Space Planning
with
Architectural Desktop
R3.3

OFFICE_300SF

300.00 SF

15'–0" x 20'–0"

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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 ADT 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

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

TIP: 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.

The two space planning toolbars available in ADT are Space Boundaries and Spaces.

We start by defining the Space Styles for each of our areas.
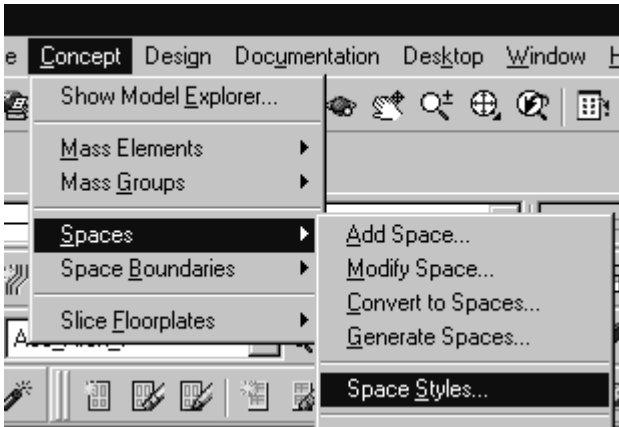
Menu\ Graphics Window-Right Click	Concept->Spaces->Space Styles
Spaces Tool Bar	
Command Line	AecSpaceStyle

Exercise 1-1:
*Adding Space Styles*

This exercise reviews the following concepts:

- Style Manager
- Creating New Space Styles
- Editing Space Styles
- Editing Entity Properties
- Controlling Entity Display
- Selecting Hatch Patterns for Entities
- Property Set Definitions
- Copying Space Styles

File: New from Scratch
Estimated Time: 30 minutes

Start a new drawing from scratch.

Each Style within ADT uses Property Set Definitions.
Because we started our drawing from scratch, we don't have any property set definitions available yet.
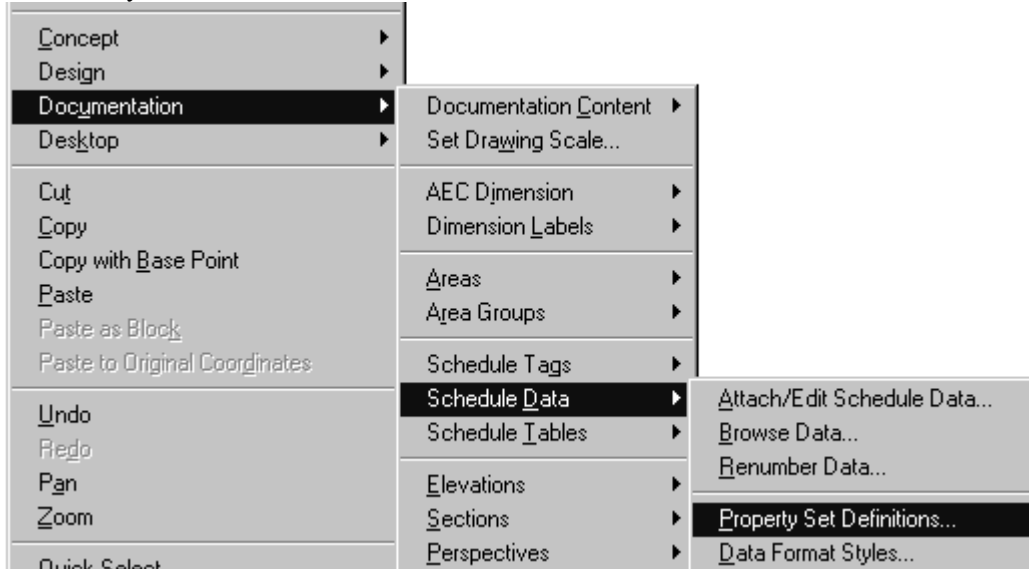
Menu\ Graphics Window-Right Click	Documentation->Schedule Data->Property Set Definitions
Command Line	PropertySetDefine

Go to Documentation->Schedule Data->Property Set Definitions.
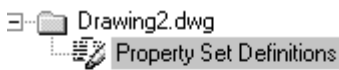
We see Property Set Definitions in the current drawing, but there are no definitions available.
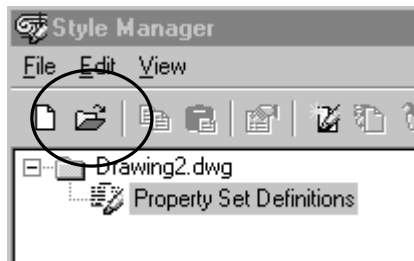
Select the 'File Open' tool in the Style Manager.
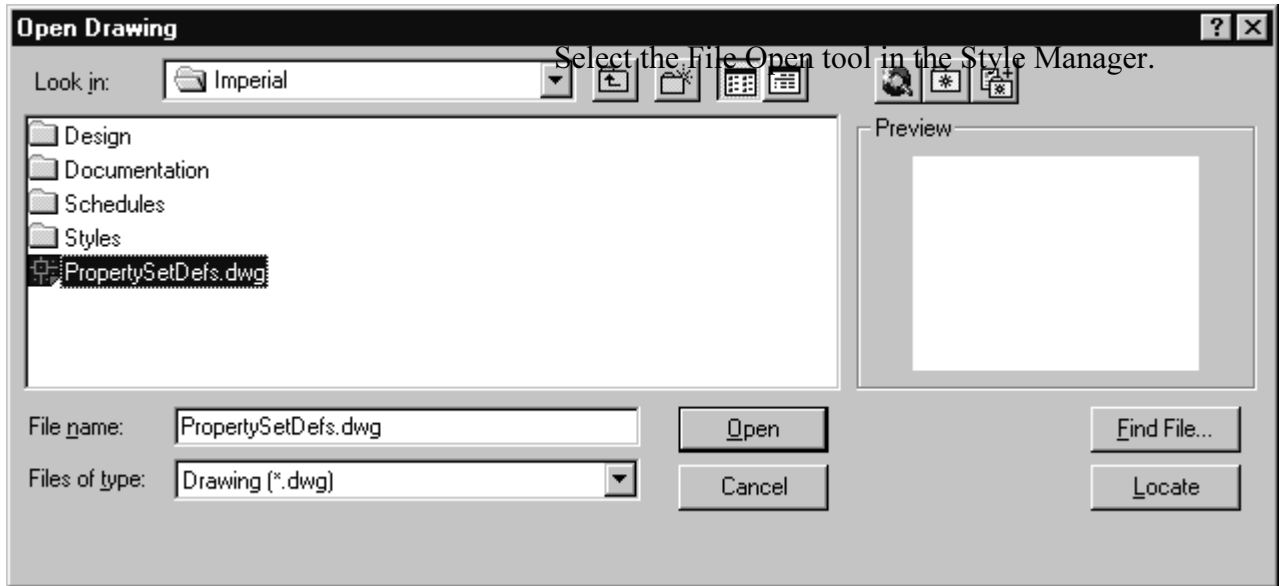
Locate the PropertySetDefs.dwg under the Content\Imperial path.

Press 'Open'.

Locate GeneralObjects under the PropertySetDefs.dwg.
On the right pane, you see all the object properties that
the property definition includes.
Highlight GeneralObjects, right click and select 'Copy'.
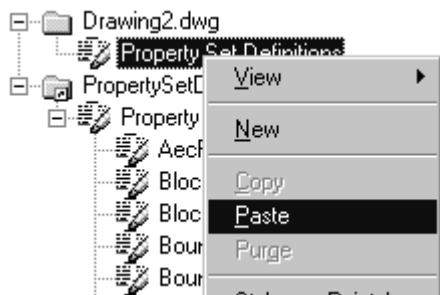
Highlight Property Set Definitions under your
drawing.
Right click and select 'Paste'.
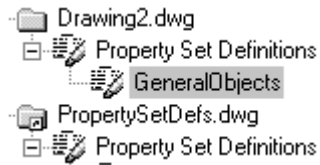
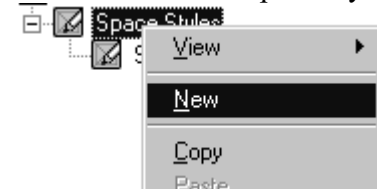We have now added the GeneralObjects Property Set definition to our drawing.

Repeat to add:

- GeoObjects
- Space
- SpaceStyles

To your Property Set Definitions.

Select the Space Style tool from the Spaces toolbar.

We want to create space styles for the defined spaces.

Expand Space Styles.
Highlight Space Styles.
Right click and select 'New'.

The New Style appears in the styles list.
Rename the new style to OFFICE_120SF.
Select the OFFICE_120SF style. Right click and select 'Edit'.

TIP: 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.

TIP: If you start your drawing using the ADT 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.
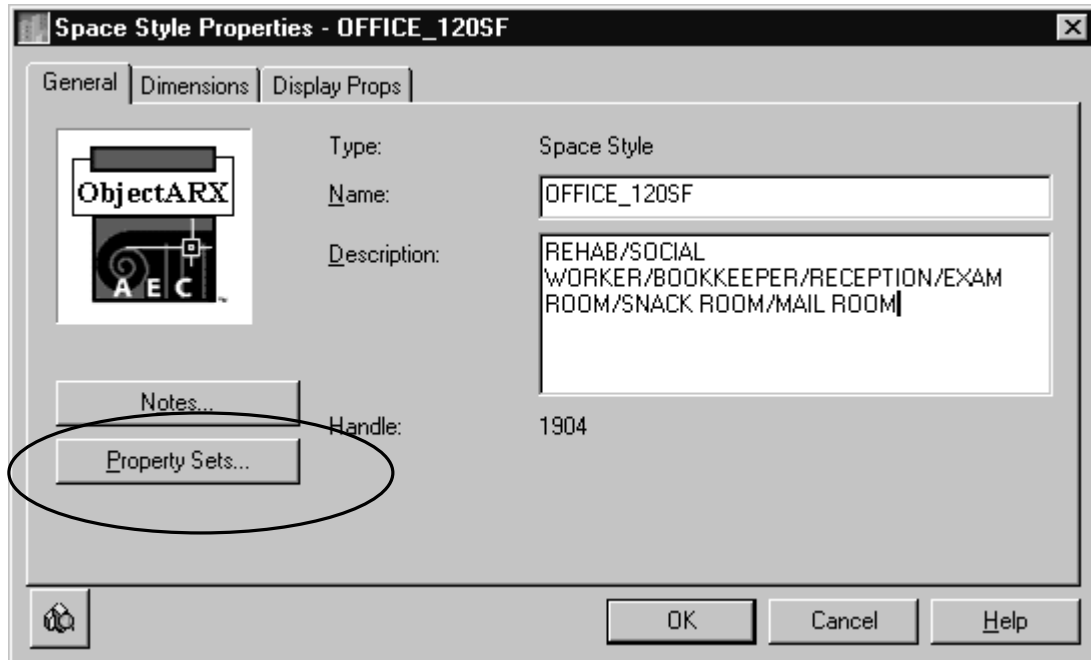
Select the General tab.
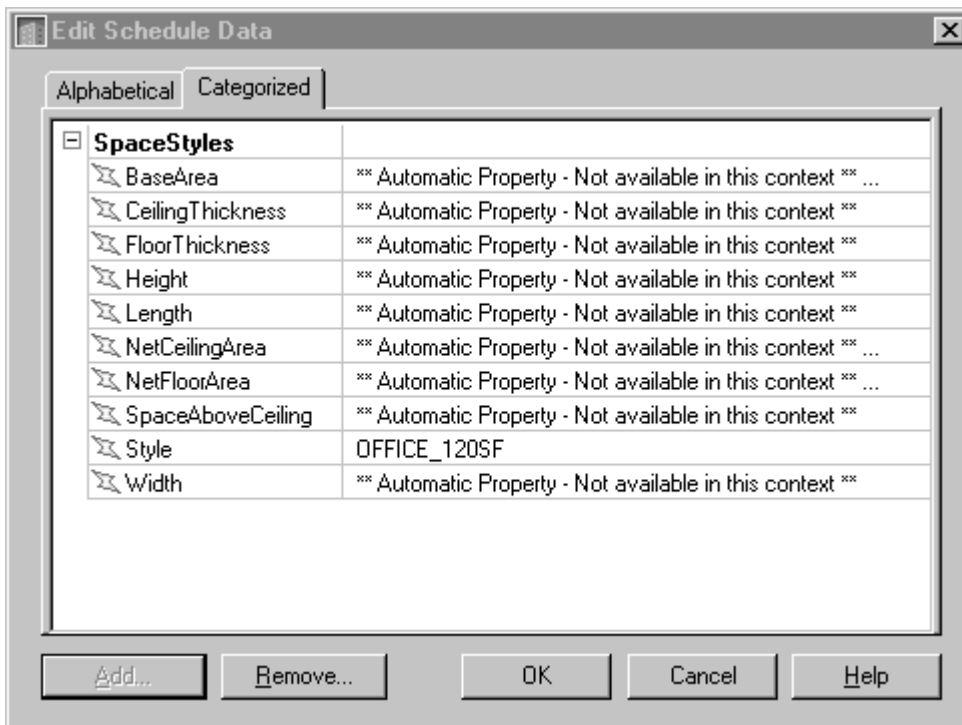Under Description, enter all the room descriptions that will be 120 SF.
Select the 'Property Sets' button.
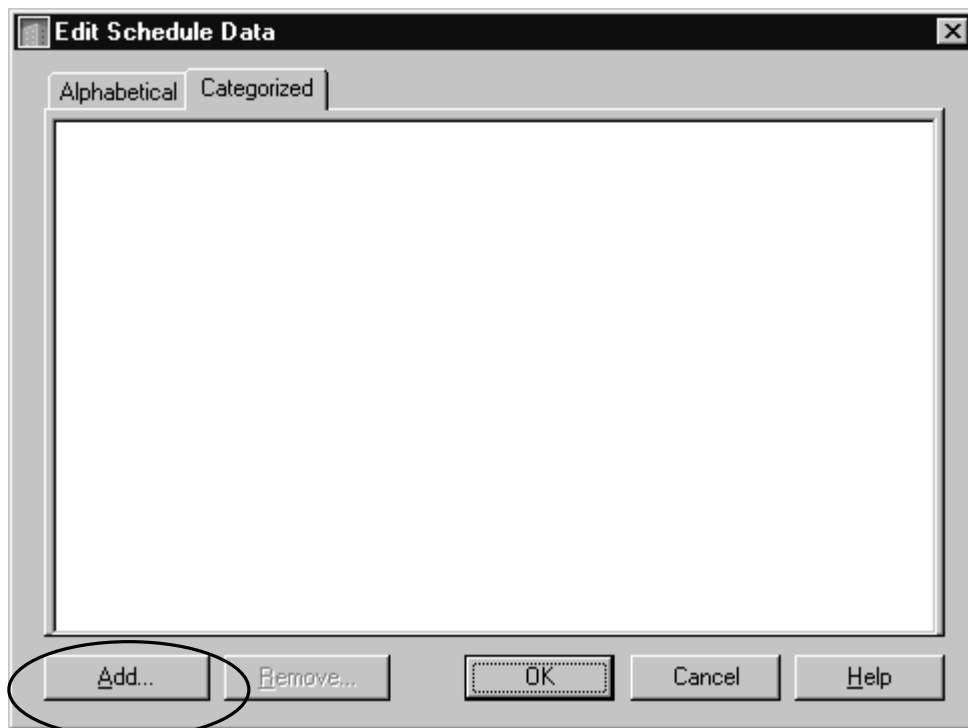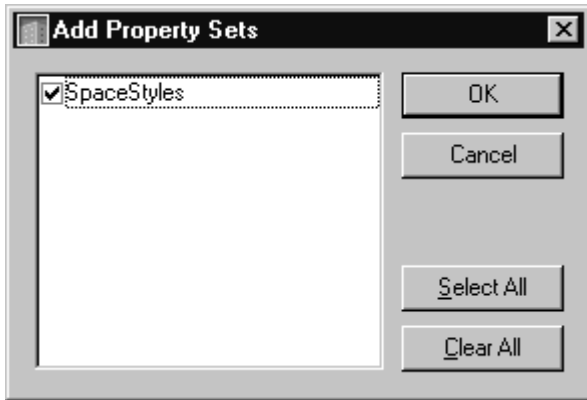
Select the Add button.

Enable SpaceStyles.
Press 'OK'.

We now have added the standard schedule data to our space style so it can be included in a space schedule.
Press 'OK'.

Select the Dimensions 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.)
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 Net to 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.
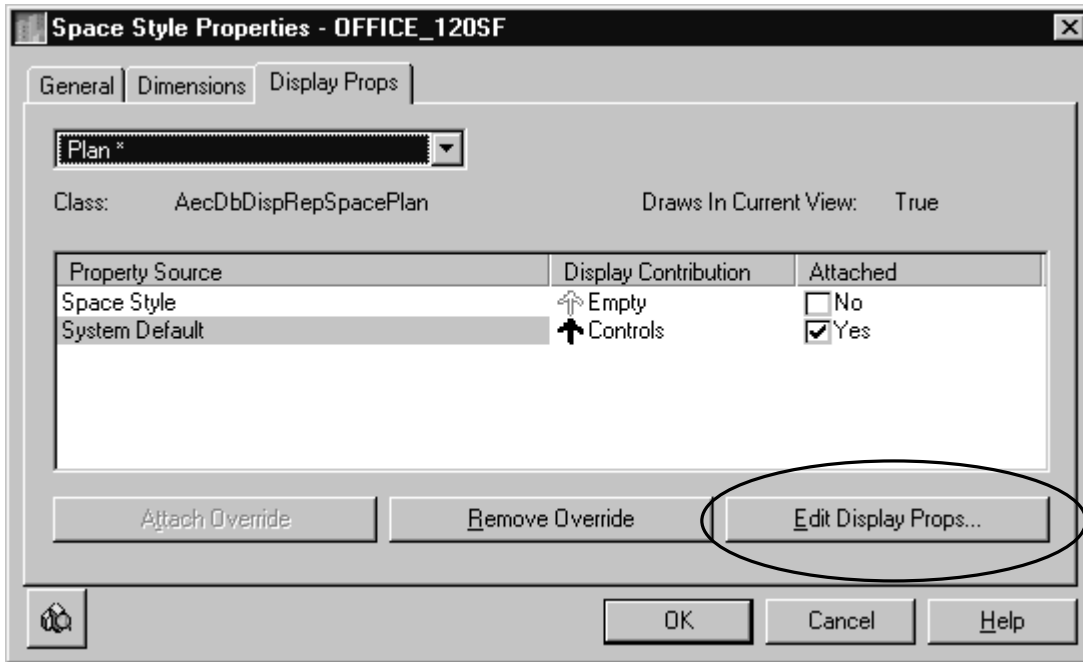
Select the Display Props tab.
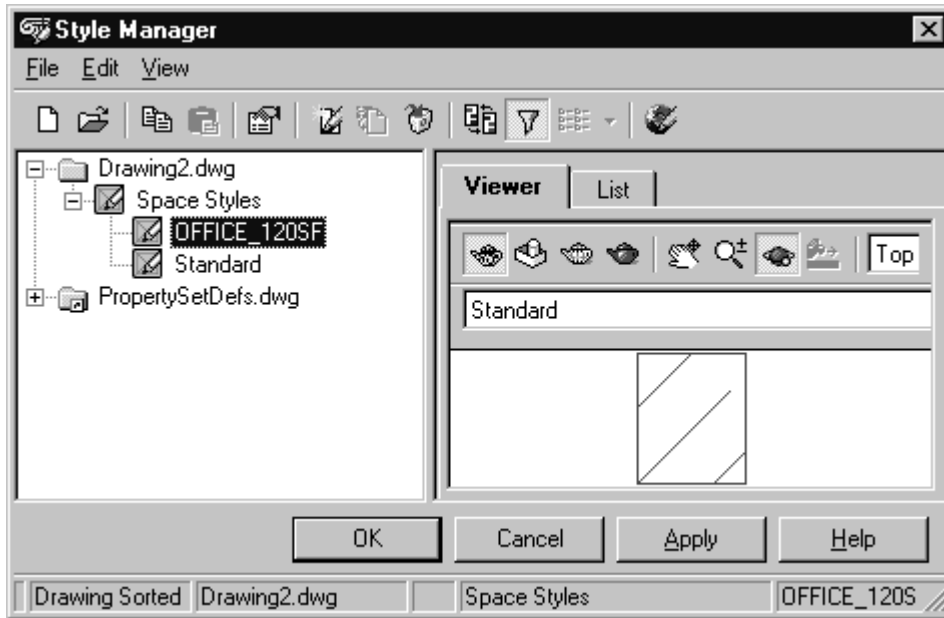Press the Edit Display Props button.
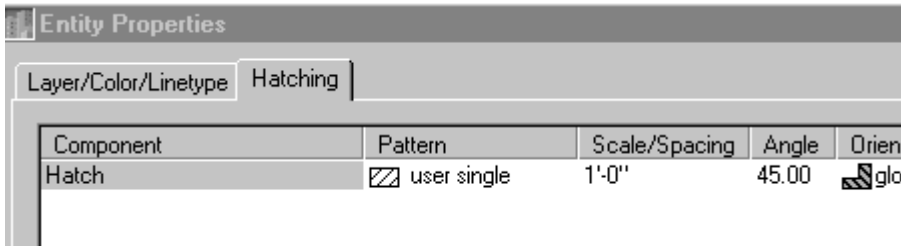
Select the Hatching tab.
Click on the pattern column where it says 'user single'.
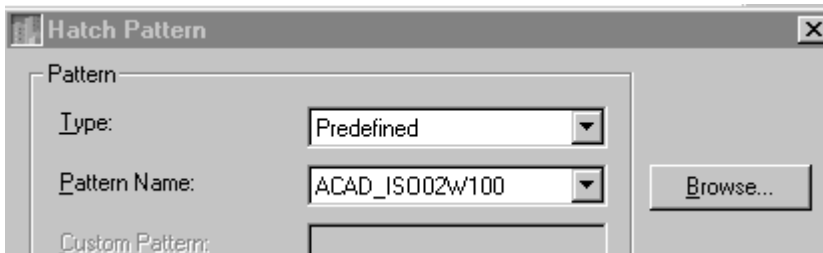
Change the hatch pattern to set Type as Predefined.
Set the Pattern Name to ACAD_ISO02W100.
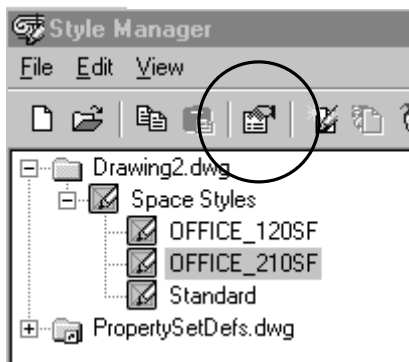
Press 'OK' three times to exit out of the dialog.

Your space appears in the Style Manager with the newly defined Hatch Pattern previewed.
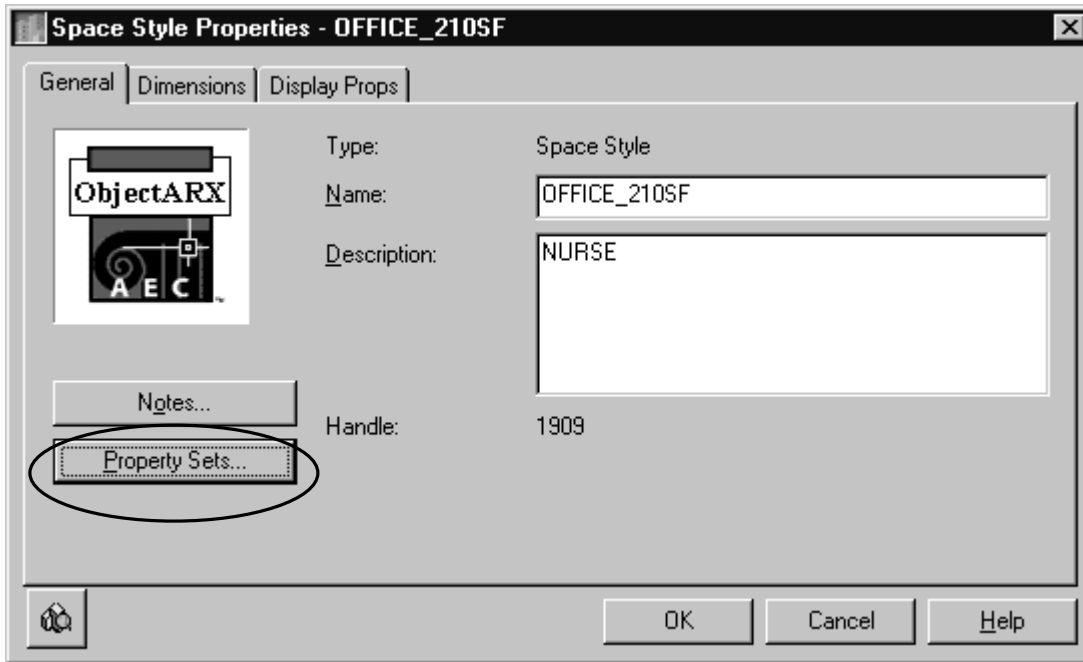
Highlight Space Styles.
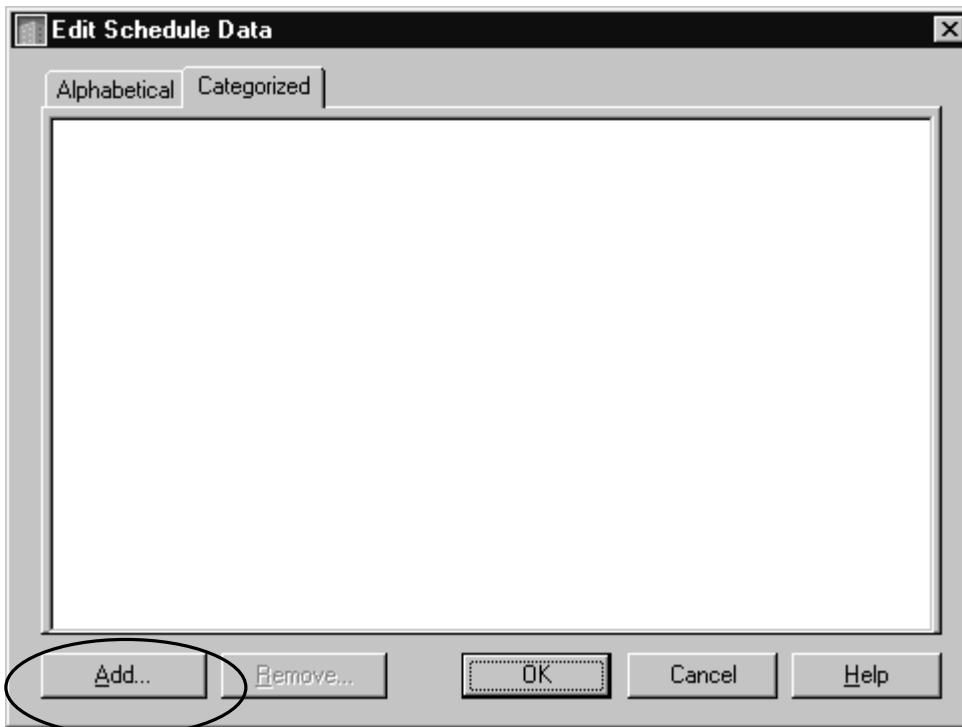Select the 'New Style' tool from the Style Manager toolbar.

Rename the new style to OFFICE_210SF.

Highlight OFFICE_210SF.

Select the 'Edit Style' tool from the Style Manager toolbar.

Select the General tab.
Type NURSE for the Description.
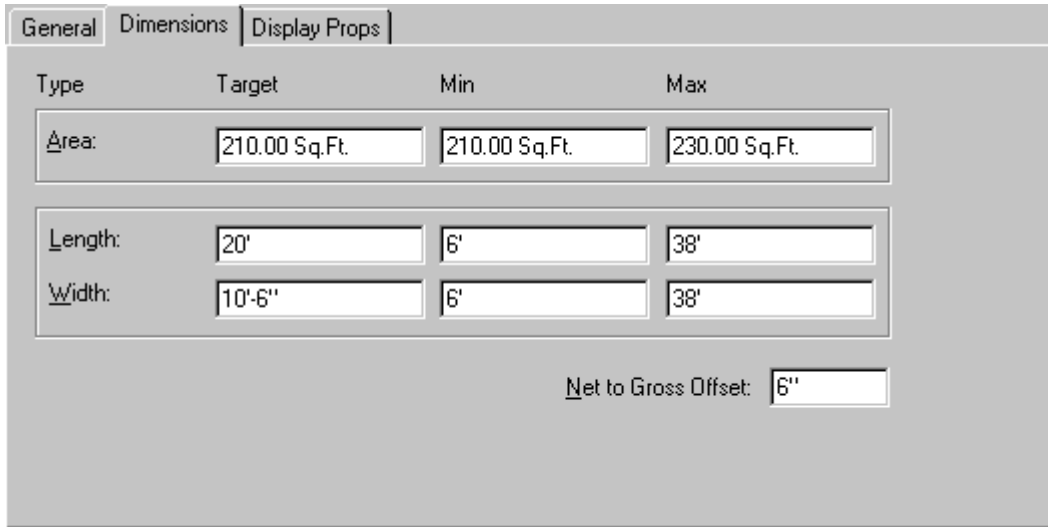Select the 'Property Sets' button.

Select the Add button.
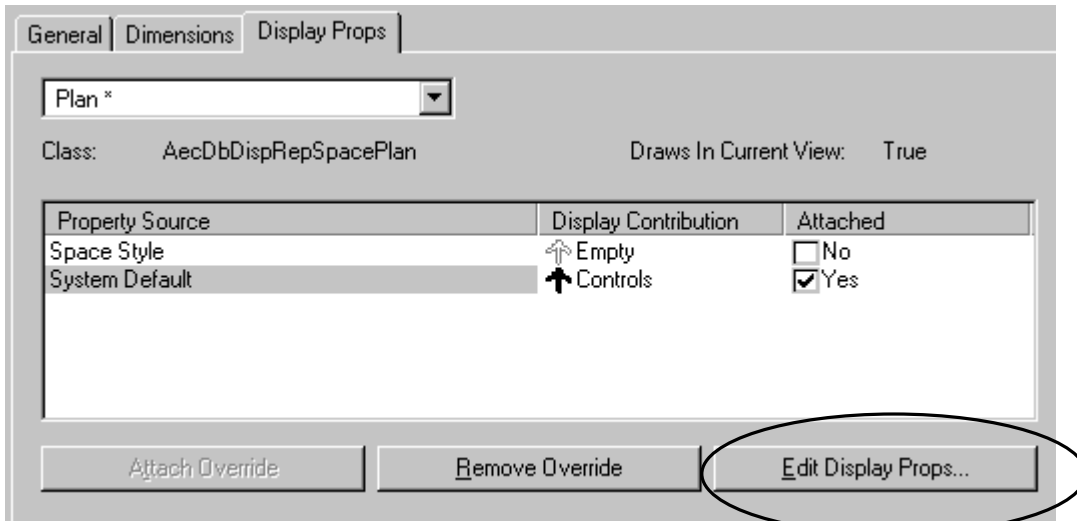
Enable SpaceStyles.
Press 'OK'.

We now have added the standard schedule data to our space style so it can be Included in a space schedule.
Press 'OK'.
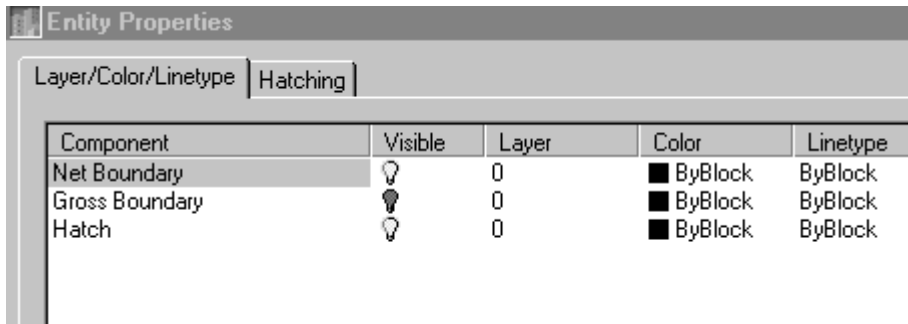
Select the Dimensions tab.
Set the Area to 210 SF.
Set the Min to 210 SF
Set the Max to 230 SF
Set the Length to 20'.
Set the Min to 6'.
Set the Max to 38'.
Set the Width to 10'-6".
Set the Min to 6'.
Set the Max to 38'
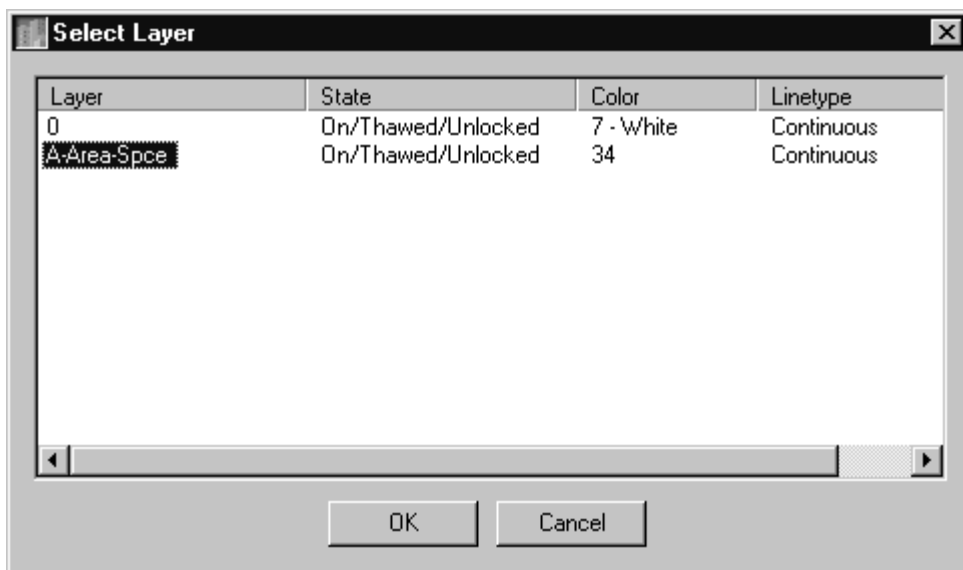Set the Net to Gross Offset to 6".

Select the Display Props tab.

Select 'Edit Display Props'.

Select the Layer/Color/Linetype tab.
Select the Layer for the Net Boundary.

Set the layer to be A-Area-Spce.
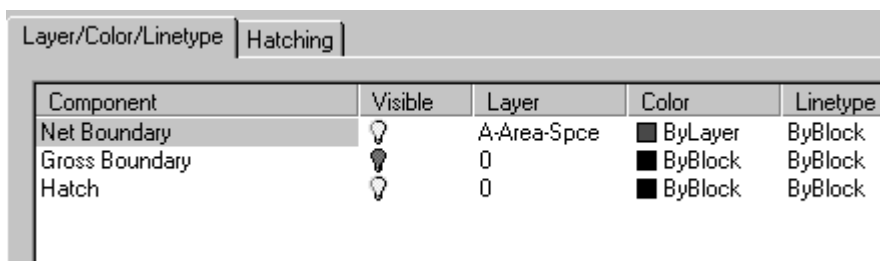
Set the color for the Net Boundary to ByLayer.
Press 'OK' twice to close the dialog box.

Highlight the OFFICE_120SF.
Right click and select 'New'.

Rename to OFFICE_300SF.

Highlight the OFFICE_300SF Style.
Right click and select 'Edit'.

Select the General tab.

Under Description, type in the two rooms that will be 300 SF.

Select the Property Sets button.
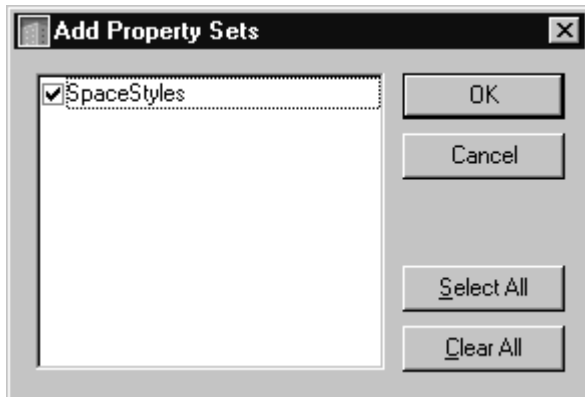
Select the Add button.

Enable SpaceStyles.
Press 'OK'.

We now have added the standard schedule data to our space style so it can be included in a space schedule.
Press 'OK'.
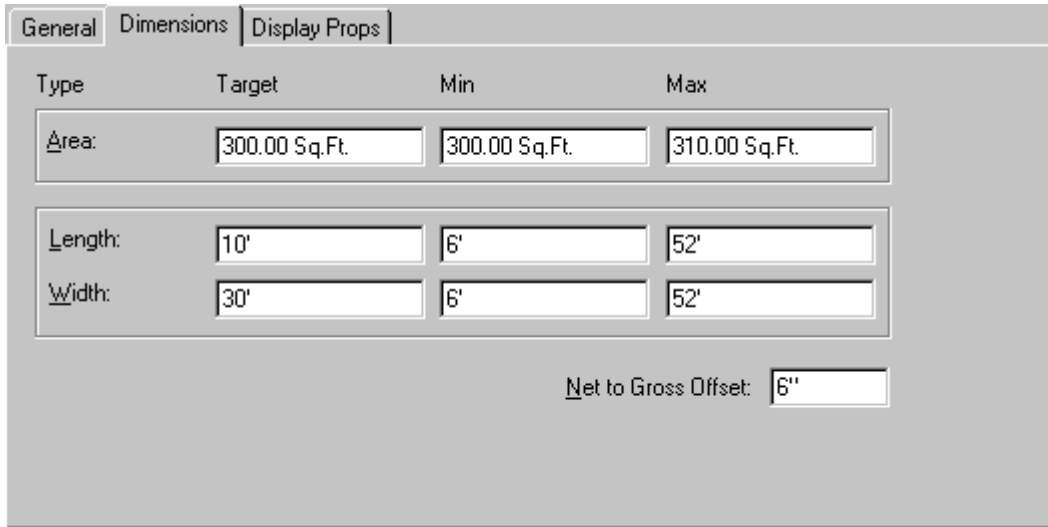
Select the Dimensions tab.
Set the Area to 300 SF.
Set the Min to 300 SF.
Set the Max to 310 SF.
Set the Length to 10'.
Set the Min to 6'.
Set the Max to 52'.
Set the Width to 30'.
Set the Min to 6'.
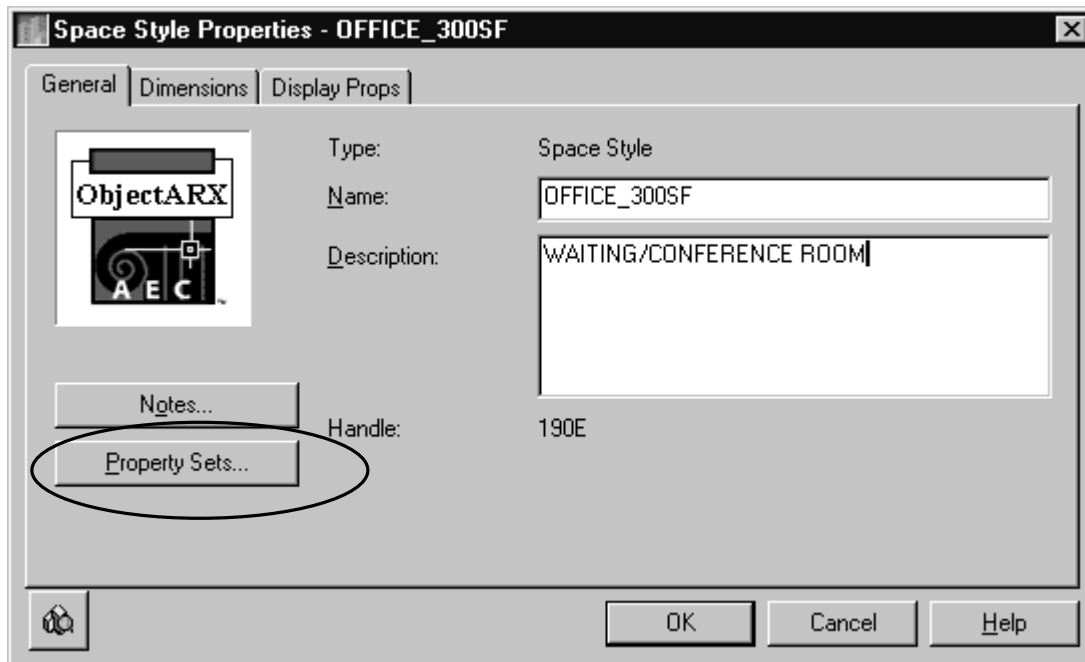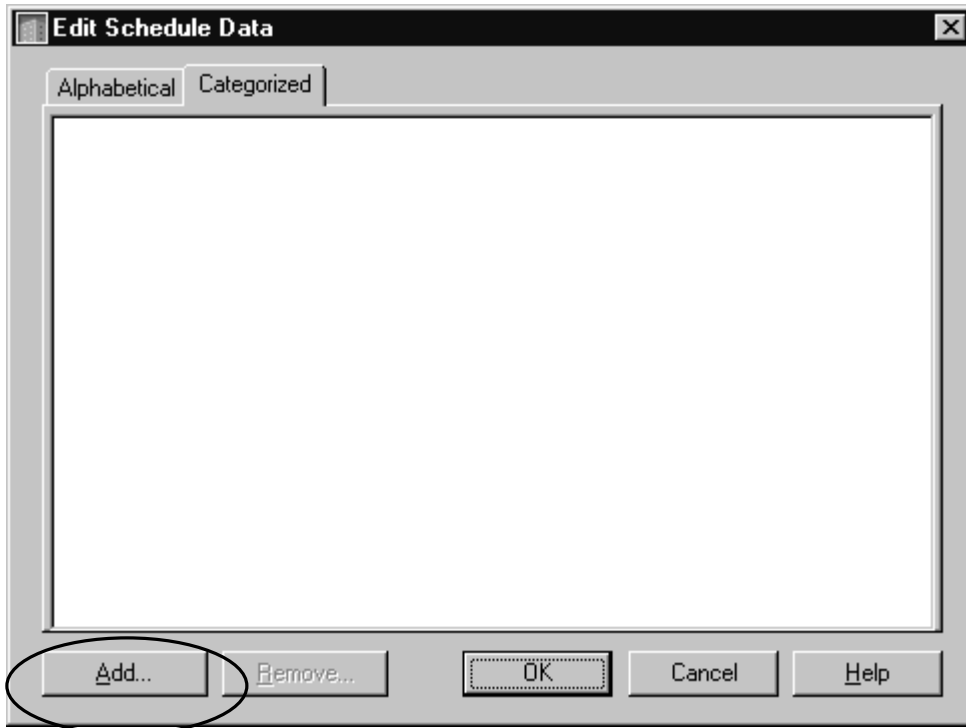Set the Max to 52'.
Set the Net to Gross Offset to 6".

Press 'OK' to exit the Space Style Properties dialog box.
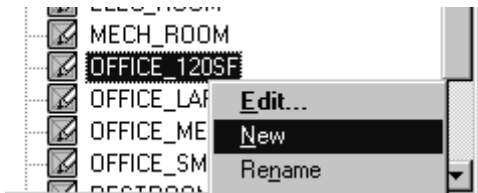
Highlight the OFFICE_120SF.
Right click and select 'New'.

Rename the new
style to
OFFICE_150SF.

OFFICE_120SF
OFFICE_150SF
OFFIC   Edit...
OFFIC   New

Highlight OFFICE_150SF.
Right click and select 'Edit'.

General	Dimensions	Display Props

Type	Target	Min	Max
Area:	150.00 Sq.Ft.	150.00 Sq.Ft.	160.00 Sq.Ft.

	Target	Min	Max
Length:	10'	6'	27'
Width:	15'	6'	27'

Net to Gross Offset: 6''

Select the Dimensions tab.
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".

Select the General tab.
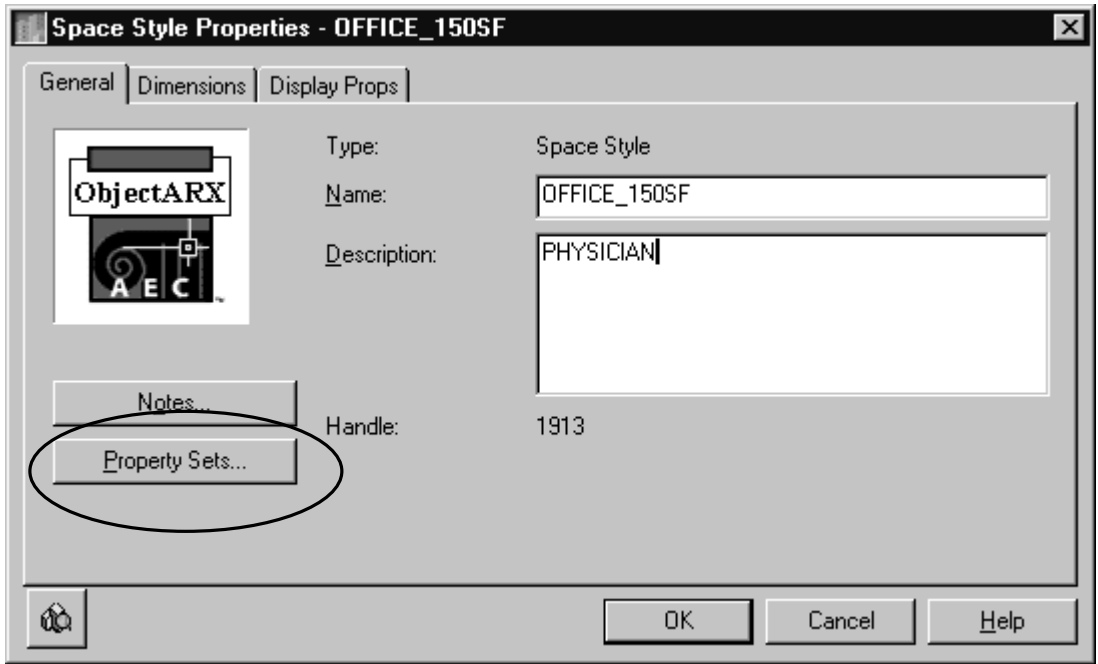
Type in the appropriate description.
Select the 'Property Sets' button.
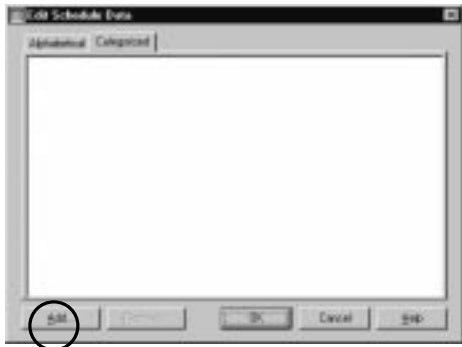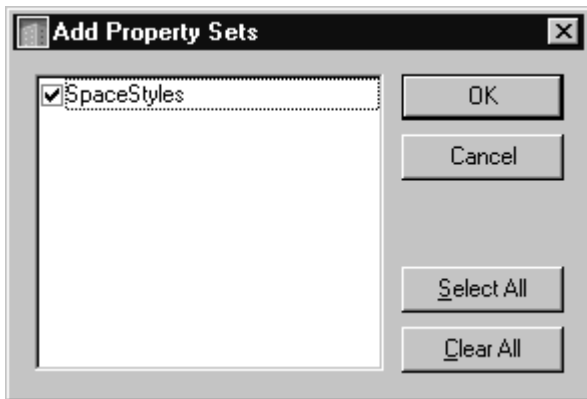

Select the Add button.

Enable SpaceStyles.
Press 'OK'.
We now have added the standard schedule data
to our space style so it can be included in a space
schedule.
Press 'OK'.

OFFICE_120SF
OFFICE_150SF
OFFICE_210SF
OFFICE_300SF
OFFICE_LARGE
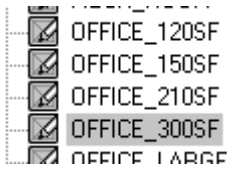
You should have four space styles created:
OFFICE_120SF
OFFICE_150SF
OFFICE_210SF
OFFICE_300SF
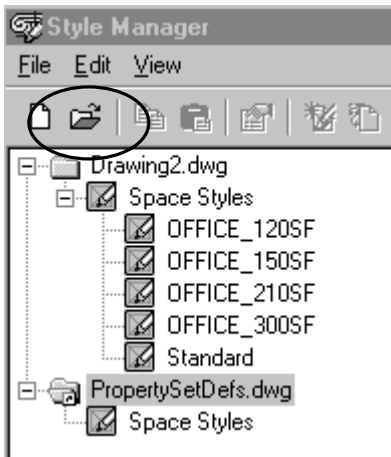
Select the File Open tool in the Style
Manager toolbar.
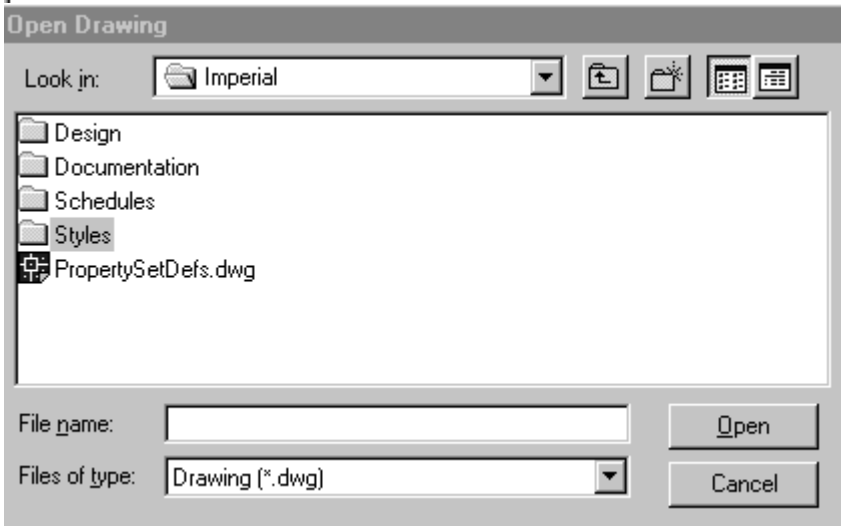
Locate the Styles folder
under Imperial and press
'Open'.
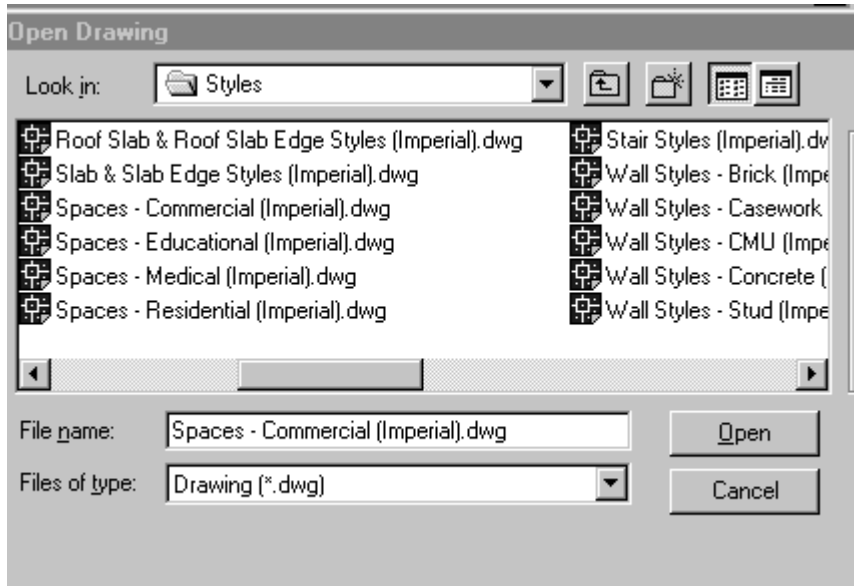
Locate the drawing named Spaces-Commerical(Imperial) and press Open.
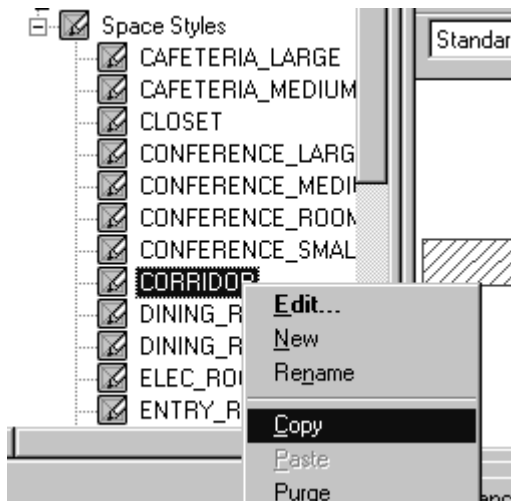
Locate the Space Style called CORRIDOR.
Highlight, right click and select 'Copy'.
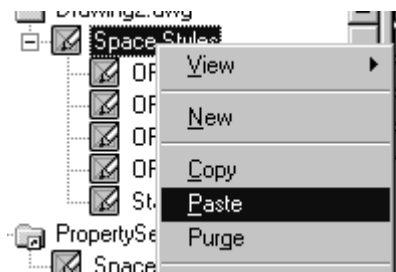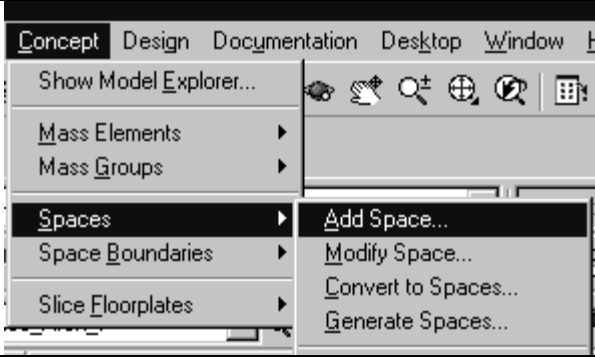
Highlight Space Styles in your drawing.
Right click and select 'Paste'.

We now have created and copied all the space styles we need to create our spaces.

Save as ex1-1.dwg.

Add Space

Menu\Graphics Window- Right Click	
	Concept Design Documentation Desktop Window Show Model Explorer... Mass Elements ▶ Mass Groups ▶ Spaces ▶ Add Space... Space Boundaries ▶ Modify Space... Convert to Spaces... Slice Floorplates ▶ Generate Spaces...
Spaces Toolbar	
Command Line	AecSpaceAdd

Exercise 1-2:
Adding Spaces

This exercise reviews the following concepts:

- Adding Spaces
- Setting Space Styles

File: ex1-1.dwg
Estimated Time: 15 minutes

Reset your drawing limits.   Set the lower left corner at 0'-0",0'-0".
                                              Set the upper right corner to 1400', 2300'.

Use Format->Drawing Limits.

```
Command: '_limits
Reset Model space limits:
Specify lower left corner or [ON/OFF] <0'-0",0'-0">:

Specify upper right corner <1400'-0",2300'-0">:
```

Select the Add Space tool.
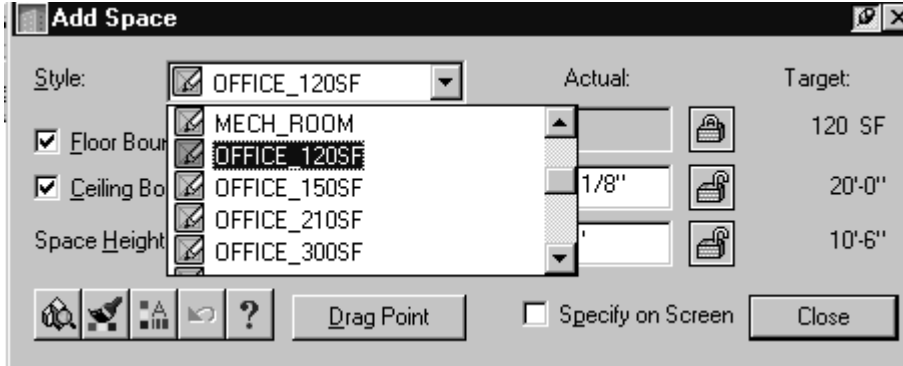
From the Style drop down list, locate the style for OFFICE_120SF.
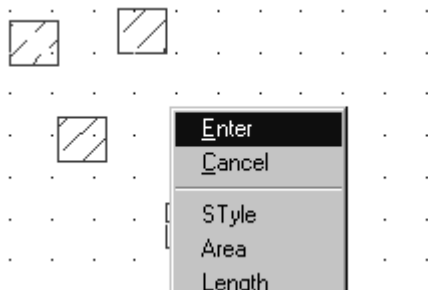
We need a total of seven spaces of this size. After selecting the insertion point, right click and select 'Enter'.
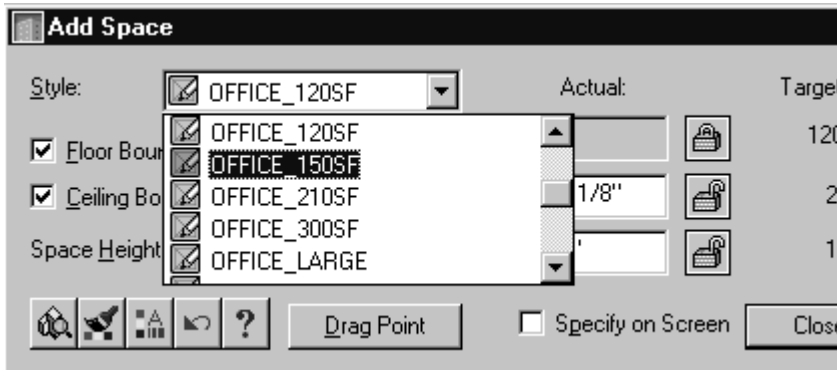
When you have placed seven instances of the OFFICE_120SF.
Go to the Add Space Dialog box and select the OFFICE_150SF style.
Place one instance.

Switch to the OFFICE_210SF style and place one instance.

Switch to the OFFICE_300SF style and place two instances.

Press 'Close'.
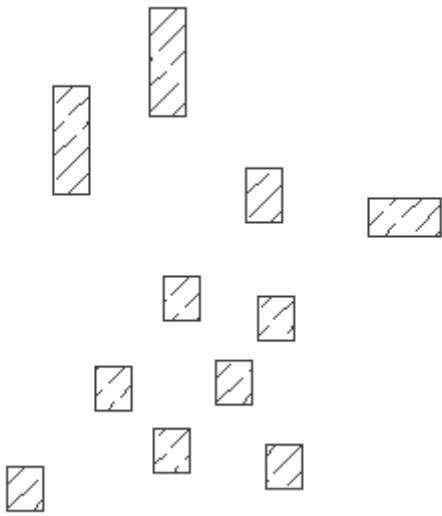
Your spaces have been placed randomly in the drawing.

Save your file as Ex1-2.dwg.

Next we need to identify our spaces so we can start defining the relationships.
To identify our spaces, ADT provides room tags.
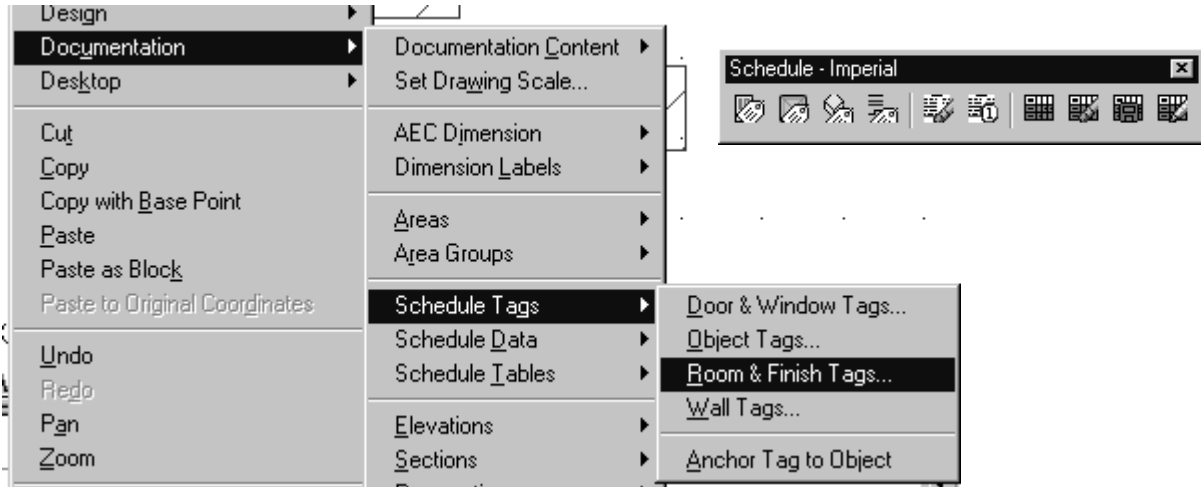
Schedule Tags

Menu/Graphics window Right Click	Documentation->Schedule Tags->Room & Finish Tags
Command Line	AecDcSetImpRoomAndFinishTags
Schedule – Imperial Toolbar	

Exercise 1-3:
Adding Space Tags

This exercise reviews the following concepts:

- Adding Space Tags
- Modifying Space Tag AEC Content
- Retrieving Entity Property Information
- Modifying Space Tags

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

We do not want to see the Edit Schedule Data dialog appear when we add our tags.

Go to Options.
Select the AEC Content tab.
Disable the 'Display Edit Schedule Data Dialog During Tag Insertion'.
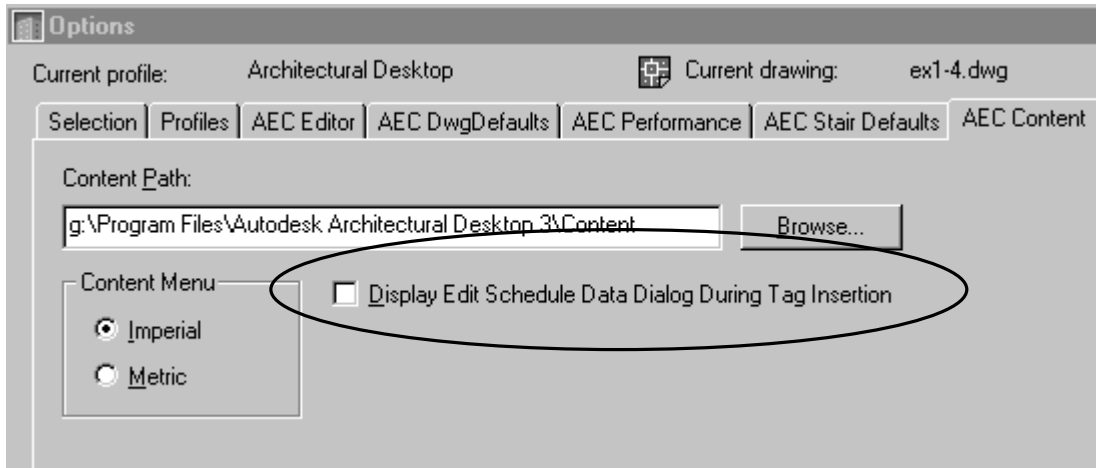
We access space tags by selecting Documentation->Schedule Tags->Room & Finish Tags from the menu.
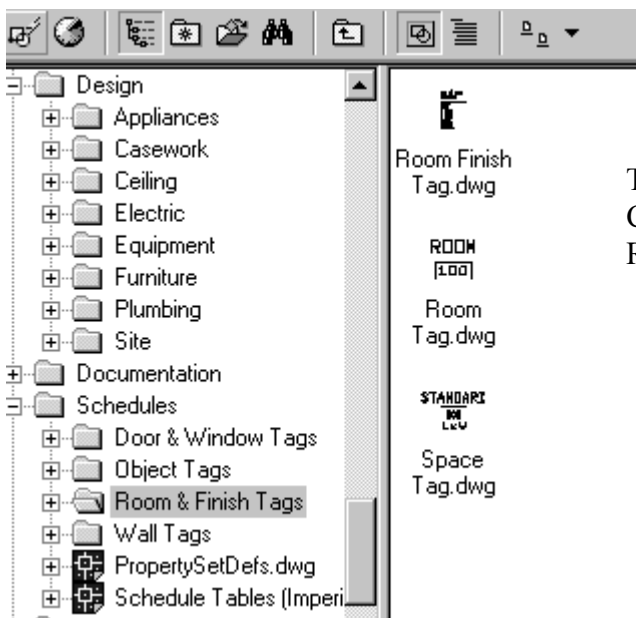
This launches the Design Center and navigates to the Room & Finish Tags folder.

Drag the Space Tag into the drawing.
Pay attention to the command line as it will provide you with directions on how to manage the tag.

You'll be prompted to select the object to tag.
Select one of the spaces.
Then you will be prompted on how you wish to locate the space.
The default is to center the tag in the space.
Select 'ENTER'.

The tag should appear centered on your space.

OFFICE__300SF
300.00 SF
15'–0" x 20'–0"

The Space Tag is really just a block with attributes. When it is inserted, it uses the values from the Property Definition Sets.

Add Space Tags to each space.

To help us keep track of which room is which, we add Room Tags as well.

OFFICE
100

Room Tag

Drag and drop the Room Tag and attach to each space.

OFFICE_120SF
ROOM
120.00 SF
10'–0" x 12'–0"

If you use the center option to place the room and space tags, the tags will overlay each other making it difficult to read the information. To manage this, create one layer for room tags and one layer for space tags and then freeze the layer you don't want to see.

A-Wall-Patt
area-labels
Defpoints
office-labels

Create one layer called area-labels and one label called office-labels.

Pan
Zoom
Quick Select...
Find...
Options...
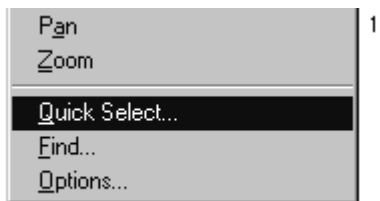
Right click in the graphics window and select 'Quick Select'.
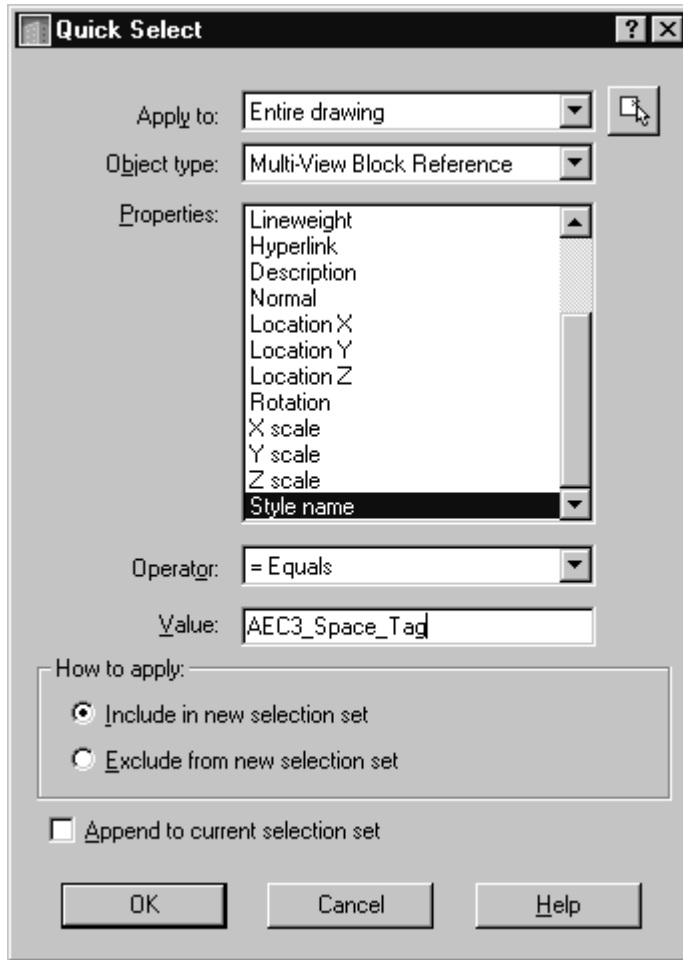
Under Object type, select Multi-View Block Reference.
Under Properties, select Style Name.
Under Value, select AEC3_Space_Tag.

Press 'OK'.

Place the selection set on the area-labels layer.

Properties - D:\schroff\adt-space planning\ex1-4.d...

Multi-View Block Reference

Alphabetic	Categorized

General

Color	■ ByLayer
Layer	area-labels
Linetype	────── ByLayer
Plot style	ByColor
Lineweight	────── ByLayer
Hyperlink	
Description	

Location

Location X	219'-9 11/16"
Location Y	17'-0 11/16"
Location Z	0"
Rotation	0.00

Dimension

X scale	12.0000
Y scale	12.0000
Z scale	12.0000

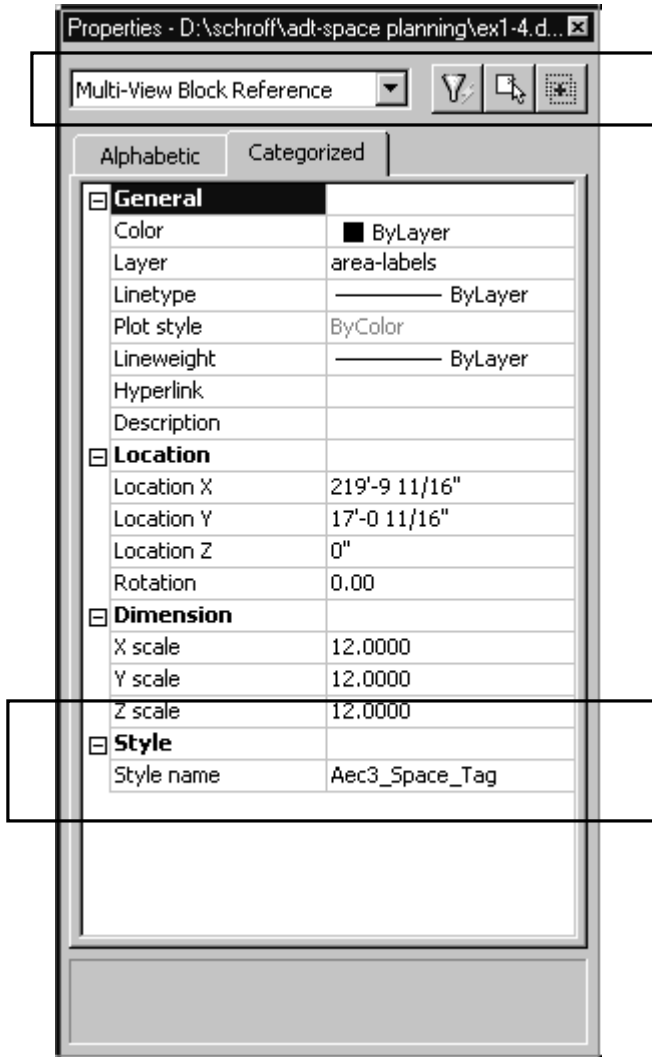**Style**

Style name	Aec3_Space_Tag

How did I know what to use for my filters for Quick Select?
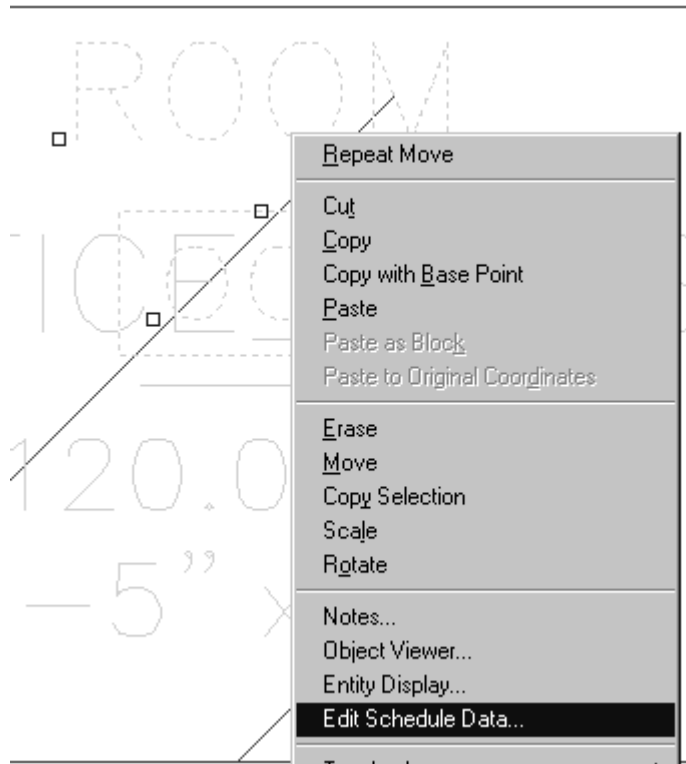
I selected one of the space tags I just placed.
Right click and select 'Properties'.

I see in the header that the tag is a Multi-View Block Reference and under Style I see that the Style name is AEC3_Space_tag.

See if you can move the room tags to the office-labels layer using the same method.

To change the label values, you can select the Room Tag so it is highlighted.

Right click and select 'Edit Schedule Data'.
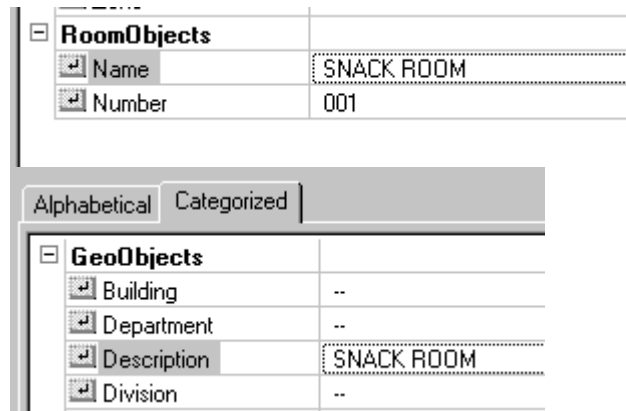
Under RoomObjects, change the Name to the name of the room.

Under GeoObjects, add the description of the room (This will be used later in a report.)

Using the table below, edit the Schedule Data for the remaining Room Tags.

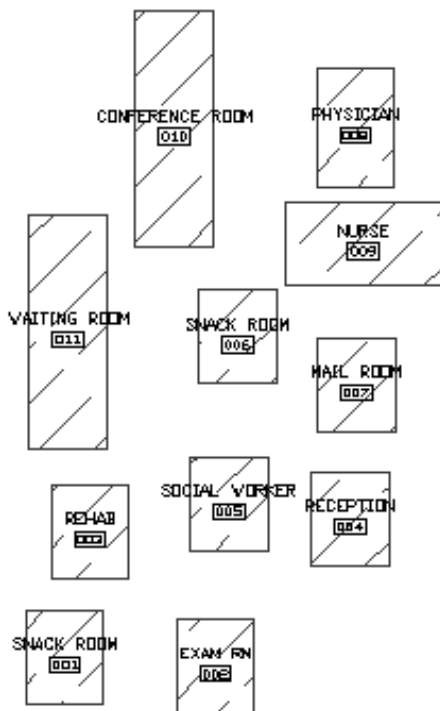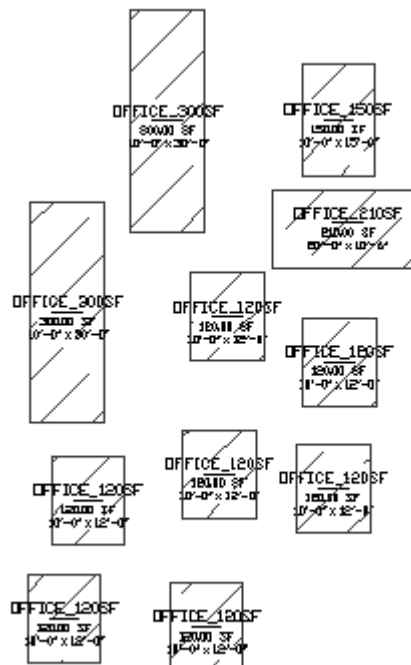| Administrative Space	Size
Office, Nurse	19.5 NSM (210 NSF)
Office, Physician	13.9 NSM (150 NSF)
Office, Rehabilitation Counselor	11.2 NSM (120 NSF)
Office, Social Worker	11.2 NSM (120 NSF)
Office, Office Manager/Bookkeeper	11.2 NSM (120 NSF)
Clinic Area	
Reception Area	11.2 NSM (120 NSF)
Waiting Area	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

With Space Tags visibility turned off   With Room Tags visibility turned off

Save our file as ex1-3.dwg.

Exercise 1-4:
Arrange Spaces

This exercise reviews the following concepts:

- Moving Spaces
- Rotating Spaces
- Managing Adjacencies
- Modify Spaces
- Space Properties

File: ex1-3.dwg
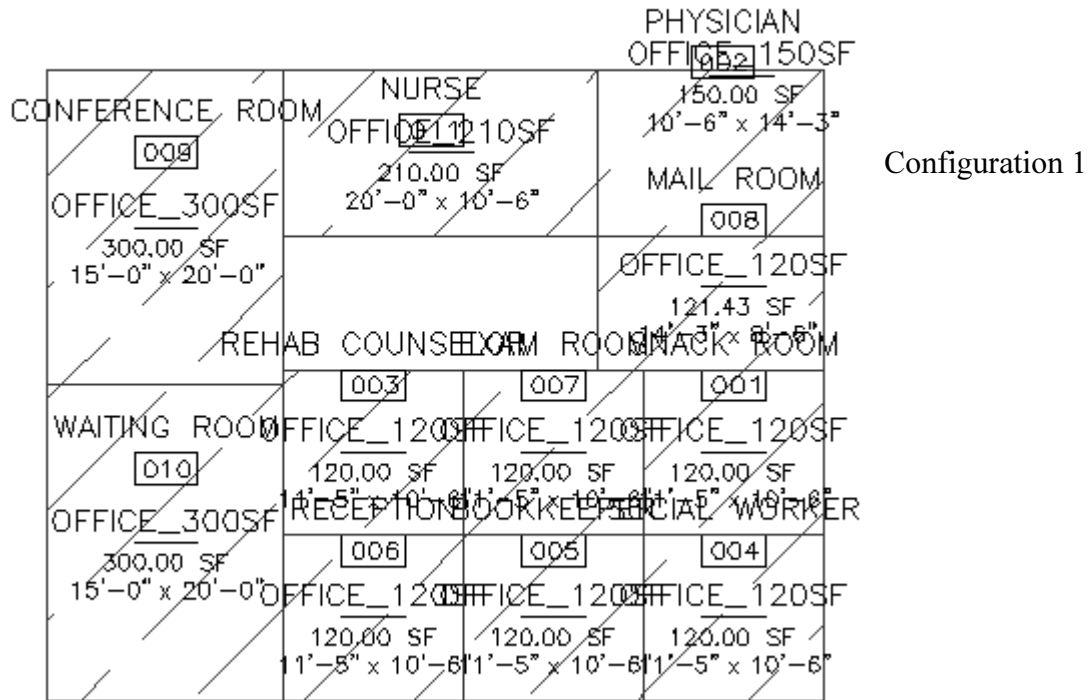Estimated Time: 15 minutes

Open ex1-3.dwg.

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

Criteria Table

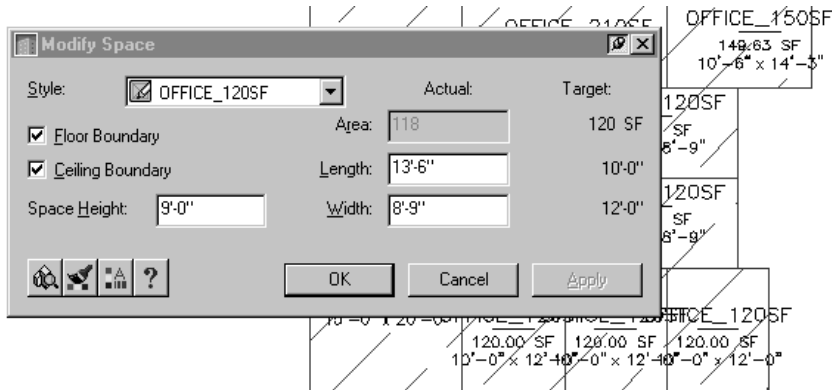| Administrative Space	Size	Adjacency
Office, Nurse	19.5 NSM (210 NSF)	1
Office, Physician	13.9 NSM (150 NSF)	1
Office, Rehabilitation Counselor	11.2 NSM (120 NSF)	2
Office, Social Worker	11.2 NSM (120 NSF)	2
Office, Office Manager/Bookkeeper	11.2 NSM (120 NSF)	2
Clinic Area		
Reception Area	11.2 NSM (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

Referring to our Criteria Table, use the Move and Rotate tools to arrange your spaces.

Configuration 1

To create this arrangement, we reset the length and width of some of the spaces.

Space Modify

| Spaces Toolbar	
Menu	
Command line	SpaceModify
Graphics Window Right Click	Concept->Spaces->Modify Space

Selecting the Modify Space tool.
Select the space you wish to modify.
Enter the new Length and Width.
Hit 'Apply' to modify the space. If you don't like the results, you can change the Length and Width again.

If you select a length or width that is not within the minimum/maximum range defined earlier, you will see a dialog box alerting you to the error.

TIP: You can use the DISTANCE tool to determine new lengths and widths. The DISTANCE tool is located on the Inquiry toolbar.
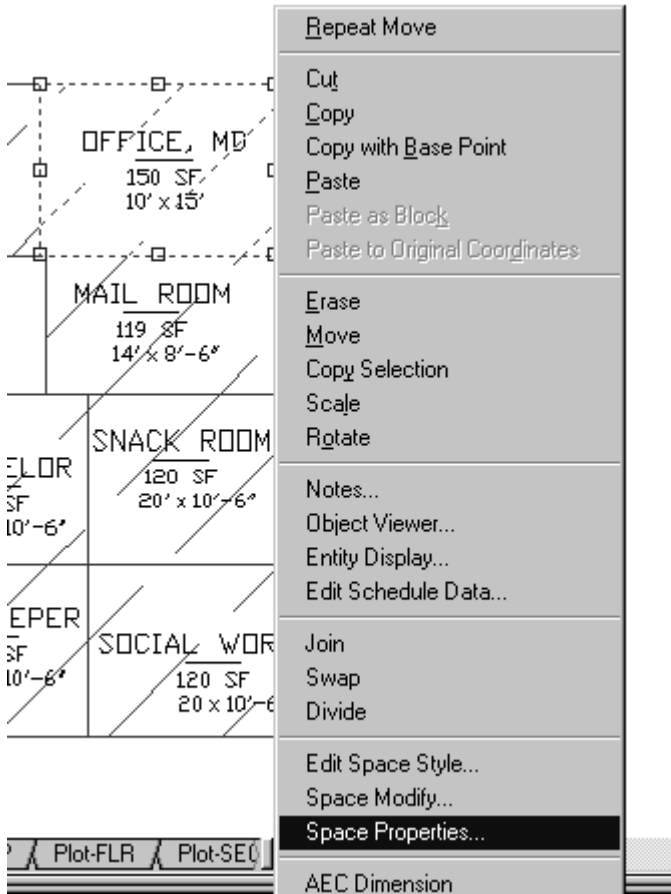
Another method to change the
length and width of a space is to use
Space Properties.
Select the space you wish to
modify.
Right click and select 'Space
Properties'.
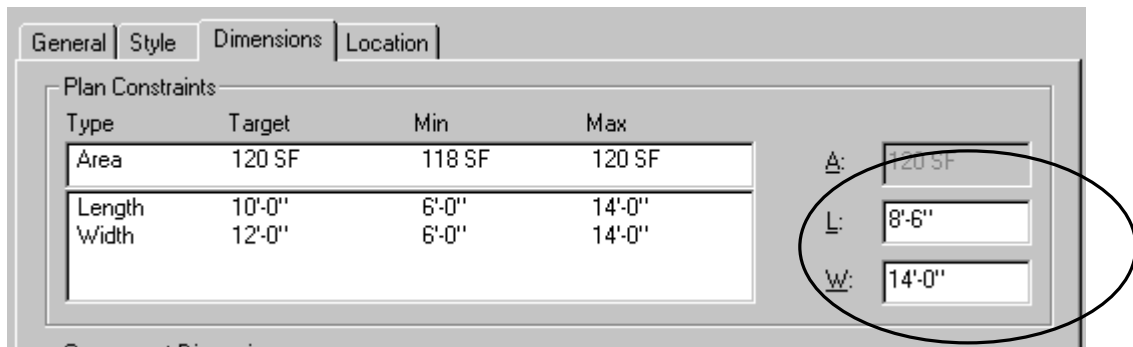
You can enter in a different length and width to modify the space.
By using this method, you can see the Min-Max range before you apply a change.
Press 'OK'.

To check the area of a modified space, select the AREA tool from the Inquiry toolbar.

```
Enter
Cancel

Object
Add
Subtract

Pan
Zoom
```
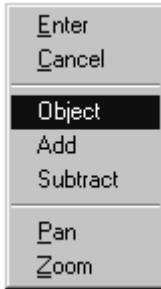
Right click and select Object from the pop up menu.
Or type 'O' at the command line.
Select the space you wish to check.

```
Select objects:
Area = 17280.00 square in. (120.0000 square ft.), Perimeter = 43'-10 5/16"
```

The information on the space will appear on the command line.
If you keep your space tags visible, they will automatically update every time you change the space.

TIP: You can use the perimeter information to calculate how much baseboard you will need in each room.

You can also use your GRIPS to stretch your space to the correct positions.

Notice that your Space Tag should update as the dimensions of your space modifies.

Configuration 1

Configuration 2

Configuration 3

Configuration 4
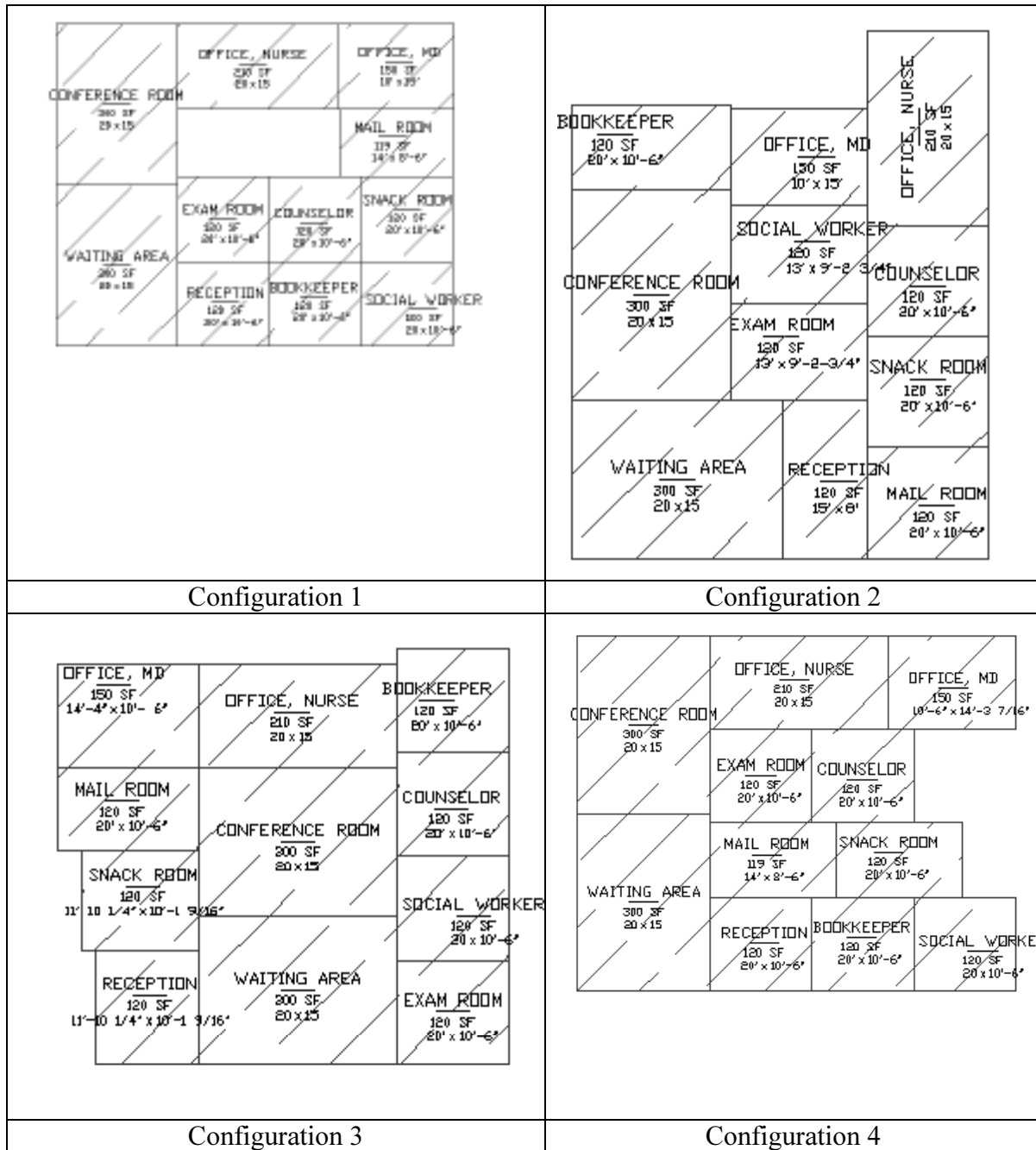
As you can see, there are multiple arrangements that can be made. Each student in a class could come up with a unique arrangement. The final arrangement will be dependent on a variety of factors, including cost, overall area that results, number of interior walls required, etc.
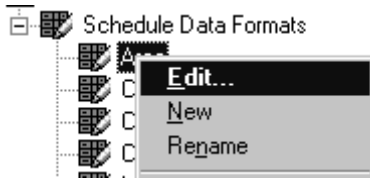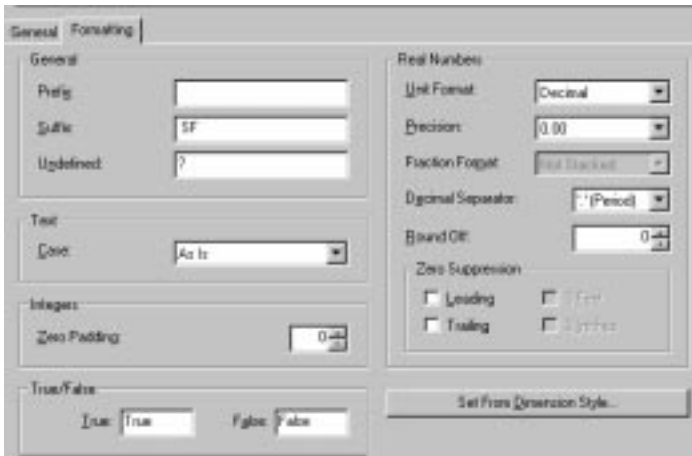
Save your file as ex1-4.dwg.

Tip:

You may have noticed that the space tag displays the area with decimal spaces. To modify the way data is displayed in your schedule tag:
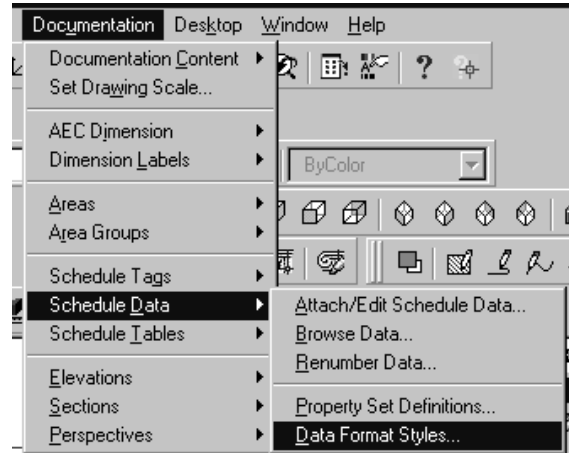
In the menu, go to Documentation->Schedule Data->Data Format Styles

Highlight Area. Right click and select 'Edit'.

Select the Formatting tab.
You can control how whether or not your area has a prefix or suffix (Note that the default suffix is 'SF'.)
You can set the precision on the right of the dialog box.
You can select a dimension style by pressing the 'Set from Dimension Style' button.

Be sure to select the 'Apply' button to have the precision change affect your space tag.

You may have to regen to see the space tags update.