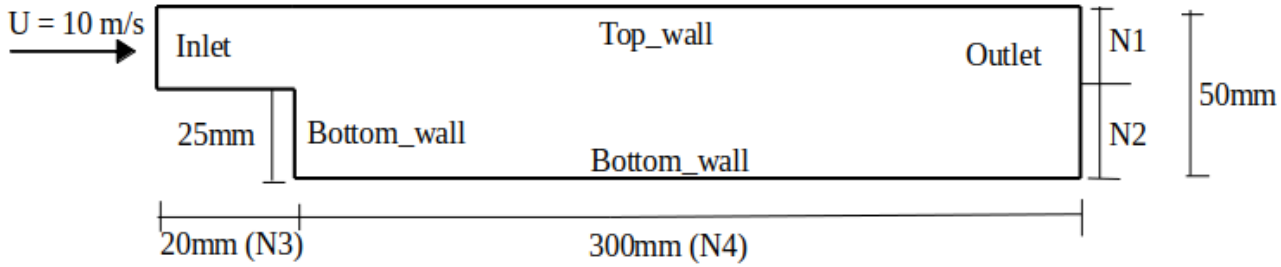
CL455-CFD-Assignment-3

Date: 13/10/2022
Total Marks:7
Duration: 2:15 pm to 5:00 pm

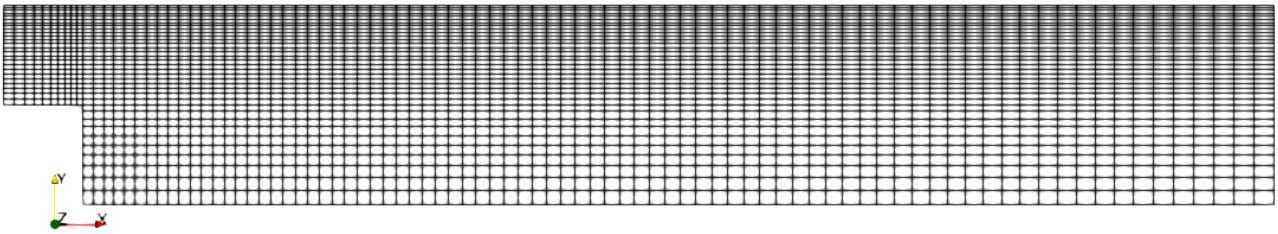
In previous classes we learnt to create block mesh using multiblock method, plotting velocity contours and streamlines. In this class we shall investigate steady turbulent flow over a backward-facing step using k-epsilon turbulence nodel. The domain is 2 dimensional, consisting of a short inlet, a backward-facing step and outlet as shown in below figure.

Hint: Take reference of tutorial “pitzDaily” from OpenFOAM incompressible/simpleFoam.



Re = 25000 (Based on inlet length and free-stream velocity)

Grid expansion ratio = 0.5 (or 2) in x and y directions, as shown in below figure.



N1 = Number of cells in y-direction = 50

N2 = Number of cells in y-direction = 30

N3 = Number of cells in x-direction = 18

N4 = Number of cells in x-direction = 200

Calcluations and Results:

1) Calculate Cf, and Yp, for Y^{+}=242.2 as mentioned in spoken tutorial.

2) Plot Velocity contour in paraview.

3) Plot streamlines showing recirculation zone in paraview.