In [1]:
```
#program-2:examine the consistency of the following system of
#equations and solve if
#x+2y-z=1,2x+y+4z=2,3x+3y+4z=1
import numpy as np
A=np.matrix([[1,2,-1],[2,1,4],[3,3,4]])
B=np.matrix([[1],[2],[1]])
AB=np.concatenate ((A,B),axis=1)
rA=np.linalg.matrix_rank(A)
rAB=np.linalg.matrix_rank(AB)
n=A.shape[1]
if(rA==rAB):
    print("the system is consistent")
    if(rA==n):
        print("the system has unique solution")
        print(np.linalg.solve(A,B))
    else:
        print("the system has infinetly many solution")
else:
        print("the system of equations is inconsistent")
```

```
the system is consistent
the system has unique solution
[[ 7.]
 [-4.]
 [-2.]]
```

In [1]:
```
#program-3:solution of system of linaer equations by Gauss Siedel method
f1=lambda x,y,z:(17-y+2*z)/20
f2=lambda x,y,z:(-18-3*x+z)/20
f3=lambda x,y,z:(25-2*x+3*y)/20
x0=0
y0=0
z0=0
count=1
e=float(input('enter tolerablr error:'))
print('\ncount\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'%(count,x1,y1,z1))
    e1=abs(x0-x1);
    e2=abs(y0-y1);
    e3=abs(z0-z1);
    count+=1
    x0=x1
    y0=y1
    z0=z1
    condition=e1>e and e2>e and e3>e
print('\nsolution:x=%0.3f,y=%0.3f and z=%0.3f\n'%(x1,y1,z1))
```

```
enter tolerablr error:0.001

count   x       y       z

1       0.8500  -1.0275 1.0109

2       1.0025  -0.9998 0.9998

3       1.0000  -1.0000 1.0000


solution:x=1.000,y=-1.000 and z=1.000
```