

Internal Flow in duct

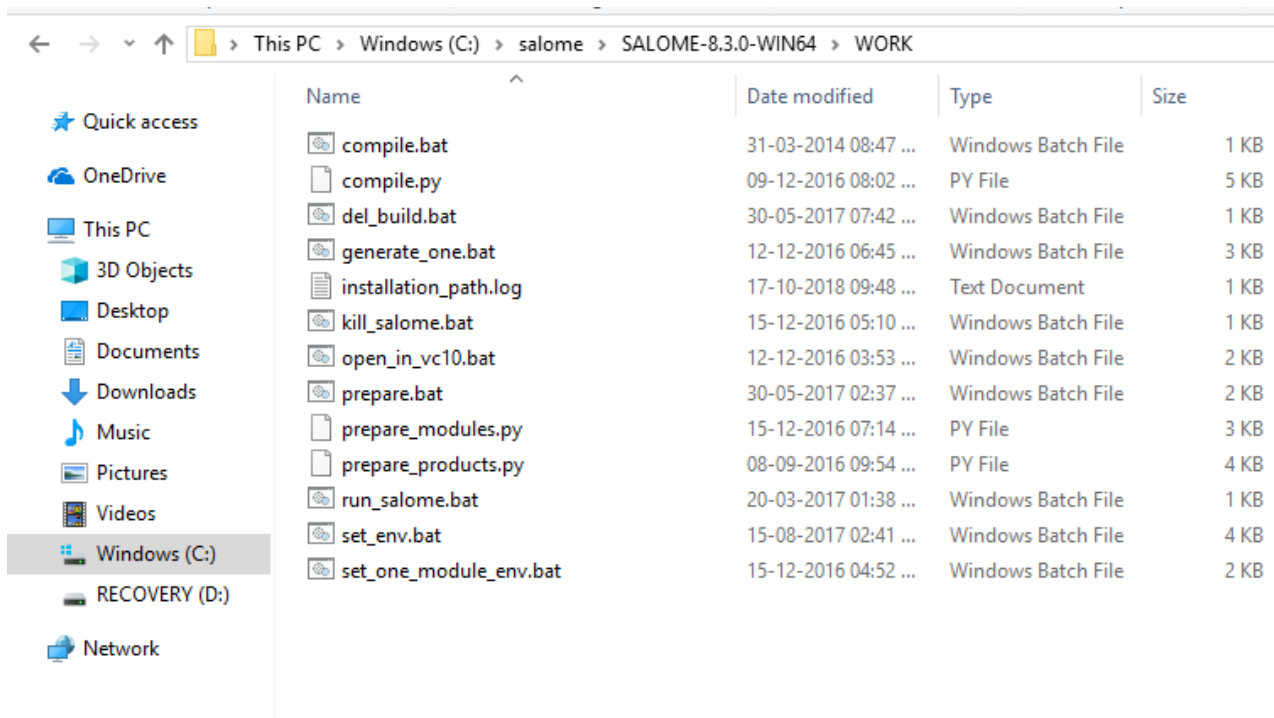
(incompressible and laminar flow)

There are 4 steps:

1. Geometry making in [Salome](#).
2. Meshing the geometry in [Salome](#).
3. Executing the files in [Blue-CFD](#) Panel.
4. Post processing or visualizing result using [Para-View](#).

Geometry making in [Salome](#).

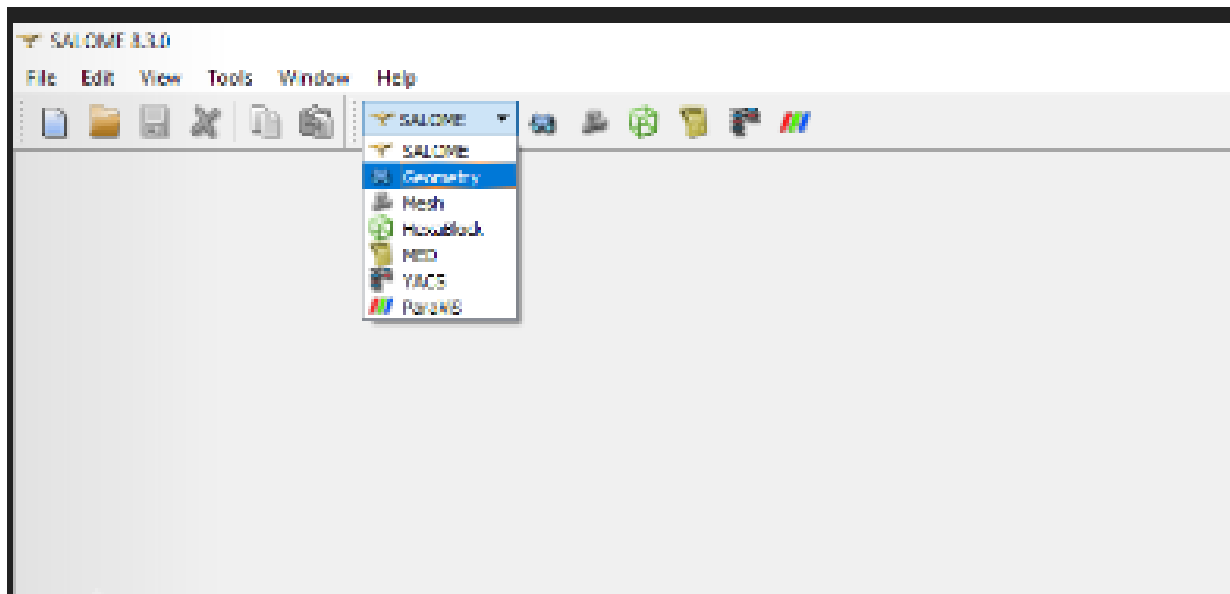
1. Open Salome software ([follow the same directory location to open Salome](#))



Double click on file **“Run_salome.bat”**

2. select “**geometry**” from drop box. **Double click on it.**

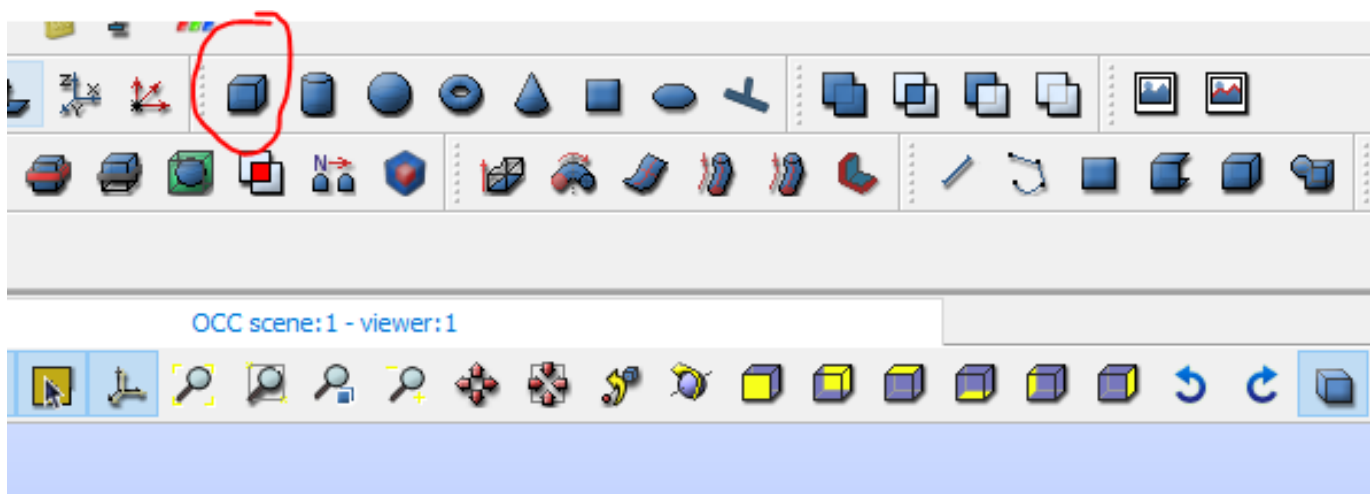
Click on new file.

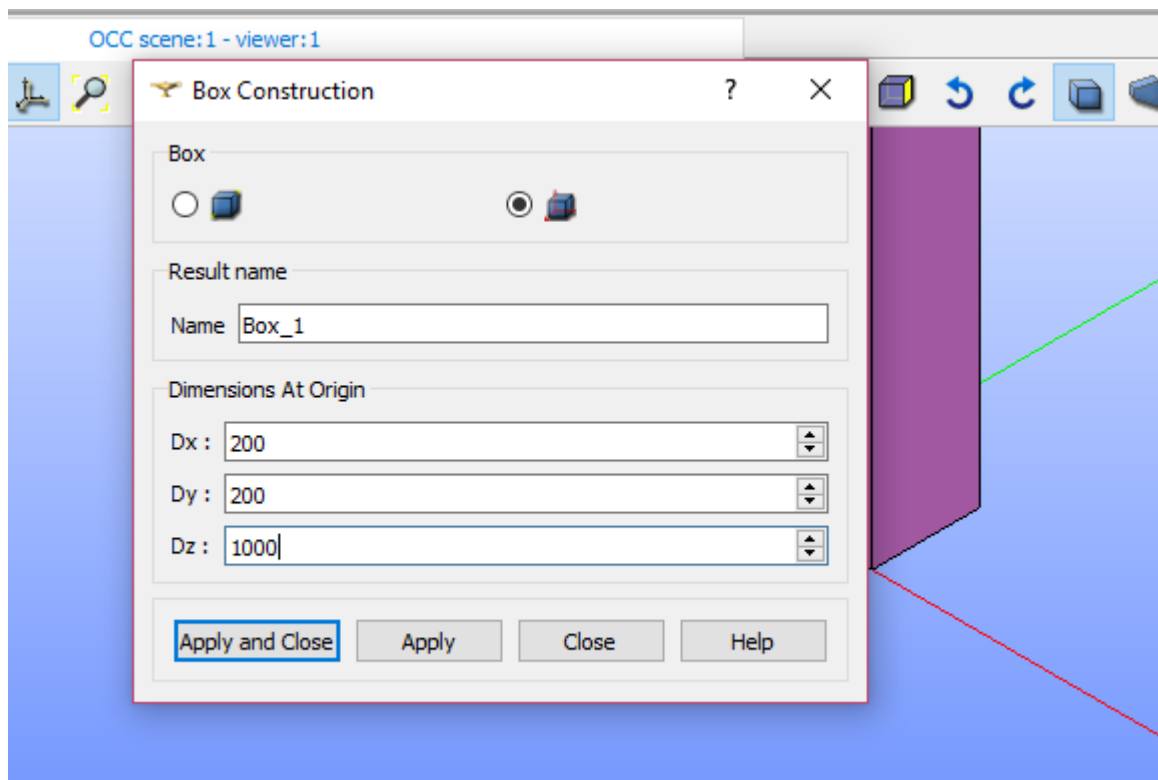


Got to files >>properties >>select the units (take **metre** as unit)

3.Making a simple geometry (a simple box).

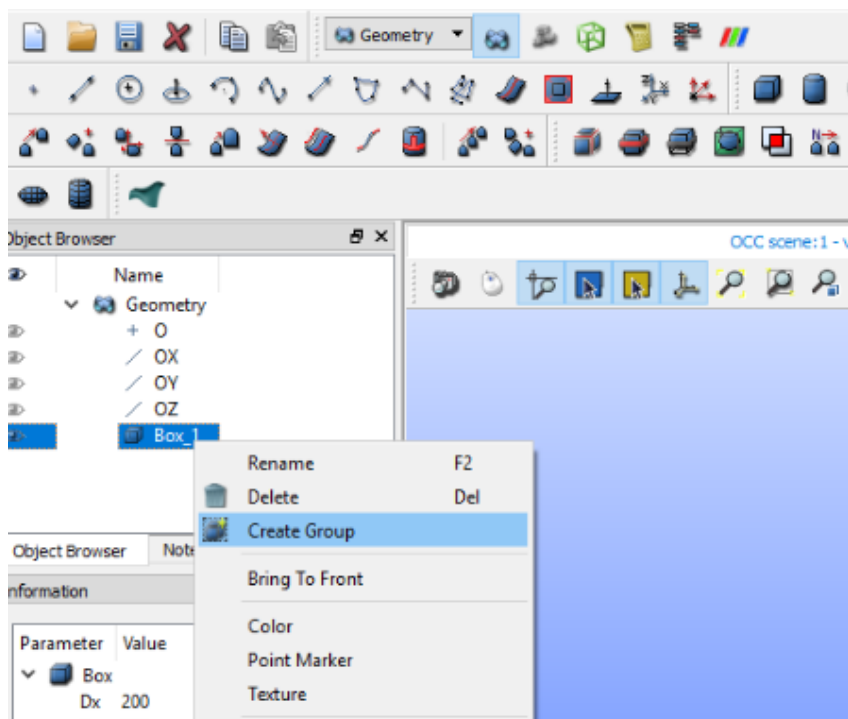
For making **box** click on “**Box**” icon enter the same dimension shown in image.





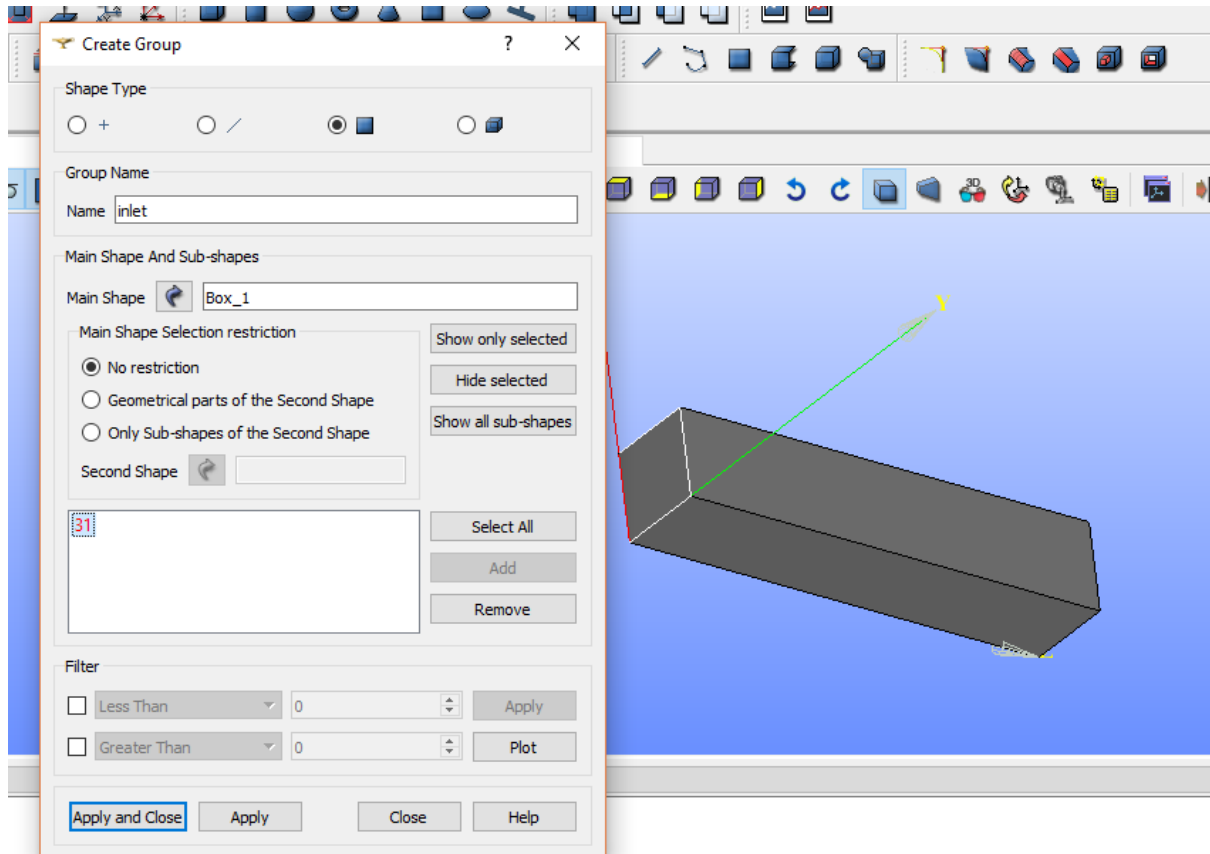
4. Giving the boundary naming like Inlet, outlet and wall.

Step1. Right click on the “box1” select the “create group” option.

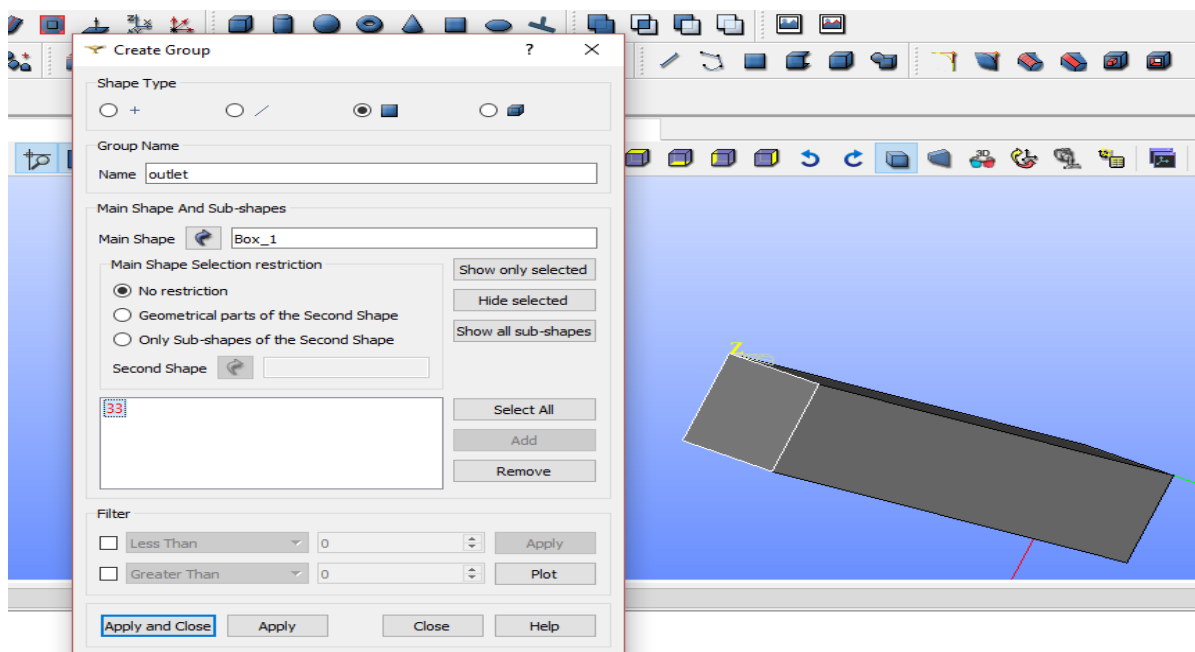


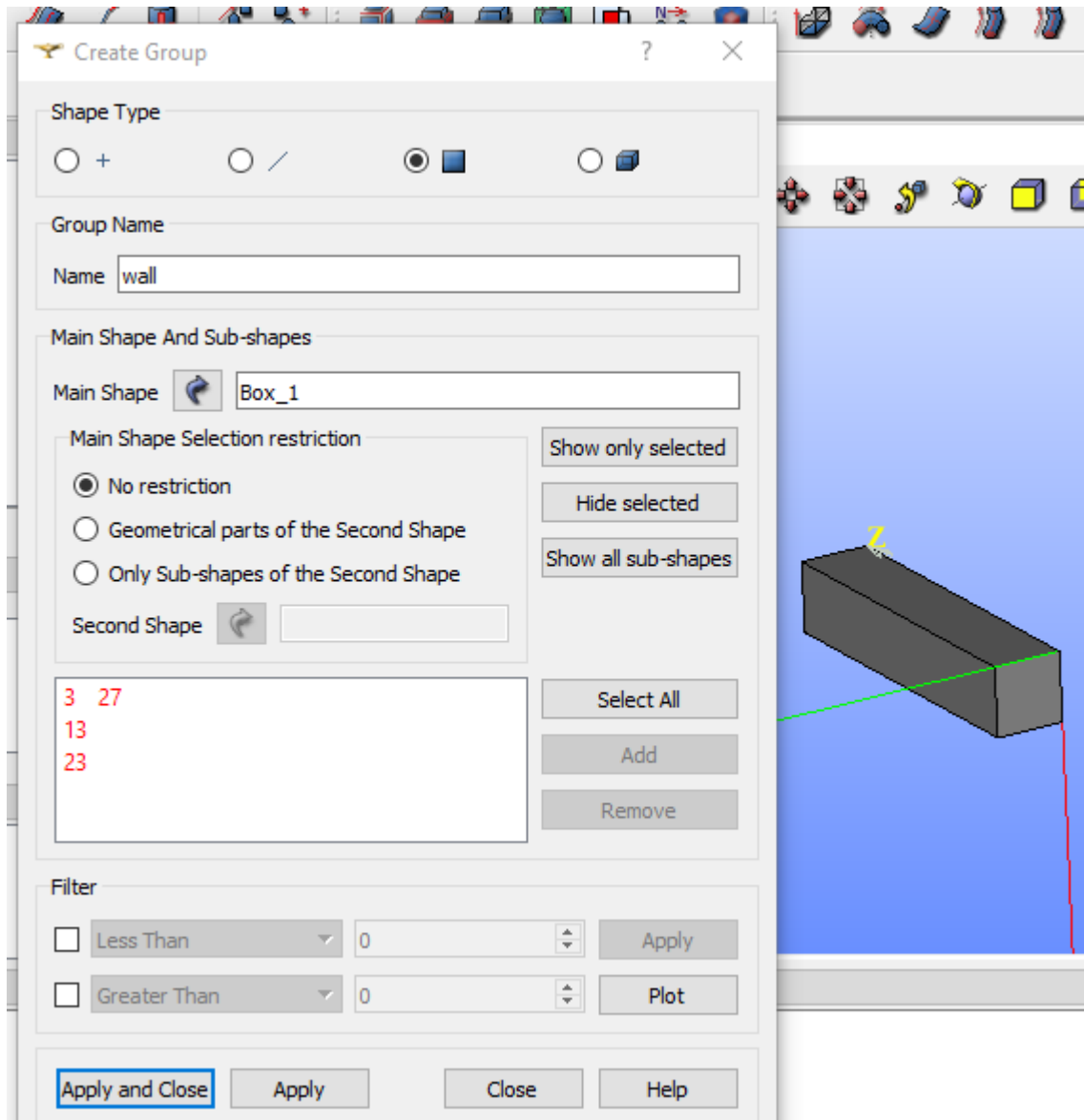
Step 2. Selecting the inlet

Click on face icon>>Name the face as “inlet”>>Select the face click add button >>Then click on apply.



Do it same for wall and outlet.

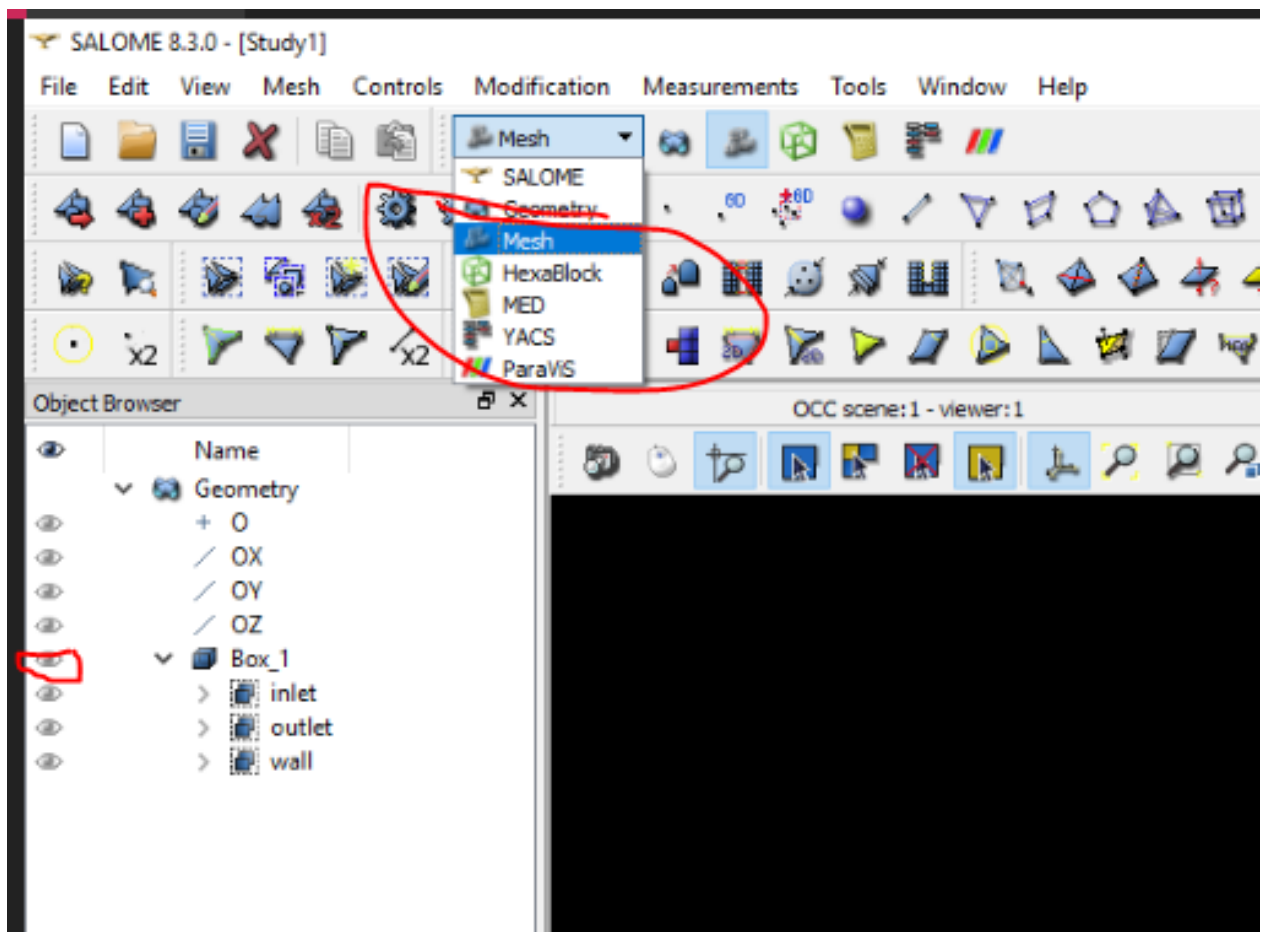




After the three naming click on “**Apply and close**”.

Your Geometry is ready

Meshing the geometry in Salome.

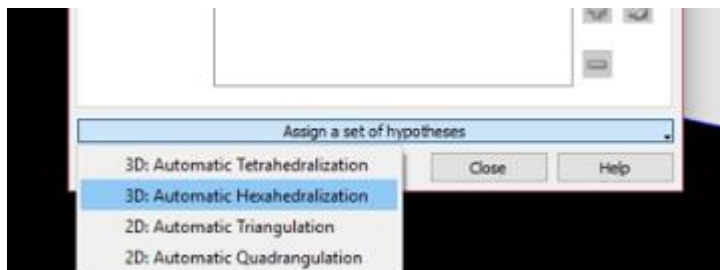


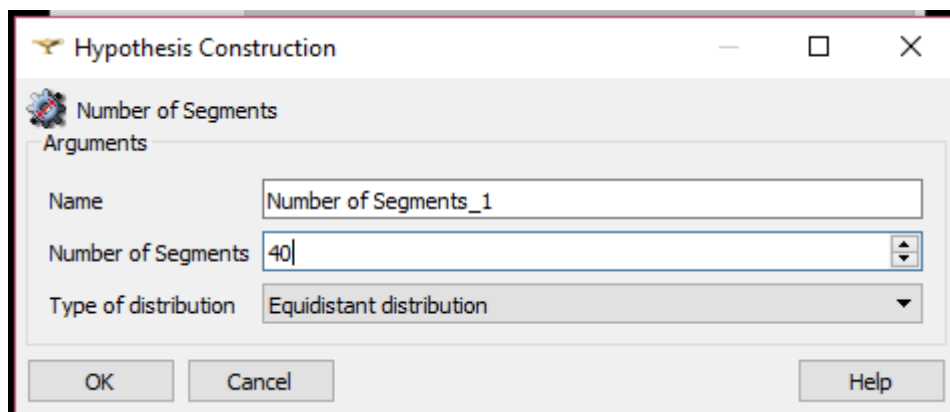
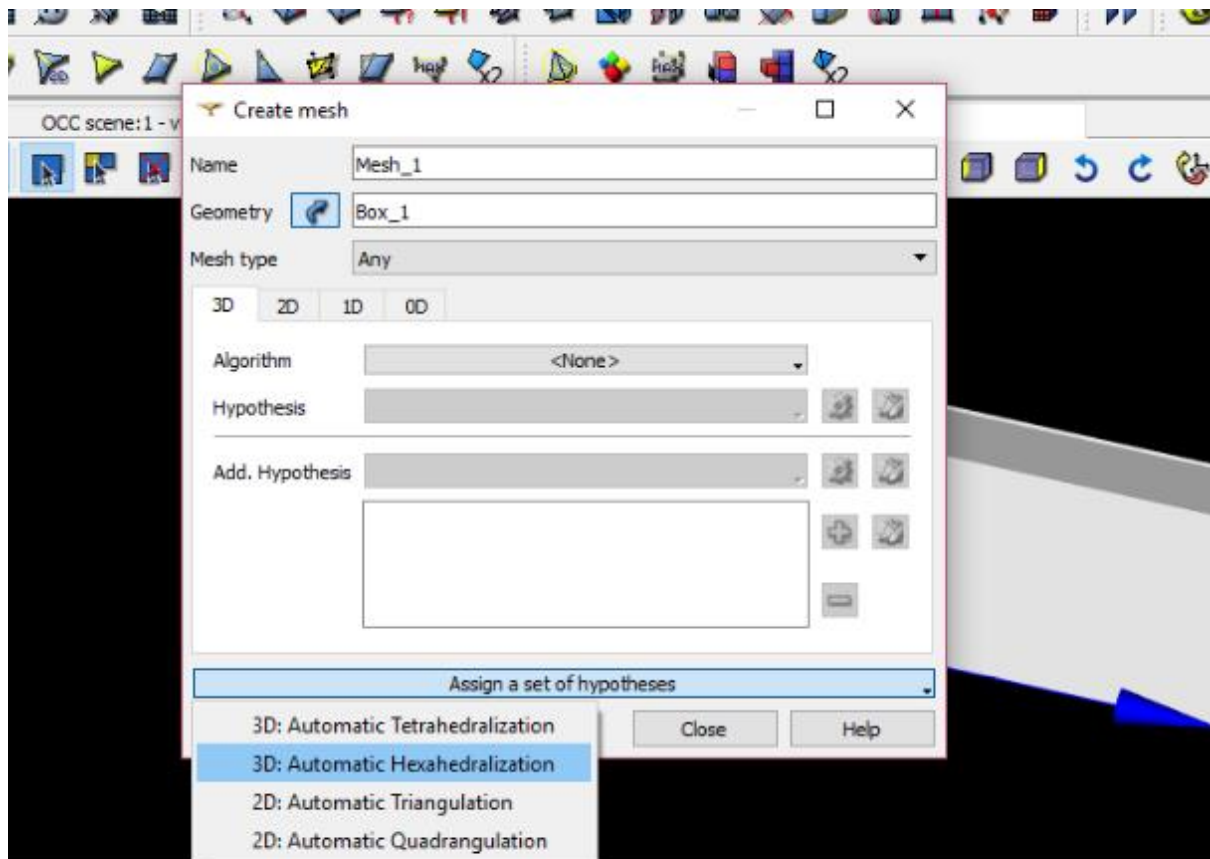
1. Double click on “Mesh” from drop box.

Click on eye option near Box_1 to see your geometry.

2. Creating automatic mesh.

Go to. Mesh>>create mesh>> select the same option as in image.

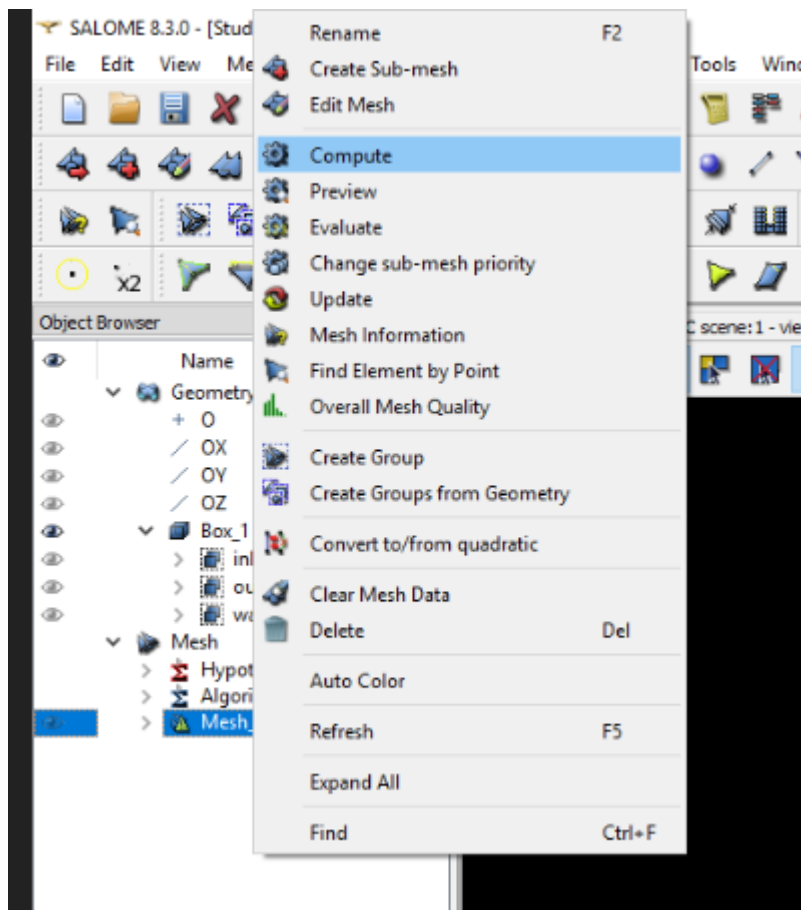




Give segment as 40.

3.To start meshing

Select mesh_1 >>right click >>Click on “compute”.

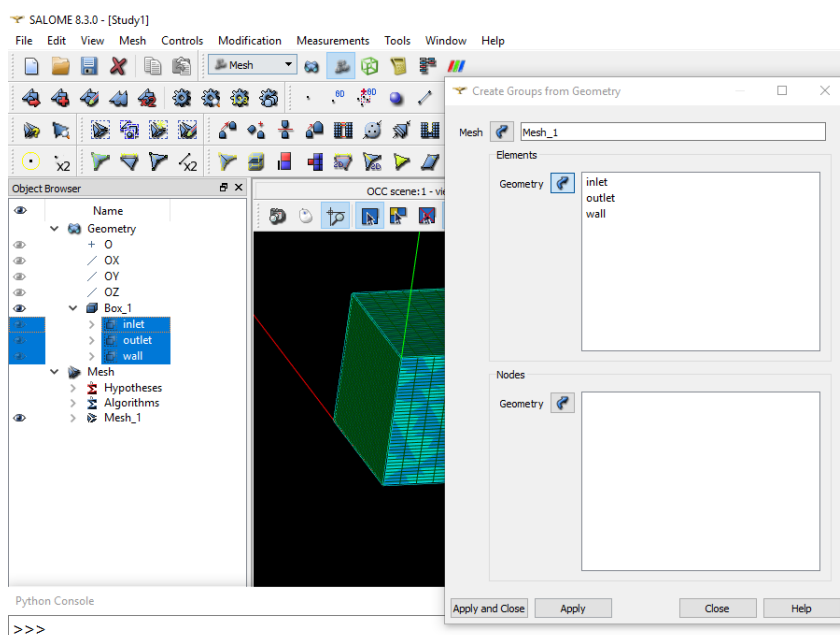


After meshing

4.Create groups

Right click on Mesh_1 icon Double click on “Create groups from geometry”

Select the inlet outlet and wall add them click on apply and close.

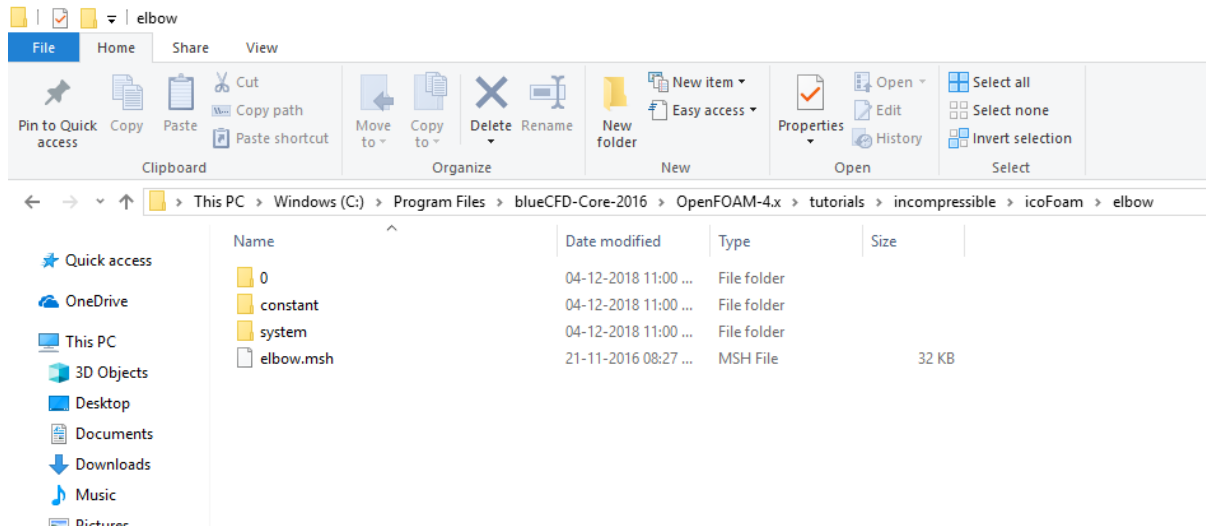


5. Saving the file>>dump study.

Making an Open-Foam readable file File>>Export>>UNV.

3.Executing the files in Blue-CFD Panel.

First selecting the proper solver.



Copy “0, constant and system” folder from same directory

Copy it in the same duct folder.

Removing extra files.

Make sure

1. “0” folder has only p and U file
2. “Constant” has transportProperties only
3. “System” folder has only three file.

mohit > system				
Name	Date modified	Type	Size	
controlDict	12-12-2018 04:01 ...	File	2 KB	
fvSchemes	21-11-2016 08:27 ...	File	2 KB	
fvSolution	21-11-2016 08:27 ...	File	2 KB	

Pressure file.

p - Notepad2

File Edit View Settings ?

File Edit View Settings ?

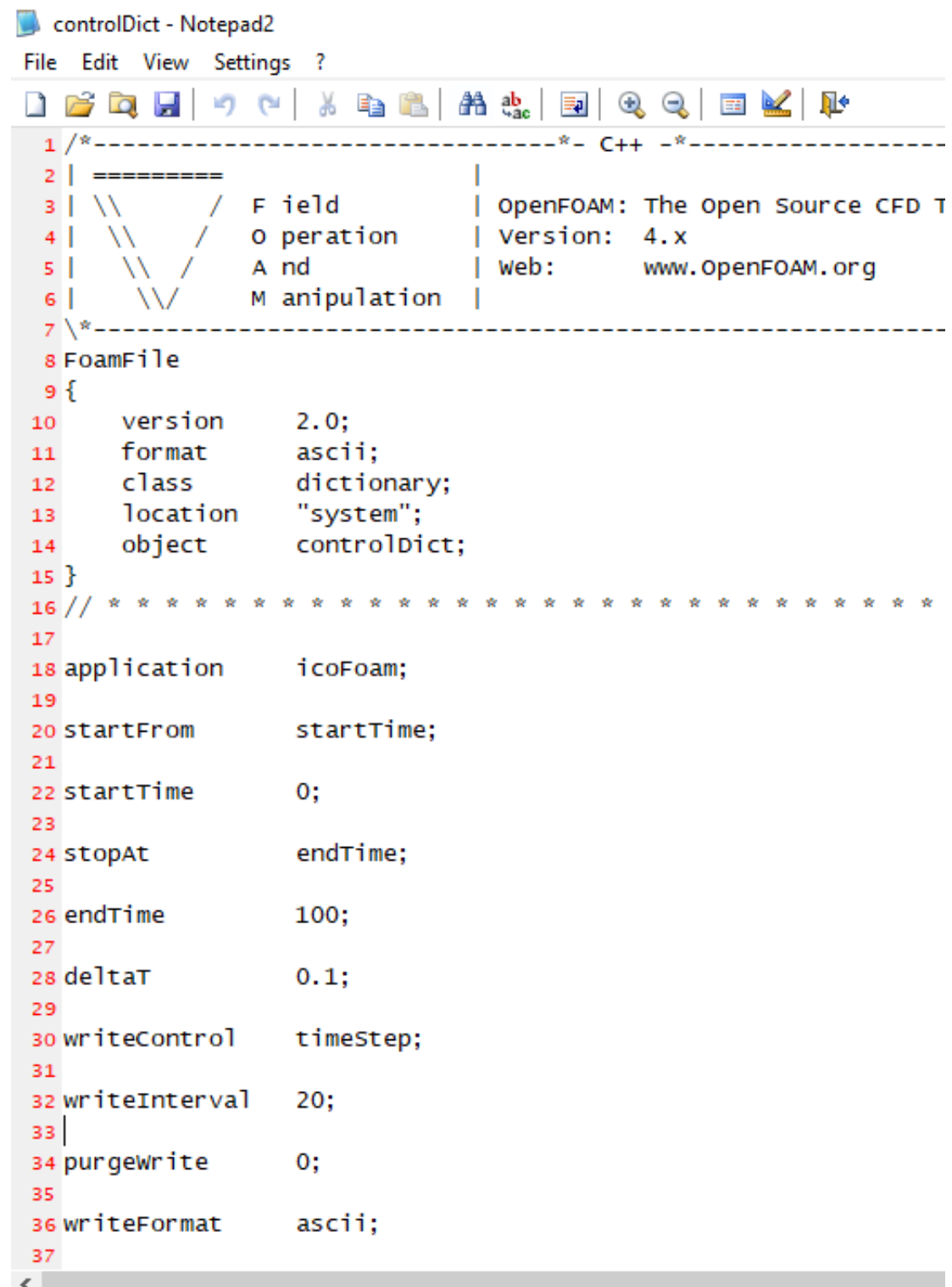
```
4 | \ \ / O peration | Version: 4.x
5 | \ \ / A nd | web: www.OpenFOAM.c
6 | \ \ M anipulation |
7 | *-----
8 FoamFile
9 {
10     version      2.0;
11     format        ascii;
12     class         volScalarField;
13     object        p;
14 }
15 // * * * * *
16
17 dimensions      [0 2 -2 0 0 0 0];
18
19 internalField    uniform 0;
20
21 boundaryField
22 {
23     inlet
24     {
25         type      zeroGradient;
26     }
27
28     outlet
29     {
30         type      zeroGradient;
31     }
32
33     wall
34     {
35         type      zeroGradient;
36     }
37 }
38
39 // *****
```

Velocity File.

```
U - Notepad2
File Edit View Settings ?

7 \*-----
8 FoamFile
9 {
10     version      2.0;
11     format        ascii;
12     class          volVectorField;
13     object         U;
14 }
15 // *****
16
17 dimensions      [0 1 -1 0 0 0 0];
18
19 internalField    uniform (0 0 3);
20
21 boundaryField
22 {
23     inlet
24     {
25         type      fixedValue;
26         value      uniform (0 0 3);
27     }
28
29     outlet
30     {
31
32         type      fixedValue;
33         value      uniform (0 0 3);
34     }
35
36     wall
37     {
38         type      noslip;
39     }
40 }
41
42 // *****
43
```

ControlDict

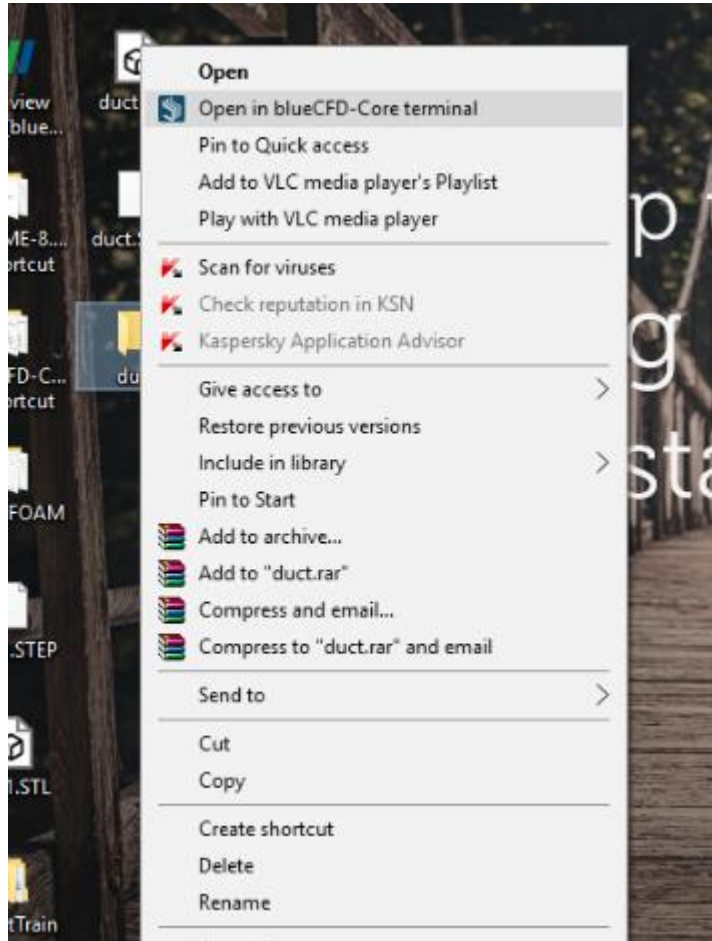


```
1 /*-----*-- C++ -*-----*
2 | =====
3 | \ \ / F i e l d      | openFOAM: The open Source CFD T
4 | \ \ / O peration    | Version:  4.x
5 | \ \ / A nd          | web:      www.openFOAM.org
6 | \ \ / M anipulation |
7 \*-----*
8 FoamFile
9 {
10     version      2.0;
11     format        ascii;
12     class         dictionary;
13     location      "system";
14     object        controlDict;
15 }
16 // * * * * *
17
18 application      icoFoam;
19
20 startFrom        startTime;
21
22 startTime        0;
23
24 stopAt           endTime;
25
26 endTime          100;
27
28 deltaT           0.1;
29
30 writeControl     timeStep;
31
32 writeInterval    20;
33
34 purgewrite       0;
35
36 writeFormat      ascii;
37
```

Change it to 10 end time

Save file don't disturb other files.

Executing the files in Blue-CFD Panel.



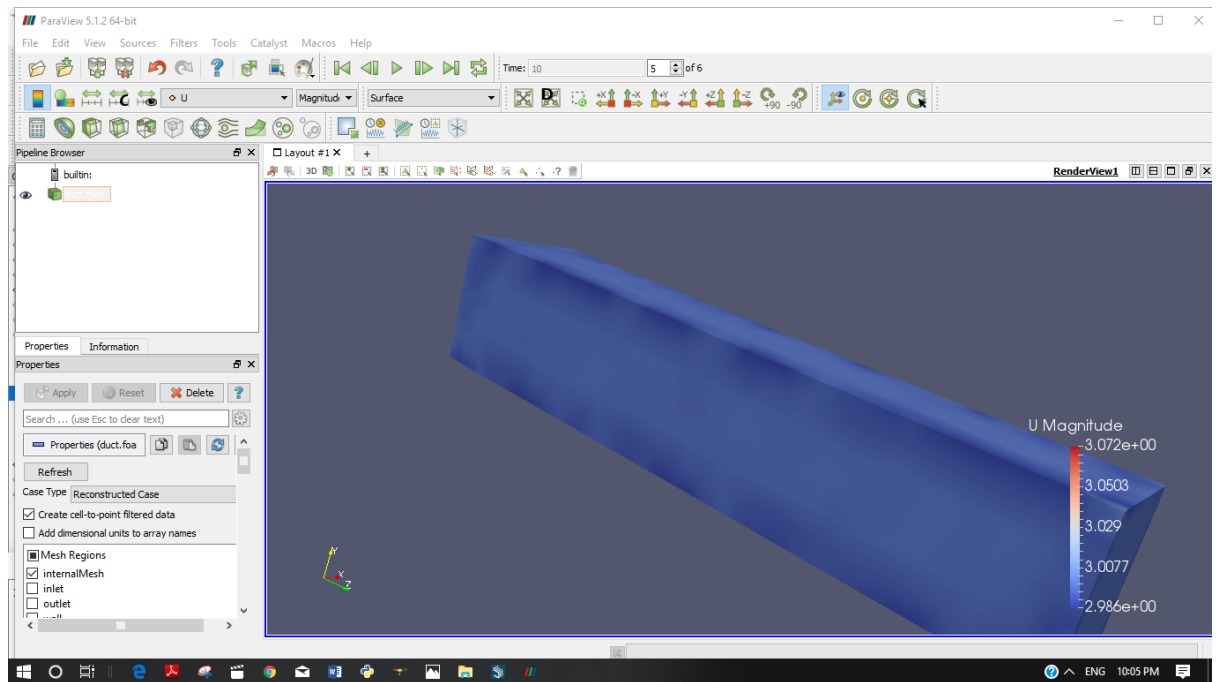
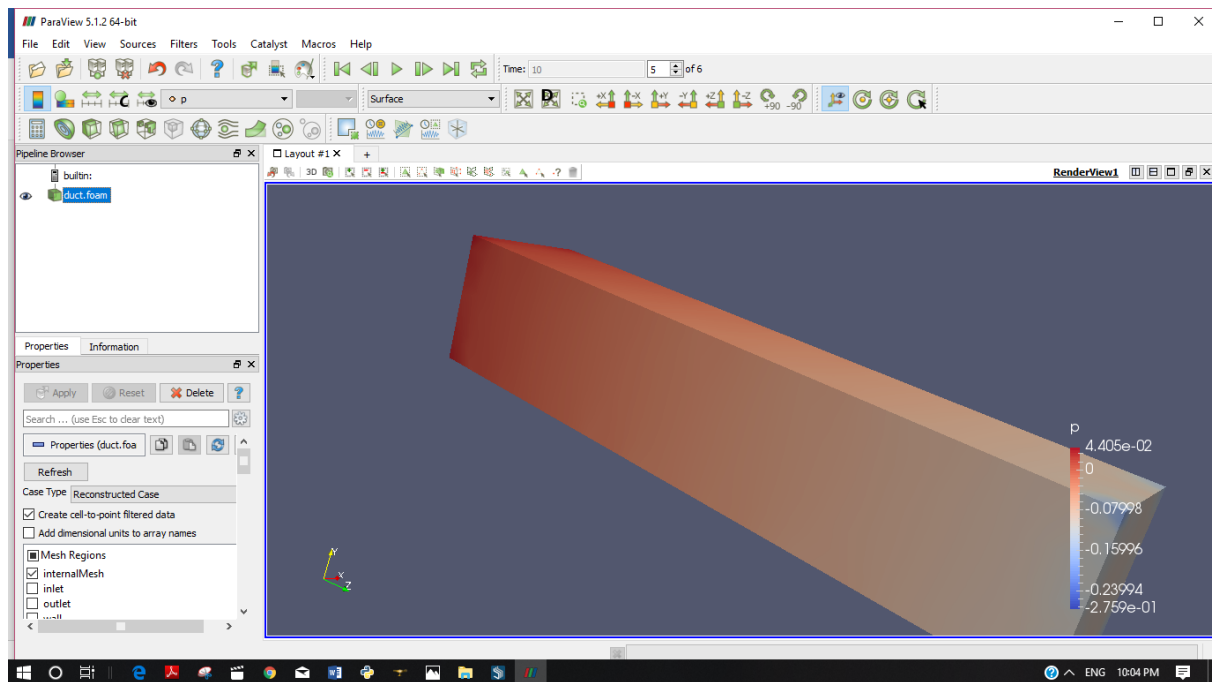
Right click on the folder double click on

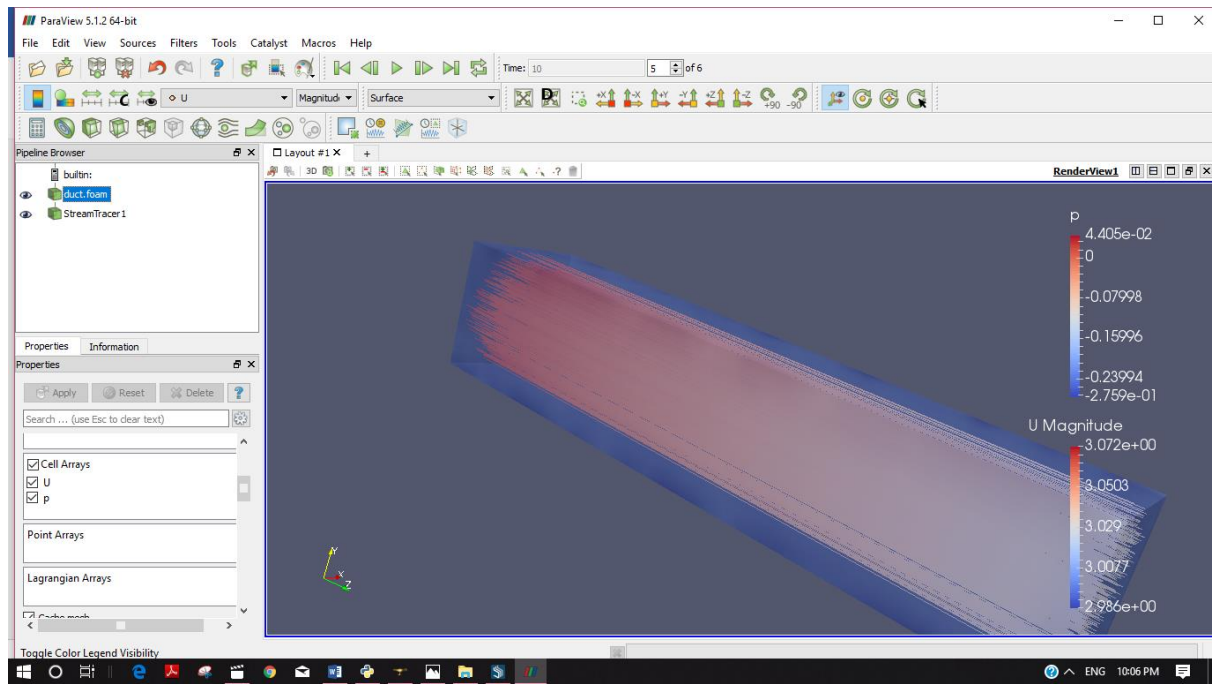
Open in blue-CFD terminal.

Type

To convert the unv file to foam “ideasUnvToFoam.exe duct.unv”
To run the solver type “icoFoam ” click enter
To see the result Type “paraFoam” click enter

Seeing the results.



















AB2-302 12/12/18 11:30 - 1:15pm Sl.no.		Internal flow seminar using Salome and OpenFOAM - Antin	
NAME		Registration no.	Signature
1.	HARSH DOSHI	18MCD1011	Harsh
2.	NIMMY BANSOD	18MCD1005	Nimmy
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4.	SAMRUDDHI GAIKWAD	18MCD1013	Samruddhi
5.	S. Bhagyarath	18MCD1037	Bhagyarath
6.	Mathew George	18MCD1023	Mathew
7.	Nijin Jose.	18MCD1040	Nijin
8.	Abhinav M.V	18MCD1041	Abhinav
9.	Hitesh Mallikarajuna	18MCD1002	Hitesh
10.	Pranath G Bharadwaj	18MCD1020	Pranath
11.	S. Nareshtbhinchand	18MCD1019	S. Naresht
12.	Himanshu Khandelwal	16BME1197	Himanshu
13.	Mali Roshan Sanjay	18MCD1045	Mali
14.	Mayur Tambare	18MCD1030	Mayur
15.	Mohit Nikhil Wagh	18BME1073	Mohit
16.	T.S. Sravan Kumar	18MCD1033	T.S. Sravan
17.	S. Nagarajuna Reddy	18MCD1046	S. Nagarajuna
18.	A. Chinna Karasimha Reddy	18MCD1042	A. Chinna
19.	At. Muthuveerappan	18BME1083	At. Muthu
20.	Prateek Srivastava	18BME1079	Prateek
21.	M. Devesh	16BME1139	M. Devesh
22.	SANTOSH MAHARANA	18MCD1031	Santosh
23.	J. Anvesh	18MCD1025	Anvesh
24.	V. Vinay Kumar	18MCD1036	Vinay Kumar

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26	M. Phani Bhushan	18MCD1021	phani
27	AKASH PRAJAPAT	18MCD1032	Ashu
28	Sanjay Desai	18MCD1015	Sh
29	Saumya Pratik Selti	18MCD1009	S
30	Santosh Maharana	18MCD1031	
30	Jibin Oommen	18MCD1029	jibin
31	Ratish Dixit	16BME1093	Ratish
32	Anshu Gupta	16BME1163	Anshu