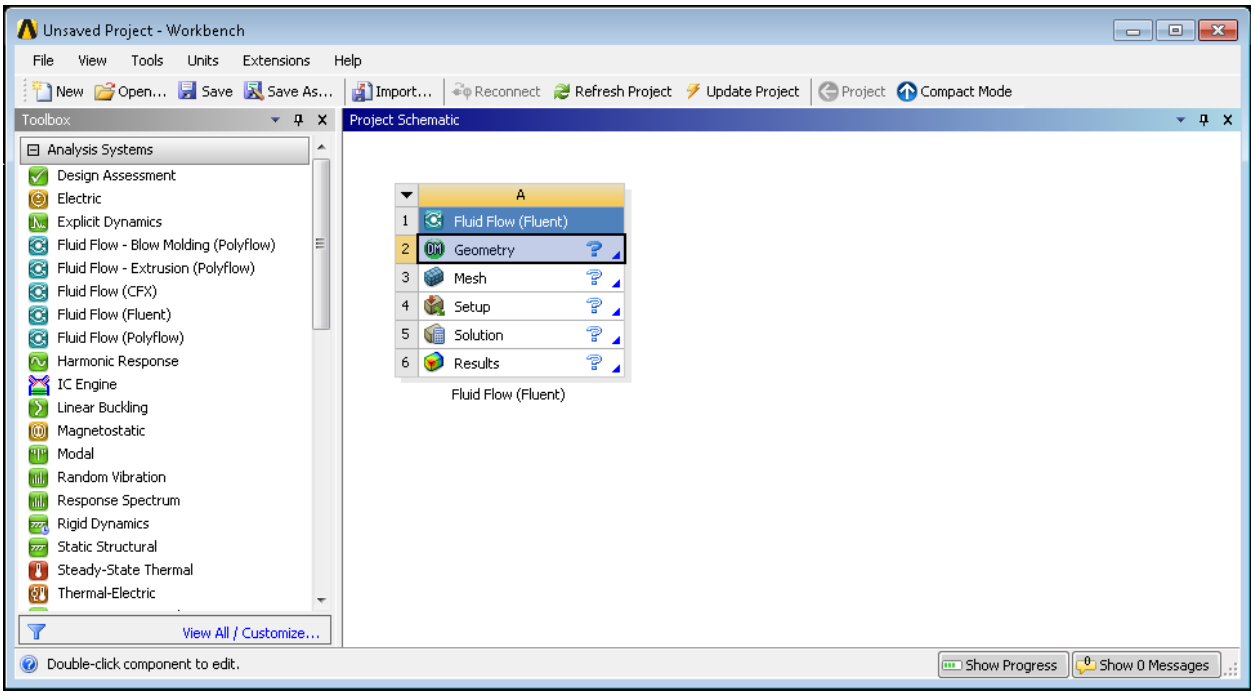
ME 412 – Numerical Thermo-Fluid Dynamics

FLUENT Lab Exercise 01 – Geometry

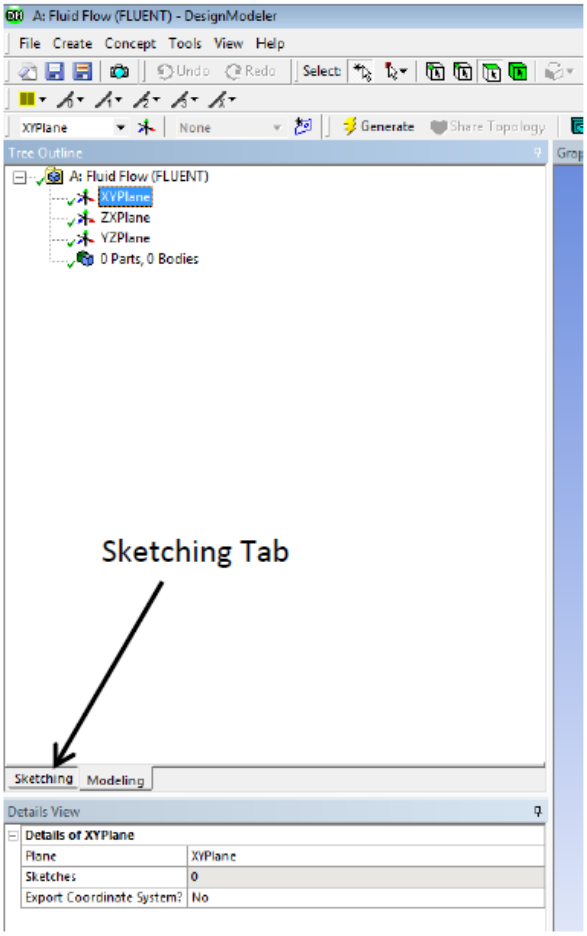
Create a new project in the Workbench. Double click “Fluid Flow (FLUENT)” to load a fluid flow project. Double click “Geometry” to launch the DesignModeler module and start generating a domain. Select length unit as needed.

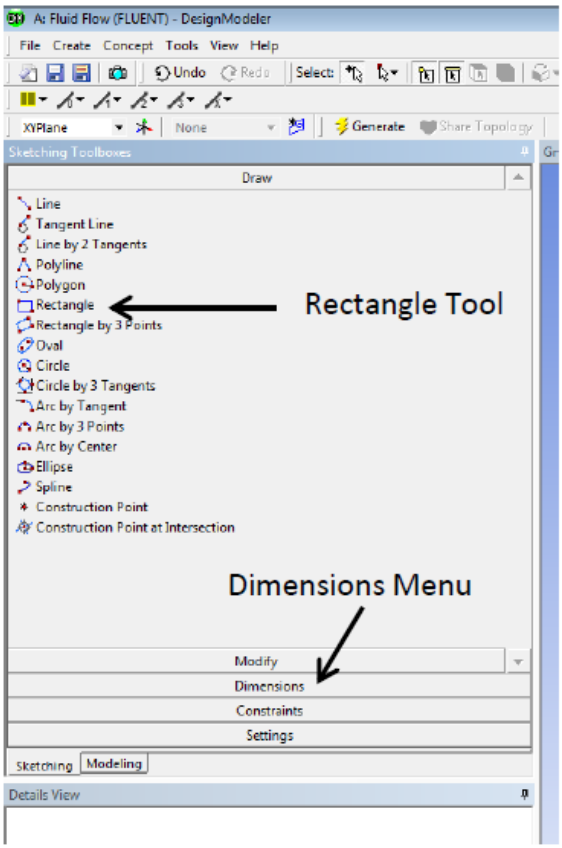


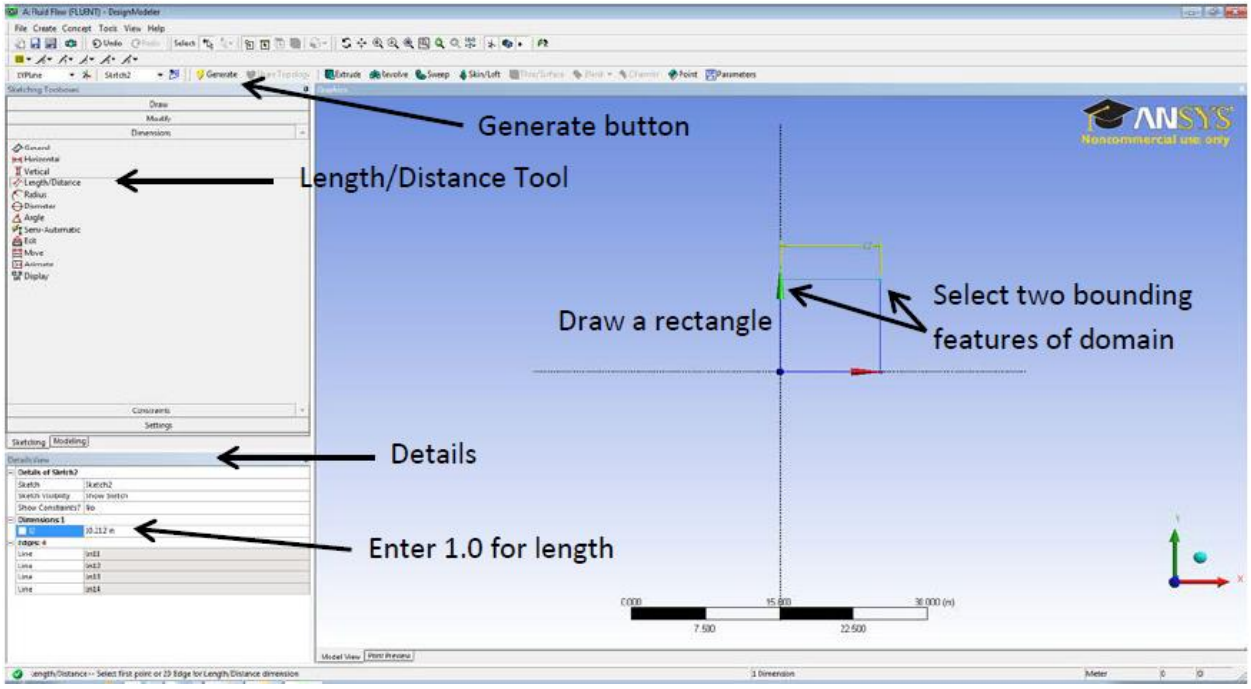
Creating a 2D Sketch

In the Tree Outline, right-click on the XYPlane object and select “Look At”  . Then, select the Sketching tab at the bottom of the Tree Outline. Select the Rectangle tool and draw a rectangle on the XYPlane by clicking two points on the sketch area.

Next open the Dimensions menu and apply a “Length/Distance” dimension to two of the edges of the domain. Select the two edges that bound the vertical sides of the domain and in the Details enter in any length of your choice. Repeat for the horizontal sides of the domain. Select the “Generate” button when finished.


A: Fluid Flow (FLUENT) - DesignModeler
File Create Concept Tools View Help
Undo Redo Select:
XYPlane None Generate Share Topology
Tree Outline
A: Fluid Flow (FLUENT)
XYPlane
ZXPlane
YZPlane
0 Parts, 0 Bodies
Sketching Tab
Sketching Modeling
Details View
Details of XYPlane
Plane XYPlane
Sketches 0
Export Coordinate System? No


A: Fluid Flow (FLUENT) - DesignModeler
File Create Concept Tools View Help
Undo Redo Select:
XYPlane None Generate Share Topology
Sketching Toolboxes
Draw
Line
Tangent Line
Line by 2 Tangents
Polyline
Polygon
Rectangle
Rectangle by 3 Points
Oval
Circle
Circle by 3 Tangents
Arc by Tangent
Arc by 3 Points
Arc by Center
Ellipse
Spline
Construction Point
Construction Point at Intersection
Rectangle Tool
Dimensions Menu
Modify
Dimensions
Constraints
Settings
Sketching Modeling
Details View


Generate button
Length/Distance Tool
Draw a rectangle
Select two bounding features of domain
Details
Enter 1.0 for length
ANSYS
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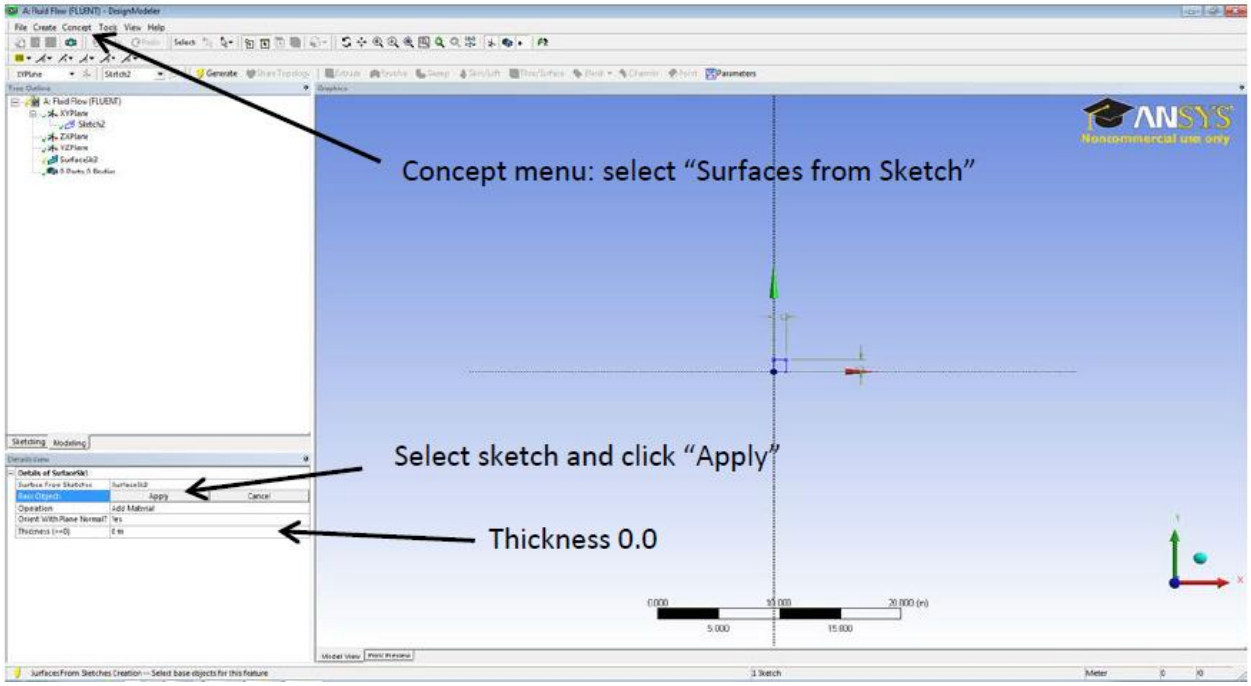
The “Zoom to Fit”  button on the top toolbar will keep the domain in view.

Creating a 2D Domain

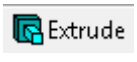
Click the Modeling tab. In the main menu, select the “Concept” menu and “Surfaces from Sketch” option underneath it. With only one sketch in the model tree, the program should default to the sketch that you drew, but if not, select your sketch in the model tree and click the “Apply” button that appears in the Details. Ensure that the thickness is zero, and click the “Generate” button above and to the left of the Graphics window. Your domain will become shaded in gray.



Now you have successfully generated a domain. Expand the parts tree (now it should say “1 Part, 1 Body”) and select “Surface Body”; your domain will become shaded in yellow. In the Details, you can rename the domain, and toggle the Fluid/Solid option.

Experiment with other sketch tools and dimensions.

Creating a 3D Domain

Draw a new circular sketch on the XYPLANE. Go back to the Modeling tab. Find the “Extrude” tool 

in the Toolbar and click on it. Select the circular sketchin the model tree and click the “Apply” button. Enter the depth of the extrusion. Click Generate to finish the generation. Now you have just created a cylinder.

Experiment other creation tools.

Close the DesignModele. The geometry option in the Project Schematic should have a green checkmark now to indicate that the geometry is defined and up to date.