Name: Wasi Mahmood

SID: 10578

NC Lab 8 & 10

In [ ]:
```
def tolernace(greater_value, smaller_value,tol):
    result =abs(greater_value - smaller_value)

    if result <= tol:
        print("Tolerance: ", result)
        return True
    else:

        return False
```

In [ ]:
```
def fx(y,z):
    x = (-11*y +4*z + 95)/83
    print("x = ",x)
    return x
```

In [ ]:
```
def fy(x,z):
    y = (-7*x -13*z +104)/52
    print("y = ",y)
    return y
```

In [ ]:
```
def fz(y,z):
    z = (-3*x -8*y + 71)/29
    print("z = ",z)
    return z
```

In [ ]:
```
x =0
y =0
z =0
#fx(y,z)
#fy(x,z)

def jacobi(x,y,z):
    for i in range(15):
        print(i," Iteration")
        x0 = fx(y,z)
        result = tolernace(x0,x, 0.001)
        if result != True:
            pass
        else:
            break
        y0 = fy(x,z)
        z0 = fz(y,z)
        x = x0
        y = y0
        z = z0
        print("\n")

jacobi(x,y,z)
```

```
0  Iteration
x =  1.144578313253012
y =  2.0
```

```
z =  2.4482758620689653


1  Iteration
x =  0.997507270461155
y =  1.2338531846217764
z =  1.896551724137931


2  Iteration
x =  1.0724556851290625
y =  1.3915822440957464
z =  2.10790256975951


3  Iteration
x =  1.061737416794998
y =  1.328655323023518
z =  2.0643911050770356


4  Iteration
x =  1.0679801911692703
y =  1.3409760330083376
z =  2.08175025571765


5  Iteration
x =  1.067183911563601
Tolerance:  0.0007962796056693033
```

LAB 10

In [ ]:

```
def gauss_seidel(x,y,z):
    for i in range(10):
        print(i," Iteration")

        x = fx(y,z)
        y = fy(x,z)
        z = fz(y,z)

        if i > 0:   #cuz on the 0th iteration the x0 is not initilized and has no value
            result = tolernace(x0,x,0.01)
            if result != True:
                pass
            else:
                break
        x0= x
        y0 =y
        z0 = z

        print("\n")

gauss_seidel(0,0,0)
```

```
0  Iteration
x =  1.144578313253012
y =  1.8459221501390175
z =  1.8206513054872009


1  Iteration
x =  0.9876802598845735
```

```
y =  1.411880215566815
z =  1.9403870115760844


2  Iteration
x =  1.0509742852417996
y =  1.3734259394772752
z =  1.9509950877387159


3  Iteration
x =  1.0565818676711427
y =  1.3700190535711287
z =  1.951934918333515
Tolerance:  0.0056075824293431165
```

In [ ]:
```
#x = fx(y,z)
#y = fy(x,z)
#z = fz(y,z)
```

```
x =  1.144578313253012
y =  1.8459221501390175
z =  1.8206513054872009
```