

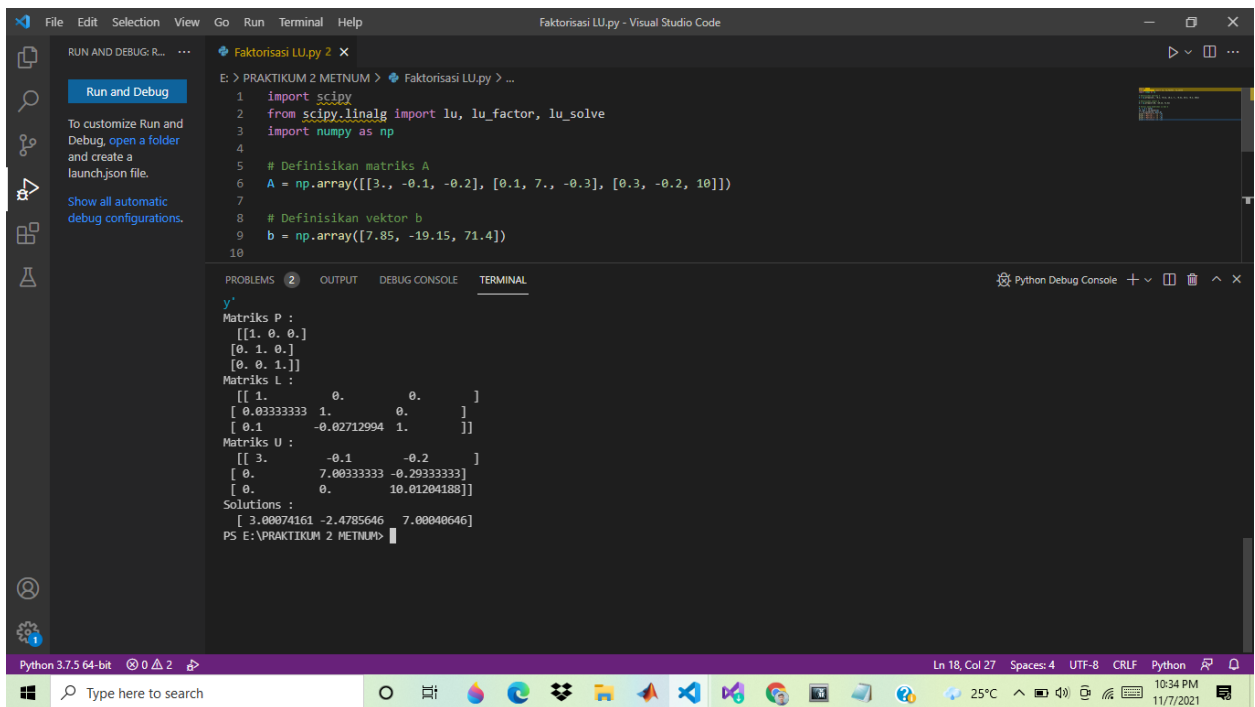
DIKA ADITYA OCTAVIANA

202010225233

TF3A6

## Praktikum 2 metnum

### 1. Faktorisasi LU



The screenshot shows the Visual Studio Code interface with a Python file named 'Faktorisasi LU.py' open. The code defines a 3x3 matrix A and a 3x1 vector b, then performs LU factorization using SciPy. The output in the terminal shows the resulting matrices P, L, and U, and the solution vector x.

```
E: > PRAKTIKUM 2 METNUM > Faktorisasi LU.py > ...
1 import scipy
2 from scipy.linalg import lu, lu_factor, lu_solve
3 import numpy as np
4
5 # Definisikan matriks A
6 A = np.array([[3., -0.1, -0.2], [0.1, 7., -0.3], [0.3, -0.2, 10]])
7
8 # Definisikan vektor b
9 b = np.array([7.85, -19.15, 71.4])
10
```

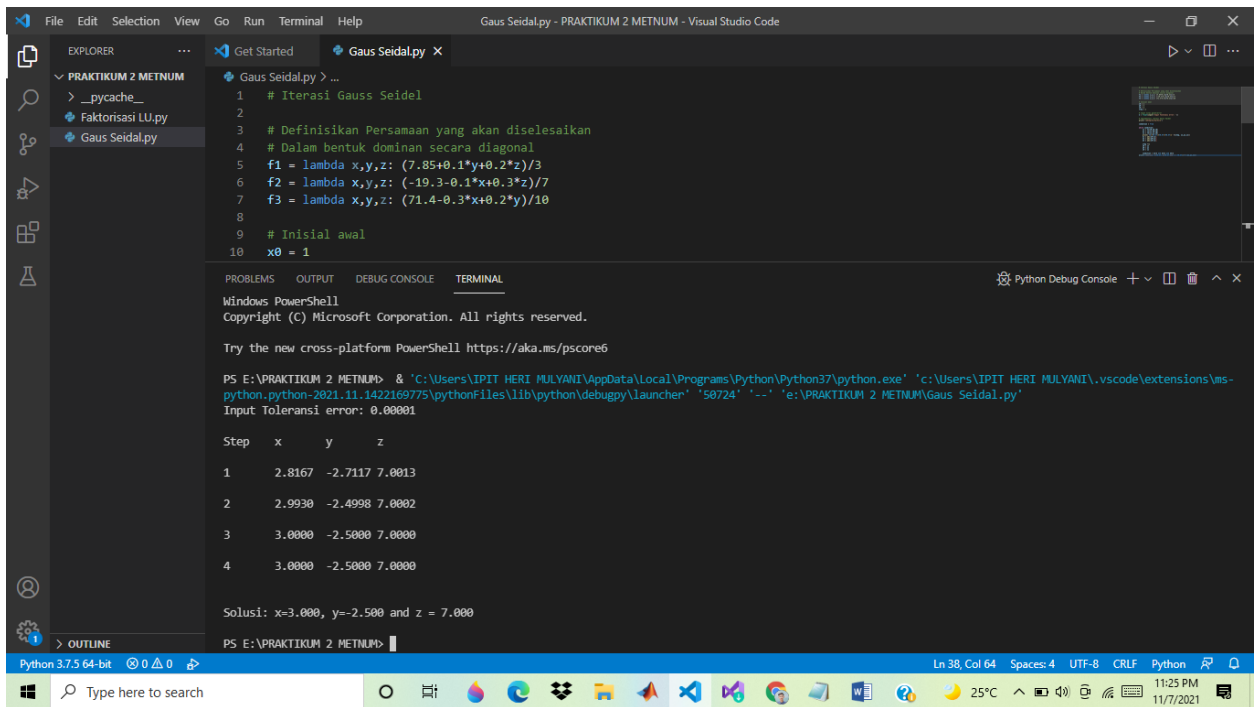
PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL

Python Debug Console

```
y'
Matriks P :
[[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
Matriks L :
[[1. 0. 0.]
 [0.03333333 1. 0.]
 [0.1 -0.02712994 1.]]
Matriks U :
[[3. -0.1 -0.2]
 [0. 7.00333333 -0.29333333]
 [0. 0. 10.01204188]]
Solutions :
[ 3.00074161 -2.4785646  7.00040646]
PS E:\PRAKTIKUM 2 METNUM>
```

Python 3.7.5 64-bit 0 2 Ln 18, Col 27 Spaces: 4 UTF-8 CRLF Python 10:34 PM 11/7/2021

## 2. Gaus Seidal



The screenshot shows the Visual Studio Code interface with the file `Gaus Seidal.py` open. The code defines three lambda functions for the Gauss-Seidel method and calculates the solution for a system of linear equations. The terminal output shows the execution of the script, displaying the iteration steps and the final solution.

```
1 # Iterasi Gauss Seidel
2
3 # Definisikan Persamaan yang akan diselesaikan
4 # Dalam bentuk dominan secara diagonal
5 f1 = lambda x,y,z: (7.85+0.1*y+0.2*z)/3
6 f2 = lambda x,y,z: (-19.3-0.1*x+0.3*z)/7
7 f3 = lambda x,y,z: (71.4-0.3*x+0.2*y)/10
8
9 # Inisial awal
10 x0 = 1
```

Terminal Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

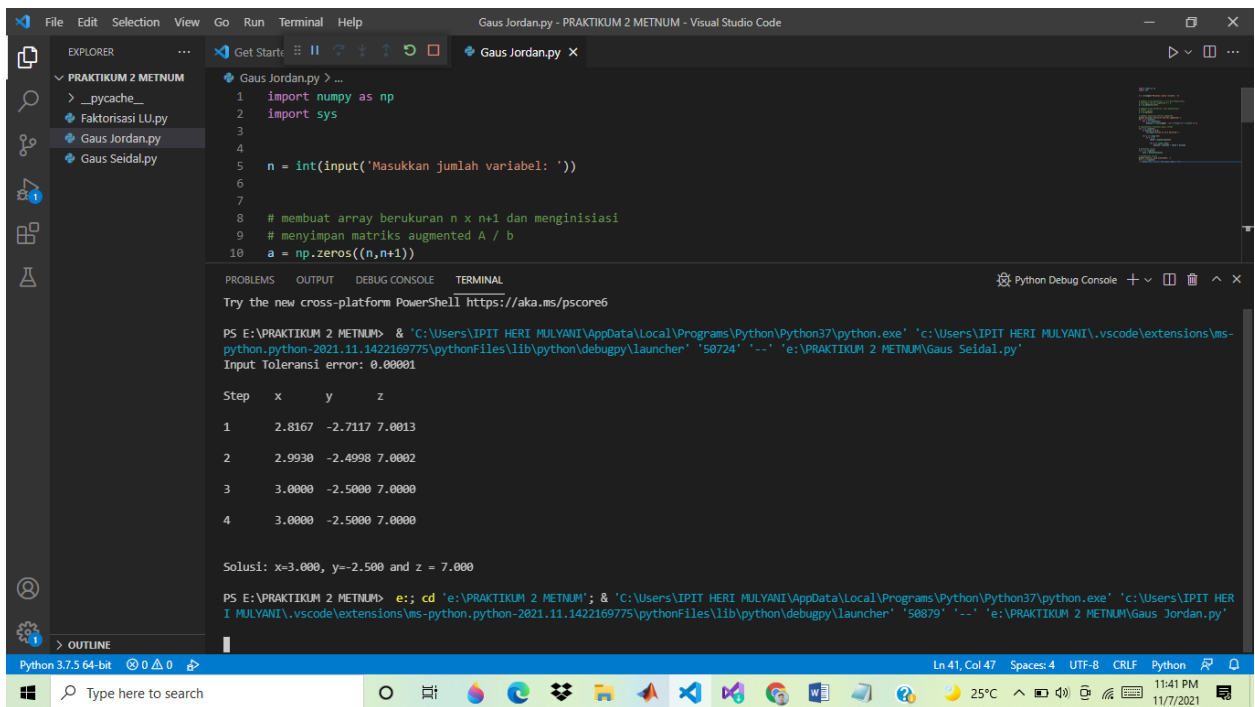
PS E:\PRAKTIKUM 2 METNUM> & 'C:\Users\IPIT HERI MULYANI\AppData\Local\Programs\Python\Python37\python.exe' 'c:\Users\IPIT HERI MULYANI\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '58724' '--' 'e:\PRAKTIKUM 2 METNUM\Gaus Seidal.py'
Input Toleransi error: 0.00001

Step  x      y      z
1    2.8167 -2.7117 7.0013
2    2.9930 -2.4998 7.0002
3    3.0000 -2.5000 7.0000
4    3.0000 -2.5000 7.0000

Solusi: x=3.000, y=-2.500 and z = 7.000

PS E:\PRAKTIKUM 2 METNUM>
```

## 3. Gaus Jordan



The screenshot shows the Visual Studio Code interface with the file `Gaus Jordan.py` open. The code uses NumPy to create an augmented matrix and perform row operations for the Gauss-Jordan method. The terminal output shows the execution of the script, displaying the iteration steps and the final solution.

```
1 import numpy as np
2 import sys
3
4
5 n = int(input('Masukkan jumlah variabel: '))
6
7
8 # membuat array berukuran n x n+1 dan menginisiasi
9 # menyimpan matriks augmented A / b
10 a = np.zeros((n,n+1))
```

Terminal Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

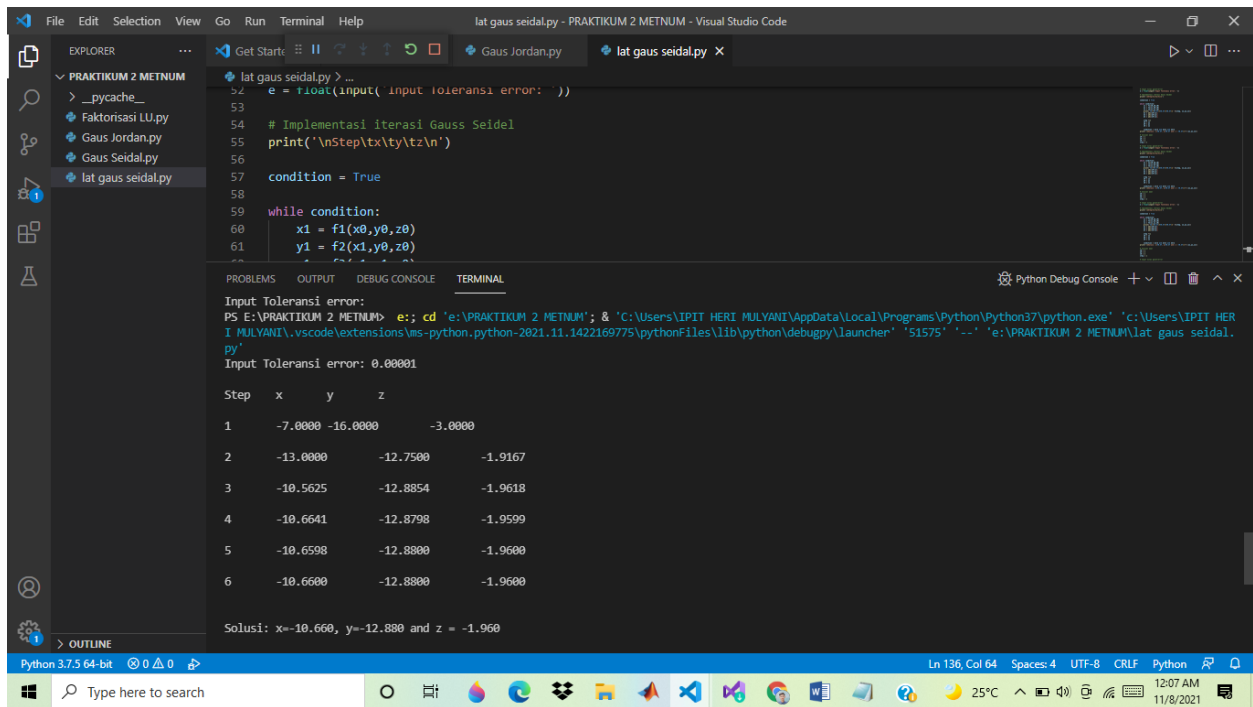
PS E:\PRAKTIKUM 2 METNUM> & 'C:\Users\IPIT HERI MULYANI\AppData\Local\Programs\Python\Python37\python.exe' 'c:\Users\IPIT HERI MULYANI\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '58724' '--' 'e:\PRAKTIKUM 2 METNUM\Gaus Seidal.py'
Input Toleransi error: 0.00001

Step  x      y      z
1    2.8167 -2.7117 7.0013
2    2.9930 -2.4998 7.0002
3    3.0000 -2.5000 7.0000
4    3.0000 -2.5000 7.0000

Solusi: x=3.000, y=-2.500 and z = 7.000

PS E:\PRAKTIKUM 2 METNUM> e; cd 'e:\PRAKTIKUM 2 METNUM'; & 'C:\Users\IPIT HERI MULYANI\AppData\Local\Programs\Python\Python37\python.exe' 'c:\Users\IPIT HERI MULYANI\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '58879' '--' 'e:\PRAKTIKUM 2 METNUM\Gaus Jordan.py'
```

#### 4. Latihan gaus seidel



```
File Edit Selection View Go Run Terminal Help
lat_gaus_seidal.py - PRAKTIKUM 2 METNUM - Visual Studio Code

EXPLORER
PRAKTIKUM 2 METNUM
  _pycache_
  Faktorisasi LU.py
  Gaus Jordan.py
  Gaus Seidal.py
  lat_gaus_seidal.py

lat_gaus_seidal.py
54 e = float(input('Input toleransi error: '))
55 # Implementasi Iterasi Gauss Seidel
56 print('\nStep\tx\tz\n')
57 condition = True
58 while condition:
59     x1 = f1(x0,y0,z0)
60     y1 = f2(x1,y0,z0)
61     z1 = f3(x1,y1,z0)
62     x0,y0,z0 = x1,y1,z1
63     condition = False
64
65 Solusi: x=-10.660, y=-12.880 and z = -1.960

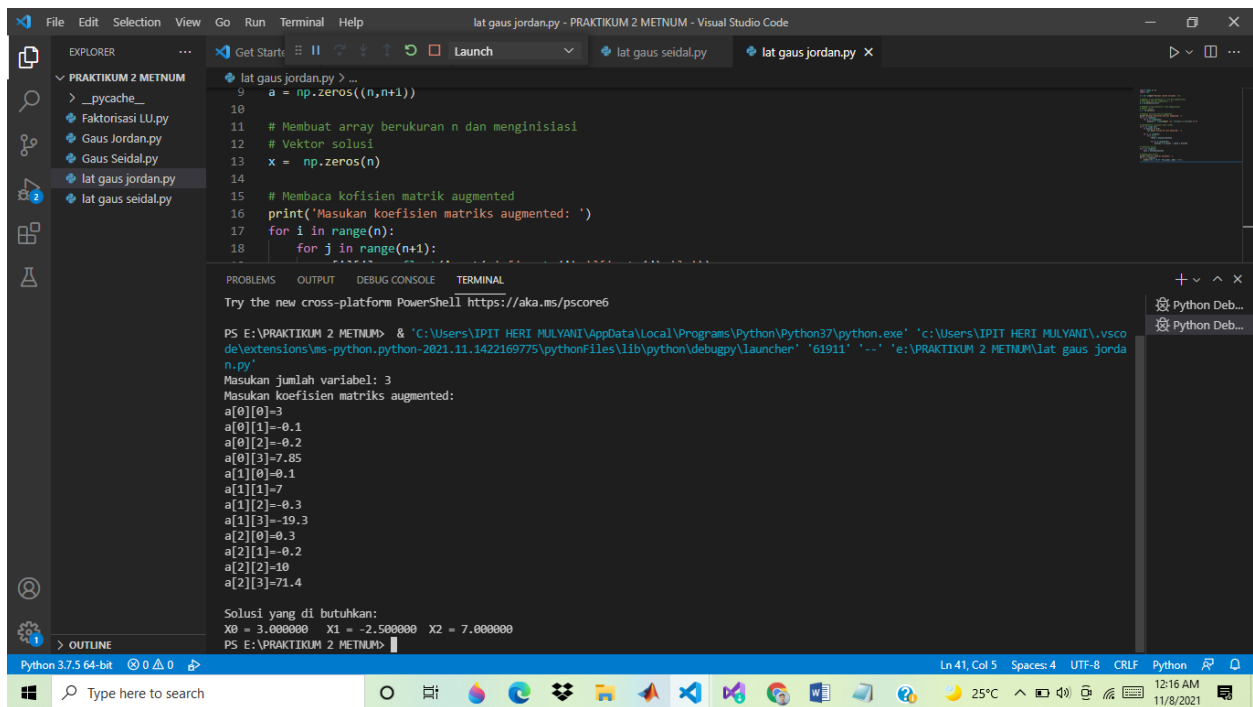
TERMINAL
Input Toleransi error:
PS E:\PRAKTIKUM 2 METNUM> es; cd 'e:\PRAKTIKUM 2 METNUM'; & 'C:\Users\IPIT HERI MULYANI\AppData\Local\Programs\Python\Python37\python.exe' 'c:\Users\IPIT HERI MULYANI\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '51575' '--' 'e:\PRAKTIKUM 2 METNUM\lat_gaus_seidal.py'
Input Toleransi error: 0.00001

Step  x      y      z
1  -7.0000 -16.0000 -3.0000
2  -13.0000 -12.7500 -1.9167
3  -10.5625 -12.8854 -1.9618
4  -10.6641 -12.8798 -1.9599
5  -10.6598 -12.8800 -1.9600
6  -10.6600 -12.8800 -1.9600

Solusi: x=-10.660, y=-12.880 and z = -1.960

Python 3.7.5 64-bit 0 0 0 Ln 136, Col 64 Spaces: 4 UTF-8 CRLF Python 12:07 AM 11/8/2021
```

#### 5. Latihan gaus jordan



```
File Edit Selection View Go Run Terminal Help
lat_gaus_jordan.py - PRAKTIKUM 2 METNUM - Visual Studio Code

EXPLORER
PRAKTIKUM 2 METNUM
  _pycache_
  Faktorisasi LU.py
  Gaus Jordan.py
  Gaus Seidal.py
  lat_gaus_jordan.py
  lat_gaus_seidal.py

lat_gaus_jordan.py
9 a = np.zeros((n,n+1))
10
11 # Membuat array berukuran n dan menginisiasi
12 # Vektor solusi
13 x = np.zeros(n)
14
15 # Membaca koefisien matriks augmented
16 print('Masukan koefisien matriks augmented: ')
17 for i in range(n):
18     for j in range(n+1):
19         a[i][j] = float(input())
20
21 Solusi yang di butuhkan:
22 x0 = 3.000000 x1 = -2.500000 x2 = 7.000000
23 PS E:\PRAKTIKUM 2 METNUM>

TERMINAL
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS E:\PRAKTIKUM 2 METNUM> & 'C:\Users\IPIT HERI MULYANI\AppData\Local\Programs\Python\Python37\python.exe' 'c:\Users\IPIT HERI MULYANI\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '61911' '--' 'e:\PRAKTIKUM 2 METNUM\lat_gaus_jordan.py'
Masukan jumlah variabel: 3
Masukan koefisien matriks augmented:
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 di butuhkan:
x0 = 3.000000 x1 = -2.500000 x2 = 7.000000
PS E:\PRAKTIKUM 2 METNUM>

Python 3.7.5 64-bit 0 0 0 Ln 41, Col 5 Spaces: 4 UTF-8 CRLF Python 12:16 AM 11/8/2021
```

## 6. Kesimpulan

