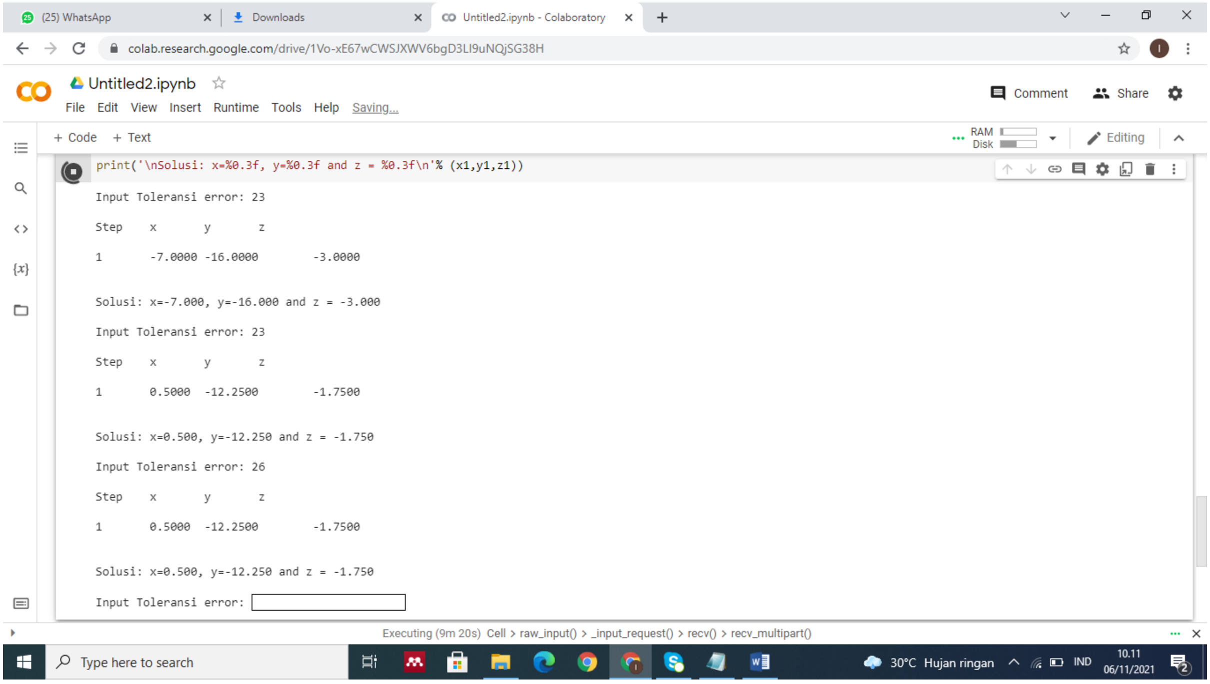
Nama : Iqbal Mahandika Putra

NPM : 202010225268

Kelas : TF3A6

PRAKTIKUM SESI 2 METODE NUMERIK

<u>Lat Gaus Seidel</u>



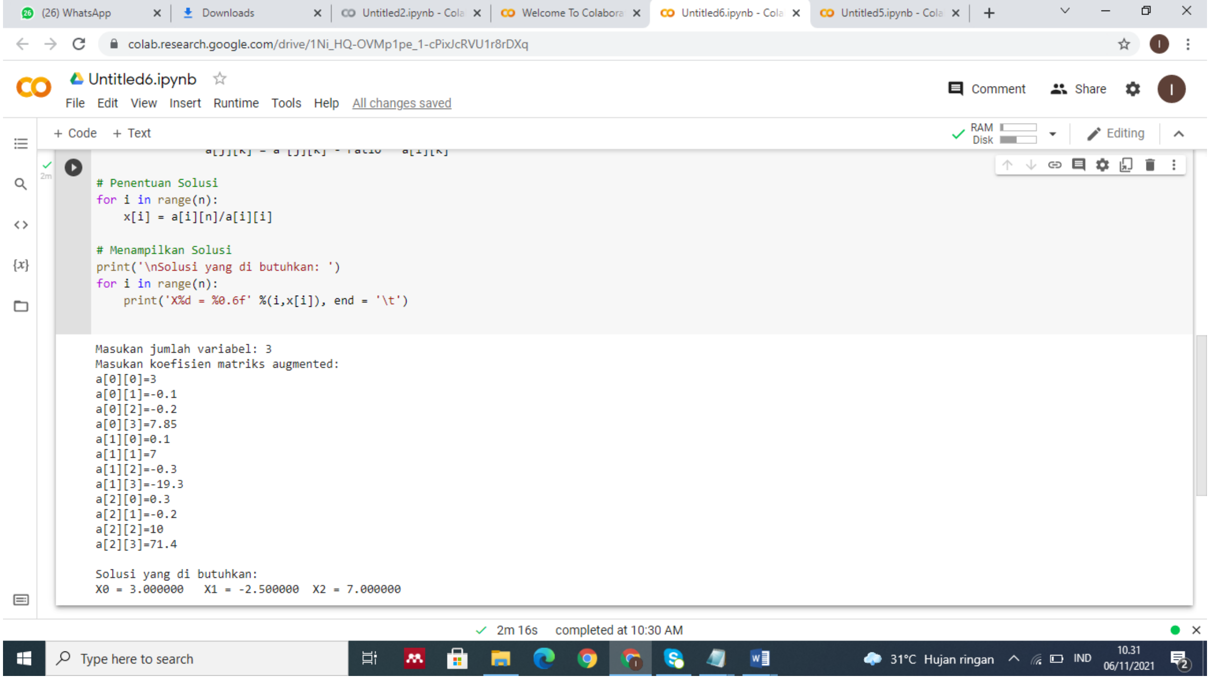

```
# Iterasi Gauss Seidel

# Definisikan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
# Iterasi Gauss Seidel

# Definisikan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
f1 = lambda x,y,z: (-4+3*y-0*z)/4
f2 = lambda x,y,z: (40-2*x+5*z)/-4
f3 = lambda x,y,z: (14+0*x+2*y)/6

# Inisial awal
x0 = 2
y0 = -8
z0 = 2
```

```
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' %(step, x1,y1,z1))
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n'% (x1,y1,z1))

# Inisial awal
x0 = 1
y0 = 2
z0 = 2
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' %(step, x1,y1,z1))
```

```
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n'% (x1,y1,z1))

# Inisial awal
x0 = 1
y0 = 2
z0 = 2
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' %(step, x1,y1,z1))
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n'% (x1,y1,z1))

# Inisial awal
x0 = 1
y0 = 2
```

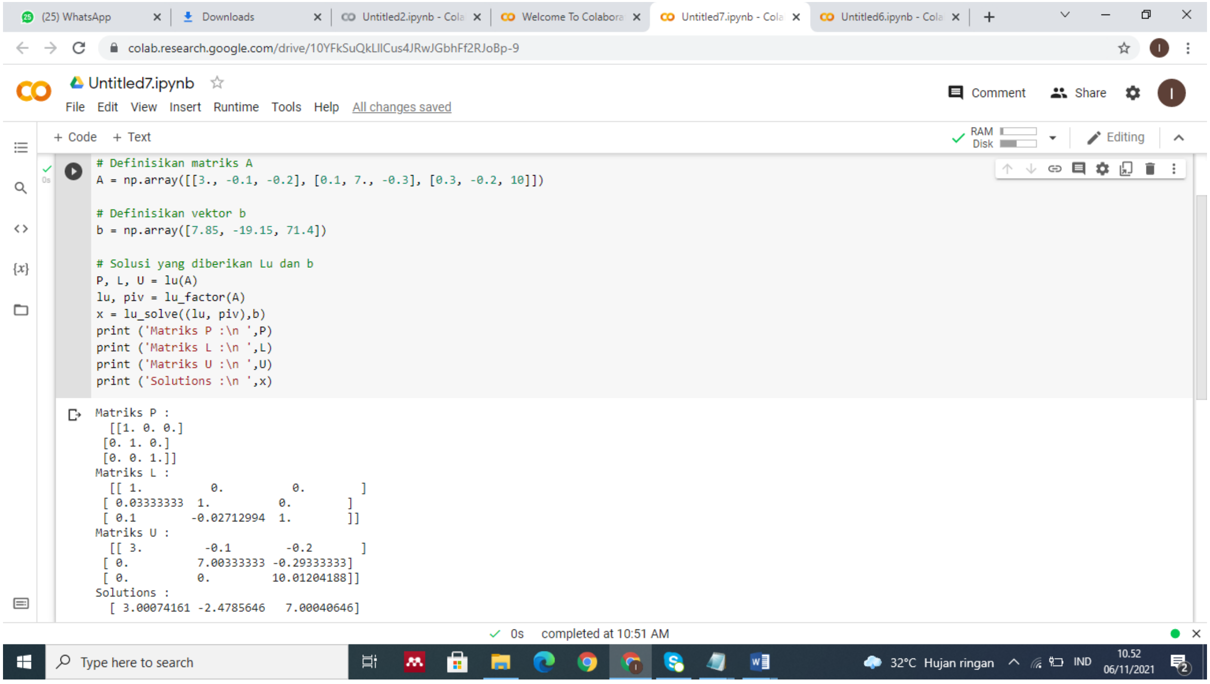
```
z0 = 2
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' %(step, x1,y1,z1))
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n'% (x1,y1,z1))
```

Gauss Jordan



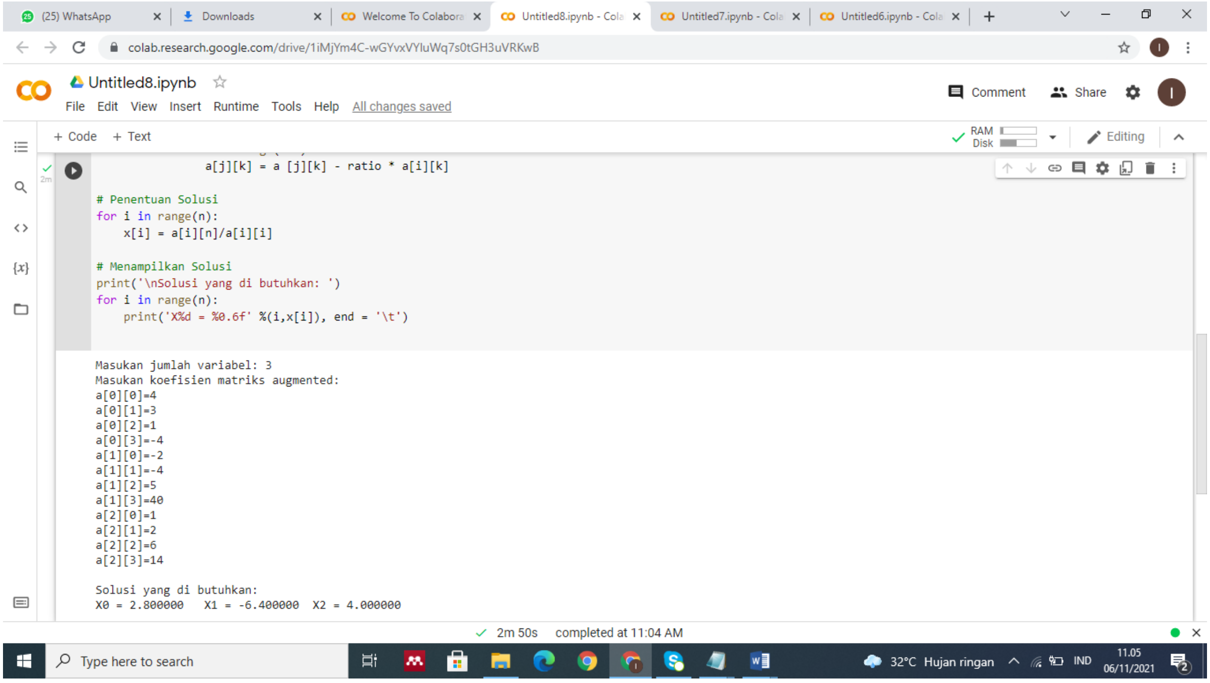
```
import numpy as np
import sys

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 kofisien matrik 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 Gaus Jordan
for i in range (n):
    if a[i][j] == 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 di butuhkan: ')
for i in range(n):
    print('X%d = %0.6f' %(i,x[i]), end = '\t')
```

Faktorisasi




```
import scipy
from scipy.linalg import lu, lu_factor, lu_solve
import numpy as np

# Definisikan matriks A
A = np.array([[3., -0.1, -0.2], [0.1, 7., -0.3], [0.3, -0.2, 10]])

# Definisikan vektor b
b = np.array([7.85, -19.15, 71.4])

# Solusi yang diberikan Lu dan b
P, L, U = lu(A)
lu, piv = lu_factor(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)
```

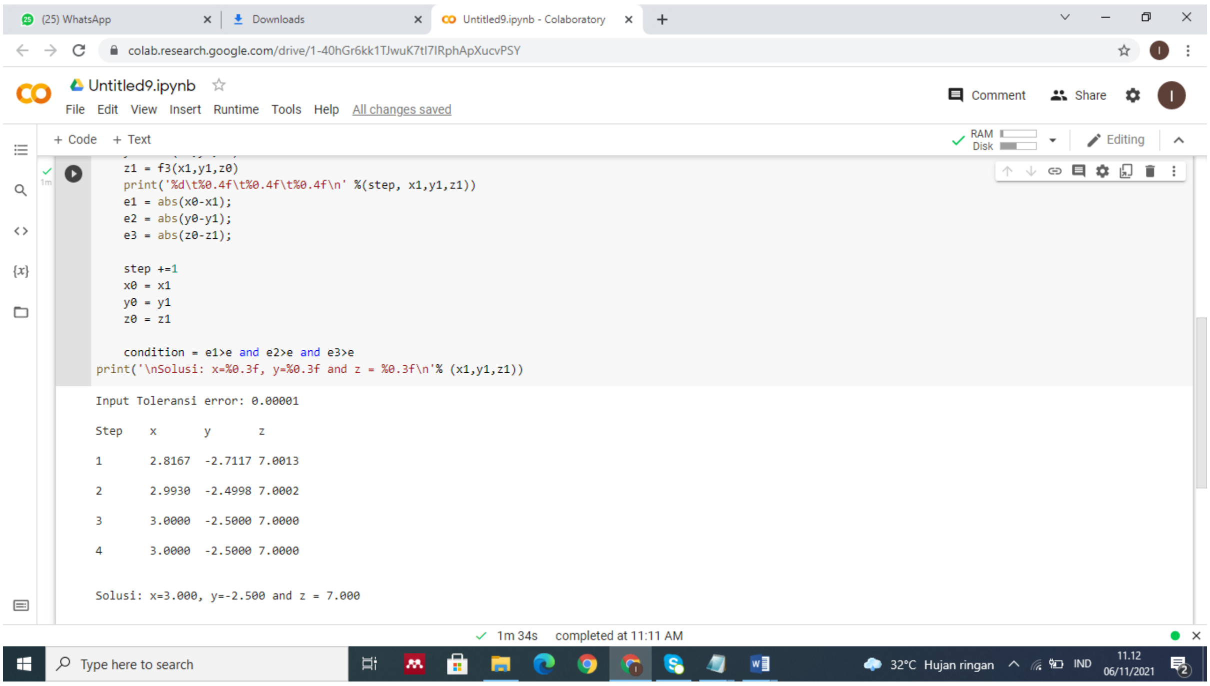
Lat Gaus Jordan




```
import numpy as np
import sys

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 kofisien matrik 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 Gaus Jordan
for i in range (n):
    if a[i][j] == 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 di butuhkan: ')
for i in range(n):
    print('X%d = %0.6f' %(i,x[i]), end = '\t')
```

Gaus Seidel




```
# Iterasi Gauss Seidel

# Definisikan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
f1 = lambda x,y,z: (7.85+0.1*y+0.2*z)/3
f2 = lambda x,y,z: (-19.3-0.1*x+0.3*z)/7
f3 = lambda x,y,z: (71.4-0.3*x+0.2*y)/10

# Inisial awal
x0 = 1
y0 = 2
```

```
z0 = 2
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' %(step, x1,y1,z1))
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n'% (x1,y1,z1))
```