Intialisation:

All the spatial grid is made both in the physical(x,y) and computational domain(zeta,eta)

Derivatives Initialisation:

All the required derivatives for the calculation in the transformed Laplace Equation is calculated using formulas which I have taken out by hand
$(\frac{\partial \xi}{\partial x}, \frac{\partial \xi}{\partial y}, \frac{\partial \eta}{\partial x}, \frac{\partial \eta}{\partial y}, \frac{\partial^2 \xi}{\partial x^2}, \frac{\partial^2 \xi}{\partial y^2}, \frac{\partial^2 \eta}{\partial x^2}, \frac{\partial^2 \eta}{\partial y^2})$

Stream Function and Calculation:

Stream function with boundary conditions is initialised and a infinite while loop is run which sends the derivatives and stream function to main3.calculate() function which updates the stream function for each iteration. Error for each iteration is also recorded and stored for plotting. A convergence condition is implemented to break out of the loop

main3.calculate():

It iteratively calculates the stream function values of all the internal points using point gauss seidel approach highlighted in report

Velocity calculation:

After we have gotten our final stream function we calculate the velocity components using potential flow theory.

Plotting:

All the required plots are done using all the results obtained. ERROR plot is done on log scale.