Application of the code you developed in Project-2

Consider flows past two airfoils, NACA-0012 and NACA-65-410, at angles of attack $\pm \alpha = 0, 2, 4, 6, 8, 10$ & $12^\circ$. Using 64 or more linearly varying vortex panels, determine the pressure distribution over the airfoils. Use panels of varying lengths, shorter ones around the leading edge and longer ones over the recovery regions.

Determine the force on the airfoils by integrating the pressure force around them

$$F = (D, L) = \int -p \ n \ dA$$

where $n$ is the unit normal vector on the airfoil surface. Compare the lift distributions and the lift coefficients to those from the theoretical analysis of the thin airfoil theory. Also compare to aerodynamic data at high Reynolds numbers available in literature.

Using the boundary layer separation criterion of Stratford, determine the stall angles for both airfoils and compare them to data in the literature.

(a) Symmetric Airfoil: NACA-0012
(b) Asymmetric Airfoil: NACA-65-410

References:
Abbott & Doenhoff, Dover
Anderson, Section 4.9
Kuethe & Chow, Section 5.10
Rosenhead L. 1963 Laminar Boundary Layers, Dover.
http://www.ae.uiuc.edu/m-selig/ads/coord_database.html