QSEE-SuperLite – Entity UML Class Model Tutorial

To begin this tutorial please start the "QSEE-SuperLite" software package as instructed by your tutor. Within the tutorial you are going to create a completely new UML class model within the multi-CASE project type. When QSEE-SuperLite first begins you <u>may</u> be presented with a dialogue that lists the available project types. Select **multi-CASE** and press the OK button (see *figure 1*).
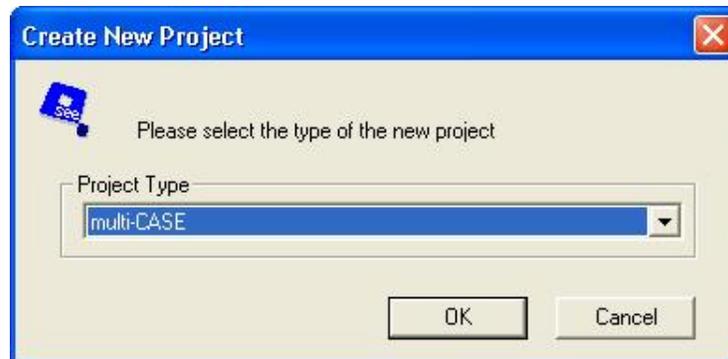

Figure 1

Step 1. Creating a new top level UML model

Your first task is to create a new top level UML model. Begin by right clicking the top level node "Untitled" in the project tree (the right-most window of the program) and selecting "Add UML Model" as shown in *figure 2* and enter the name when prompted This will create a top level UML model complete with a system package.
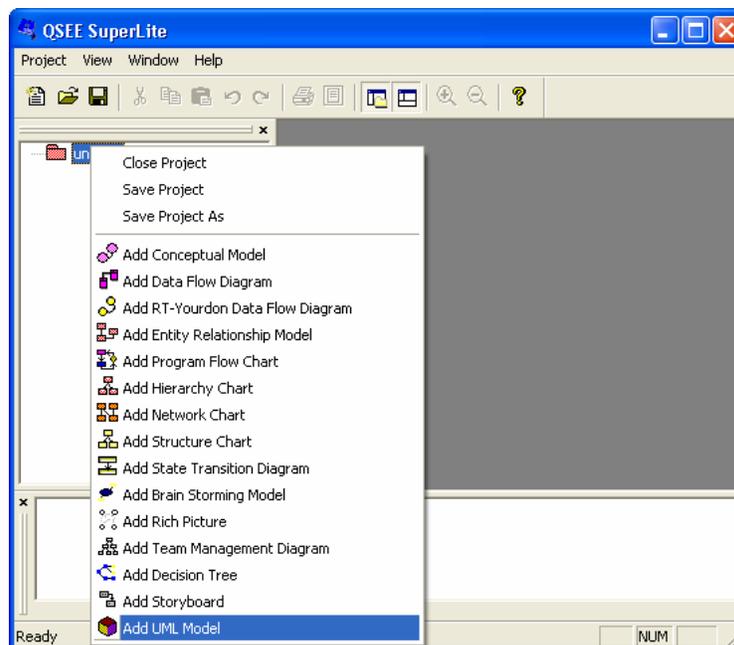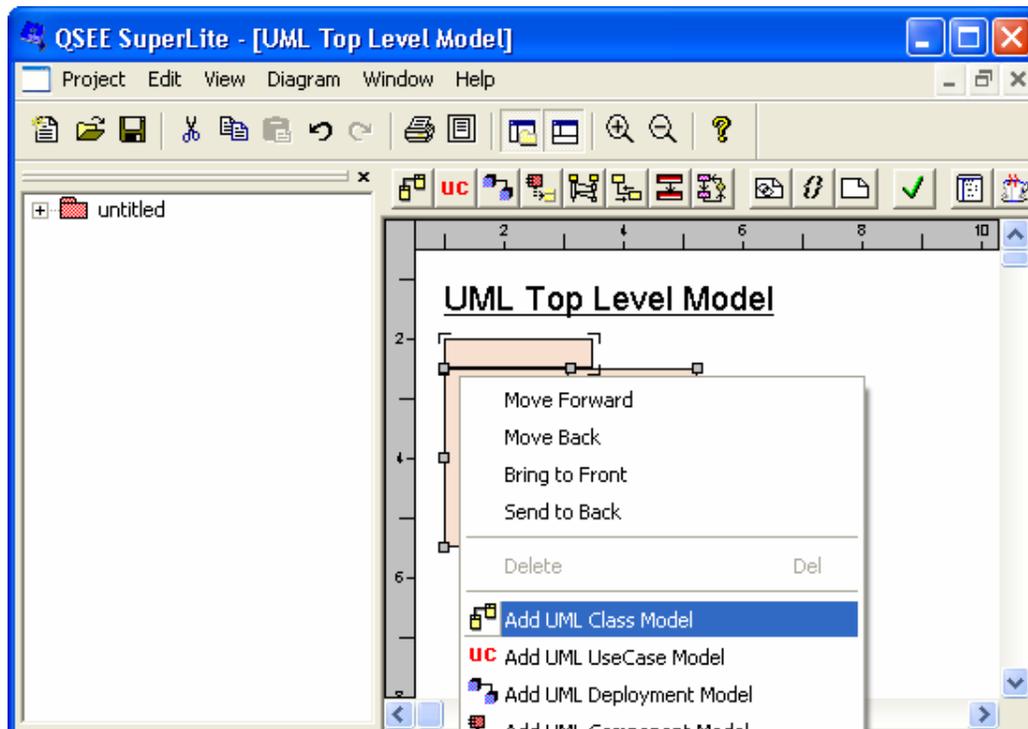

Figure 2

Step 2. Creating a new UML class model

You must now create a new UML class model. Begin by right clicking on the system package and selecting "Add UML Class Model" as shown in *figure 2*. This will create an empty UML class modelready for further manipulation.

Figure 3

Step 3. Adding the "Diagram" Class

Now that a new diagram has been created the next stage is to start adding classes. All operations within QSEE-SuperLite can be performed via a context sensitive menu. To see the options available on the Class Model right click on the diagram background as shown in *figure 4*.
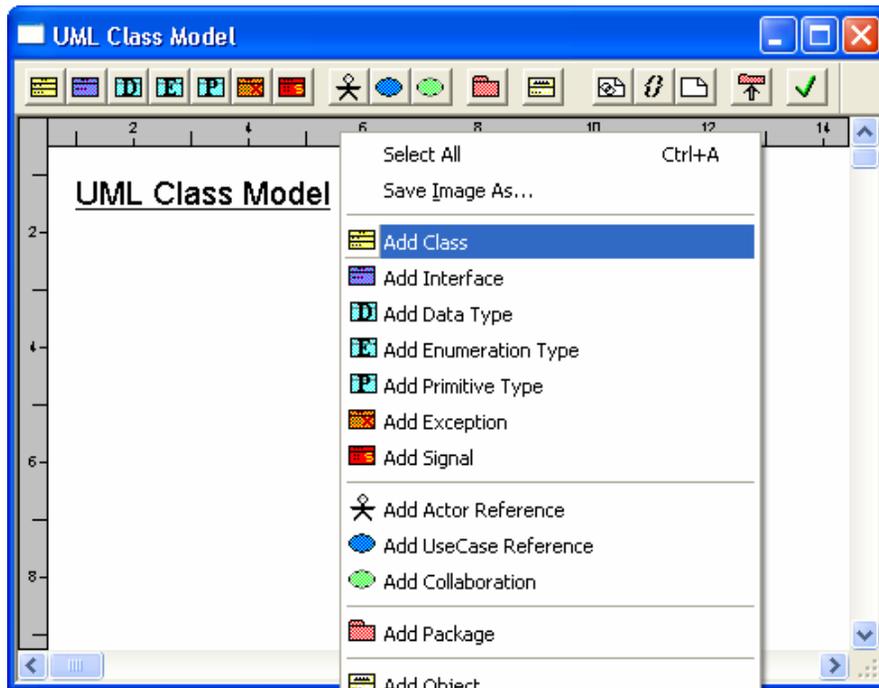

Figure 4

To add a new class select the "Add Class" option. Once this option is selected use the mouse to position the class on the diagram and press the left mouse button to create the class. Once the class has been added the name of the class can be added as shown in *figure 5*. Type the word "Diagram" and press the OK button of the form.
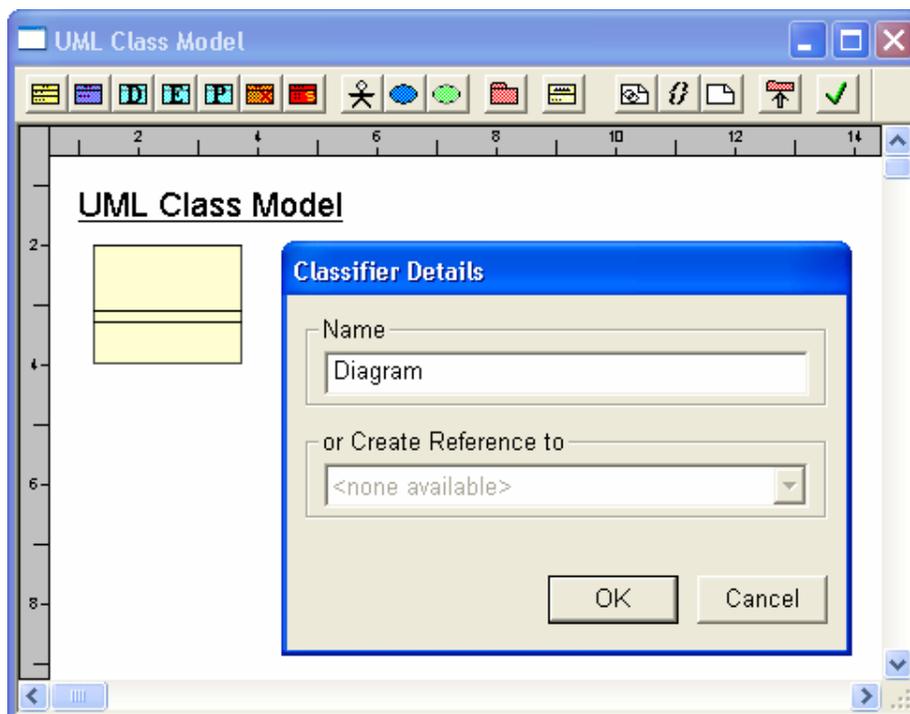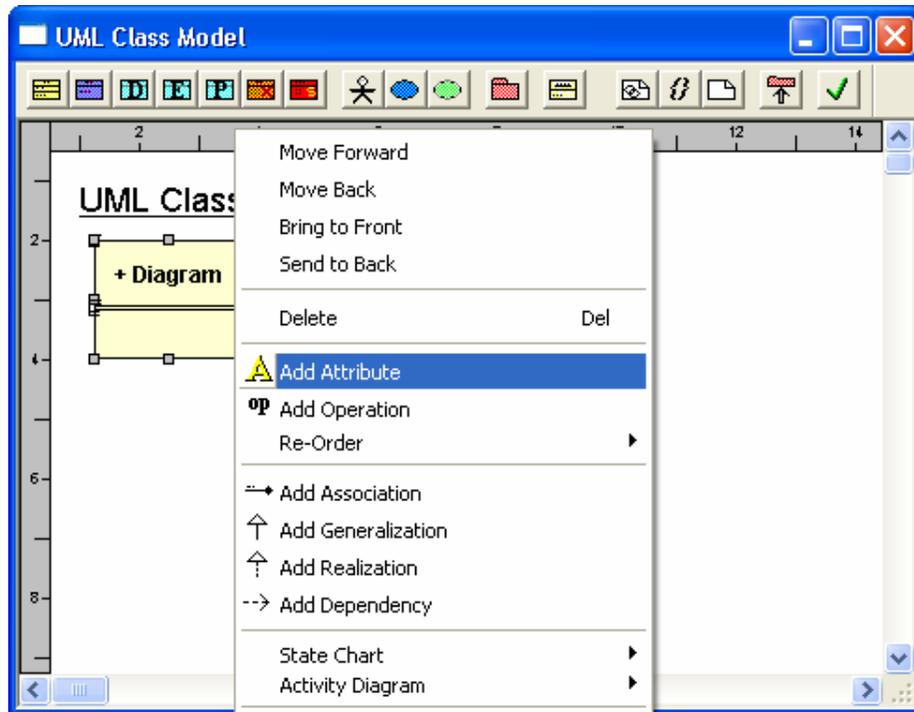

Figure 5

Now the entity has been created it is now possible to add attributes and operations. To see the options available on the class right click on the newly created class as shown in *figure 6*.
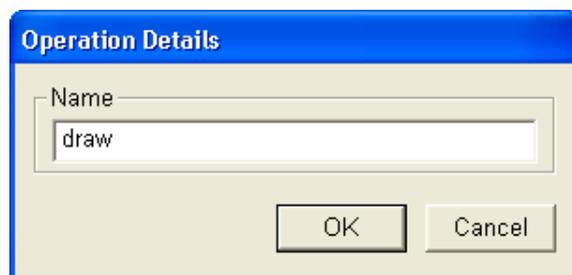

Figure 6

Select the "Add Attribute" option, which will result in the Attribute Details form being shown. Enter the details within this form as shown in *figure 7* and press the OK button.

Figure 7

Select the "Add Operation" option, which will result in a name form being shown. Enter the name as shown in *figure 8* and press the OK button.

Operation Details

Name

draw

OK   Cancel

Figure 8

Now add a second operation called "shapeCount".

We are now ready to add parameters to the operations. To see the options available on an operation right click on the newly created operation "shapeCount" as shown in *figure 9*.

UML Class Model

Move Forward
Move Back
Bring to Front
Send to Back

Delete   Del

() Add Parameter
Edit Parameter Details
Edit Parameter Annotation
X Delete Parameter

--> Add Dependency

State Chart   ▶
Activity Diagram   ▶

✓ Is Sequential
Is Guarded
Is Concurrent

UML Clas

+ Diag

- diagramNan
+ shapeCoun
+ draw()
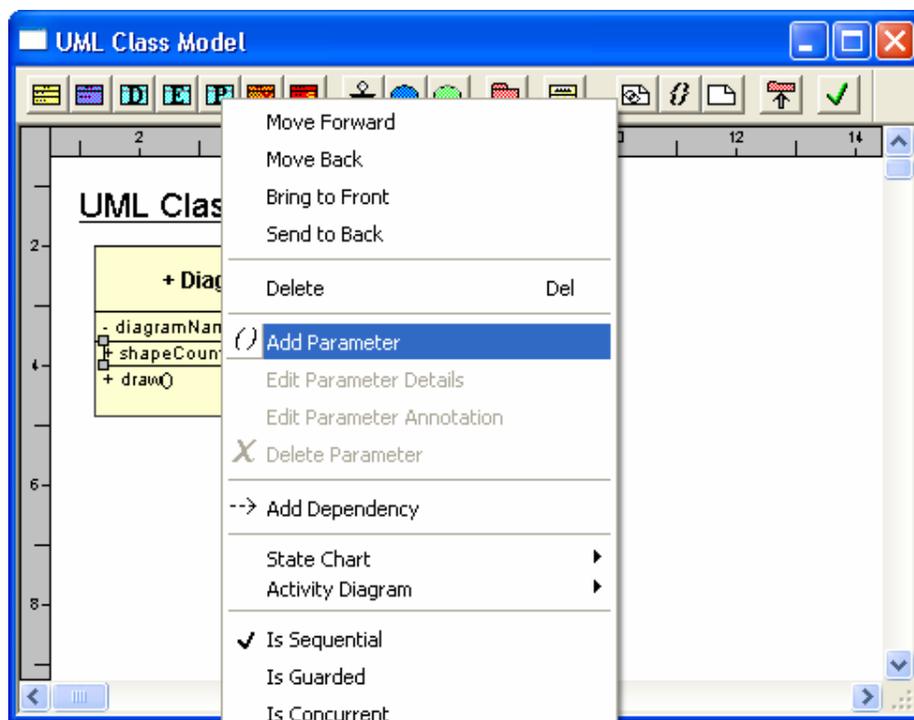
Figure 9

Select the "Add Parameter" option, which will result in the Parameter Details form being shown. Enter the details within this form as shown in *figure 10* and press the OK button.

Figure 10

Now we have a completed class use the same methods as above to enter the classes detailed below.

Name of Class: **Model**

Attribute Name	Data Type
modelName	String

Name of Class: **Shape**

Attribute Name	Data Type
isFilled	Boolean
shapeHeight	Int
shapeWidth	Int
xPos	Int
yPos	Int

Operation Name	Parameter Name	Parameter Type	Direction
draw			

Name of Class: **Ellipse**

Operation Name	Parameter Name	Parameter Type	Direction
draw			

Name of Class: **Rectangle**

Operation Name	Parameter Name	Parameter Type	Direction
draw			

Name of Class: **Polygon**

Attribute Name	Data Type	Lower	Ordered	Unbounded
points	Int	1	No	No
xPoints	Int	2	Yes	Yes
yPoints	Int	2	Yes	Yes

Operation Name	Parameter Name	Parameter Type	Direction
draw			

Name of Class: **Vector**

Operation Name	Parameter Name	Parameter Type	Direction
draw			

Step 4. Adding the "Serializable" Interface

To add a new interface right click on the diagram and select the "Add Class" option. Once this option is selected use the mouse to position the interface on the diagram and press the left mouse button to create the interface. Once the interface has been added the name of the interface can be added as shown in *figure 11*. Type the word "Serializable" and press the OK button of the form.
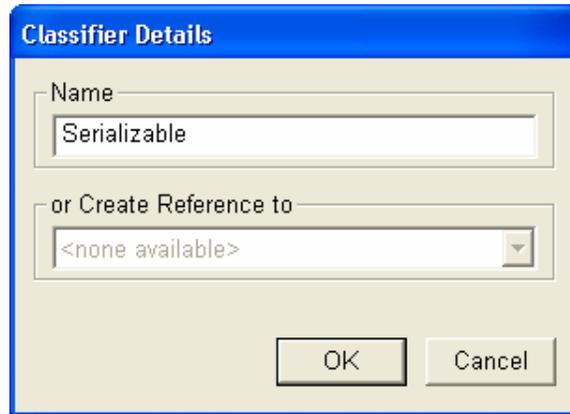
Figure 11

Operations and their parameters are added to interfaces in the same way as they are to classes. Add the two operations detailed below.

Operation Name	Parameter Name	Parameter Type	Direction
Load	streamName	String	In

Operation Name	Parameter Name	Parameter Type	Direction
Save	streamName	String	In

Step 5. Changing Visibility

You will notice on the completed diagram that the attributes of the shape class are prefixed with "#" symbols. This is to show they are protected attributes. To set an attribute as protected you must right click on it as shown bellow in *figure 12*.
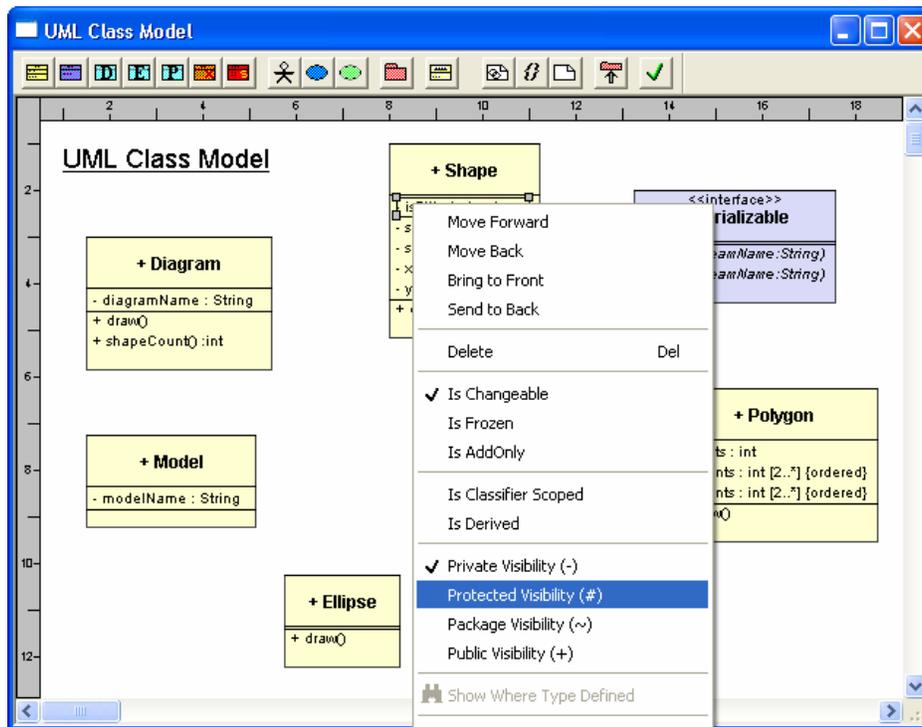

Figure 12

Select the option "Protected Visibility" and the "isFilled" attribute should now be protected. Now make the other four attributes protected. Once this is complete all these attributes should be prefixed with the '#' symbol.

Try experimenting with the visibility of other attributes and operations. Notice how the prefix changes depending on the selected visibility. What visibility does the '+' symbol indicate?

Step 6. Adding Associations

Now that we have the classes and the interface in place we can start to add the links between them. We will start by adding associations. Right click on the "Model" class and select the option "Add Association" from the menu as shown below in *figure 13*.
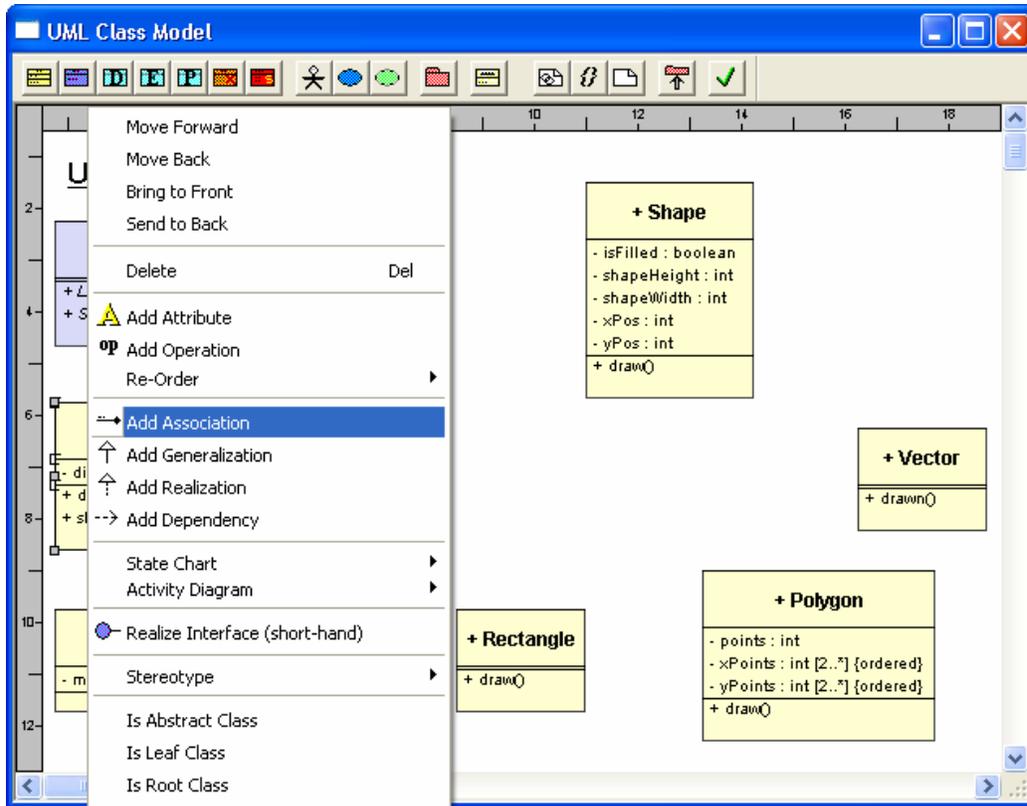

Figure 13

The source end of the association will be linked to the "Model" class automatically but the destination end has to be linked up manually. To do this simply left click on the class you wish to link to, in this case the "Diagram" class. When you connect the destination end you will be prompted to enter the name of the association. Fill in the form as shown below in *figure 14* and left click the "OK" button of the form.

Figure 14

The association will now be created with default source and destination labels that can be edited. We will begin by editing the source label. To do this you must bring up the edit form by right clicking on the source label and selecting the option "Edit Source Details" from the menu. Now fill in the edit form for the source label with the details shown below in *figure 15*.

Figure 15

Now we will edit the destination label. Fill in the edit form for the destination label with the details shown below in *figure 16*.

Figure 16

Step 7. Adding Details to Associations

An association and each end of an association have several options available from the context sensitive menus (available by right clicking on either the association or the appropriate end label). These may be used to select various options. Add two further associations as specified in the tables below, using the context sensitive menus to setup each correctly.

Name of Association		Source Class	Destination Class		
displays		Diagram	Shape		
Source Label	**Lower**	**Upper**	**Unique**	**Ordered**	**Unbound**
diagram	0	0	NO	NO	NO
Destination Label	**Lower**	**Upper**	**Unique**	**Ordered**	**Unbound**
displayedShape	0	(unbounded)	NO	YES	YES
At Source			**At Destination**		
Is Navigable, Is Composite, Is Changeable			Is Navigable , Is Changeable		

Name of Association		Source Class	Destination Class		
madeFrom		Shape	Shape		
Source Label	**Lower**	**Upper**	**Unique**	**Ordered**	**Unbound**
compositeShape	0	1	NO	NO	NO
Destination Label	**Lower**	**Upper**	**Unique**	**Ordered**	**Unbound**
subShape	0	(unbounded)	NO	YES	YES
At Source			**At Destination**		
Is Navigable, Is Composite, Is Changeable			Is Navigable , Is Changeable		

Step 8. Adding Generalizations and Realizations

To add a generalization right click on the class you want to be the source and select the option "Add Generalization" from the menu produced. Now left click the class you want to be the destination and the generalization will be added.

Realizations are added in much the same way. Right click on the class you want to be the source and select the option "Add Realization" from the menu produced. Now left click the interface you want to be the destination and the realization will be added.

Now add the following generalizations:
- Ellipse to Shape
- Rectangle to Shape
- Polygon to Shape
- Vector to Shape

Now add the following realizations:
- Diagram to Serializable
- Shape to Serializable

Step 9. Inputting your Own Model

Now you have the skills to use the QSEE-SuperLite tool try developing and inputting your own model. This may be a model you develop now or one that you developed in a tutorial exercise. Practice using other facilities provided by the tool to save; load; print preview; cut/paste; zoom etc. You will soon become familiar with the features and be capable of concentrating on the design of the model being input rather than how to use the tool itself.