Example(2) : Solve the I.V.P.

$$\frac{dy}{dx} = x - y \quad , \quad y(0) = 1$$

By using modified Euler's method at the points $x = 0.1,0.2,0.3,0.4$

```
% Modified Euler Method to solve an I.V.P of the first order.
clear
clc
a=0;
b=0.4;
n=4;
y0=1;
f=@(x,y)x-y;
h=(b-a)/n;
y=zeros(1,n+1);
x=zeros(1,n+1);
x(1)=a;
y(1)=y0;
for k=1:n
 x(k+1)=x(k)+h;
 k1=h*f(x(k),y(k));
 k2=h*f(x(k+1),y(k)+k1);
 y(k+1)=y(k)+(1/2)*(k1+k2);
end
disp(' x y ')
disp(' ------- -------')
disp([x' y'])
```

```
      x            y
  -------      -------
       0       1.0000
  0.1000       0.9100
  0.2000       0.8380
  0.3000       0.7824
  0.4000       0.7416
```