Example: Solve the I.V.P.

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

By using Runge-Kutta4 method at the points $x = 0.1,0.2,0.3,0.4$

```
% Runge-Kutta4 method to solve I.V.P.
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)+h/2,y(k)+k1/2);
 k3=h*f(x(k)+h/2,y(k)+k2/2);
 k4=h*f(x(k)+h,y(k)+k3);
 y(k+1)=y(k)+(k1+2*k2+2*k3+k4)/6;
end
disp('   x         y   ')
disp(' ------- -------')
disp([x' y'])
```

```
      x          y

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    0         1.0000

    0.1000    0.9097

    0.2000    0.8375

    0.3000    0.7816

    0.4000    0.7406
```