```
%% Pseudo Code
% Do not run this

Give all Inputs

Call MeshR function to generate 2D Rectangular Mesh
Call PlotMesh function to get visual reprsentation of the↙
generated mesh

Define DOF_NOD matrix
% DOF_NOD matrix is but a matrix similar to NOD matrix, but↙
rather than
% mapping global node number with element number, it maps↙
global degree of
% freedom with element number

Initialize current and previous iteration solution (GCU & GPU)

%% Big Loop

for NL = 1:NLS % Initiate load step loop
    Define required constants like Rho and Mu
    while iter<=ITERMAX && convergence == 0 % Initiate↙
iterative loop
        Initialize GLK and GLF matrices
        for N = 1:NEM
            Calculate ELU matrix from GPU & GCU & Acceleration↙
parameter (GAMA1)

            Define ELXY from GLXY

            Call FLUIDMATRICS function to calculate ELK and ELF

            Perform Assembly of ELK & ELF into GLK & GLF
        end
        Call FLUIDBCS function to apply Essential and Natural↙
BCs

        Calculate current iteration solution GCU

        Null out VSPV for NI after 1st iteration

        Calculate error and check for convergence

        iter = iter+1;
    end % END OF ITERATIVE LOOP

    %% Post Processing of converged solution

    if IGRAD ~= 0 % Check if post-processing is required by the↙
user or not
        for I = 1:NEM % Calculate for all elements
            Define ELXY and ELU

            Call STRESS2D function to calculate Pressure for↙
all the gaussian points in the element

            Call Press_Calc script to print the required↙
Pressure values
            % Note Press_Calc is question specific and needs to↙
be changed
            % if we solve any other question (except 10.8.1 &↙
10.8.4)

        end
    end
end % END OF LOAD STEP LOOP

PRINT SOLUTIONS
```

```
%↙
---------------------------------------------------------------↙
------- %

function [ELK,ELF] = FLUIDMATRICS(NDF,NPE,NONLIN,ELXY,ELU,↙
RHOAMU,NGPF,GAMA2)

Initialize ELK and ELF

% Full integration
for NI = 1:NGPF
    for NJ = 1:NGPF
        Calculate ELF and part of ELK matrix

        if NONLIN > 1
            Calculate TANG matrix as well
        end
    end
end

% Reduced Integration
for NI = 1:NGPR
    for NJ = 1:NGPR
        Calcuate the penalty term in ELK
    end
end

if NONLIN > 1
    Calculate final TANG matrix and Residual matrix
end
end

%↙
---------------------------------------------------------------↙
```

```
---------%

function [XMAT,YMAT,SXMAT,SYMAT,SXYMAT,PRSMAT] = STRESS2D(ELXY,↙
NPE,ELU,NGPR,GAMA2,MU)

% Perform Reduced integration
for NI = 1:NGPR
    for NJ = 1:NGPR
        Find the requried Gauss points where Pressure needs to↙
be calculated in an element
        Calculate corresponding pressure.
    end
end
```