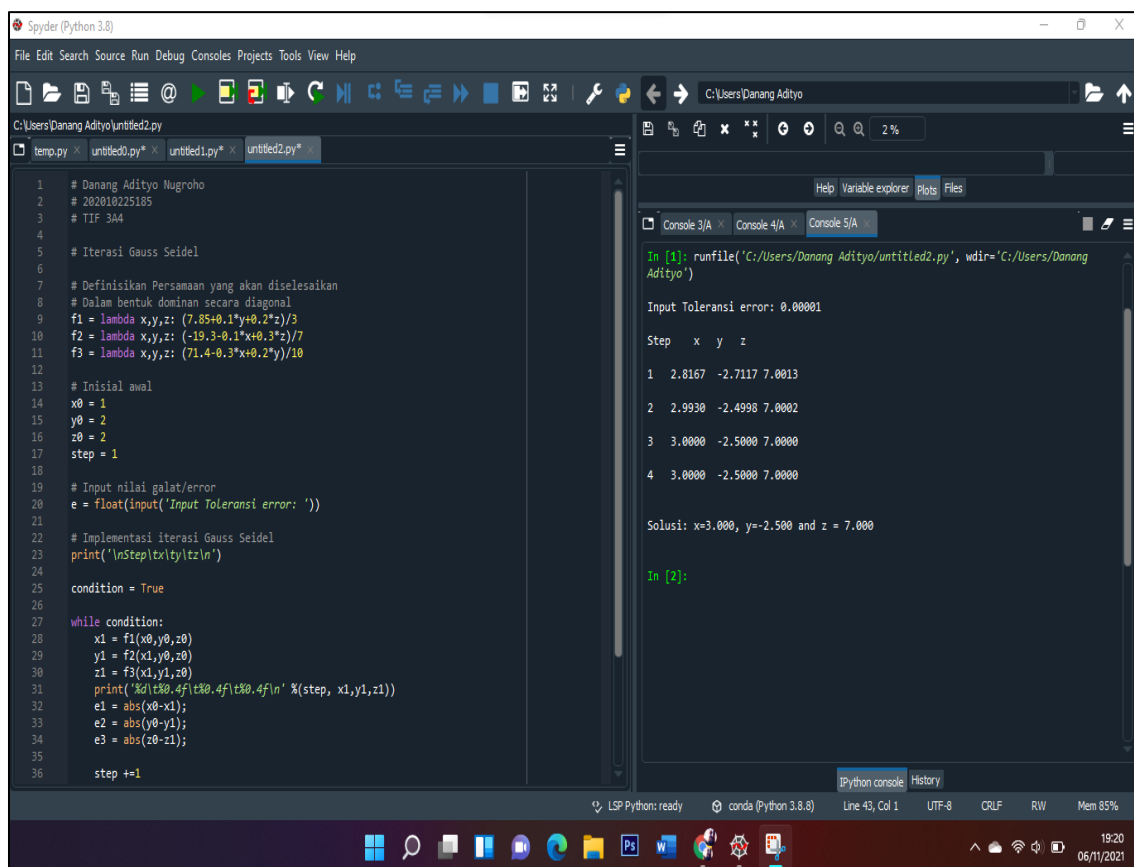
```
print('Matriks P :\n', P)
```

```
print('Matriks L :\n', L)
```

```
print('Matriks U :\n', U)
```

```
print('Solutions :\n', x)
```

➤ *Gauss Seidal*



Coding Gauss Seidel :

Danang Adityo Nugroho

202010225185

TIF 3A4

```
print("\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n" % (x1,y1,z1))
```