Programming assignment #2 for Math 55200 (upload a PDF file to canvas by April 16 Sunday)

Solve the following initial value problem of the following differential equation

$$u_t + uu_x = 0$$

in the region $R = \{(x,t)|0 \le t, 0 \le x \le 2\pi\}$. The initial condition is $u(x,0) = 2.5 + sin(x)$. Assume perioid boundary condtion: $u(2\pi, t) = u(0, t)$. Use the upwind scheme. Run your code on a series of at least 6 pairs of gradually halved $(\triangle x, \triangle t)$. Compute the solution up to t=1. Plot the solutions on the $x - u$ plane for $t = 1$ on the same figure and compute the order of accuracy p in both space and time.