

The background of the slide features a large, stylized, 3D-rendered letter 'A' in shades of orange and yellow. The 'A' is composed of several overlapping, curved segments, giving it a dynamic, architectural feel. Behind the 'A' and the text, there is a light gray grid pattern. A large, faint, light gray circle is also visible in the background, centered behind the text area.

AUTODESK **INVENTOR** Trial Projects

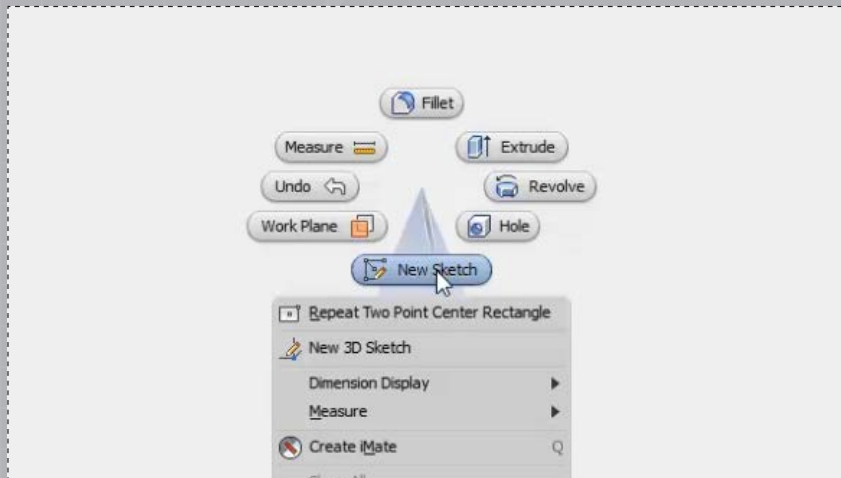
Frame Generator

Design a structural frame for a robot

PART 1: FRAME GENERATOR

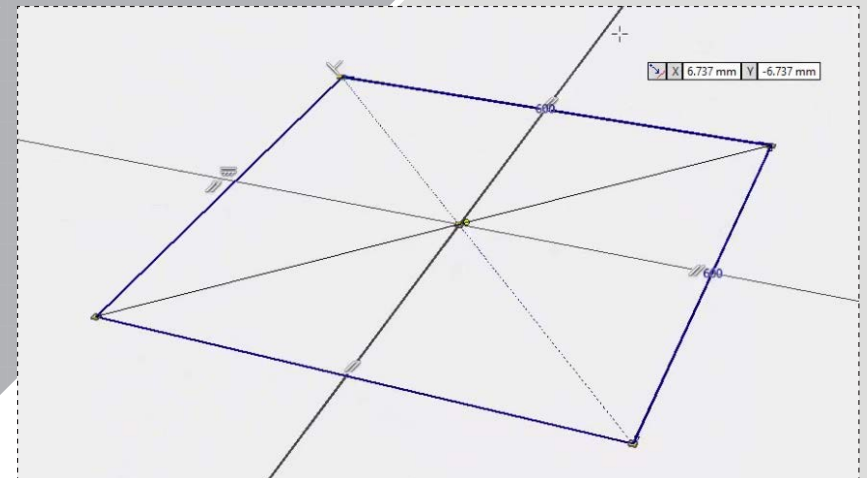
page: 2

1.



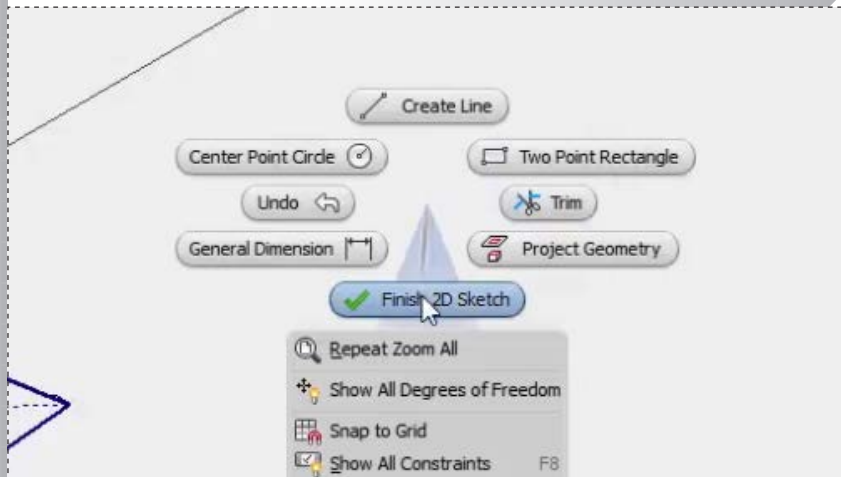
Within a new part file, begin a 'New Sketch' on the XZ Plane.

2.



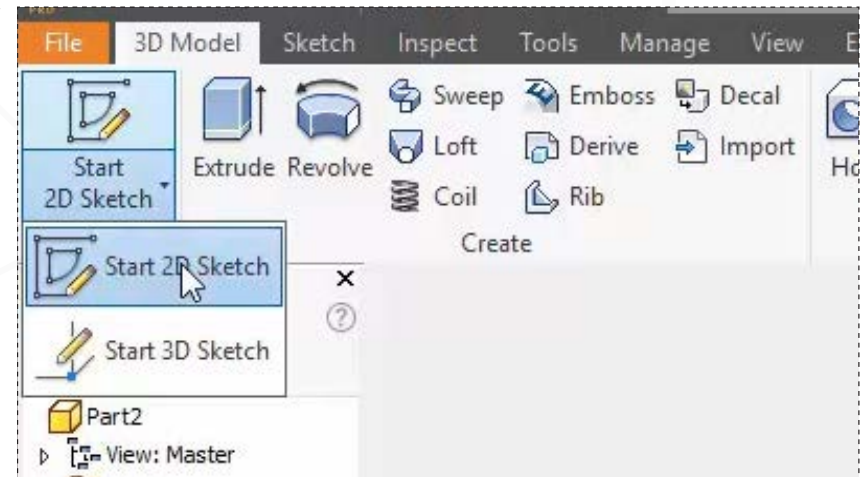
Activate the 'Centerpoint Rectangle' tool, and then sketch a rectangle, centered at the origin, 600mm x 600mm.

3.



Select 'OK' from the marking menu, and then select 'Finish 2D Sketch'.

4.

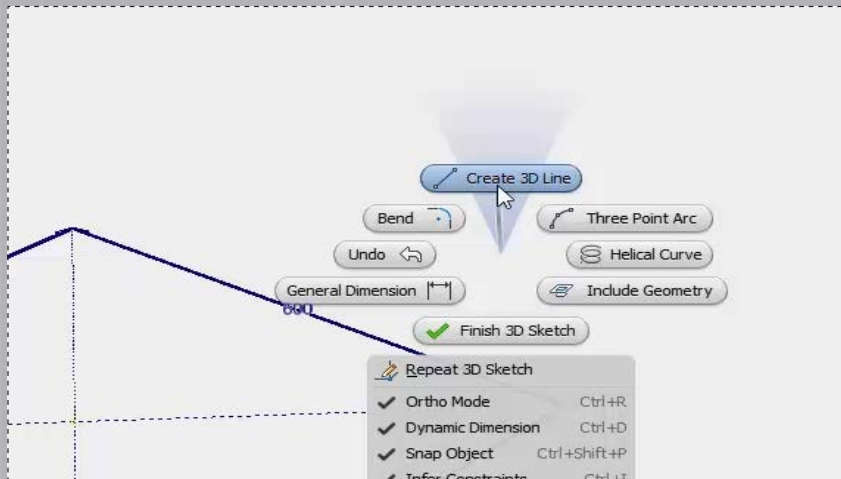


Click 'Start 3D' sketch from the 'Sketch' panel.

PART 1: FRAME GENERATOR

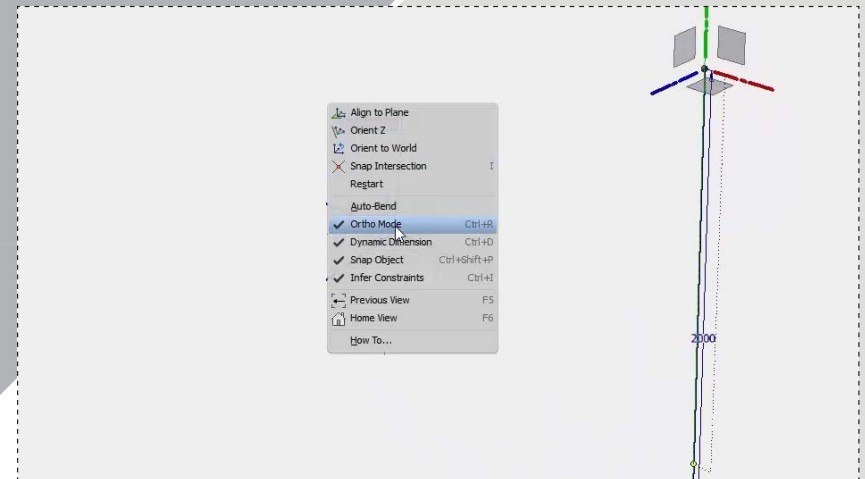
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5.



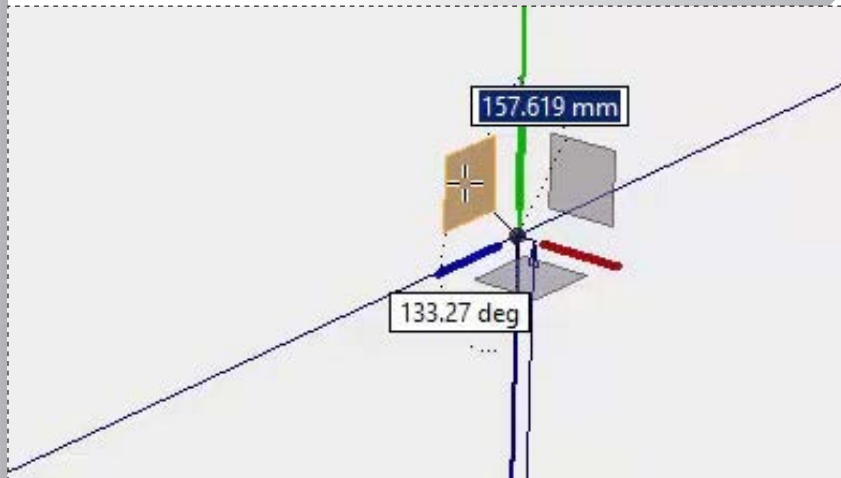
Start the sketch by selecting 'Create 3D Line' from the marking menu.

6.



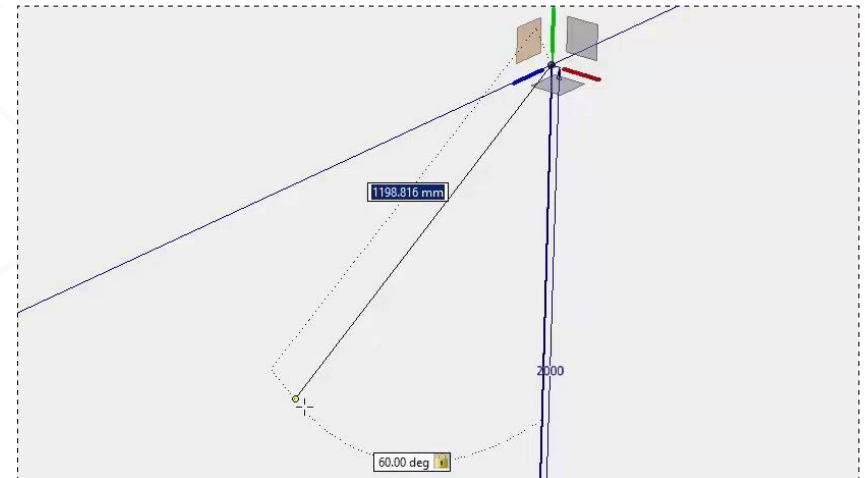
Ensure 'Ortho Mode' is checked, and then sketch a line upward as shown at 2000mm.

7.



Continuing the 'Line' command, uncheck 'Ortho Mode', and then select the planar face on the triad as shown to correctly orient the line.

8.

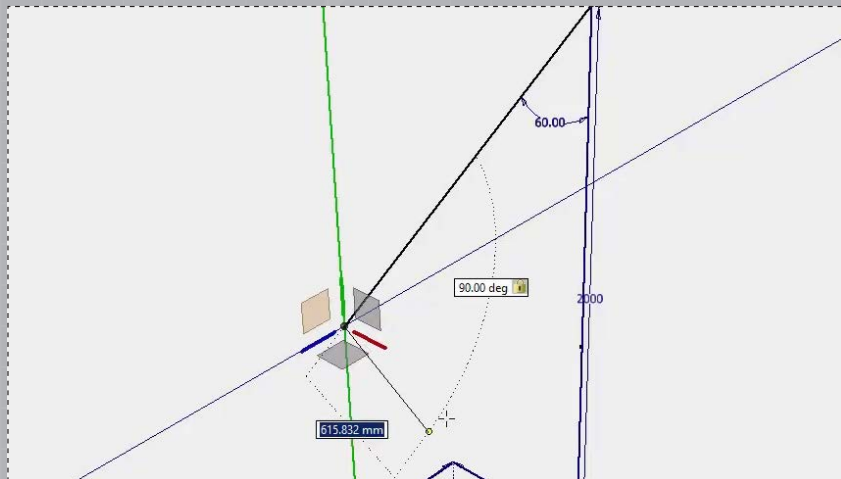


Sketch an angled line downward at 60°, roughly matching the length shown, and then press 'TAB' to lock in the value before creating your next line.

PART 1: FRAME GENERATOR

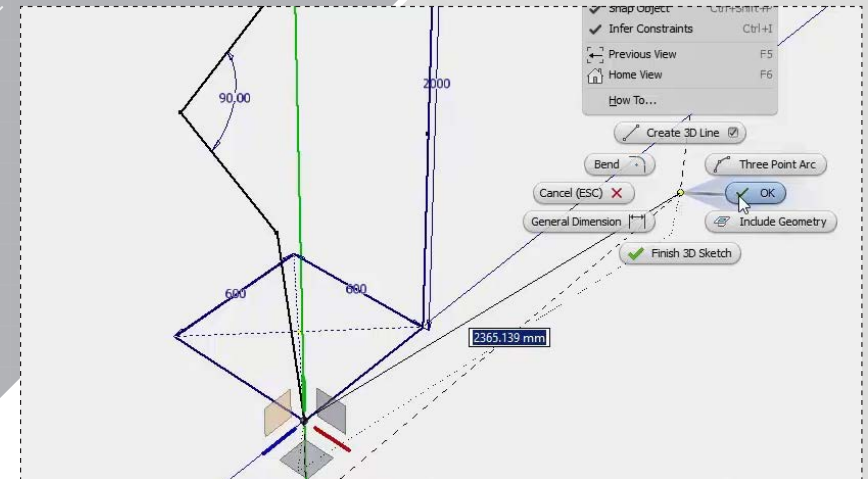
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9.



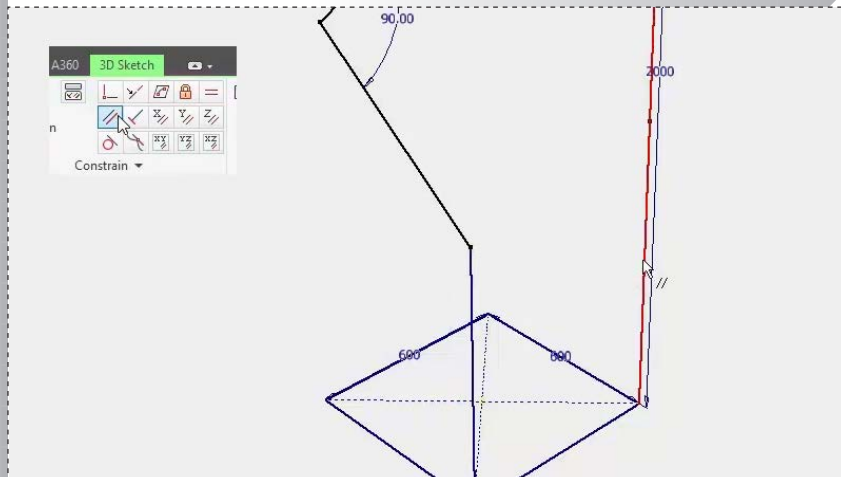
Sketch the next line 90° to the last line, and then click 'TAB' to lock in the value.

10.



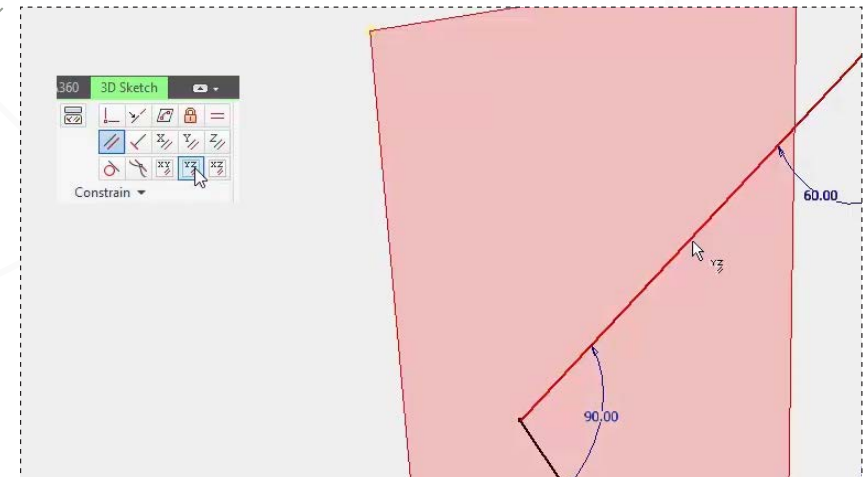
Sketch a final line, ending at the point shown on the 2D sketch, and then select 'OK' to complete the command.

11.



From the 'Constrain' panel, select the 'Parallel' constraint, applying it to the short line segment you just sketched and the long vertical segment.

12.

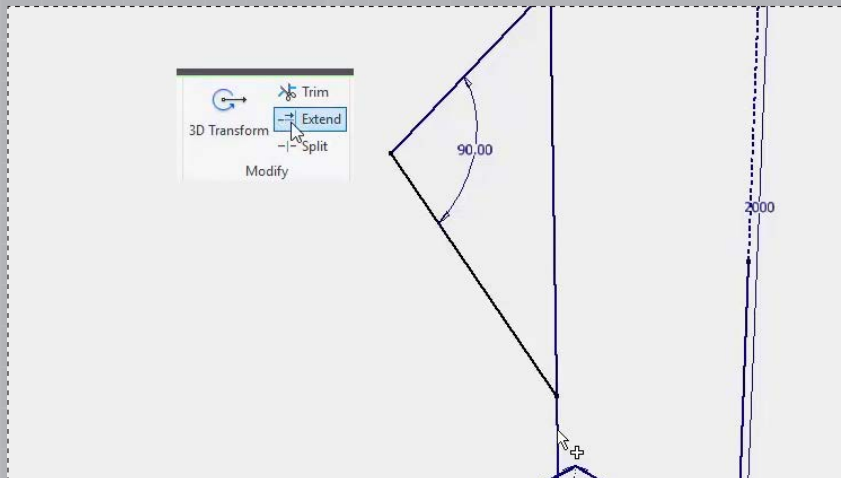


Select the 'Parallel to YX Plane' constraint and apply it to the upper line segment.

PART 1: FRAME GENERATOR

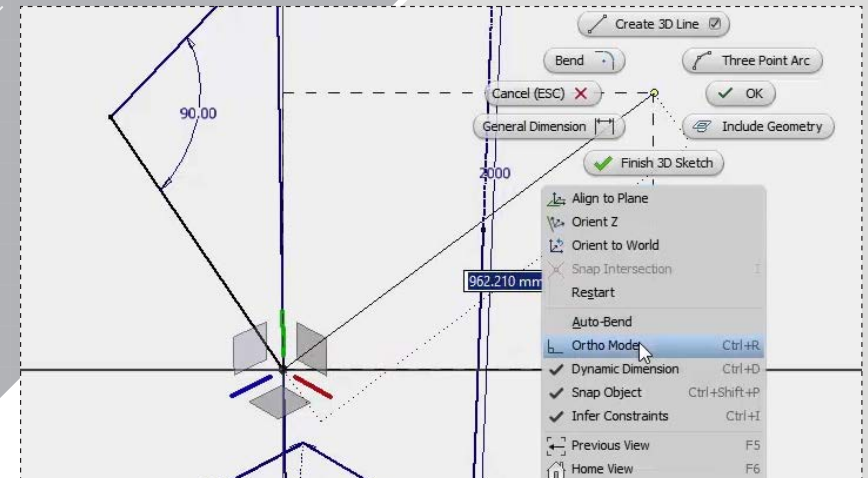
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13.



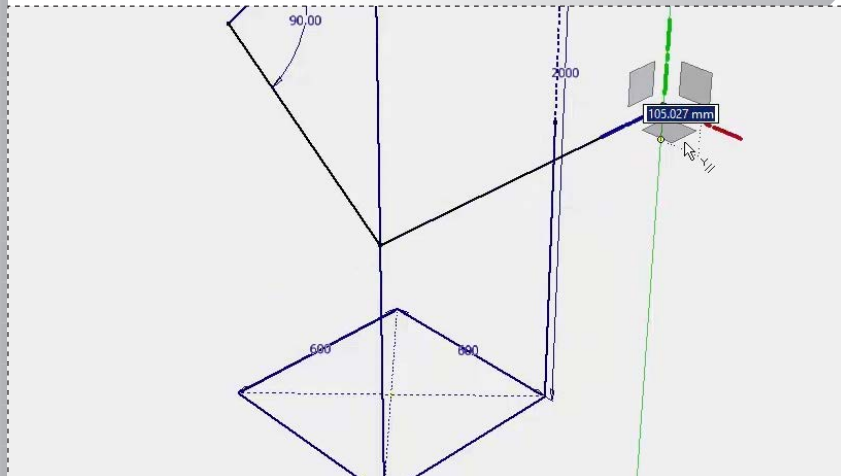
Activate 'Extend' from the 'Modify' panel and extend the line shown.

14.



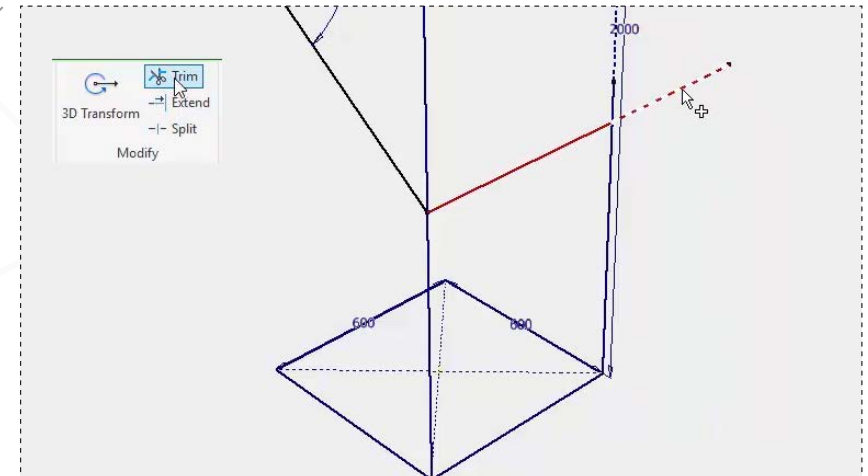
Begin sketching a new 3D Line at the point shown, and then check 'Ortho Mode'.

15.



Extend the line past the long vertical line and select a point for its end.

16.

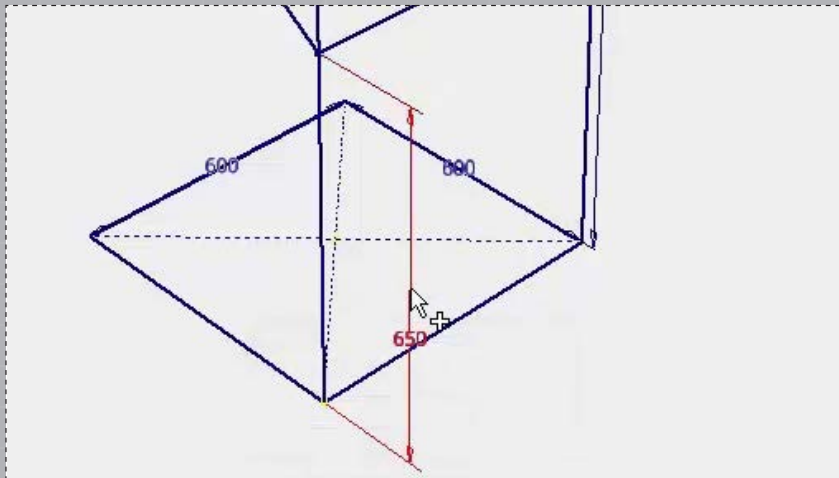


Select 'Trim' from the 'Modify' panel, and trim away the line overlap.

PART 1: FRAME GENERATOR

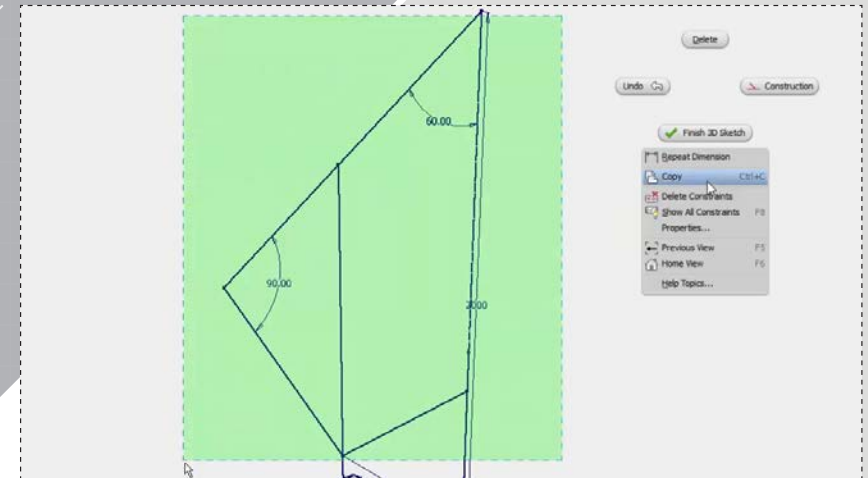
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17.



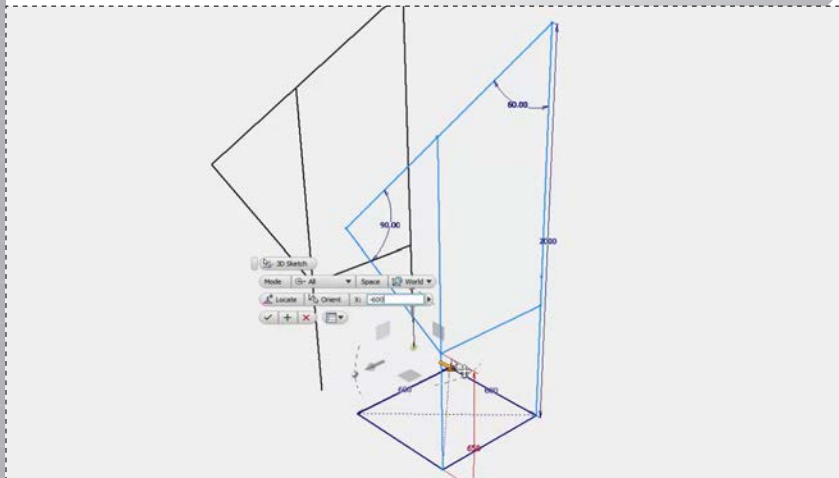
Create a 650mm dimension between the two endpoints shown to define the line's location, and then select 'OK' to complete the sketch.

18.



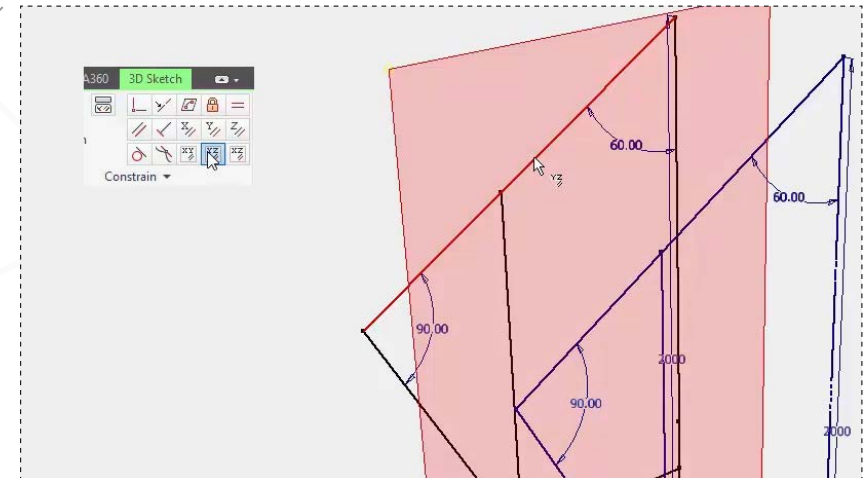
Use a crossing selection to select the 3D sketch geometry, and then 'Copy' it.

19.



Select 'Paste' to automatically activate the '3D Transform' command, and then enter a value of -600mm to locate the sketch.

20.

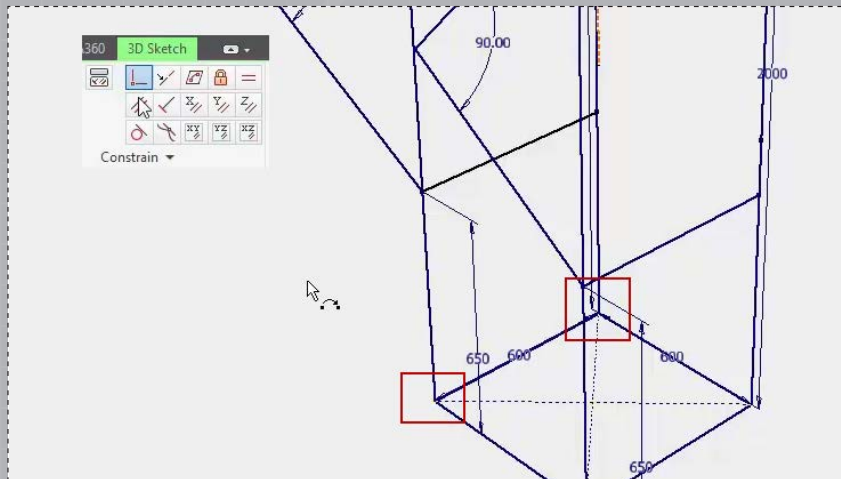


Apply a 'Parallel to YZ Plane' constraint to the copied geometry as shown. (If a constraint already exists, click 'Cancel' to exit the notification.)

PART 1: FRAME GENERATOR

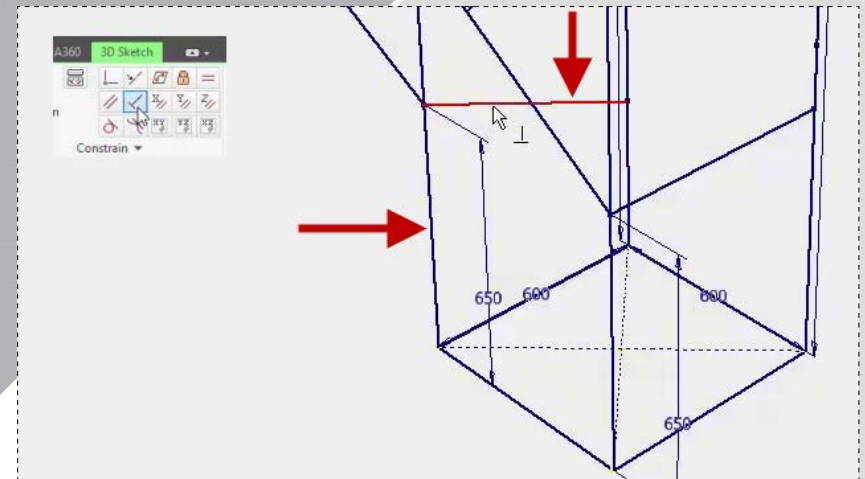
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21.



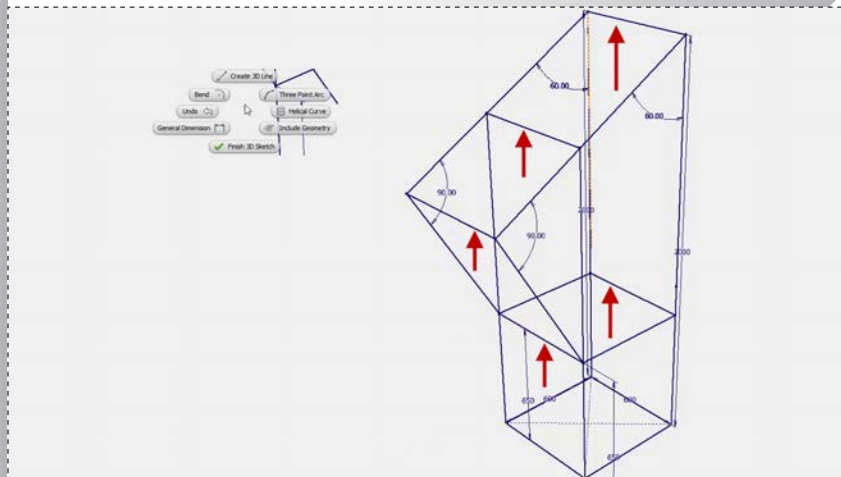
Add 'Coincident' constraints between the copied endpoints and the rectangle corners.

22.



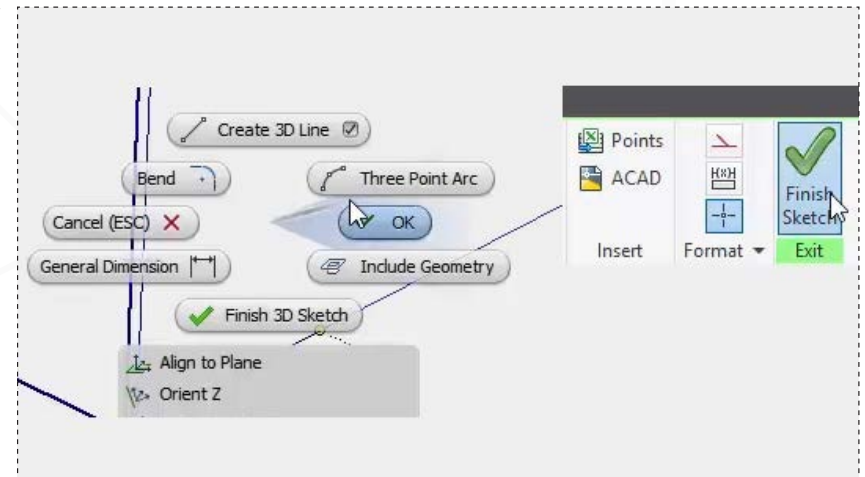
Complete the 3D sketch by adding a 'Perpendicular' constraint between the two copied segments shown.

23.



Using the 'Create 3D Line' command, create five individual line segments connecting the two sides as shown.

24.

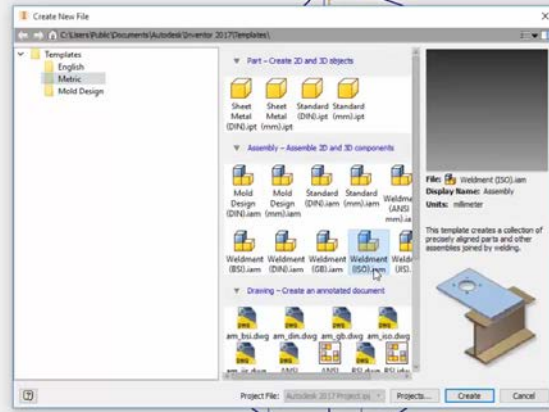


Select 'OK', and then click 'Finish Sketch' to complete the sketch. Save your progress to continue.

PART 2: FRAME GENERATOR

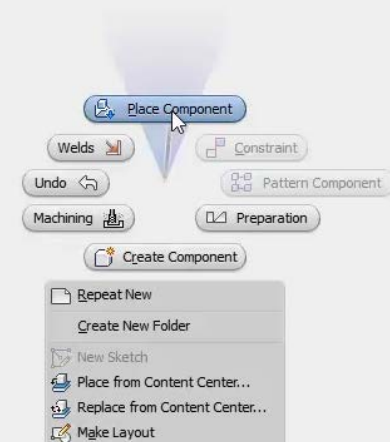
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25.



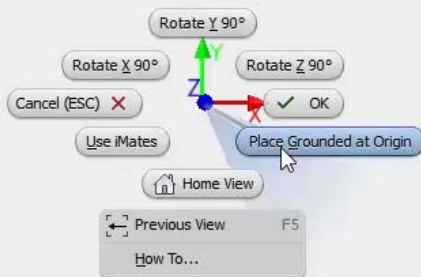
Create a new assembly file using the **Weldment (ISO).iam** template.

26.



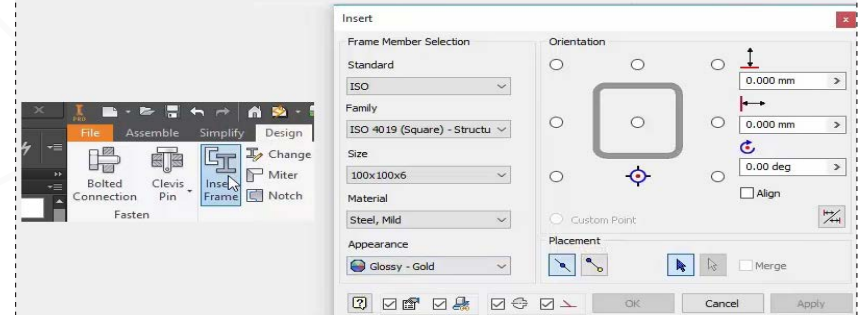
Select 'Place Component' on the marking menu and open your frame part file.

27.



Select 'Place Grounded at Origin', and then press 'ESC' to exit the place command. Save the assembly file to continue.

28.

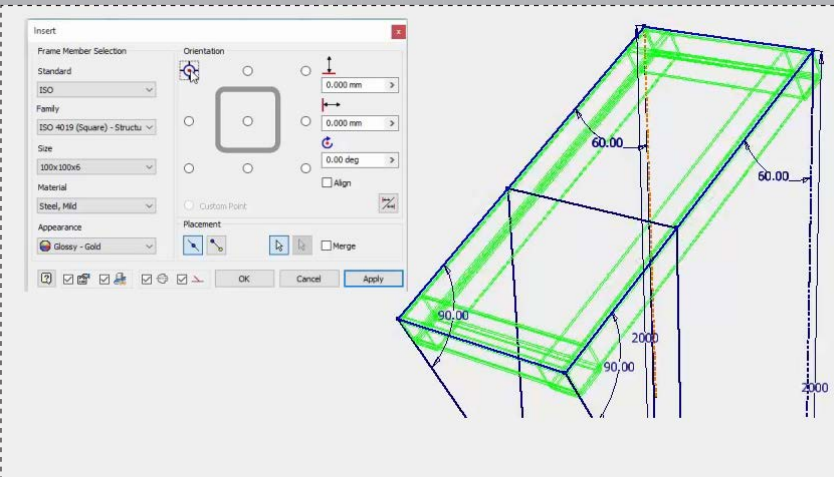


Activate 'Insert Frame' from the 'Design' tab on the ribbon, and then select the frame properties shown.

PART 2: FRAME GENERATOR

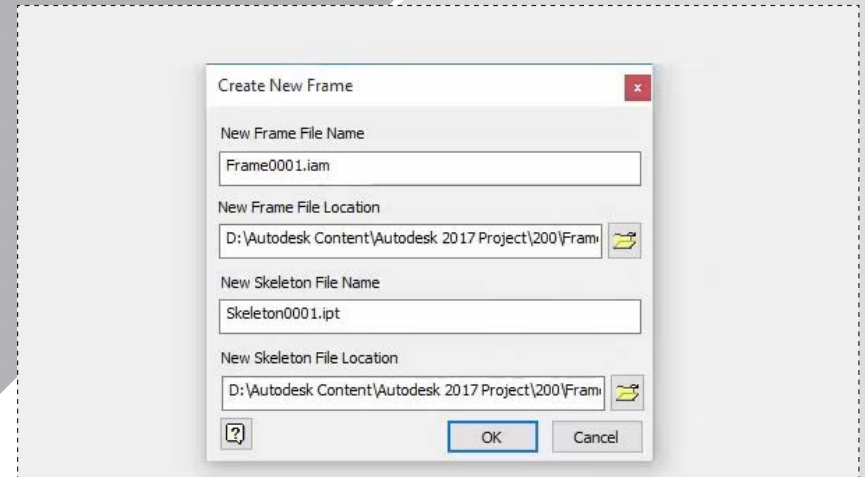
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29.



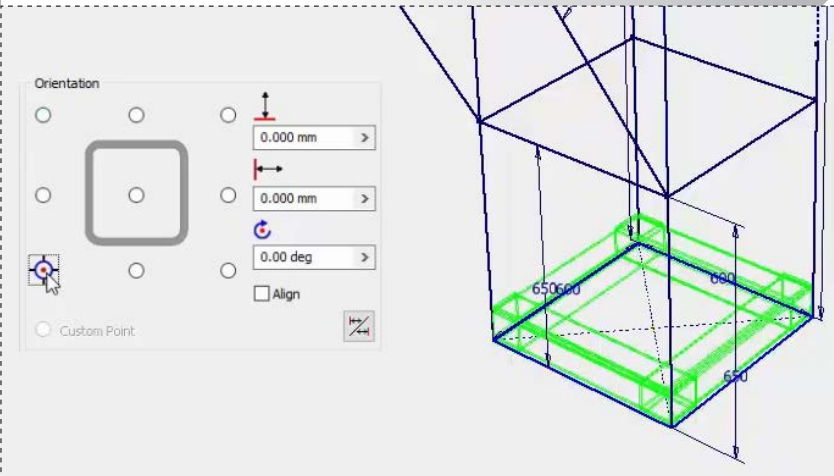
Apply four members to the upper section of the frame, ensuring the orientation is set so the members are applied inside, and below the selected segments.

30.



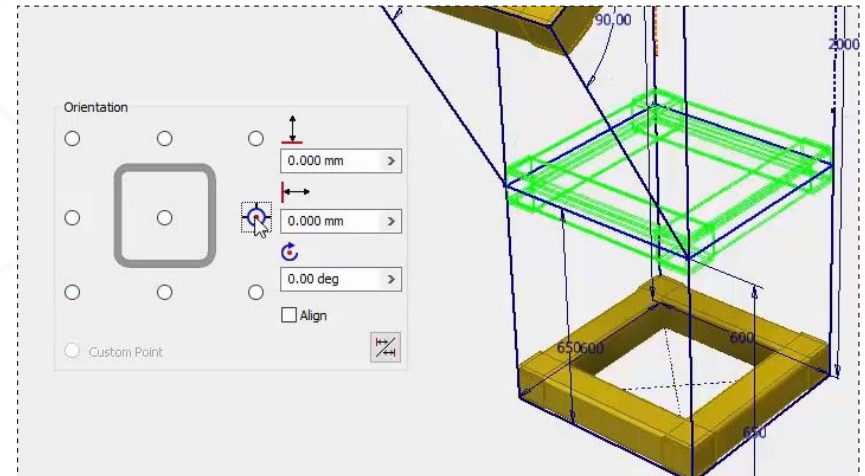
Click 'OK' twice to accept the part file names.

31.



Apply members to the bottom four segments, ensuring their placement is inside, and above the selections. Click 'OK' to accept the part naming.

32.

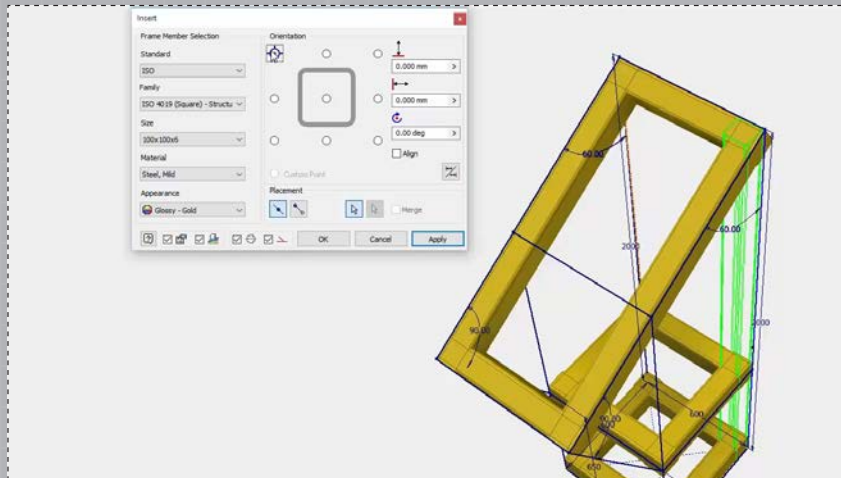


Apply members to the middle four segments, ensuring their placement is inside, and centered with your selections. Click 'OK' to accept the part naming.

PART 2: FRAME GENERATOR

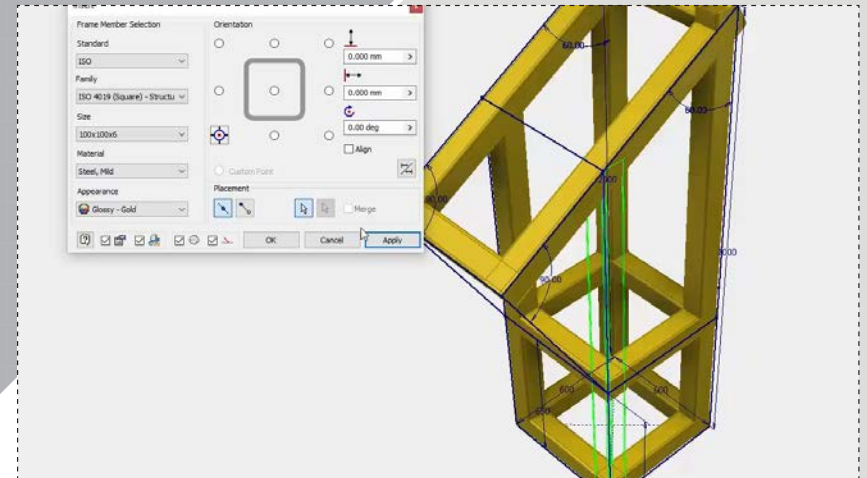
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33.



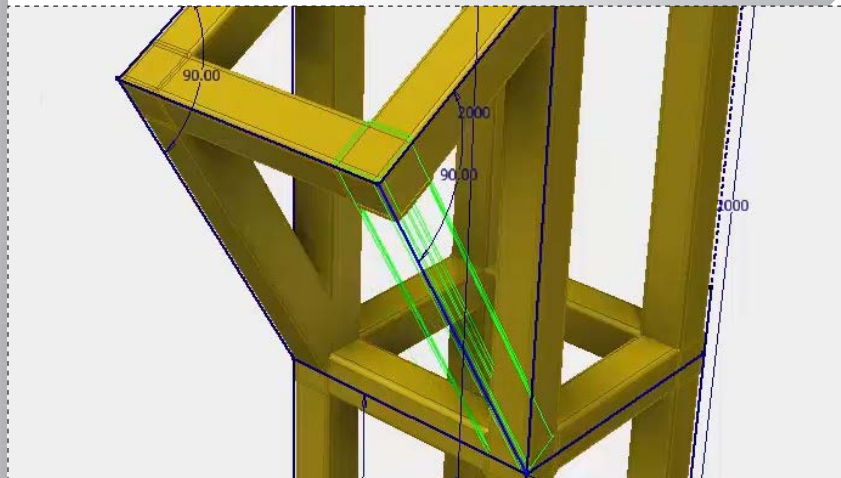
Apply a member to one of the vertical segments, ensuring its placement is within the frame boundaries. Click 'OK' to accept the part naming.

34.



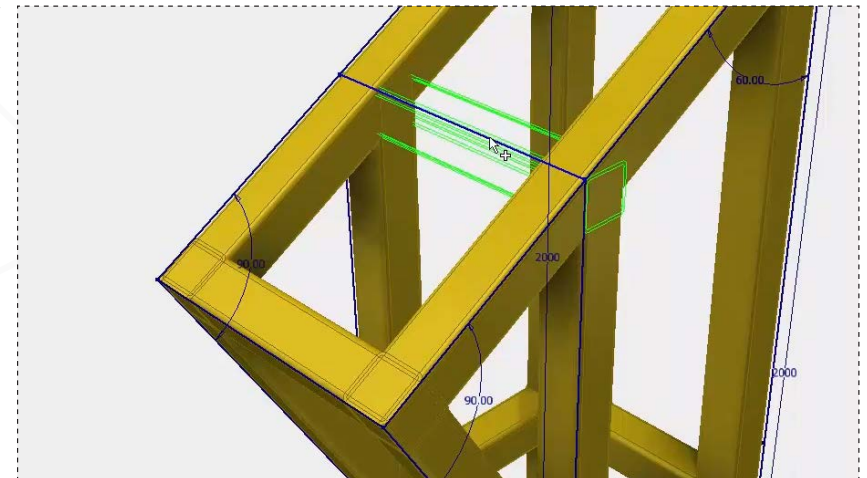
Apply three more members to the remaining vertical segments, ensuring their placements are all within the frame sketch.

35.



Apply members to the two angled segments, again, ensuring they're within the frame boundaries.

36.

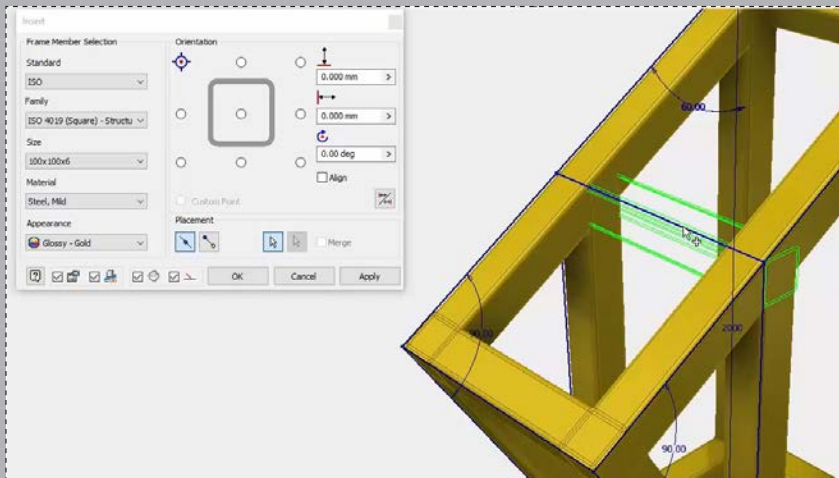


Select the remaining segment to apply a member to it.

PART 2: FRAME GENERATOR

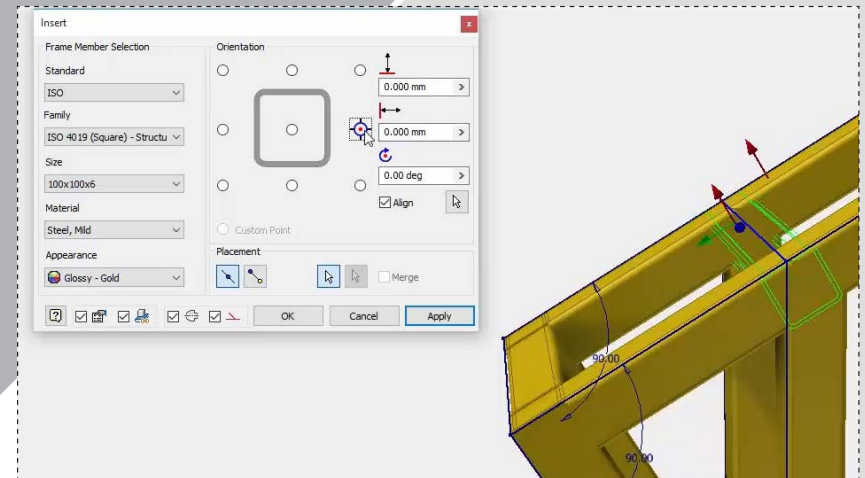
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37.



Check 'Align' in the dialog, and then select an angled face for the alignment reference.

38.



Ensure the member is positioned inside the frame before applying it. Click 'Cancel' to finish the member insertions.

39.

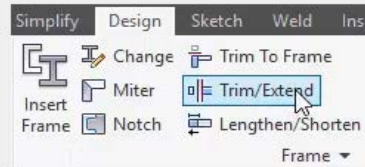


Now that you've created all the members in the assembly, right-click the frame part in the browser and uncheck 'Visibility' to hide it. Save the assembly to continue.

PART 3: FRAME GENERATOR

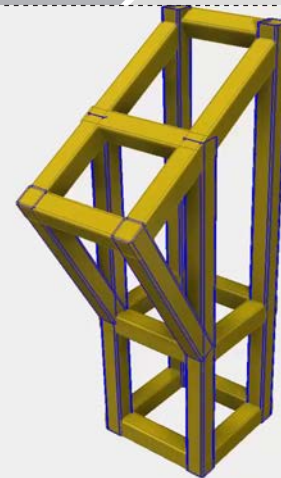
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40.



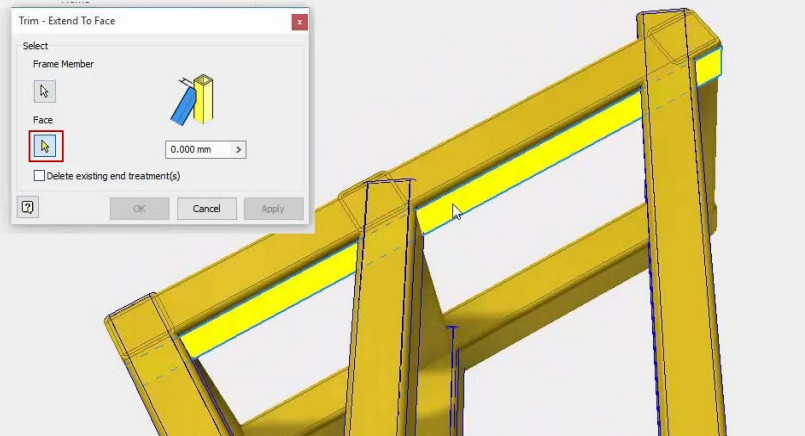
Activate 'Trim/Extend' from the 'Design' tab in the ribbon.

41.



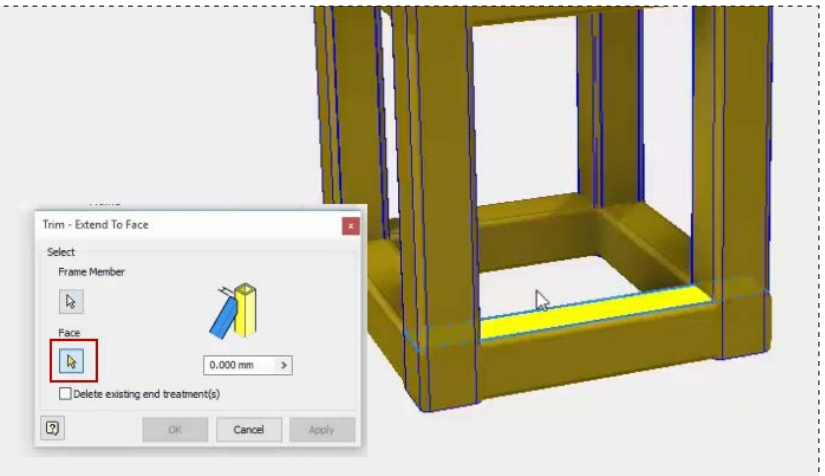
Select the four vertical, and two diagonal members as shown for trimming.

42.



After toggling 'Face' in the dialog, select the bottom face of one of the upper members for the trim face, and then click 'Apply'.

43.

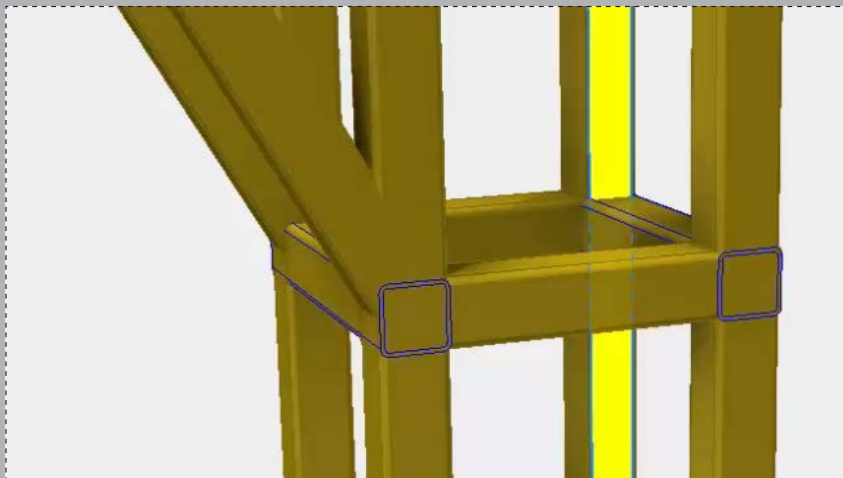


Select the four vertical members again, toggle 'Face' selection, and then apply a trim using a bottom member's upper face for the trim surface.

PART 3: FRAME GENERATOR

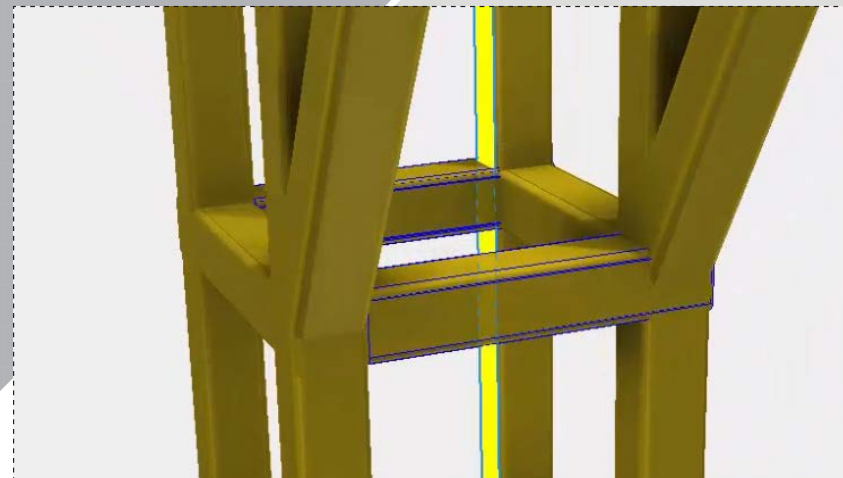
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44.



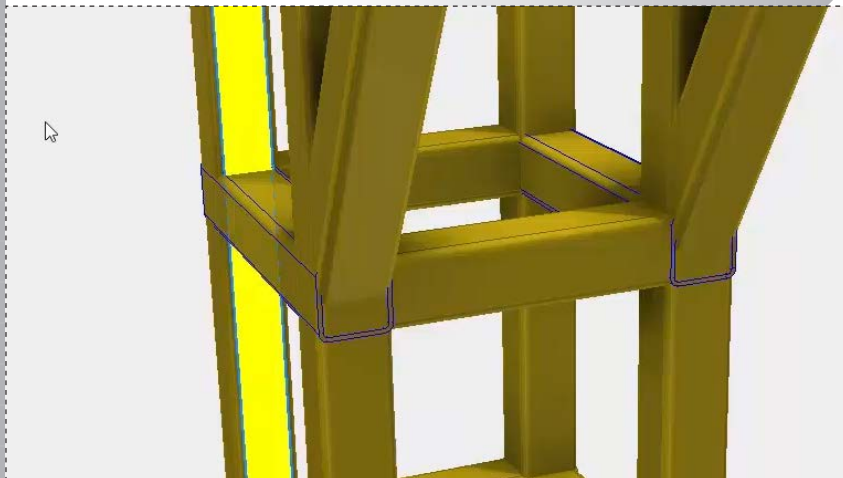
Apply a trim to one side of two of the middle members as shown.

45.



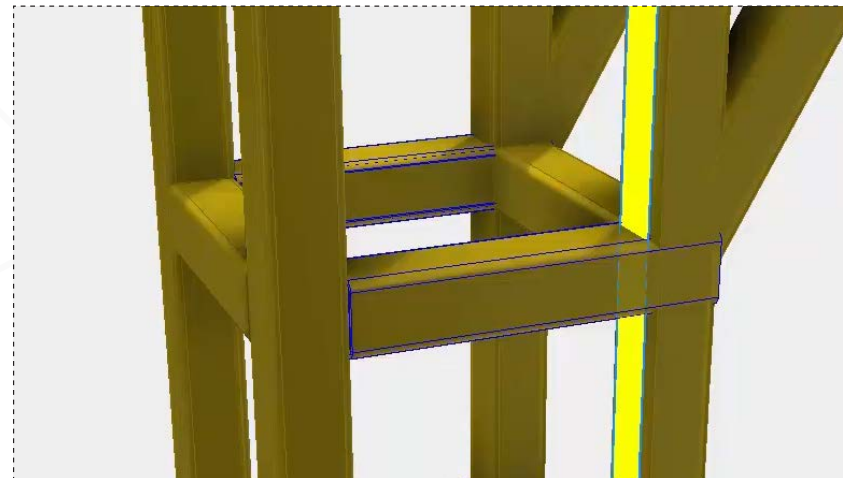
Repeat the trim on the opposite side of the same members.

46.



Trim one side of the remaining two middle members.

47.

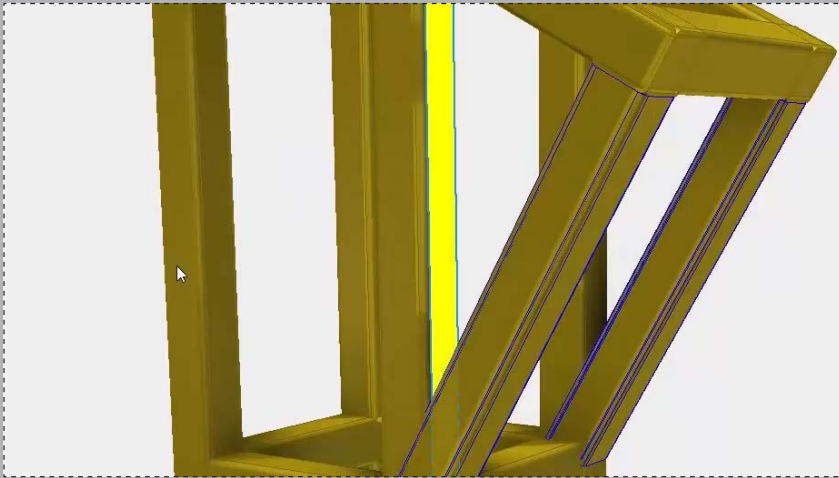


Trim the opposite side of the same members.

PART 3: FRAME GENERATOR

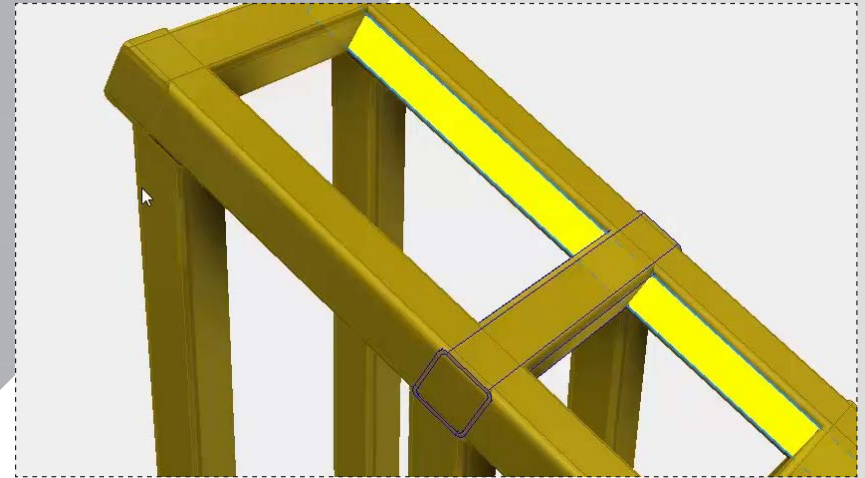
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48.



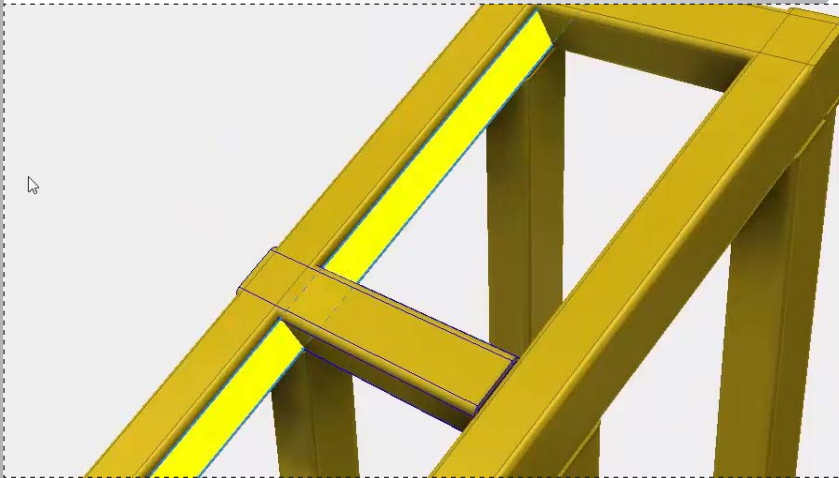
Trim the other ends of the diagonal members using the outer face of one of the connecting vertical members for the trim face.

49.



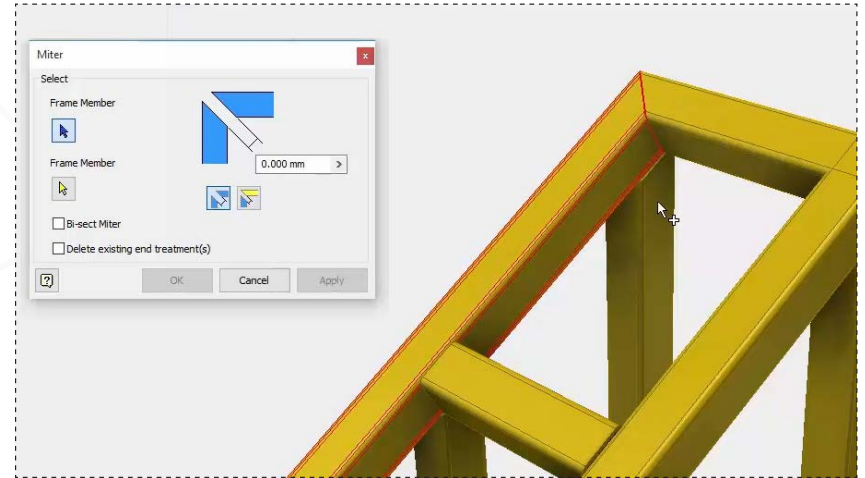
Trim one side of the upper-middle member as shown.

50.



Trim the opposite side of the same member.

51.

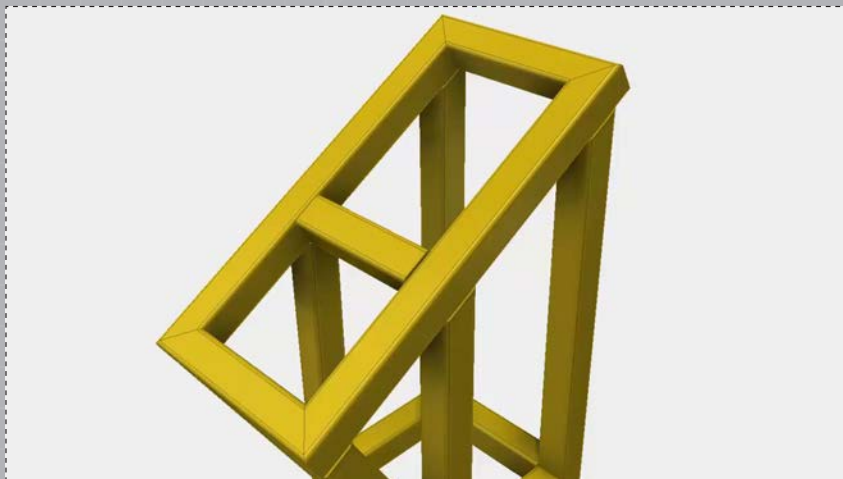


Activate the 'Miter' command from the 'Design' tab, select two connecting, perpendicular members, and then click 'Apply' to create a 45° miter at the corner.

PART 3: FRAME GENERATOR

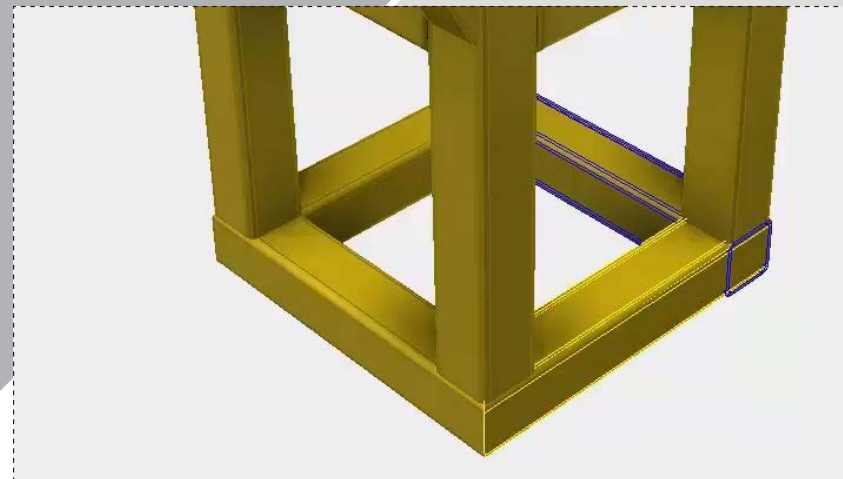
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52.



Repeat the same process for the remaining three upper corners.

53.



Repeat the processes in steps 51 & 52, applying miters to all four of the corners at the bottom of the assembly. Save your structural frame assembly to finish.



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