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.