```matlab
function [ y ] = Euler( f,y0,dt,t_end )
%EULER this function returns an euler approximation of a function
%    this approximation of a function is based on the function f
%    starting value y0 timesteps dt and the end time t_end

len = t_end/dt; %number of steps in range

y = [y0,zeros(1,len)];

for n = 1:len
    y(n+1) = y(n) + dt*f(y(n));
end

end
```

Error using Euler (line 6)
Not enough input arguments.

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```matlab
function [ y ] = Heun( f,y0,dt,t_end )
%HEUN The Heun function model is based on a similar concept as
%    the Euler model, but averages the slop for the function points n
%    and n+1.  This leads to a more percice result than with Heun
%
len = t_end/dt; %the number of steps is calculated

y = [y0,zeros(1,len)]; % the result memory is allocated
for n = 1:len
     % a temporary value is calculated for the current Euler value
     % this value is based on previous Heun y result values
     % range for the calculation is limited to two steps for
     % perfomance purposes
    temp = Euler(f,y(n),dt,dt);

    %Average of both test point y values based on slopes
    y(n+1) = y(n) + dt * 0.5 * (f(y(n)) + f(temp(2)));
end

end
```

Error using Heun (line 6)
Not enough input arguments.

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```matlab
function [ y ] = RKEuler( temp,y0,dt,t_end )
%EULER this function returns an euler approximation of a function
%    this approximation of a function is based on the function f
%    starting value y0 timesteps dt and the end time t_end

len = t_end/dt; %number of steps in range

y = [y0,zeros(1,len)];

for n = 1:len
    y(n+1) = y(n) + dt*temp;
end

end
```

Error using RKEuler (line 6)
Not enough input arguments.

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```matlab
function [ y ] = RungeKutta( f,y0,dt,t_end )
%UNTITLED Summary of this function goes here
%   Detailed explanation goes here
len = t_end/dt;

y = [y0,zeros(1,len)];
for n = 1:len
    temp1 = f(y(n));
    temp21 = RKEuler(temp1,y(n),dt/2,dt/2);
    temp2 = f(temp21(2));
    temp31 = RKEuler(temp2,y(n),dt/2,dt/2);
    temp3 = f(temp31(2));
    temp41 = RKEuler(temp3,y(n),dt,dt);
    temp4 = f(temp41(2));
    y(n+1) = y(n) + dt * (1/6) * (temp1 + 2*temp2 + 2*temp3 + temp4);
end

end
```

Error using RungeKutta (line 4)
Not enough input arguments.

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