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Computer Applications in Mining Engineering

Lecture (4)

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Example 1 :This tutorial illustrates how to use CFD-Post to visualize a two dimensional laminar fluid flow. This tutorial demonstrates how to do the following:

- 1.1 Create a Working Directory
- 1.2 Launch CFD-Post
- 1.3 Display the Solution in CFD-Post
- 1.4 Save Your Work
- 1.5 Generated Files

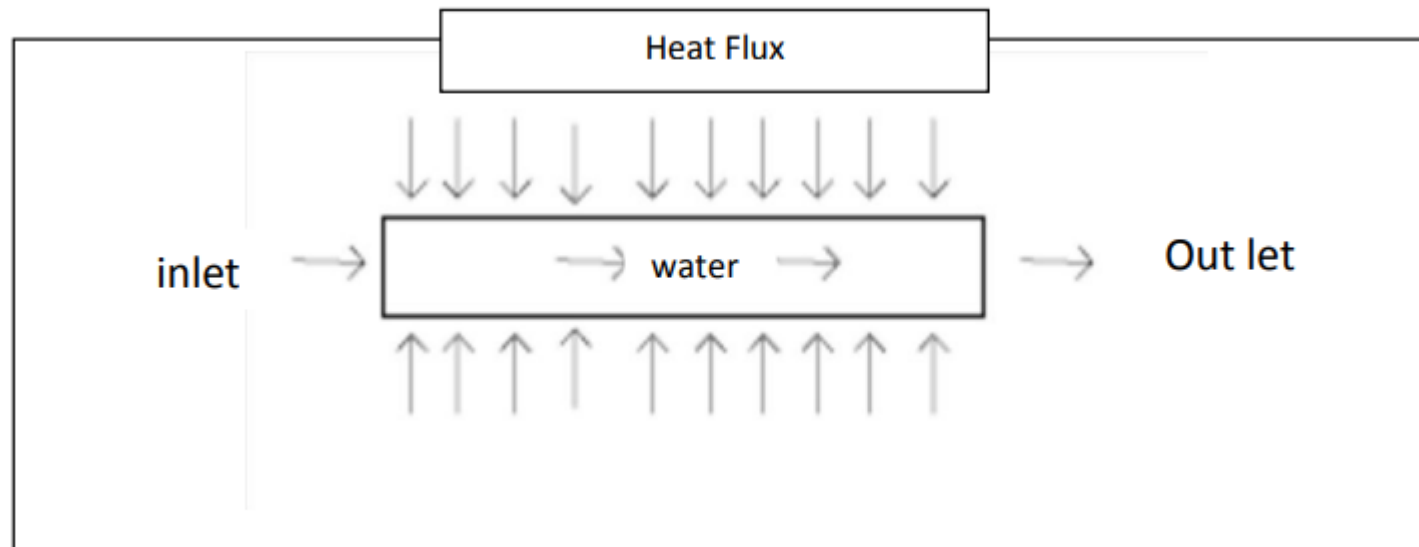
Problem Description

The problem to be considered is shown schematically in Figure below: A cold fluid at 25° C flows into the pipe through a large inlet. The pipe dimensions are in mm (200, 30 mm), but the fluid properties and boundary conditions are given in metric units. The Reynolds number for the flow at the larger inlet is 2,000, so the flow has been modeled as being laminar. The walls are exposed to a 300 W /m² heat flux.



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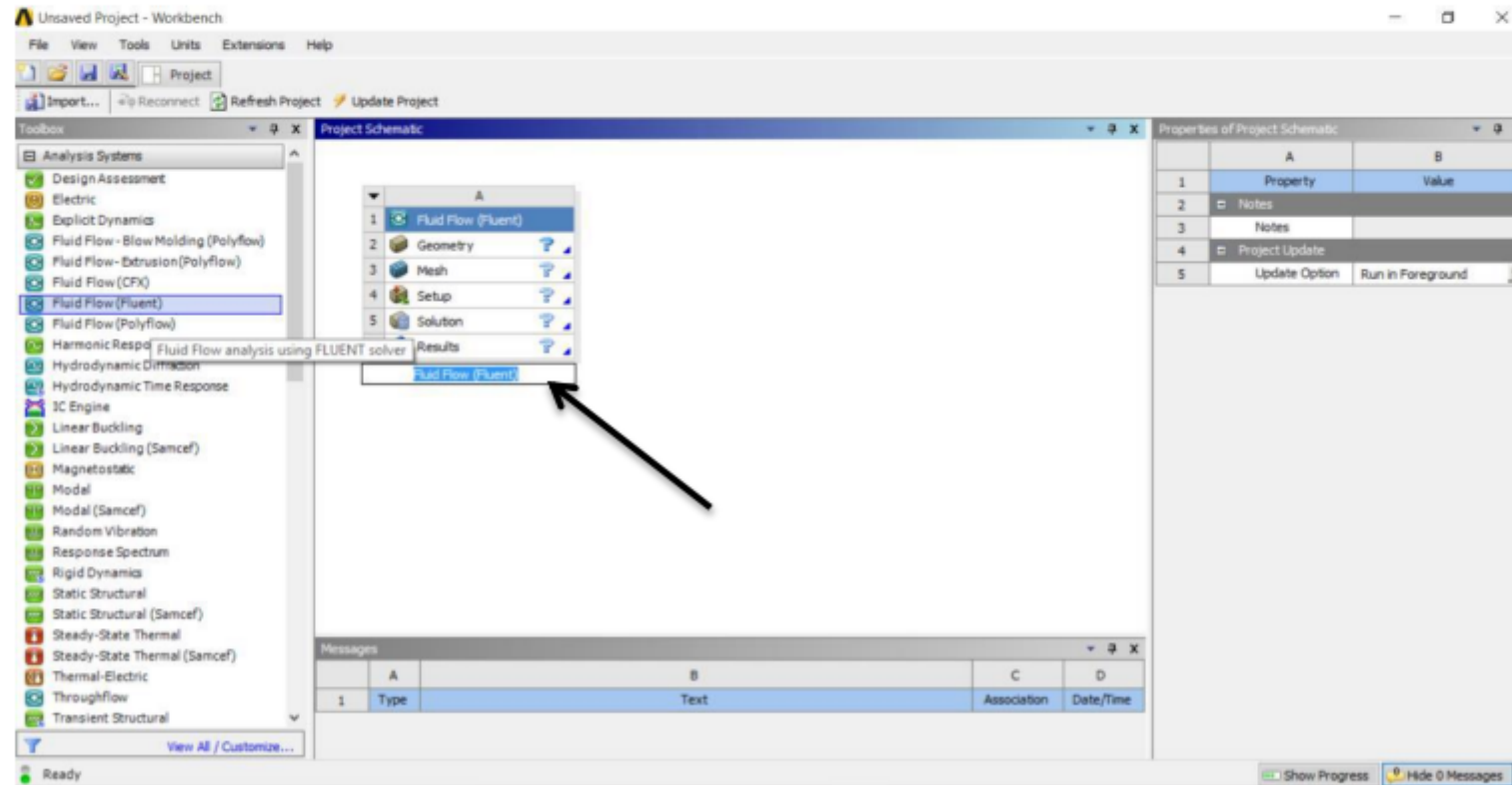
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SOLUTION:

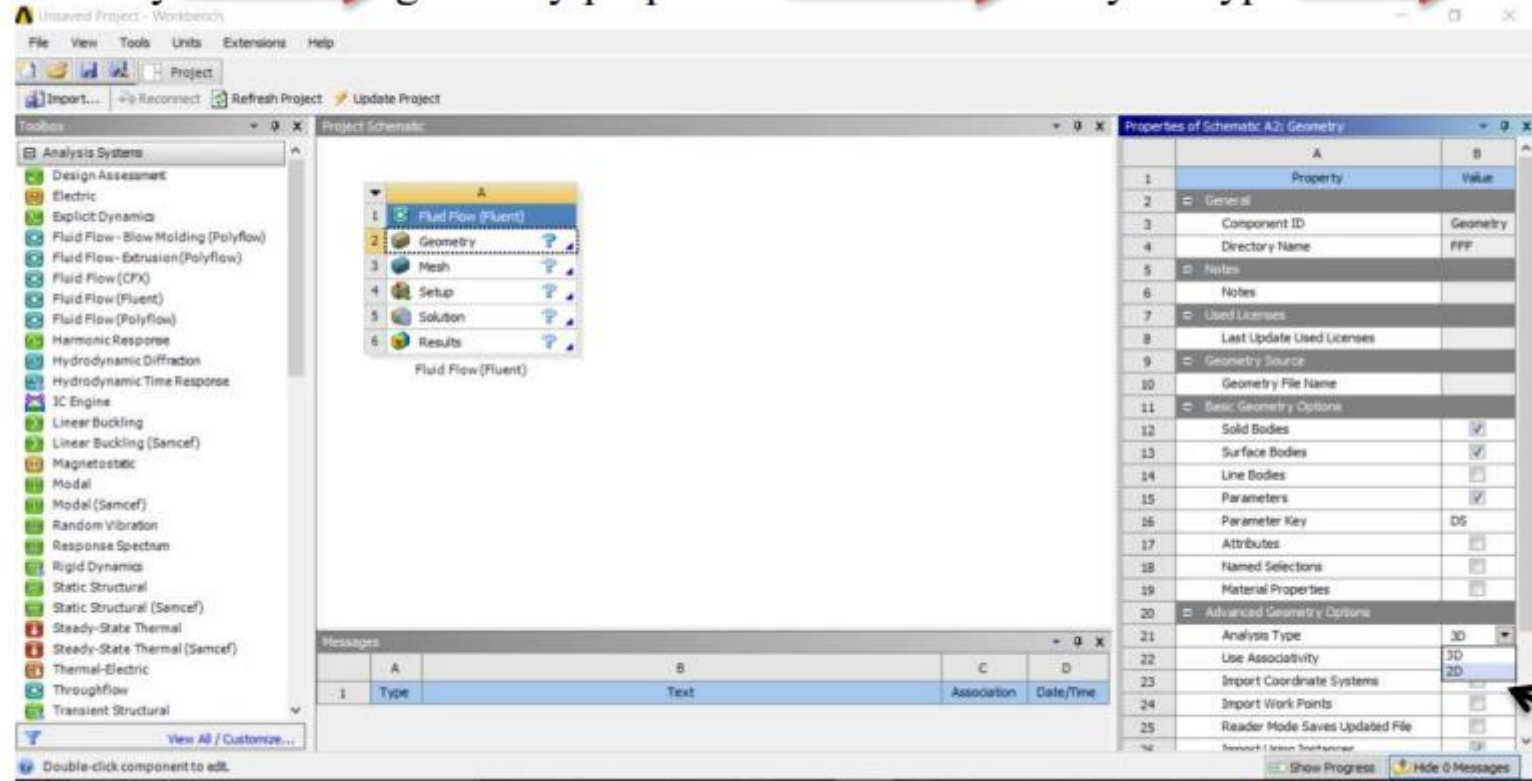
1- Analysis systems → fluid flow (fluent) → create name



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2- Geometry → geometry properties → Analysis Type → 2D



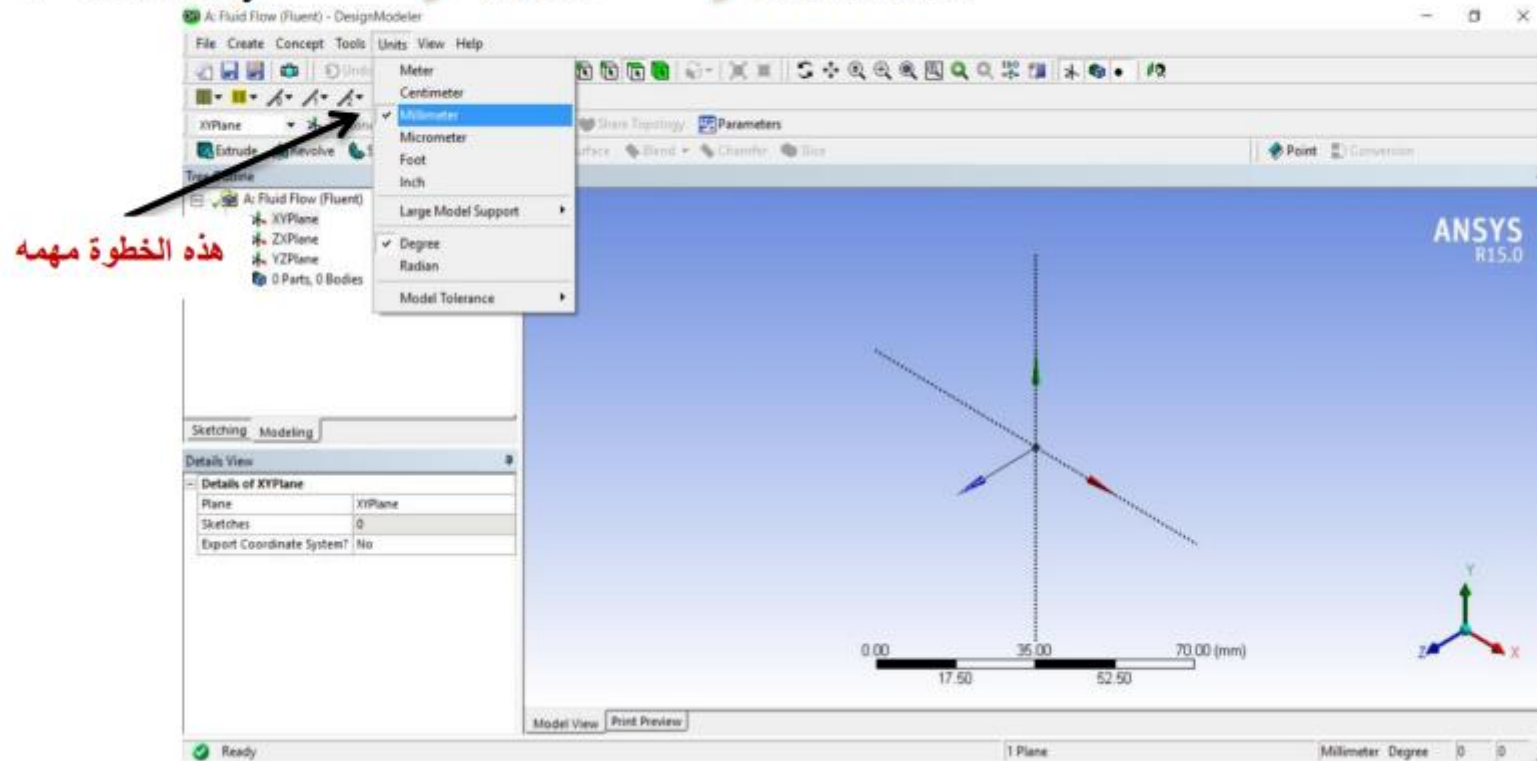
The screenshot shows the ANSYS Workbench interface. The 'Properties of Schematic A2: Geometry' panel is open, displaying various settings for the geometry component. The 'Analysis Type' is set to '2D', which is highlighted by a black arrow. The 'Geometry' component is selected in the Project Schematic, and the 'Fluid Flow (Fluent)' analysis system is chosen from the Analysis Systems list.

Property	Value
Component ID	Geometry
Directory Name	FFF
Notes	
Used Licenses	
Last Update Used Licenses	
Geometry Source	
Geometry File Name	
Basic Geometry Options	
Solid Bodies	☒
Surface Bodies	☒
Line Bodies	☐
Parameters	☒
Parameter Key	DS
Attributes	☐
Named Selections	☐
Material Properties	☐
Advanced Geometry Options	
Analysis Type	2D
Use Associativity	3D
Import Coordinate Systems	☐
Import Work Points	☐
Reader Mode Saves Updated File	☐
Report Units	☐

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3- Geometry → units → millimeters

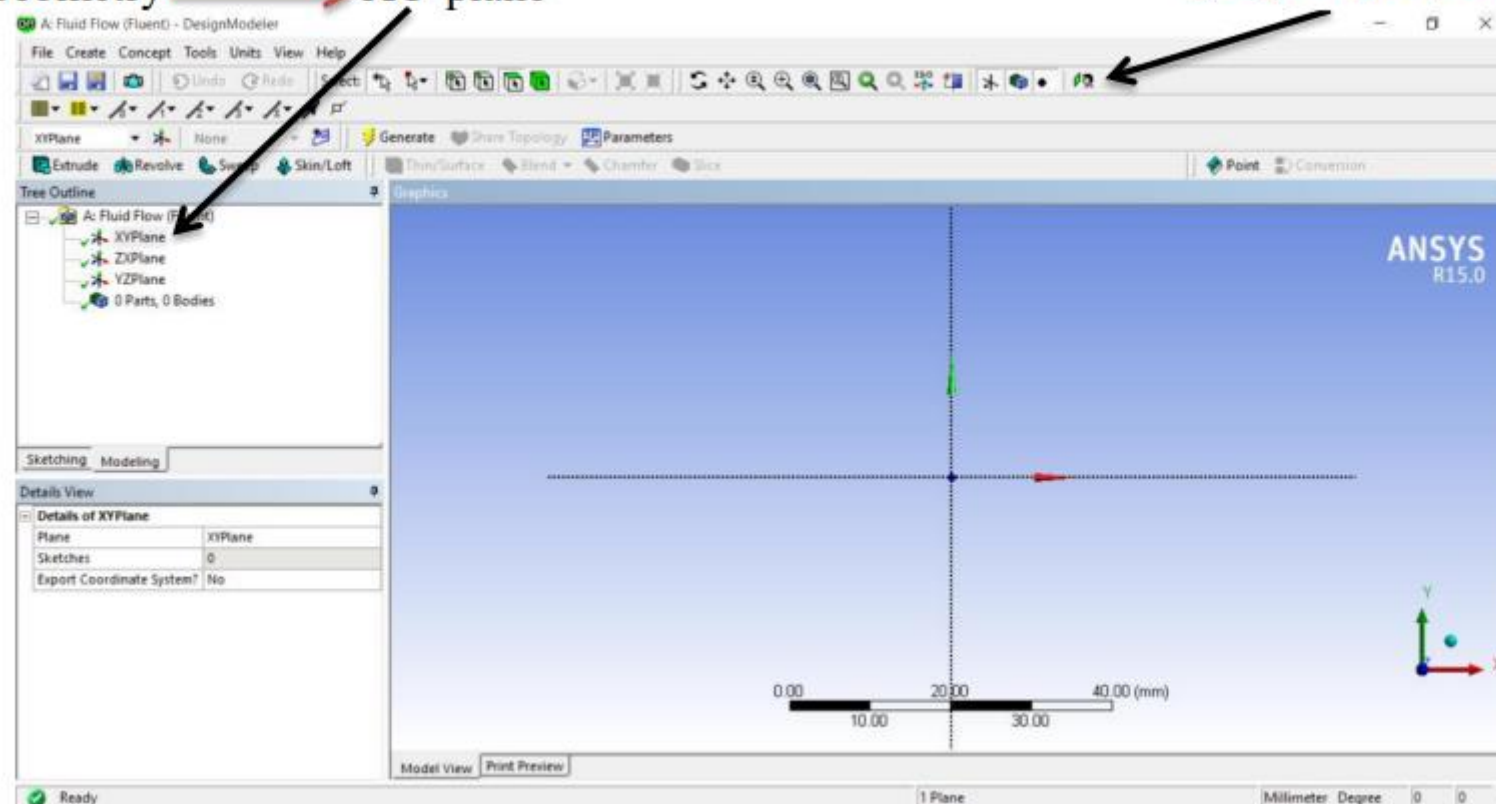


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4- Geometry → XY-plane

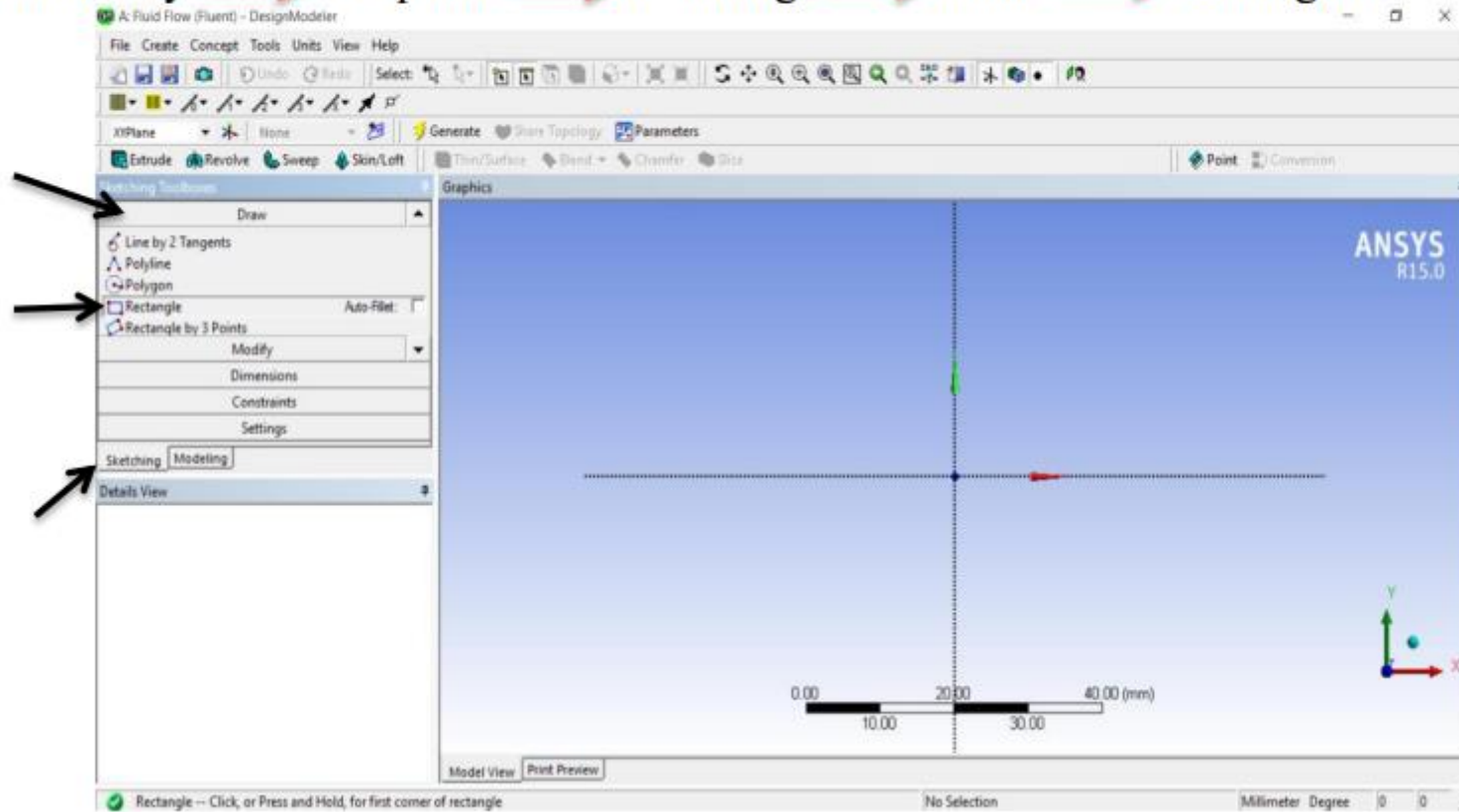
نحول الاحداثيات الى احداثي ثنائي



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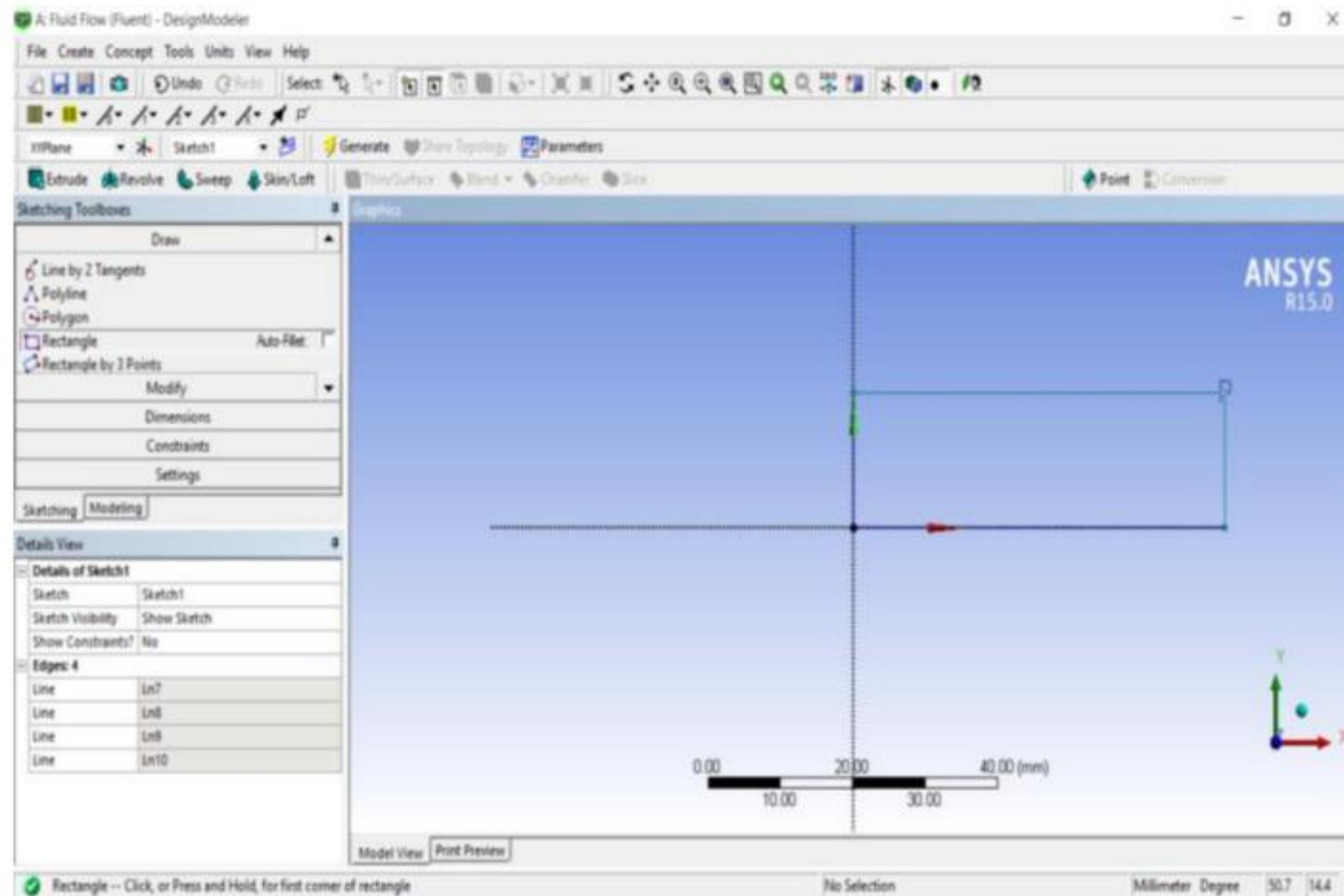
5- Geometry → XY-plane → Sketching → Draw → Rectangular





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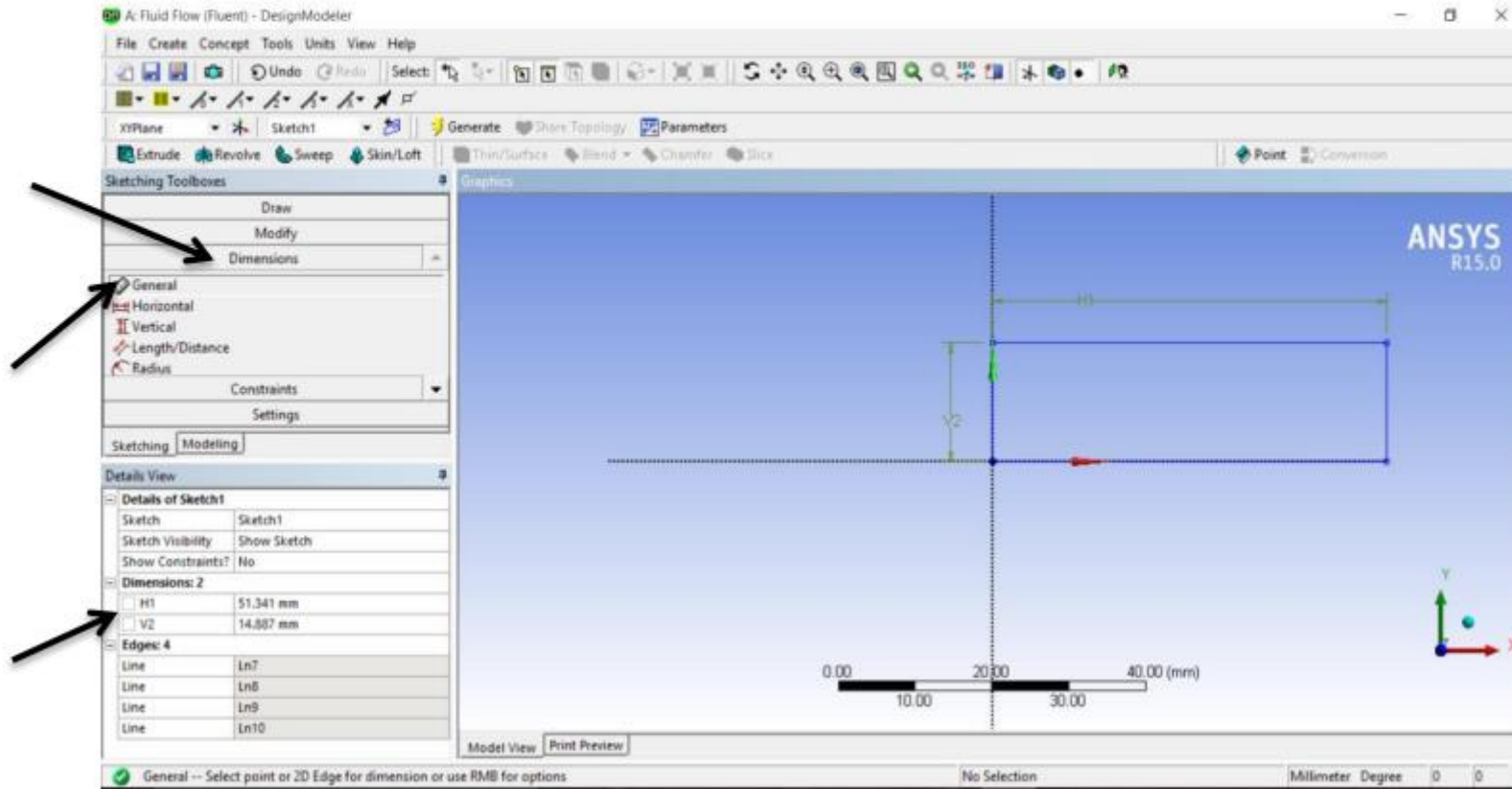
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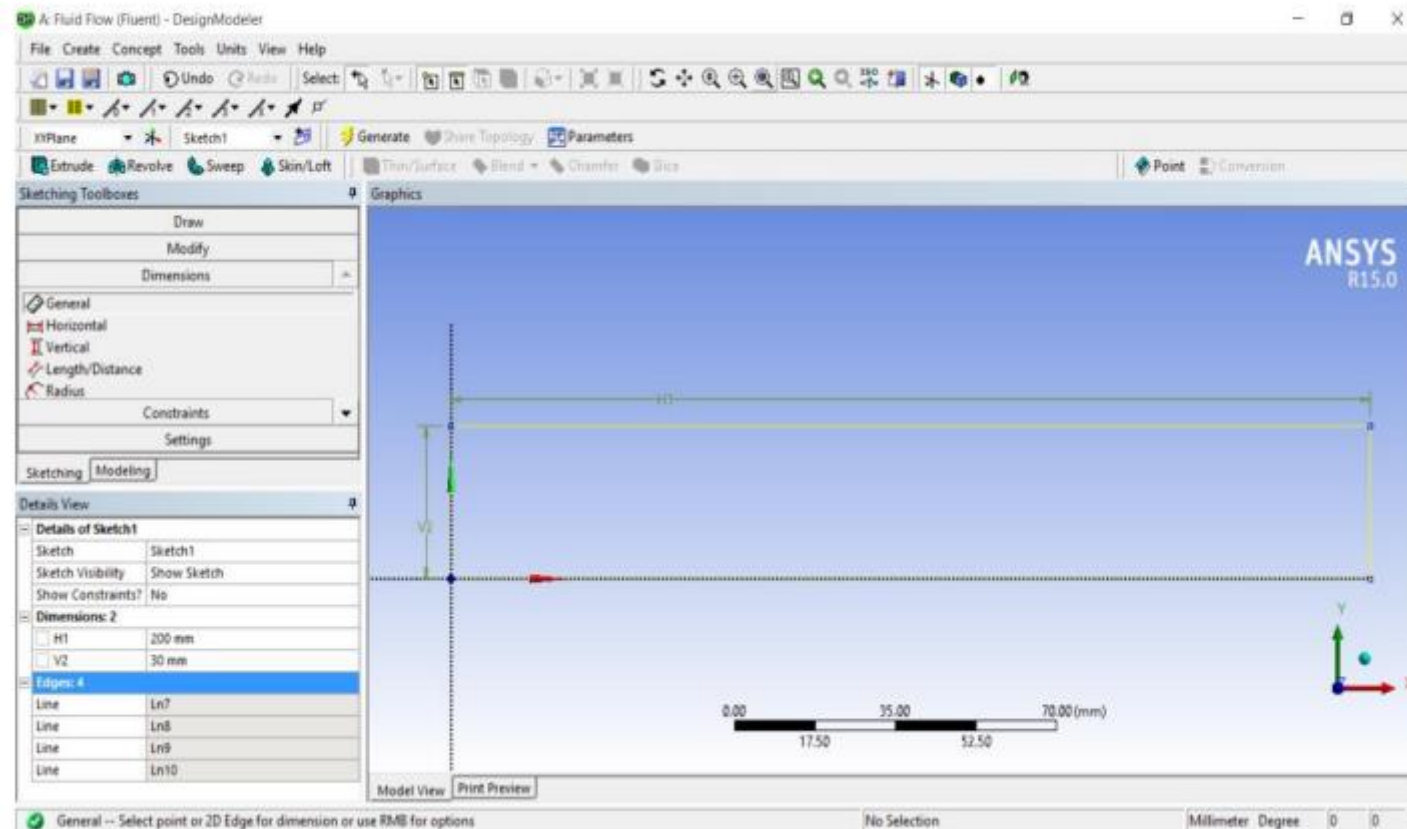
6- Geometry → XY-plane → Sketching → Dimensions → General





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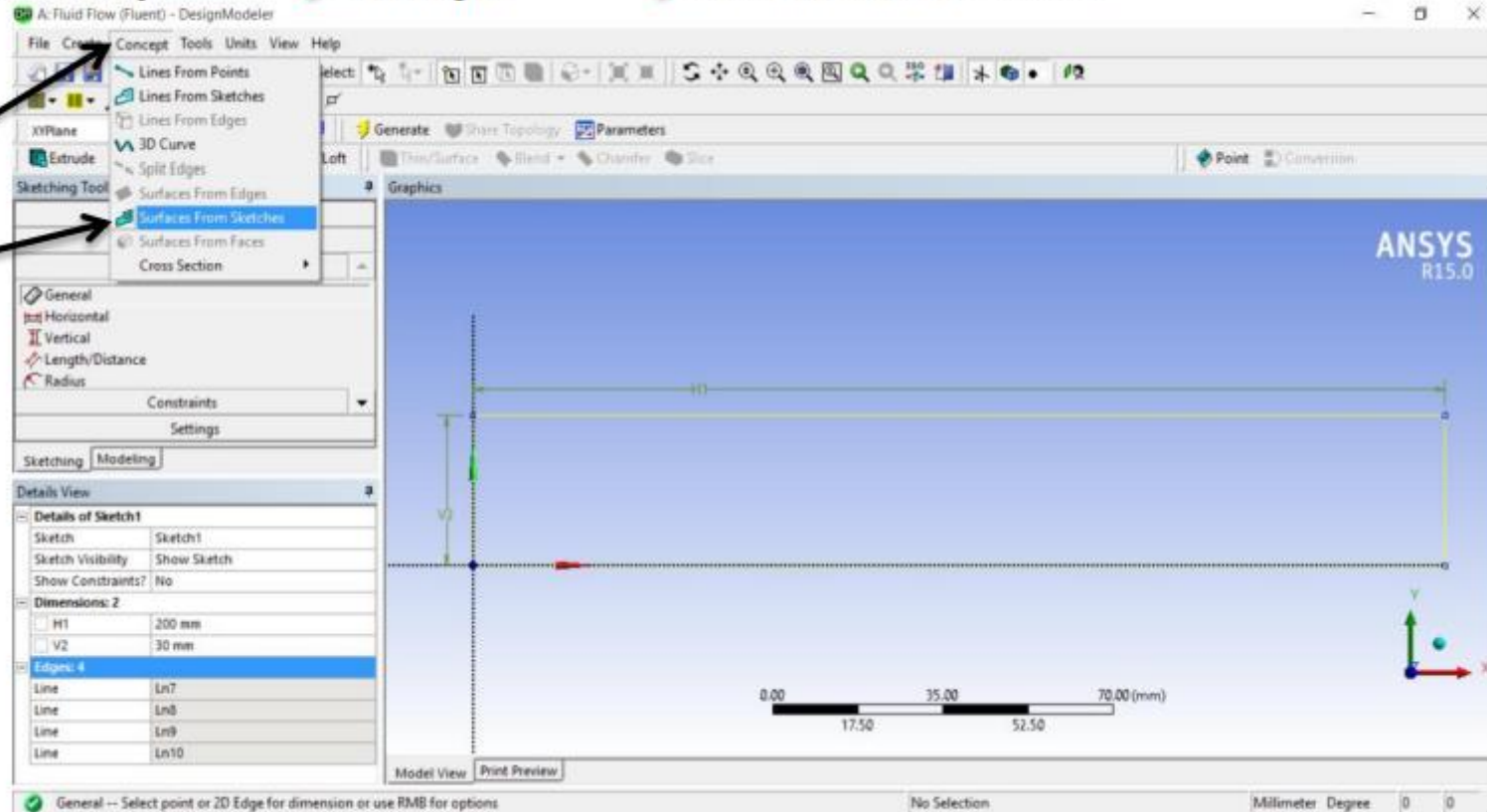
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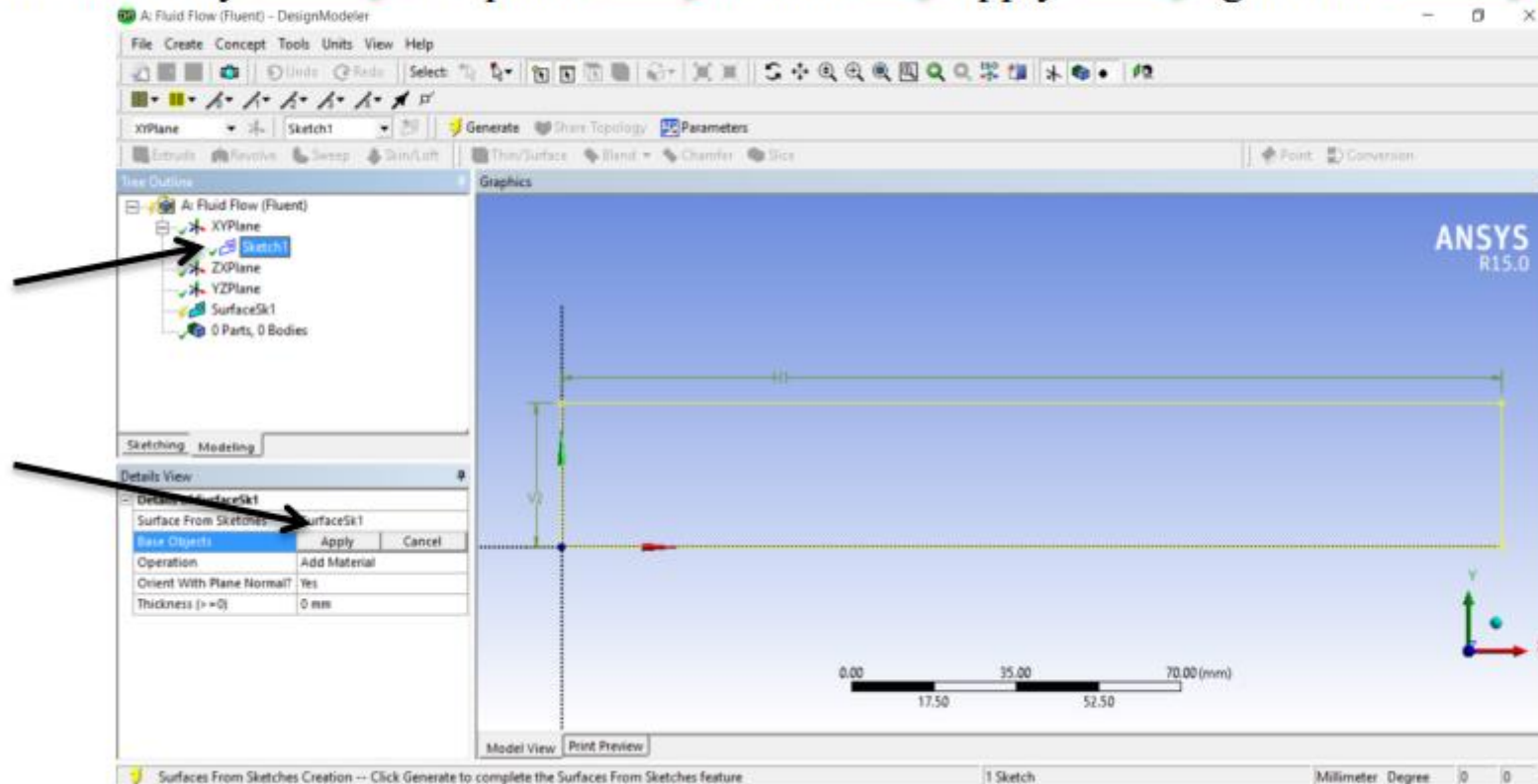
7- Geometry → concept → surface from sketches



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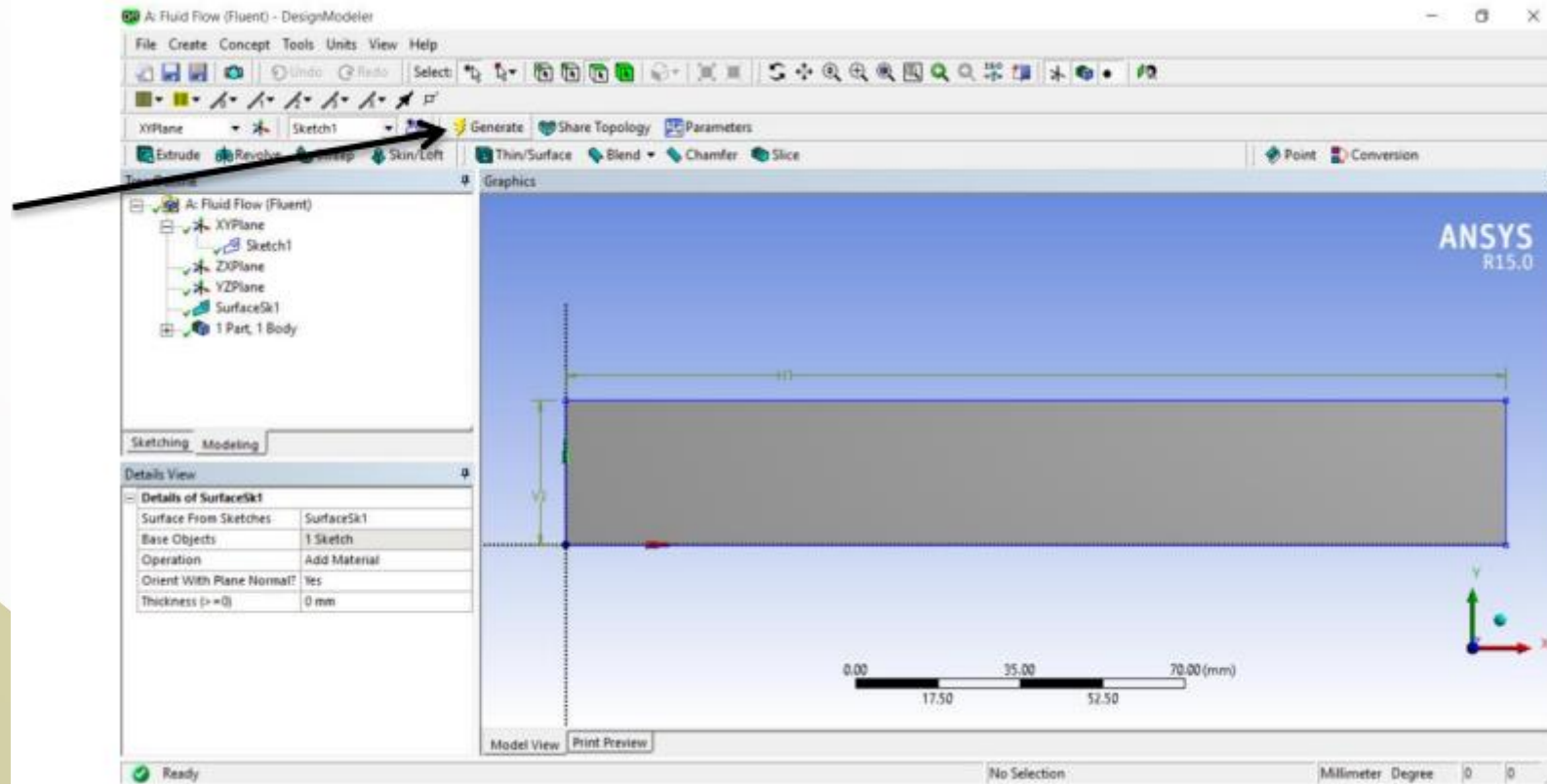
8- Geometry → XY-plane → sketch1 → apply → generate → close





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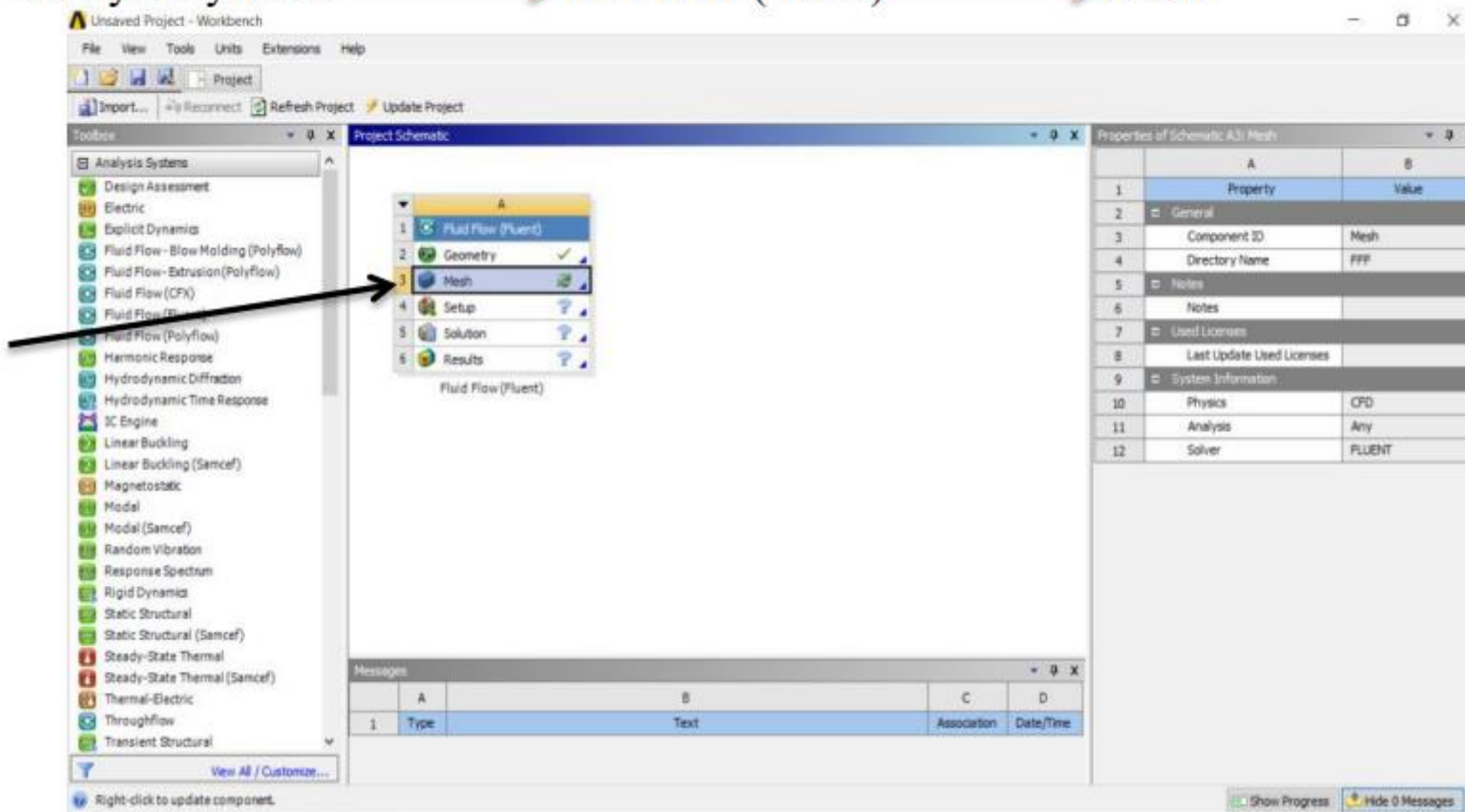
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9- Analysis systems → fluid flow (fluent) → Mesh



The screenshot shows the ANSYS Workbench interface. On the left, the 'Toolbox' contains various analysis systems. In the center, the 'Project Schematic' shows a sequence of steps: 1. Fluid Flow (Fluent), 2. Geometry, 3. Mesh, 4. Setup, 5. Solution, and 6. Results. A black arrow points from the 'Mesh' step in the schematic to the 'Properties of Schematic A3: Mesh' panel on the right.

Properties of Schematic A3: Mesh

	A	B
1	Property	Value
2	General	
3	Component ID	Mesh
4	Directory Name	FFF
5	Notes	
6	Notes	
7	Used Licenses	
8	Last Update Used Licenses	
9	System Information	
10	Physics	CFD
11	Analysis	Any
12	Solver	FLUENT

Messages

	A	B	C	D
1	Type	Text	Association	Date/Time

Right-click to update component.

Show Progress Hide 0 Messages



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