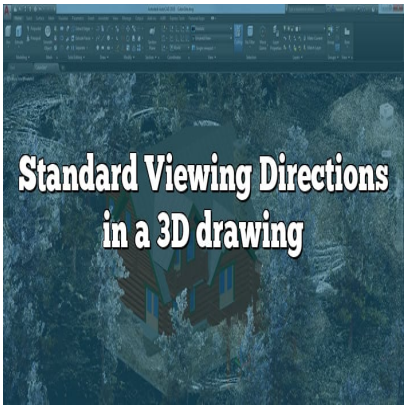


Standard Viewing Directions in a 3D drawing

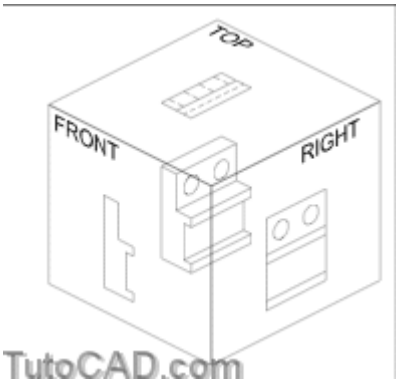
Description

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Orthographic Views

Most drafters are familiar with the concept of a â€œglass boxâ€• to help generate 2D **orthographic** views of 3D objects.

- imagine your object inside a rectangular **glass box** and the 2D views used for drafting are projected to the faces of this box.



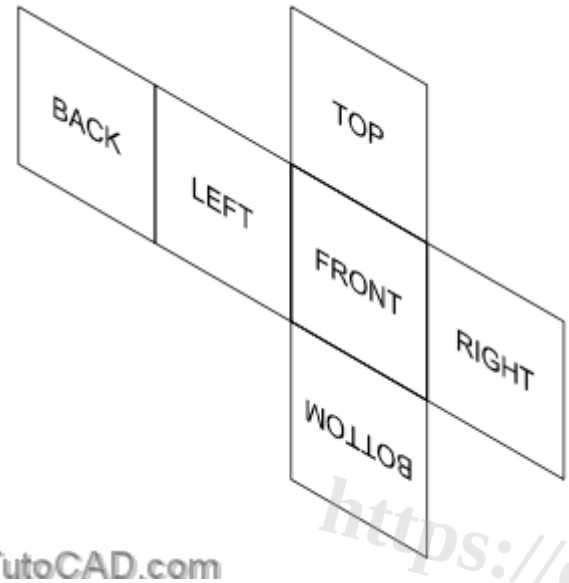
- then imagine unfolding these faces onto a flat plane (the sheet of drafting paper) to generate a 2D drawing.

2D drawings normally include only two or three views but there are a total of 6 orthographic views to choose from.

- you can completely unfold the â€œglass boxâ€• to lay out all 6 orthographic views properly in a 2D drawing.

The illustration below shows these **standard orthographic views** and the labels illustrate the default orientation in AutoCAD.

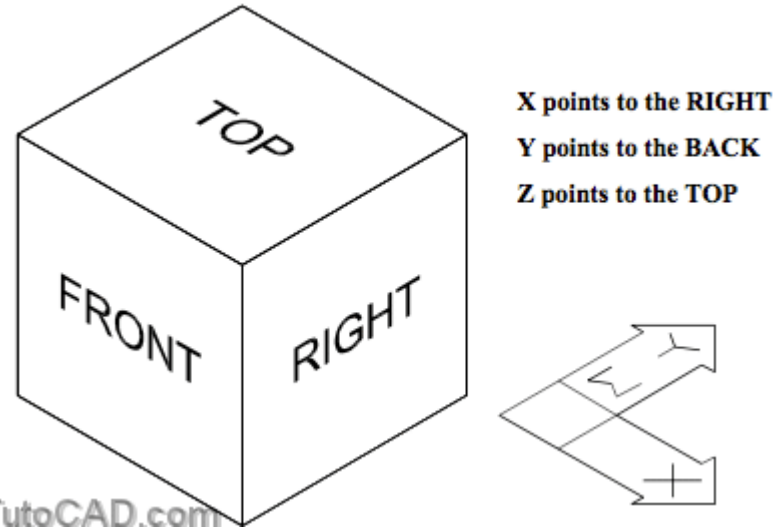
- when you view one of these six views you would see the text label such that it reads properly on-screen (from left to right).



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The illustration below shows the relationship of these orthographic views to the **World Coordinate System** (WCS) axes in AutoCAD.



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You will also want to view models from **isometric** viewing directions.

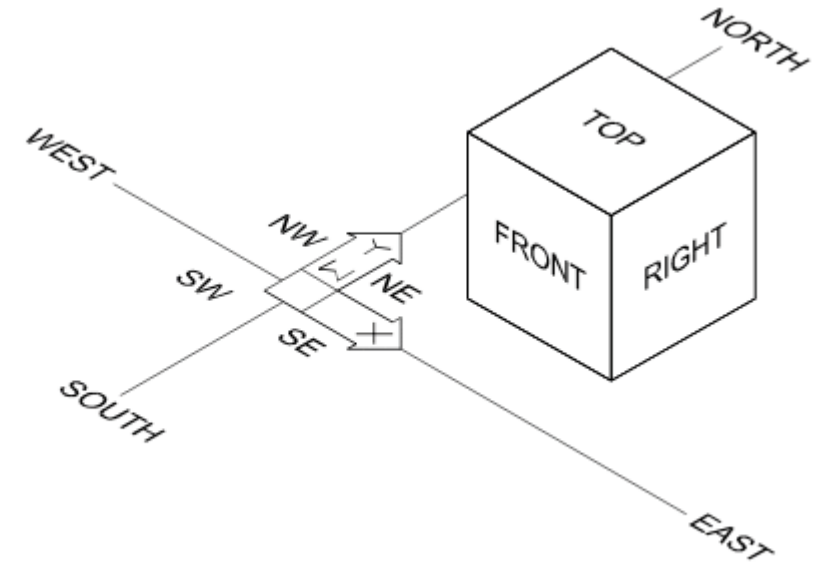
- this is a common viewing direction for illustrations because you can see most (if not all) model features in one view.
- it is also practical to create models from this viewing direction because it exposes more edges and object snaps.

AutoCAD uses **quadrants** based on compass directions (North, East, West & South) to **abbreviate** isometric viewing directions.

- **East** represents the X axis direction and **North** represents the Y axis direction.

SE Isometric

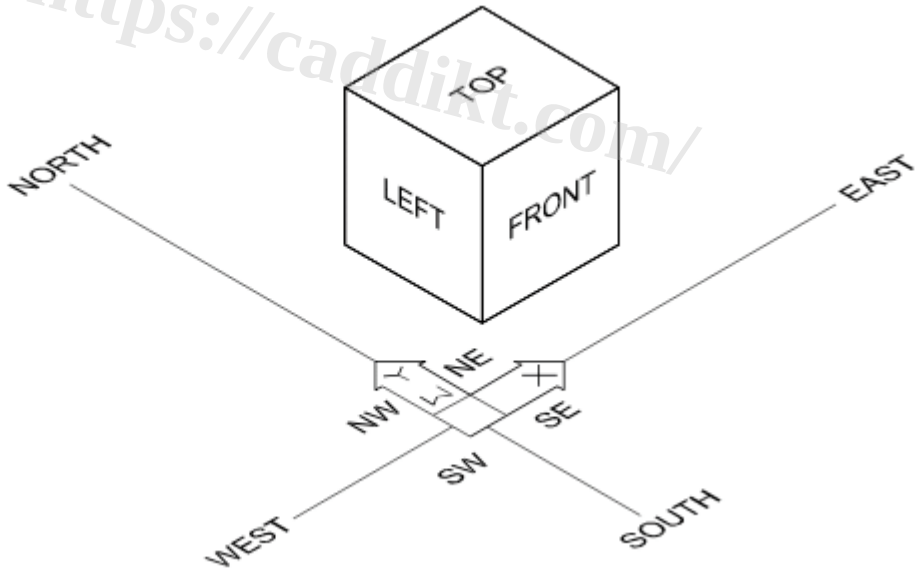
Imagine standing in the SE quadrant looking towards the opposite quadrant.



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SW Isometric

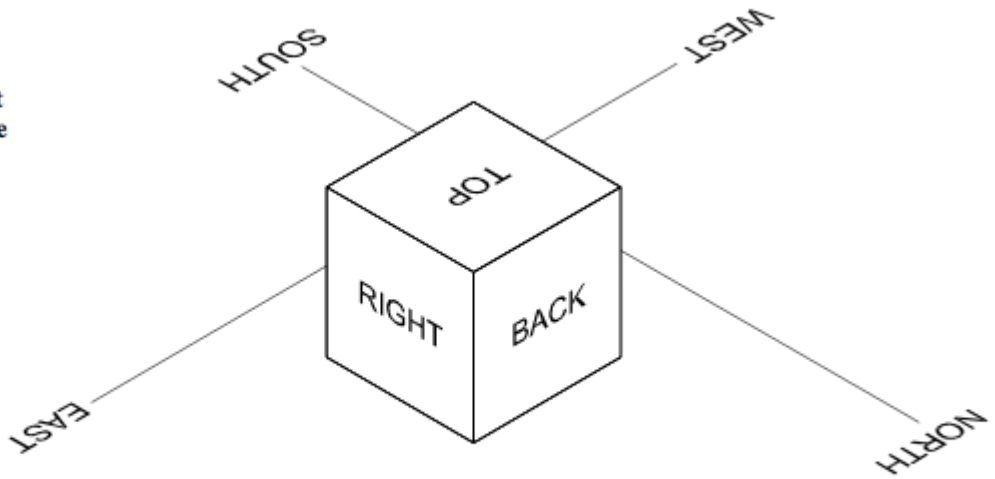
Imagine standing in the SW quadrant looking towards the opposite quadrant.



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NE Isometric

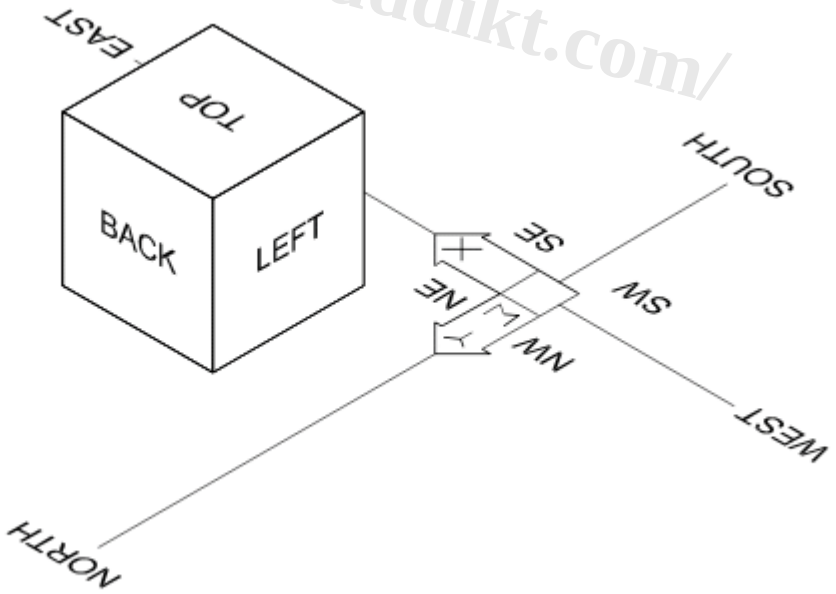
Imagine standing in the NE quadrant looking towards the opposite quadrant.



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NW Isometric

Imagine standing in the NW quadrant looking towards the opposite quadrant.



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Standard isometric views are **from above** so you would not see the bottom of your models after **Hide** (or in **Hidden** & **Shaded** modes).

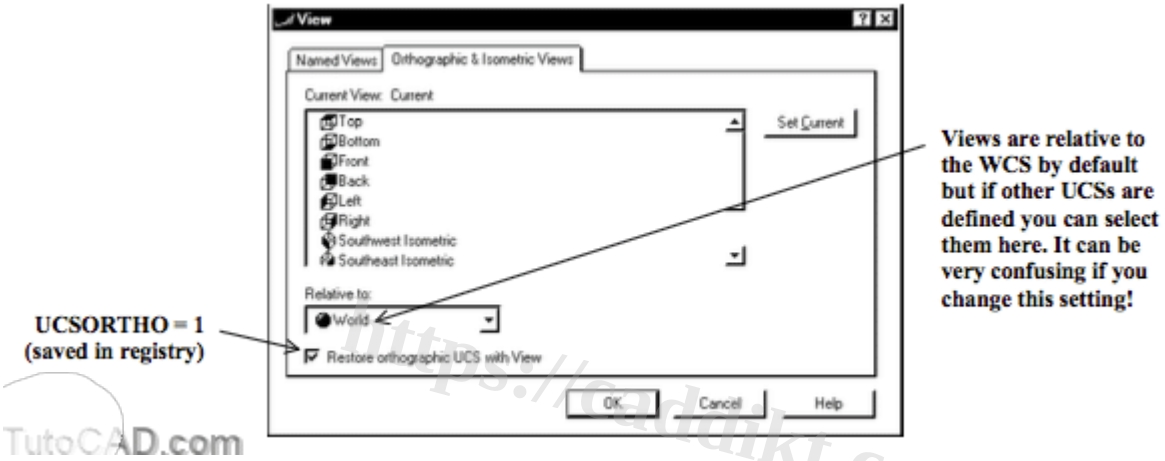
VIEW
V (alias)

View + 3D Views + {option}

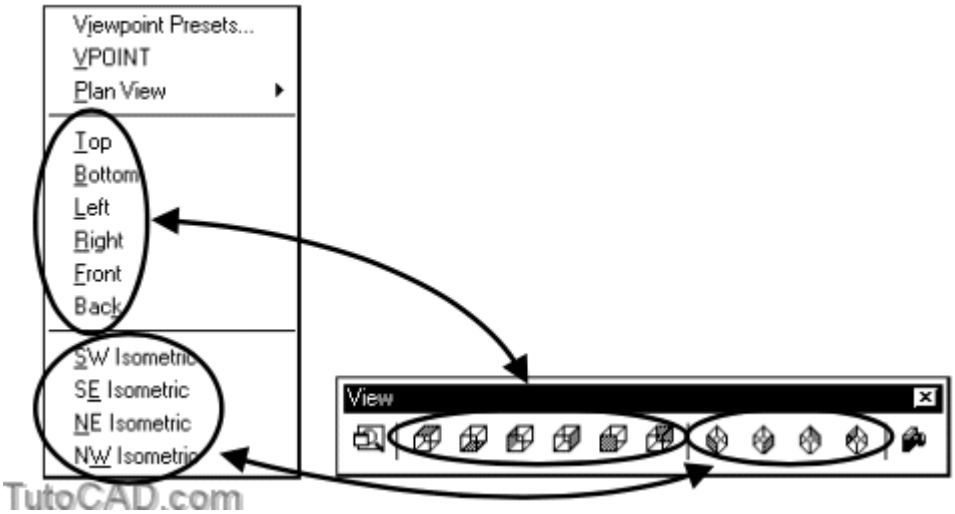
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You can change your viewing direction to display one of the 6 orthographic views or 4 isometric views using the **View** command.

- if you invoke the **View** dialogue box you can select the desired view on the **Orthographic & Isometric Views** tab.
- **double-click** on the desired view to make it Current (or select the desired view and pick **Set Current**) then pick **OK**.



Use the **View** toolbar buttons or **View** + **3D Views** pulldown menus to restore views directly (you do not invoke the **View** dialogue box).



When you display an orthographic view AutoCAD may automatically change the current UCS to align with that view, such that

- the X axis points to the right, the Y axis points up and the Z axis points directly at you out of the screen.
- if you do not want to change the UCS you can **uncheck** the Restore orthographic UCS with View setting in the **View** box.

So far you have learned how to use the **View** command to change your viewing direction for standard views.

- there are other tools/commands to achieve similar results but they can also be used to set non-standard viewing directions.

These other tools/commands are somewhat obsolete in AutoCAD 2000 because of the new **3dorbit** command.

- you will be learning how to use the new intuitive **3dorbit** command in the next section of this document.

You can specify viewpoint vectors using the **Vpoint** command.

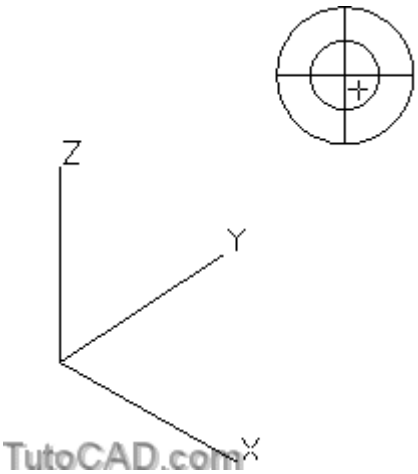

VPOINT

View + 3D Views + VPOINT

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- for example, **1,1,1** is the vector for **NE Isometric** & you could use**1,1,â€“1** to look at your model from below.
- if you press <**enter**> at the main prompt instead of entering a vector you can drag the vector dynamically using a tripod.



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You can specify the viewing direction by changing two different angles using the **ddVpoint** command.

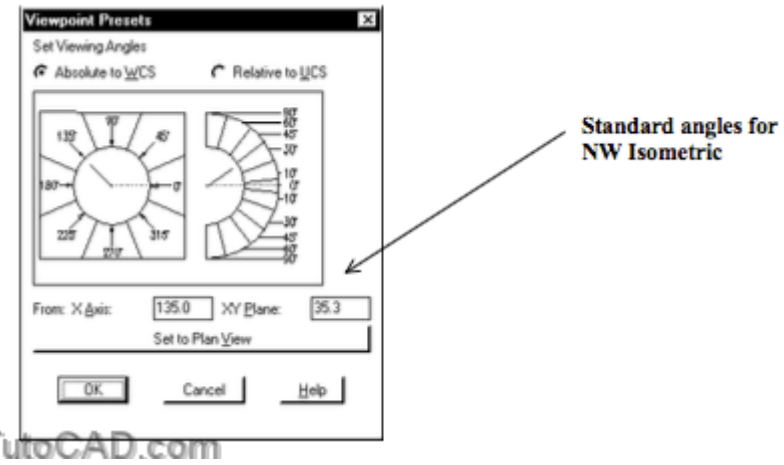

DDVPOINT

View + 3D Views + Viewpoint Presets

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- this can be useful when edges overlap in isometric views (a common problem in mechanical parts).

- you can alter viewing angles slightly (from the standard angles) to expose more edges in non-standard isometric views.

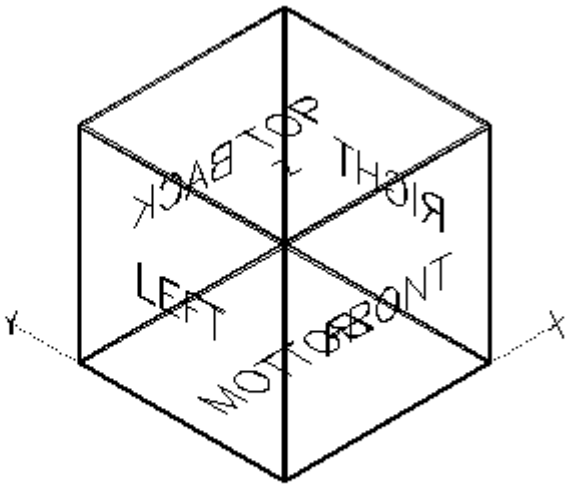


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PRACTICE WITH STANDARD VIEWING DIRECTIONS

Â» 1) ***Close*** *the drawing from the previous exercise if it is open.*

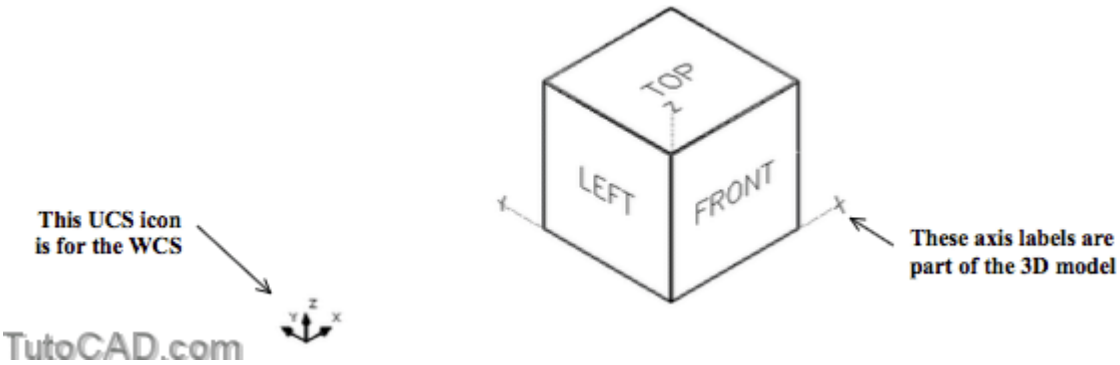
Â» 2) Open the ***T302_2.dwg*** *drawing in your* ***personal folder****.*





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3) Pick ***View*** *+* ***Shade*** *+* ***Hidden*** *to change the shademode.*



This is a simple 3D model of a box and you are currently viewing the model from the **SW Isometric** viewing direction.

- each face on this box has a TEXT object with the corresponding orthographic view name for that face.
- with shade mode set to **Hidden** you see only the TEXT labels on faces that have their outside surface oriented towards you.

The X, Y and Z axes of the **World Coordinate System** (WCS) are also labeled on this model

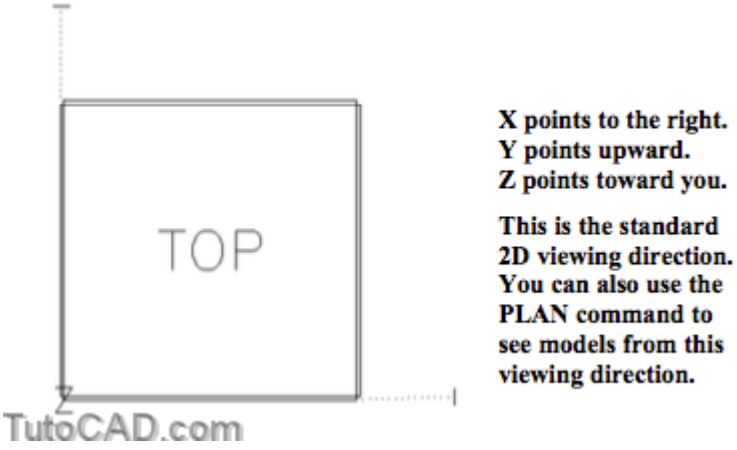
- at the moment the current UCS is the WCS so the UCS icon matches the XYZ axes that are part of the 3D model.

It can be confusing when you restore orthographic views and the UCS changes to align itself with the new view.

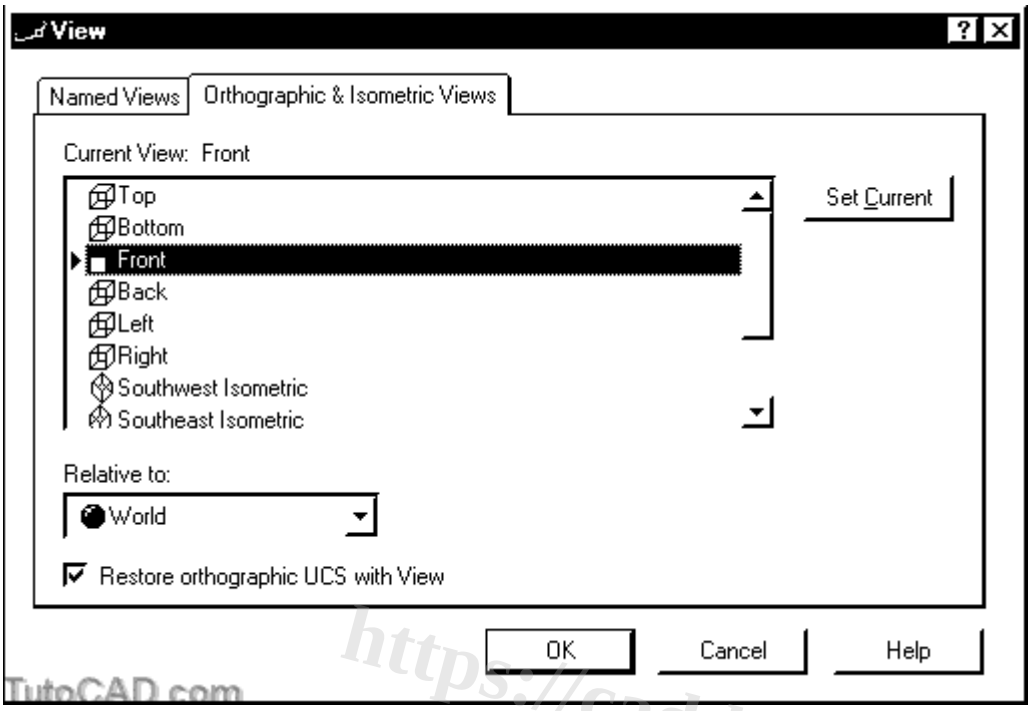
- so in the next step you will turn UCSICON Off.

*Â» 4) Pick **View** + **Display** + **UCS Icon** + **On** (toggles check **Off**).*

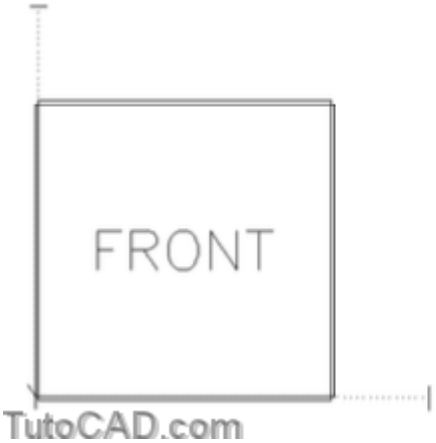
*Â» 5) Pick **View** + **3D Views** + **Top**.*



*6) Enter **V** (as an alias) at the keyboard to invoke the **View** dialogue box. On the **Orthographic & Isometric Views** tab select **Front** and pick the **Set Current** button. Then pick **OK**.*



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X points to the right.
Y points away from you.
Z points upward.

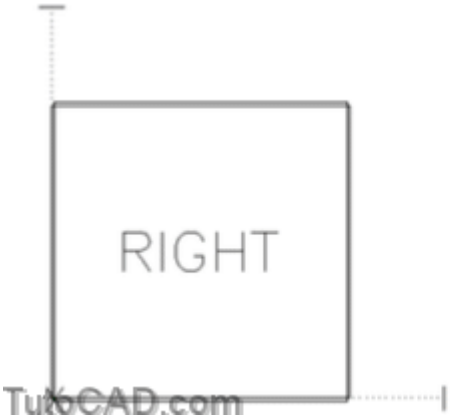
Now you are looking down the Y axis.

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*7) Display the **View** toolbar (if it is not already displayed). Pick the **Right View** button to view the model from the right side.*



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X points toward you.
Y points to the right.
Z points upward.

You are now looking in the negative X direction.

You have used the **View** command to change your viewing direction three times but you invoked **View** differently each time.

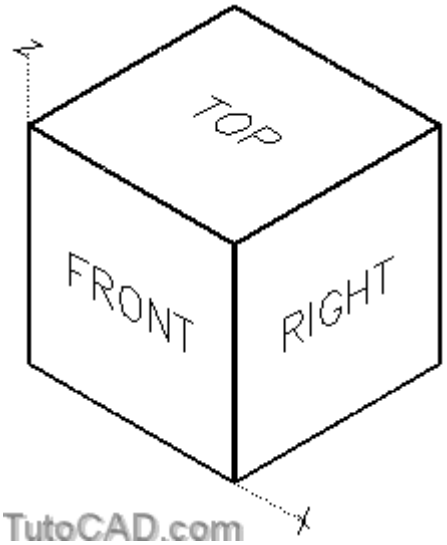
- you can use the **View** dialogue box
- or you can avoid the **View** dialogue box by selecting a menu option (pulldown menu or toolbar button).

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When you change your viewing direction AutoCAD displays the current **drawing extents** to fit in the active viewport.

- you can always **Zoom** in for magnified views after setting a new viewing direction.

*Â» 8) Pick **View** + **3D Views** + **SE Isometric**.*

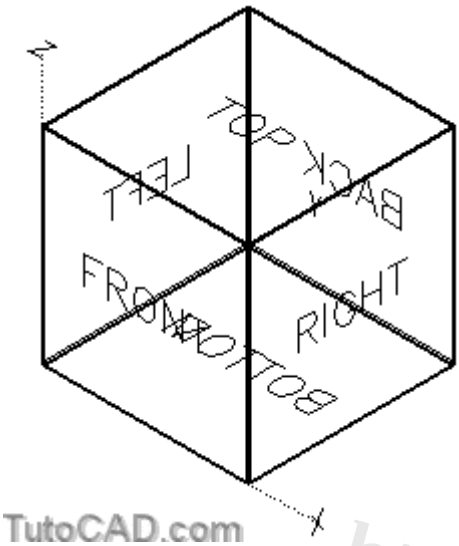


If you were to stand in the SE quadrant (positive X but negative Y) and look toward the opposite quadrant this is what you would see.

- the **SE Isometric** & **SW Isometric** viewing directions are practical for illustrations and presentations.

More practice?

*Â» 9) Pick **View** + **Shade** + **3D Wireframe**.*



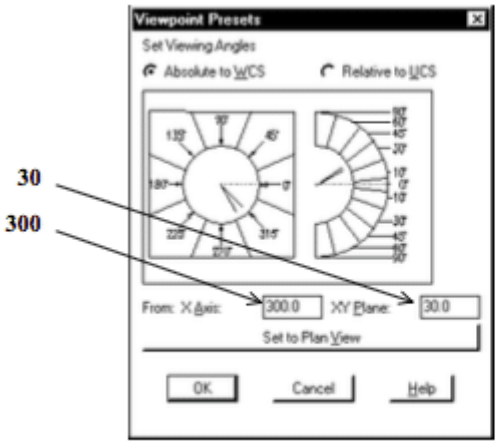
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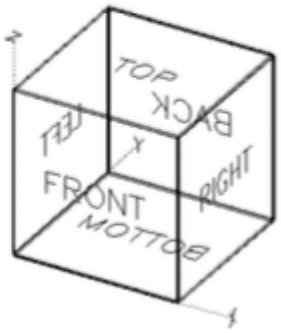
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When you view models in standard isometric viewing directions, some edges and intersection points may overlap.

- this can make it difficult to select snap points or select the desired edges in commands.
- you can change angles slightly to overcome this problem.

*10) Pick **View** + **3D Views** + **Viewpoint Presets**. Change the angle From X Axis to **300** (was 315) and the angle From XY Plane to **30** (was 35.3). Then pick **OK**.*





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Now each vertex of this box is clearly visible and you can identify all individual edges (even at the back of the model).

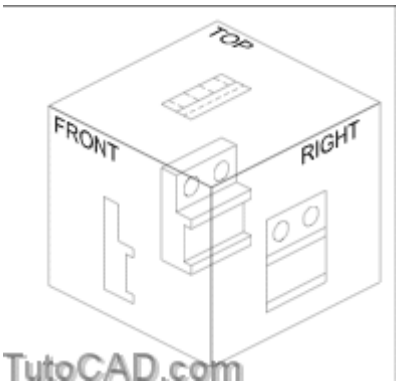
- this non-standard isometric viewing direction can be practical for creating and editing 3D models.

Â» 11) Practice viewing various standard isometric viewing directions. Imagine what the view should look like before you change viewing directions and then see if you were right.

Still more practice?

Â» 12) ***Close*** *the current drawing without saving changes.*

Â» 13) ***Open*** *the* ***T302_3.dwg*** *drawing in your* ***personal folder****.*



Â» 14) Using methods of your choice view this model from the ***Top****,* ***Front*** *and then from the* ***Right*** *side.*

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You may want to **Zoom Out** after changing view directions because the extents in this drawing are the same size as the model.

Â» 15) Using the method of your choice view this model from the ***NE Isometric*** *viewing direction.*

Â» 16) Change the shade mode to ***Gouraud Shaded****.*

Â» 17) ***Close*** *this drawing without saving any changes.*