1. Consider the non-linear ordinary differential equation

$$y' + y(1 - y) = 0$$

with y(0) = 1/2.

- Write a code to solve the above to obtain y(1) using
 - Euler Explicit
 - Euler Implicit
 - Trapezoidal Rule
 - RK2
 - RK4

For each of the above, identify for what time stepping the scheme is stable, and the overall global accuracy.

2. Write a code that guarantees global fourth order accuracy to solve

$$y'' + 4y' + 3y = \sin(t^2)$$

with y(0) = 0 and y(1) = 1 using the shooting method.