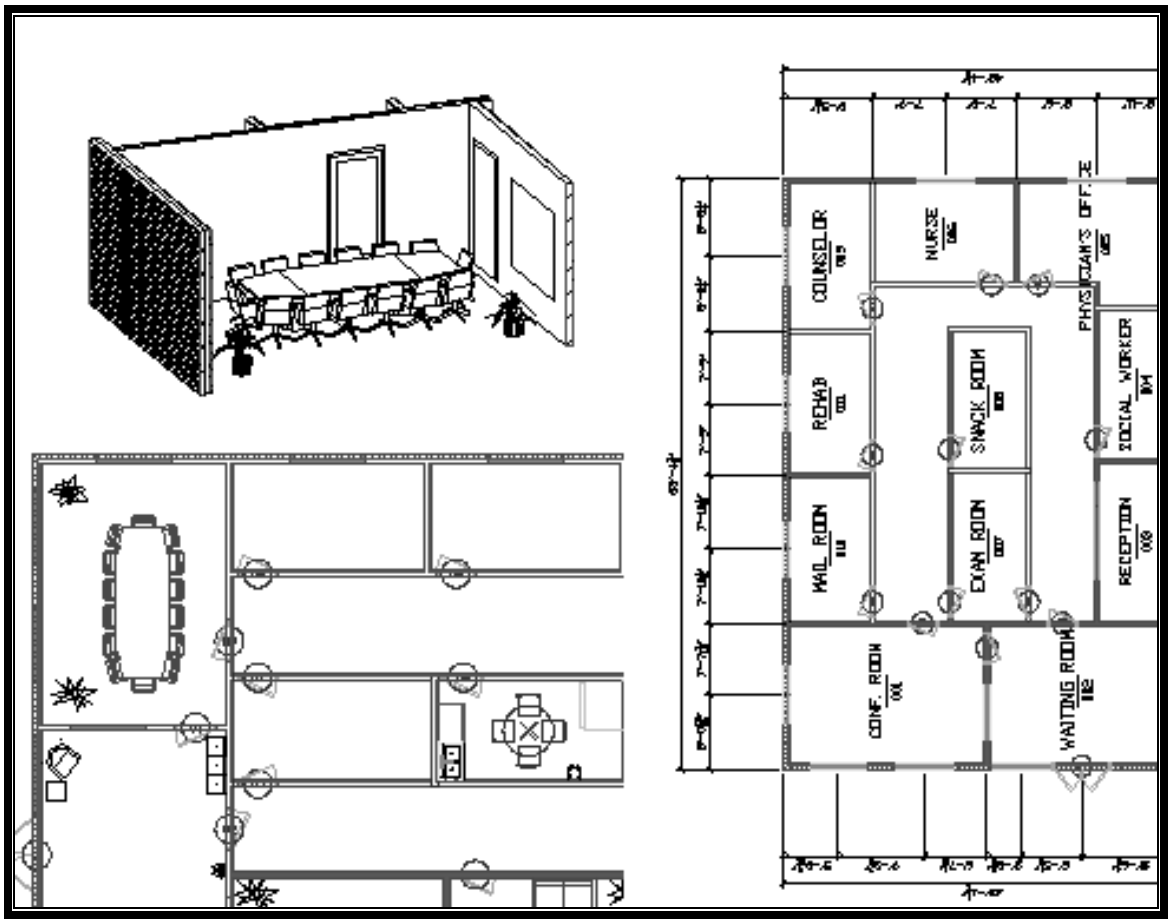
Space Planning

with AutoCAD Architecture 2008



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Lesson 1
Planning Criteria

Space Planning can be done for an existing space or a new space. It is similar to the top-down or bottom-up approach taken in mechanical design.

An **outside-in approach** is where you are introduced to an existing building and asked to maximize the space and function. In an outside-in approach, you must work with the existing exterior walls. You may be able to move, add, or demolish existing doors and windows. You may be able to extend or contract specific exterior walls. However, you are constrained to work with the existing architecture. This can be a very challenging type of project as you seek to preserve the character of the building and blend with the existing structure.

An **inside-out approach** involves a new building. When starting a new building project, you define your space needs and from that, determine the exterior form and size. Often, you can use the criteria you develop when looking for space to rent for a business.

When using ACA for space planning, you use Spaces, Areas and Boundaries. In the inside out approach, spaces are used to define rooms and space boundary edges are used to define walls. A group of spaces inside a boundary can be used to define separate cubicle areas to form a department.

Before you can start defining your space, you need to determine your space needs. Meeting with the people who will be using or building the space accomplishes this.

An easy way to track your space criteria is to create a Criteria Table.

For example, a non-profit group that wants to establish a counseling center in the downtown area has approached you with the following criteria:

Criteria Table

Administrative Space	**Size**
Office, Nurse	19.5 NSM (210 NSF)
Office, Physician	13.9 NSM (150 NSF)
Office, Rehabilitation Counselor	11.2 NSM (120 NSF)
Office, Social Worker	11.2 NSM (120 NSF)
Office, Office Manager/Bookkeeper	11.2 NSM (120 NSF)
Clinic Area	
Reception Area	11.2 NSM (120 NSF)
Waiting Area	27.9 NSM (300 NSF)
Exam Room/Intake Room	11.2 NSM (120 NSF)
Group Therapy/Conference Room	27.9 NSM (300 NSF)
Common Area	
Coffee/Snack Room	11.2 NSM (120 NSF)
Utility/Storage/Mail	11.2 NSM (120 NSF)
Restrooms	Common to adjoining complex
Corridor	Minimum to meet ADA

When looking at space planning, you also need to look at which areas need to have adjacencies. In other words, certain spaces need to be located next to each other.

For example, the receptionist should be located adjacent to the waiting area. It also makes sense to locate the nurse and physician next to each other, as they will probably want to confer often.

You look at adjacency requirements by sketching relationships.

PHYSICAL RELATIONSHIPS BETWEEN SPACES

Legend
1 ADJACENT
2 CLOSE/INSIDE SPACE
3 CLOSE/OUTSIDE SPACE
4 LIMITED TRAFFIC
X SEPARATION DESIRABLE

Using a legend to help you sort out the relationships between spaces will make it easier for you to arrange the spaces.

Criteria Table

Administrative Space	Size	Adjacency
Office, Nurse	19.5 NSM (210 NSF)	1
Office, Physician	13.9 NSM (150 NSF)	1
Office, Rehabilitation Counselor	11.2 NSM (120 NSF)	2
Office, Social Worker	11.2 NSM (120 NSF)	2
Office, Office Manager/Bookkeeper	11.2 NSM (120 NSF)	2
Clinic Area		
Reception Area	11.2 NSM (120 NSF)	1
Waiting Area	27.9 NSM (300 NSF)	1
Exam Room/Intake Room	11.2 NSM (120 NSF)	4
Group Therapy/Conference Room	27.9 NSM (300 NSF)	2
Common Area		
Coffee/Snack Room	11.2 NSM (120 NSF)	4
Utility/Storage/Mail	11.2 NSM (120 NSF)	X
Restrooms	Common to adjoining complex	3
Corridor	Minimum to meet ADA	1

Exercise 1-1:

Modifying the Space Tools Palette

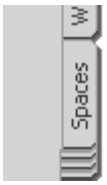
This exercise reviews the following concepts:

- Content Browser
- Tool Palettes
- Using idrop

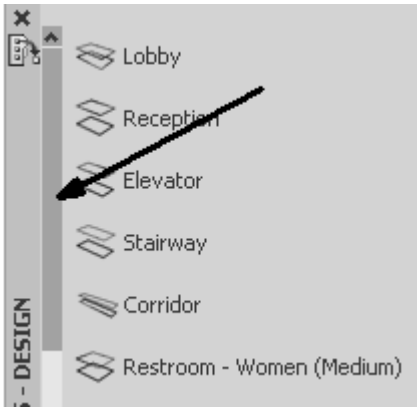
File: New from Scratch
Estimated Time: 15 minutes

1. 

Launch ACA 2008.

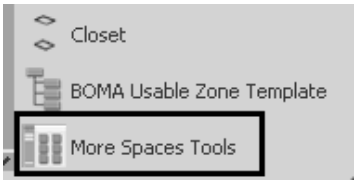
2. 

Select the **Spaces** tool palette.

3. 

Use the scroll bar to look at the space tools already available.

These tools are preloaded when ACA is installed.

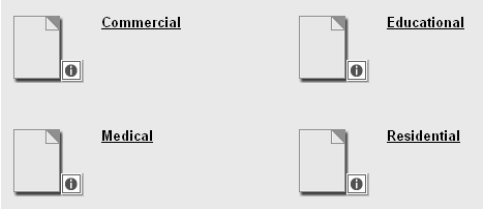
4. 

Scroll down until you see the **More Spaces Tools**.

Select the **More Spaces Tools** by left clicking on it.

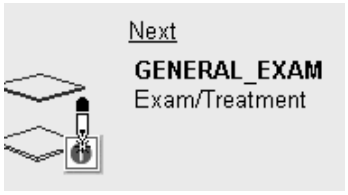
5. 

Verify the heading says **Imperial**.

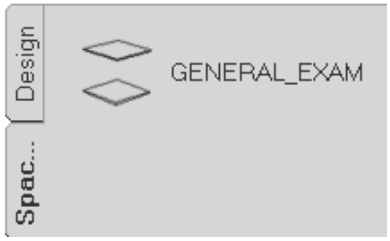
6. 

You'll see that ACA already has several space tools defined for different types of building models.

Since the space we'll be defining is a medical office, select the **Medical** link.

7. 

Locate the **GENERAL_EXAM** tool on the first page. Place your cursor over the idrop symbol. The cursor will change to an eyedropper symbol.
Hold down the left mouse button to fill up the eyedropper, then drag and drop the symbol on to your Spaces tool palette.

8. 

You now have added this tool to your palette.

9. 

Repeat to add the **NURSE_MGR** tool to your palette.

10. 

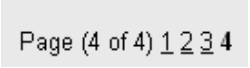
Select the **Spaces** link on the top of the page.

11. 

Select the **Commercial** link.

12. 

Select the **CONFERENCE_SMALL** tool.
Drag and drop onto the palette.

13. 

Select **Page 4** at the bottom left on the page.

14. 

Select the **WORKSTATION_ LARGE** tool.
Drag and drop onto the palette.

15. 

Select the **WORKSTATION_ SMALL** tool.
Drag and drop onto the palette.

16. Close the Content Browser.

17. Save as *ex1-1.dwg.*

Exercise 1-2:
Editing Space Styles

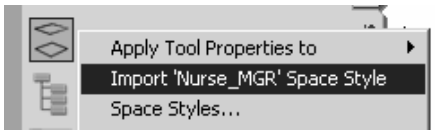
This exercise reviews the following concepts:

- Space Styles
- Style Manager
- Property Set Data

File: ex1-1.dwg
Estimated Time: 40 minutes

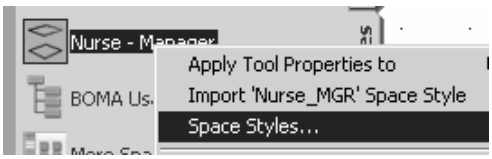
Refer to the Criteria Table on page 1-2.
This lists the types of spaces we need to have defined.

1. Open or continue working in *ex1-1.dwg.*



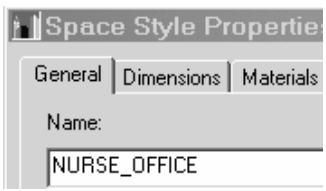
Highlight the **Nurse-Manager** tool.
Right click and select **Import 'Nurse_MGR' Space Style**.

This adds the space style to the Style Manager for the active drawing file.

2. 

Highlight the **Nurse-Manager** tool.

Right click and select **Space Styles**.

3. 

Change the Name to **NURSE_OFFICE**.

4. 

Select the **Property Sets** button.

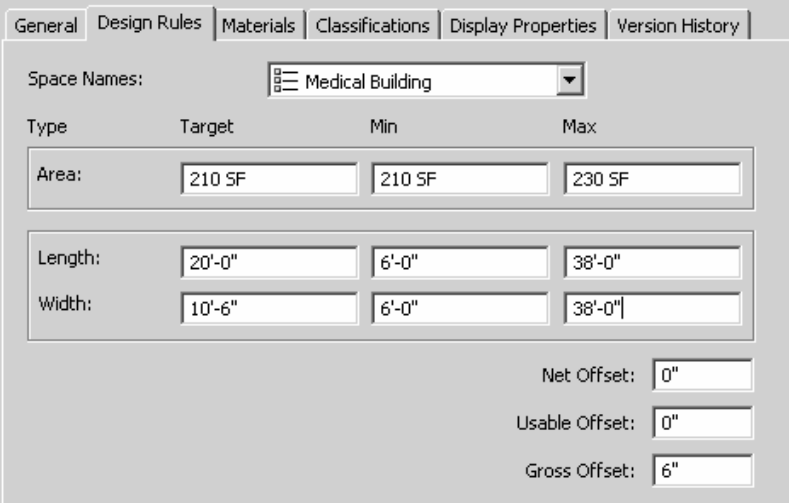
5. 

Note that you already have property data defined for your space.

This data will be used for square footage calculations and for any schedule tables you want to create.

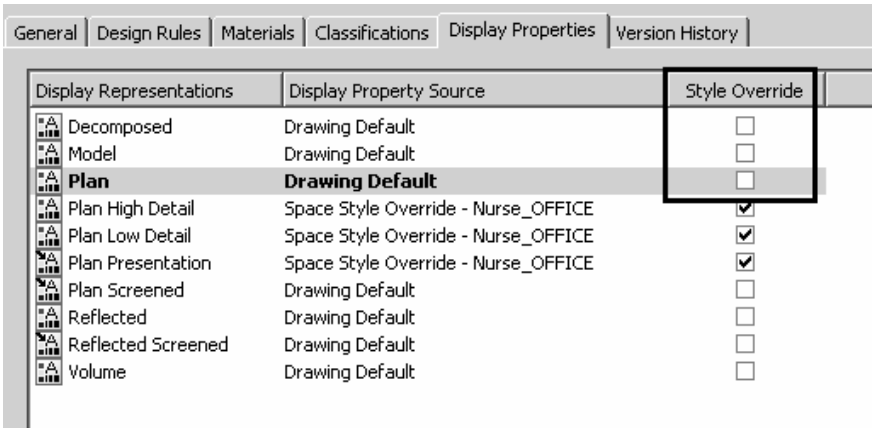
Press **OK** to close.

6. Select the **Design Rules** tab.



7. Set the Area to **210 SF**.
Set the Min to **210 SF**.
Set the Max to **230 SF**.
Set the Length to **20′**.
Set the Min to **6′**.
Set the Max to **38′**.
Set the Width to **10′-6″**.
Set the Min to **6′**.
Set the Max to **38′**.
Set the Gross Offset to **6″**.

This allows for wall thickness between adjacent spaces.
You can also set to 0″, but then some of the office space will be eaten by wall thickness.
Press **OK** to ignore any error messages that pop up.

8. 

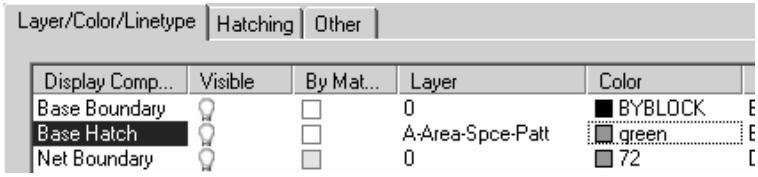
Select the **Display Properties** tab.
Highlight **Plan**.

9. 

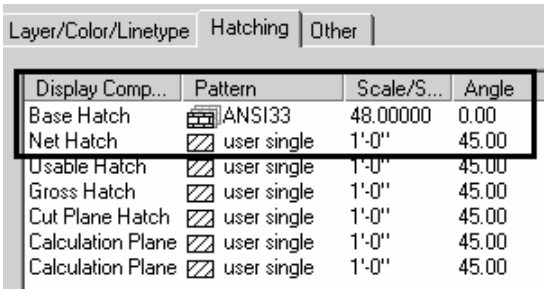
Select the **Display Properties** button located on the right.

10. 

Select the **Layer/Color/Linetype** tab.

11. 

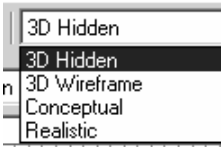
Locate the **Base Hatch** Display Component.
Set the Color to **green**.

12. 

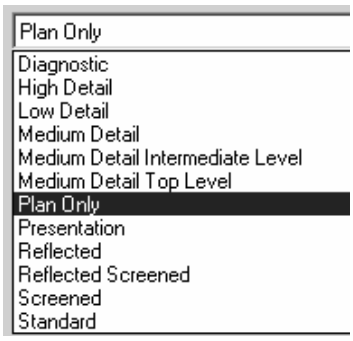
Select the **Hatching** tab.
Set the Hatch to **ANSI33**.
Set the Scale to **48**.
Set the Angle to **0**.
Press **OK**.

13. 

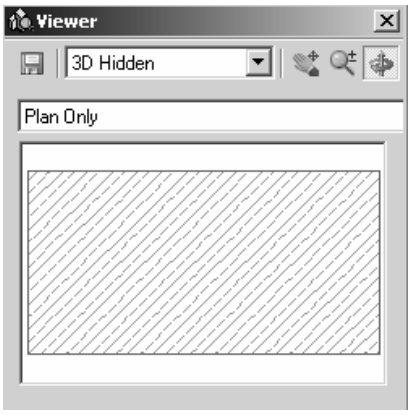
Select the **Floating Viewer** tool located in the lower left corner of the Styles dialog.

14. 

Select **3D Hidden** from the drop-down list.

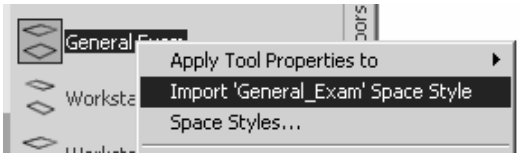
15. 

Select **Plan Only** from the view display drop-down.

16. 

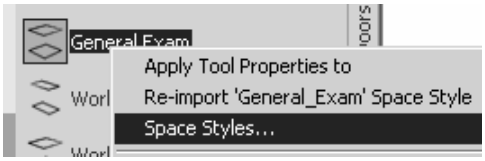
Your space is previewed in the preview window.

Press **OK** to close the Styles dialog.

17. 

Highlight the **General_Exam** tool. Right click and select **Import 'General_Exam' Space Style**.

This adds the space style to the Style Manager for the active drawing file.

18. 

Highlight the **General_Exam** tool.

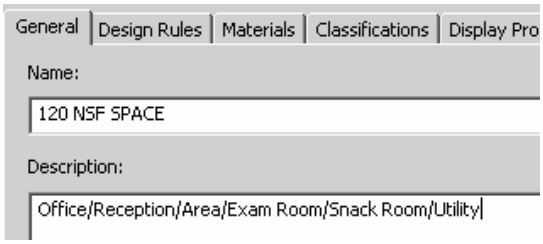
Right click and select **Space Styles**.

19. 

We see that the General_Exam space style has been added to the list of available styles.

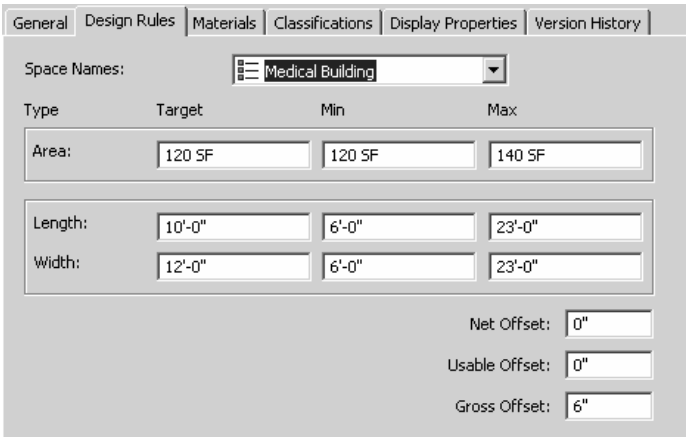
20. Highlight the **General_Exam** space style.

Select the **General** tab.



Change the Name field to **120 NSF SPACE**.

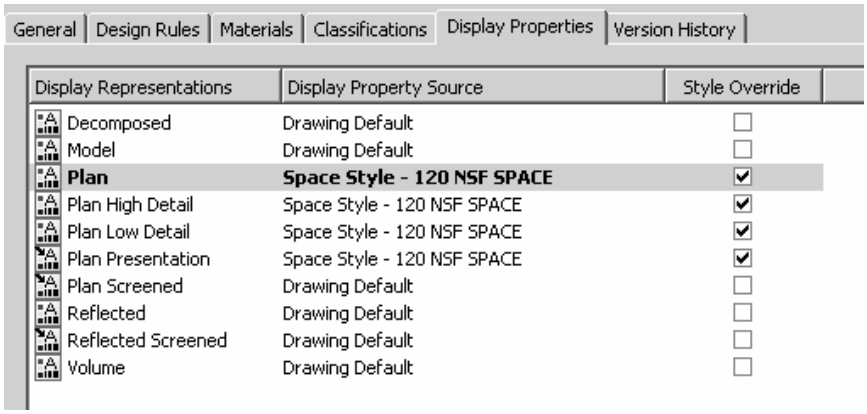
Under Description, enter all the room descriptions that will be 120 SF.

21. 

Select the **Design Rules** tab.

Set the Area to **120 SF**.
Set the MIN to **120 SF**.
(This means the space can be no less than 120 SF)
Set the MAX to **140 SF**.
(This means the space can be no more than 140 SF.)

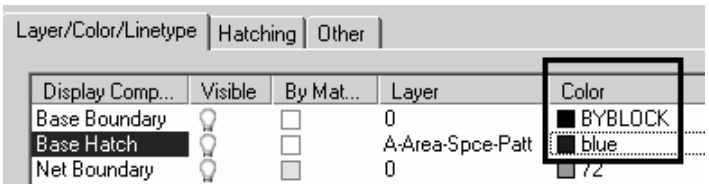
22. Set the Length to **10′**.
Set the Min to **6′**.
Set the Max to **23′**.
Set the Width to **12′**.
Set the Min to **6′**.
Set the Max to **23′**.
Set the Gross Offset to **6″**.

23. 

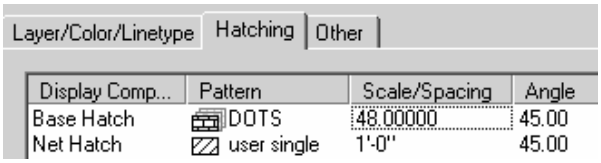
Select the **Display Properties** tab.
Highlight **Plan**.

24. 

Select the **Display Properties** button located on the right.

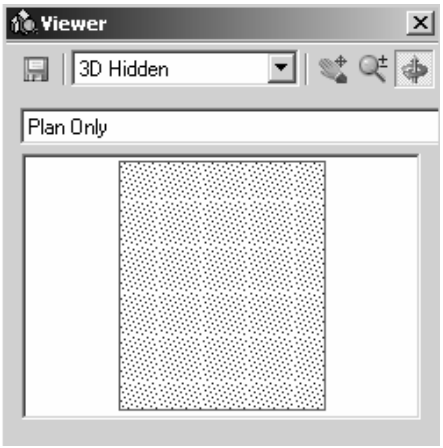
25. 

Select the **Layer/Color/Linetype** tab.
Highlight the **Base Hatch**.
Set the Color to **blue**.

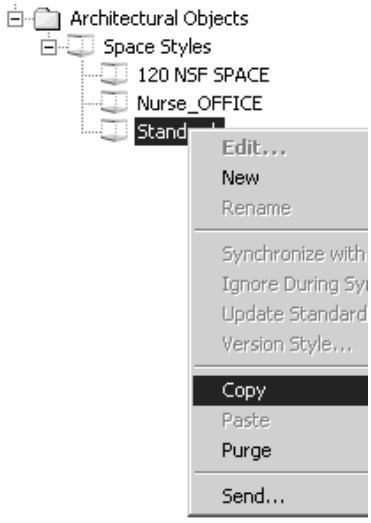
26. 

Select the **Hatching** tab.
Set the Hatch to **DOTS**.
Set the Scale to **48.00**.
Set the Angle to **45.00**.
Press **OK**.

27.  Select the **Floating Viewer** tool located in the lower left corner of the Styles dialog.

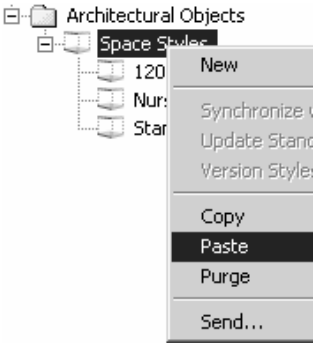


Your space is previewed in the Viewer.

28. 

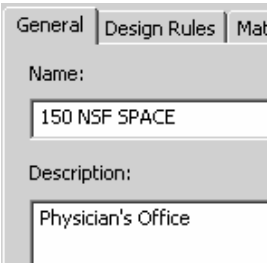
Highlight the **Standard Space Style**.

Right click and select **Copy**.

29. 

Highlight **Space Styles**.

Right click and select **Paste**.

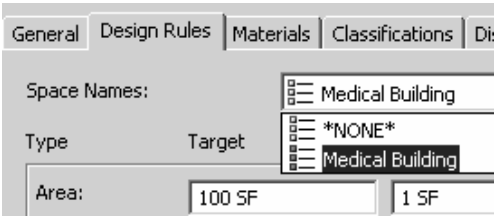
30. 

Highlight the **Standard (2)** space style.

Select the **General** tab.

Change the Name field to **150 NSF SPACE**.

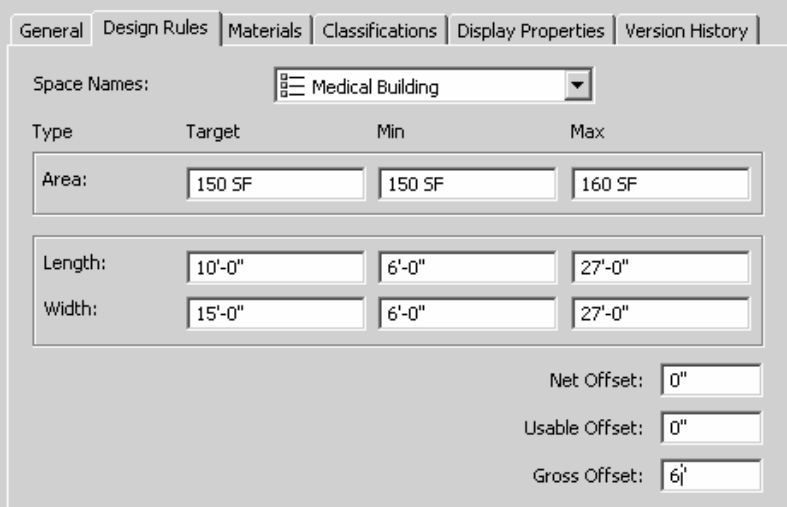
Type in **Physician's Office** in the Description field.

31. 

Select the **Design Rules** tab.

Under Space Names:
Select **Medical Building** from the drop-down list.

32.

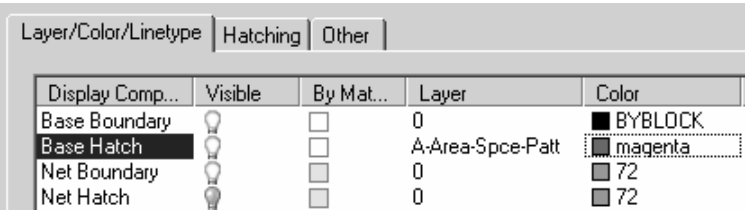


Set the Area to **150 SF**.
Set the Min to **150 SF**.
Set the Max to **160 SF**.
Set the Length to **10′**.
Set the Min to **6′**.
Set the Max to **27′**.
Set the Width to **15′-0″**.
Set the Min to **6′**.
Set the Max to **27′**.
Set the Net to Gross Offset to **6″**.

33. Select the **Display Properties** tab.
Highlight **Plan**.

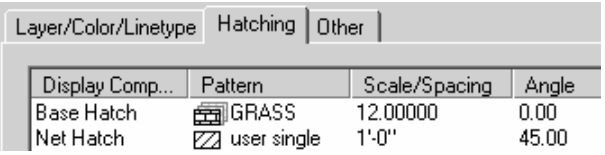
34.  Select the **Display Properties** button located on the right.

35.



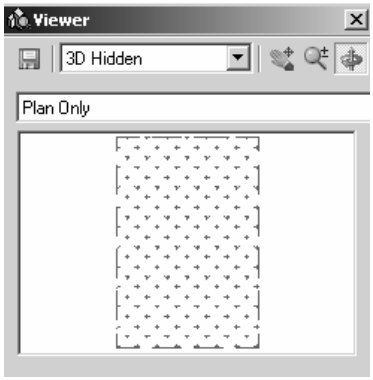
Select the **Layer/Color/Linetype** tab.
Highlight **Base Hatch**.
Set the Layer to **A-Area-Spce-Patt**.
Set the Color to **magenta**.

36.



Select the **Hatching** tab.
Set the Hatch to **GRASS**.
Set the Scale to **12**.
Set the Angle to **0.00**.
Press **OK**.

37.  Select the **Floating Viewer** tool located in the lower left corner of the Styles dialog.



Your space is previewed in the Viewer.

38. Close the Style Manager.

39. Save as *ex1-2.dwg*.

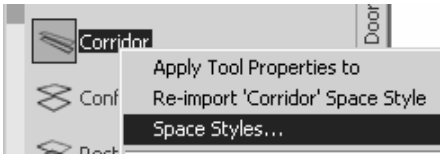
Exercise 1-3:
Copying Space Styles

This exercise reviews the following concepts:

- Space Styles
- Style Manager
- Copy Style
- Paste Style

File: ex1-2.dwg
Estimated Time: 15 minutes

1. Open or continue working in *ex1-2.dwg.*

2. 

Highlight the Corridor tool.

Right click and select **Space Styles**.

3. 

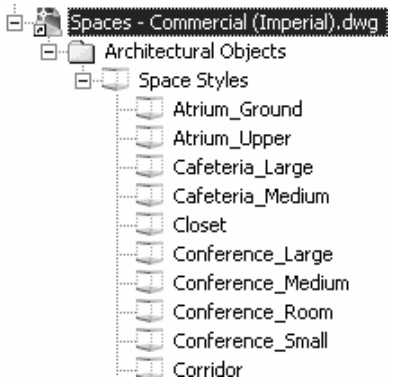
Select the **Open** tool.

4. 

Browse to the Imperial folder under *Documents and Settings\All Users\Application Data\ Autodesk\ACD-A 2005\enu\Styles\Imperial.*

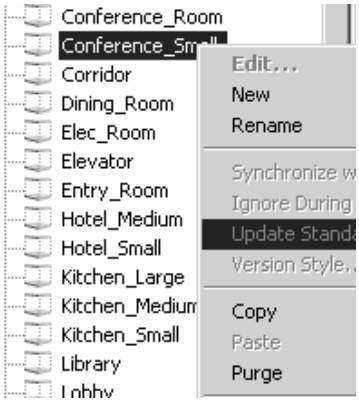
5. 

Open
Spaces – Commercial (Imperial).dwg.

6. 

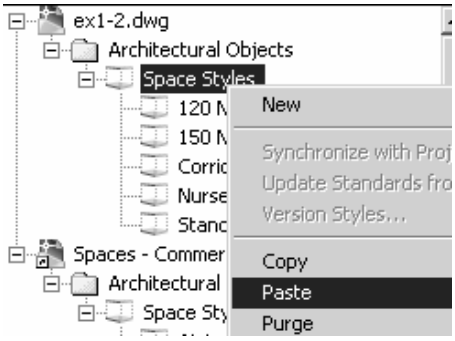
Expand the *Space Styles c*ategory under Architectural Objects.

You see the same tools as we had in the Content Browser.

7. 

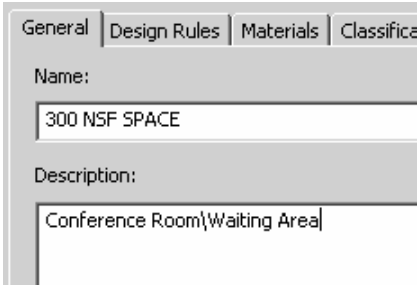
Locate the **CONFERENCE_SMALL** space style.

Right click and select **Copy**.

8. 

Highlight the *Space Styles* category in the *ex1-2.dwg.*

Right click and select **Paste**.

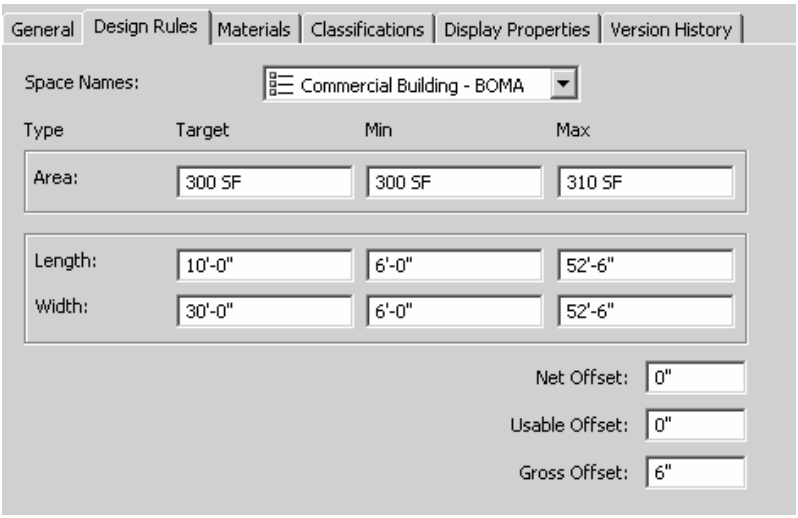
9. 

Highlight the **CONFERENCE_SMALL** space style.

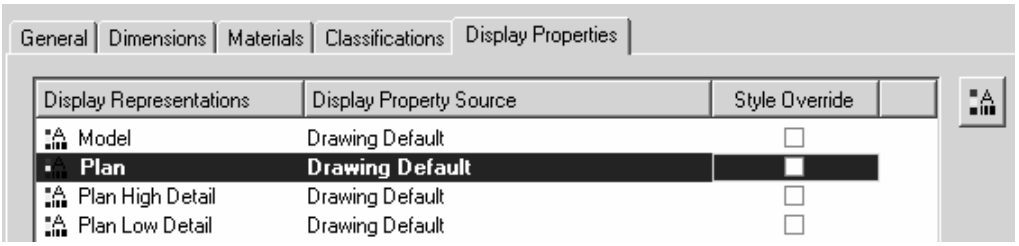
Select the **General** tab.

Change the Name field to **300 NSF SPACE**.

Type in **Conference Room\Waiting Area** in the Description field.

10. 

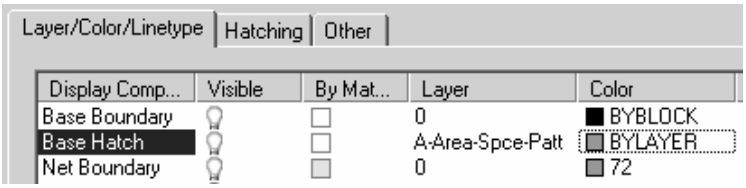
Select the **Dimensions** tab.
Set the Area to **300 SF**.
Set the Min to **300 SF**.
Set the Max to **310 SF**.
Set the Length to **10′**.
Set the Min to **6′**.
Set the Max to **52′6″**.
Set the Width to **30′**.
Set the Min to **6′**.
Set the Max to **52′ 6″**.
Set the Gross Offset to **6″**.

11. 

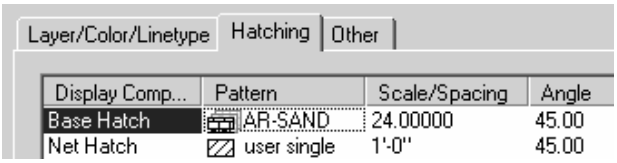
Select the **Display Properties** tab.
Highlight **Plan**.

12. 

Select the **Display Properties** button located on the right.

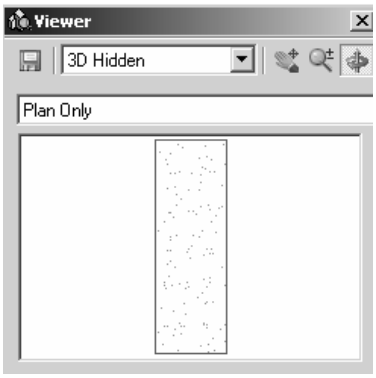
13. 

Select the **Layer/Color/Linetype** tab.
Highlight **Base Hatch**.
Set the Color to **BYLAYER**.

14. 

Select the **Hatching** tab.
Set the Hatch to **AR-SAND**.
Set the Scale to **1′-0″**.
Set the Angle to **45.00**.
Press **OK** twice.

15.  Select the **Floating Viewer** tool located in the lower left corner of the Styles dialog.



Your space is previewed in the preview window.

16. Close the Style Manager.

17. Save as *ex1-3.dwg*.

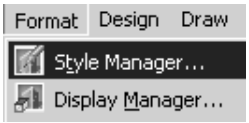
Exercise 1-4:
Adding Styles to the Palette

This exercise reviews the following concepts:

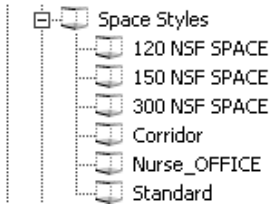
- Space Styles
- Style Manager
- Copy Style
- Paste Style
- Delete Tool
- Tool Properties

File: ex1-3.dwg
Estimated Time: 10 minutes

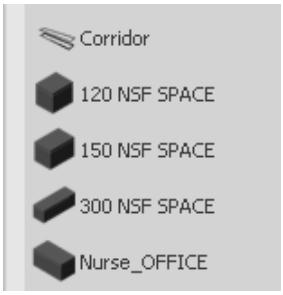
1. Open or continue working in *ex1-3.dwg*.

2. 

Go to **Format→Style Manager**.

3. 

Expand the *Space Styles* category in the *ex1-3.dwg.*

4. 

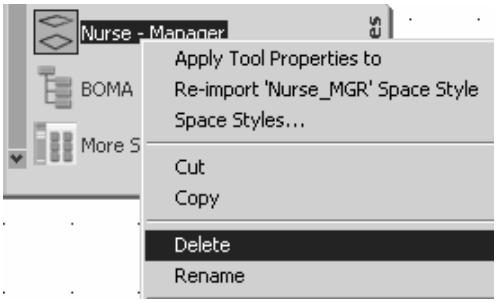
Drag the 120 NSF SPACE style onto your SPACE tools palette.

Drag the 150 NSF SPACE style onto your SPACE tools palette.

Drag the 300 NSF SPACE style onto your SPACE tools palette.

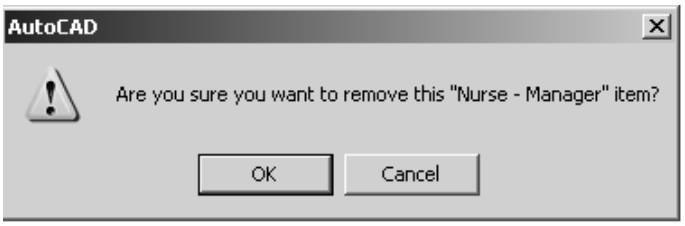
Drag the NURSE_OFFICE style onto your SPACE tools palette.

Close the Style Manager.

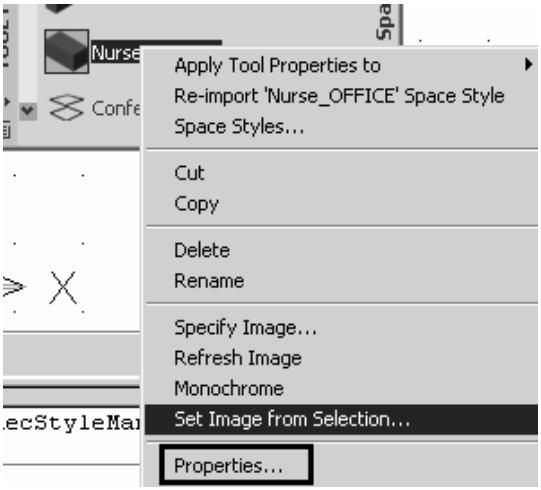
5. 

Highlight the **NURSE_Manager** tool on the palette.

Right click and select **Delete**.

6. 

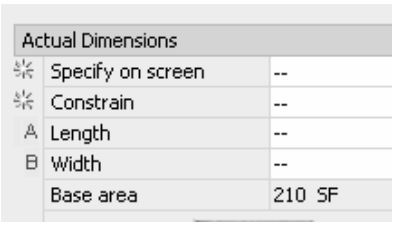
Press **OK** to complete the deletion.

7. 

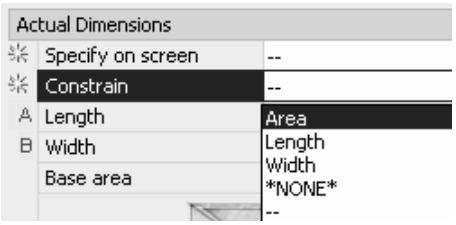
Highlight the **NURSE_OFFICE** tool.

Right click and select **Properties**.

8. Browse through the Properties.

9. 

Note that the Base Area is 210 SF – the value you assigned when you edited this style.

10. 

Locate the **Constrain** field.

Select **Area** under Constrain.

This requires the space to always equal the specified area.

Press **OK** to close the Properties dialog.

11. Save the file as *ex1-4.dwg.*

ACA 2005 includes a built-in drawing management system. This system consists of the Project Browser and the Project Navigator. The Project Browser allows you to define new projects and assign information, such as location, sub-contractors, contact information, permits, etc. The Project Navigator allows you to organize your drawings into categories and organize your drawing sheets.

Exercise 1-5:

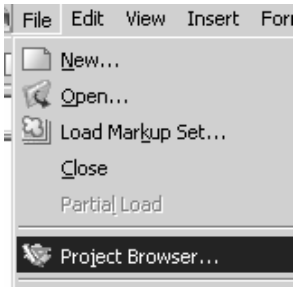
Starting a New Project

This exercise reviews the following concepts:

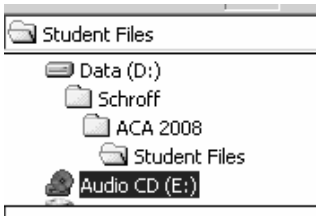
- Project Browser
- Adding a New Project

File: ex1-4.dwg
Estimated Time: 10 minutes

1. Open or continue working in *ex1-4.dwg*.

2. 

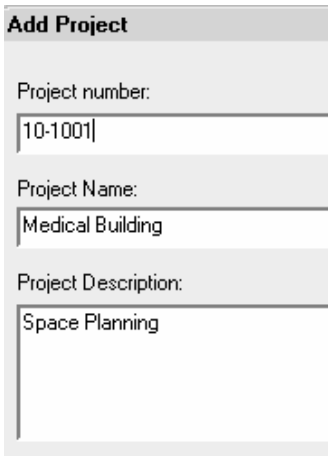
Go to **File→Project Browser**.

3. 

Browse to the folder where you want to store your project files.

4. 

Select the **New Project** tool located in the lower left of the dialog.

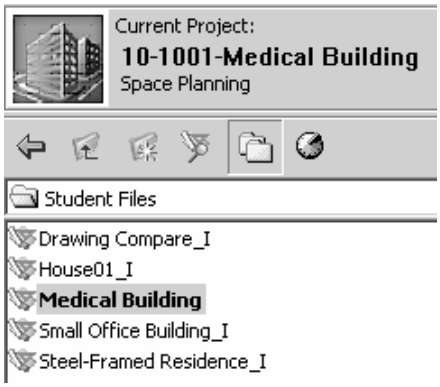
5. 

Enter **10-1001** as the Project Number

Enter **Medical Building** in the Name field.

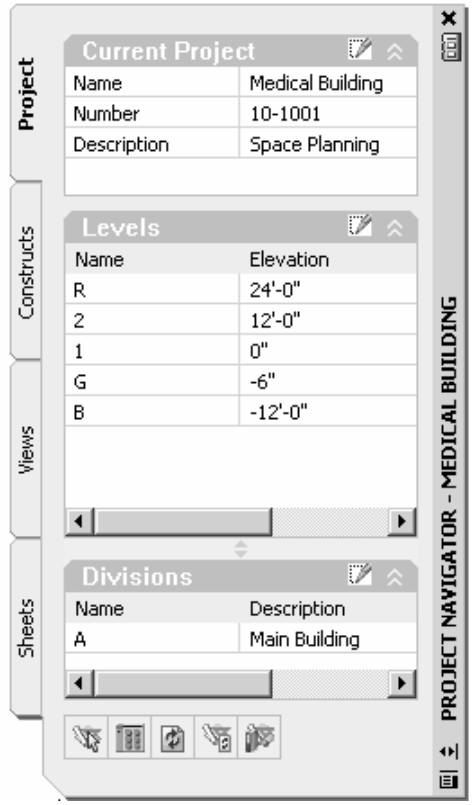
Enter **Space Planning** in the Description field.

Press **OK**.

6. 

The Current Project now shows **Medical Building**.

7. Press **Close**.



The Project Navigator will launch with the project information.

8. Save as *ex1-5.dwg.*

Constructs are used to organize your drawing.

There are three types of content used in defining a construct:

- Drawing objects: spaces, areas, ceiling grids, and walls are all examples of types of constructs
- Element references: Furniture, casework, landscape objects are all examples of elements which may be reused throughout a model design
- Combination of drawing objects and element references: a ceiling grid with lighting fixtures or a floor plan with furniture are examples of this type of construct.

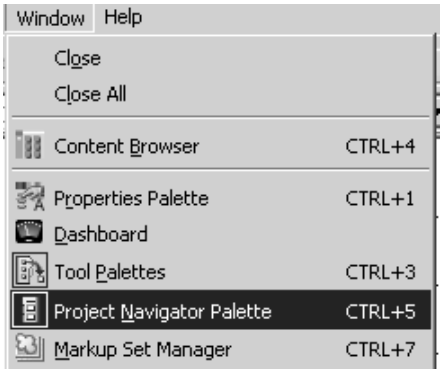
Exercise 1-6:
Adding Constructs

This exercise reviews the following concepts:

- Adding Constructs
- Project Navigator

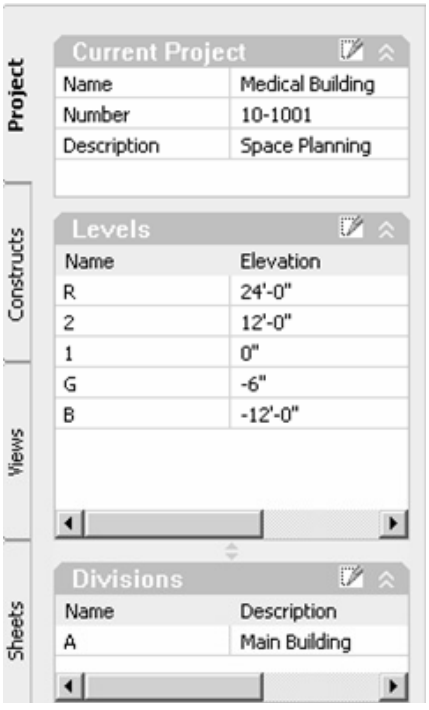
File: ex1-5.dwg
Estimated Time: 10 minutes

1. Open or continue working in *ex1-5.dwg*.

2. 

   Launch the **Project Navigator Palette**, if it is not already visible.

   You can enable it by going to **Window→Project Navigator Palette**.

3. 

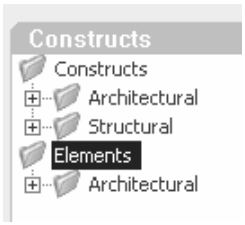
   Select the **Project** tab.

   Note that we have defined a project with one level (this means it is a single story building) and one division.

   Divisions are used to allow users to break up a model into smaller files. The files could then be used as external references and shared among users.

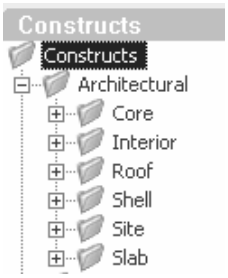
   Levels are horizontal portions of a building model. Divisions are vertical portions of a building model. An East/West wing would be an example of a division. A division could also be used for phasing or demolition.

   The main plus to defining different divisions is to quickly and easily create views and navigate around a large building model.

4. 

Select the **Constructs** tab.

Note that there are two main folders. The Constructs folder is used to store drawing objects. The Elements folder is used to store blocks, which are used in multiple occurrences.

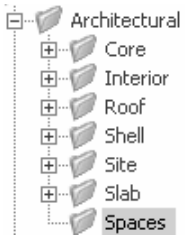
5. 

Expand the **Architectural** folder.

6. 

Highlight the **Architectural** folder.

Right click and select **New→Category**.

7. 

Rename the folder **Spaces**.

8. Save the file as *ex1-6.dwg.*

- If you start your drawing using the ACA template, there are several styles already imbedded. This automatically makes your file size bigger than it needs to be as you probably won't be using all the styles.
- If you make changes to your palette, any changes will be saved with your application – not just the drawing.
- Styles in the Style Manager are organized in alphabetical order. When you rename your style, it will shift to the correct location in the style manager list.
- If you want custom styles to be available to all your drawings, open the template drawing you use and save all the styles to the template.