How to draw a Class Diagram in UML

A class diagram is a kind of UML diagram that shows the objects that are required and the relationships between them. Since it provides detailed information about the properties and interfaces of the classes, it can be considered as the main model and regard the other diagrams as supplementary models.
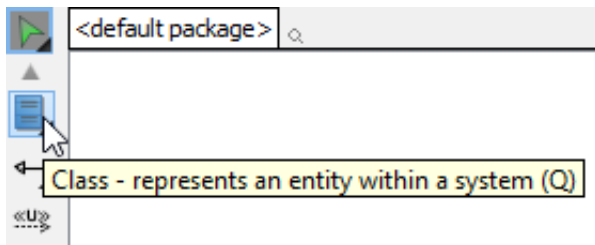
Creating class diagram

Perform the steps below to create a UML class diagram in Visual Paradigm.

1. Select **Diagram > New** from the application toolbar.
2. In the **New Diagram** window, select **Class Diagram**.
3. Click **Next**.
4. Enter the diagram name and description. The **Location** field enables you to select a model to store the diagram.
5. Click **OK**.

Creating class

To create a class in a class diagram, click **Class** on the diagram toolbar and then click on the diagram.

A class will be created.
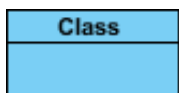
Creating association

To create an associated class in a class diagram:

1. Move your mouse pointer over the source shape.
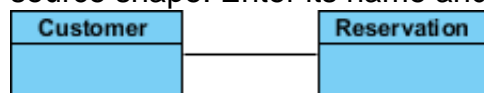2. Press on the **Resource Catalog** button and drag it out.

3. Release the mouse button at the place where you want the class to be created. If you want to connect to an existing class, drop at that class. Otherwise, drop an the empty

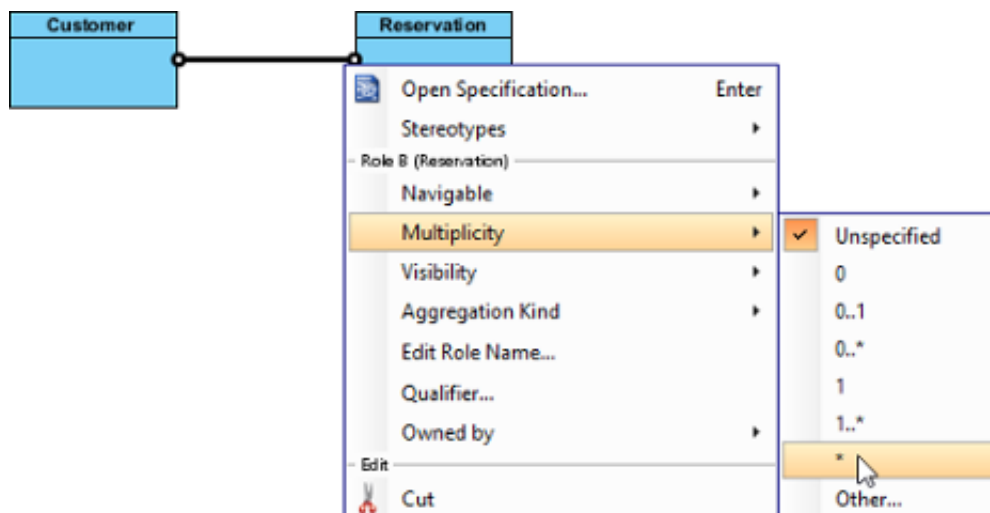space (either at the diagram background or container shape like package).

4. If you are connecting to an existing class, select **Association** from Resource Catalog. If you are creating a new class, select **Association -> Class** from Resource Catalog. If you want to create an aggregation or composition, select **Aggregation -> Class** or **Composition -> Class** instead.
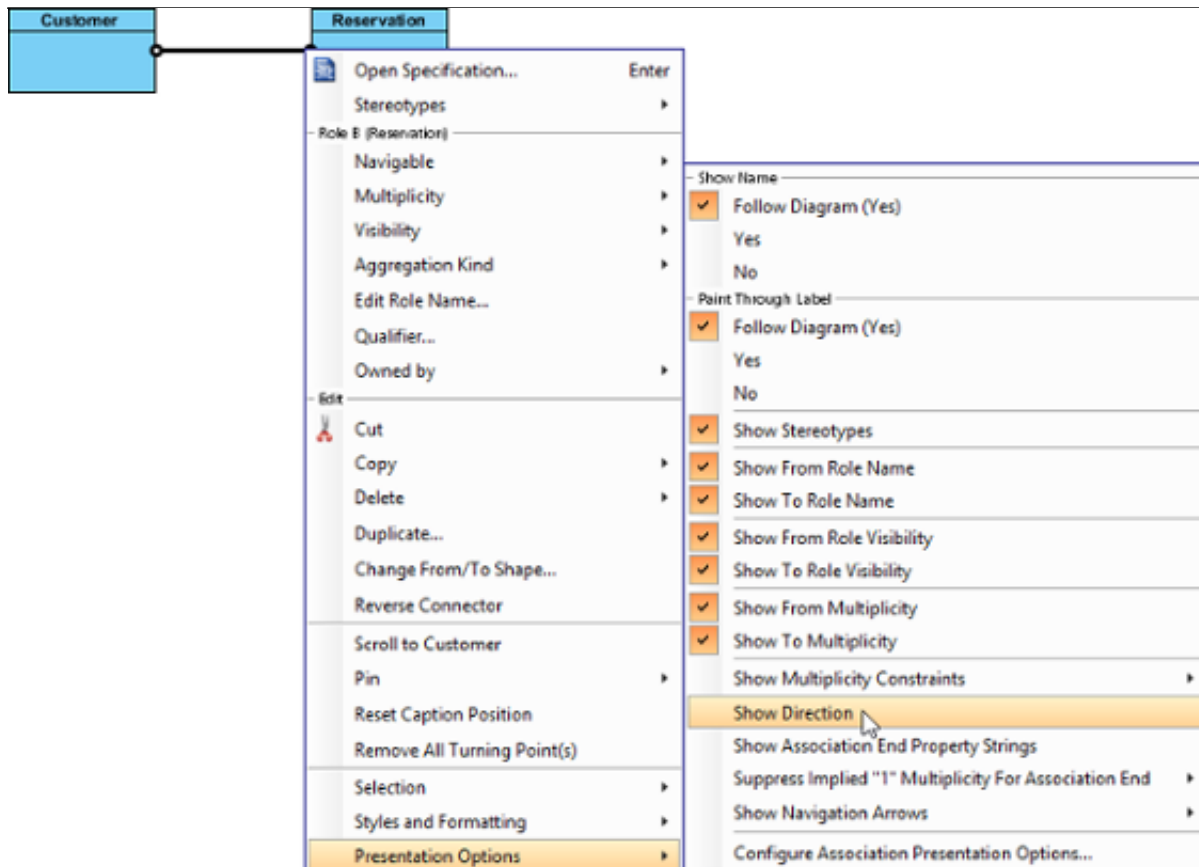

Association -> Class

5. If you are creating a new class, you should see the class now and it is connected to the source shape. Enter its name and press **Enter** to confirm editing.
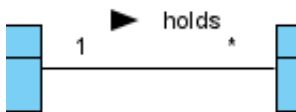

To edit multiplicity of an association end, right-click near the association end, select **Multiplicity** from the popup menu and then select a multiplicity.

To show the direction of an association, right click on it and select **Presentation Options** > **Show Direction** from the pop-up menu.
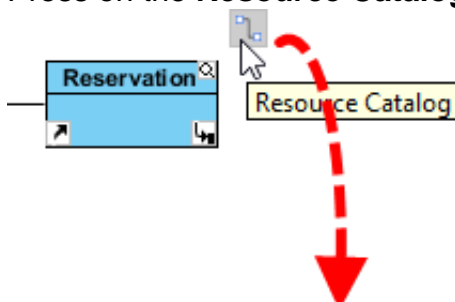
The direction arrow is shown beside the association.


Creating generalization

To create a subclass:

1. Move your mouse pointer over the superclass.
2. Press on the **Resource Catalog** button and drag it out.

3. Release the mouse button at the place where you want the subclass to be created. If you want to connect to an existing class, drop at that class. Otherwise, drop an the empty space (either at the diagram background or container shape like package).
4. If you are connecting to an existing class, select **Generalization** from Resource Catalog. If you are creating a new class, select **Generalization -> Class** from Resource Catalog.
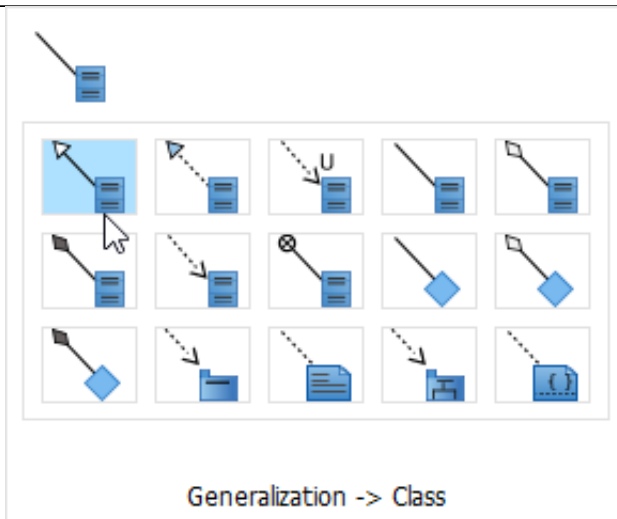
Generalization -> Class

5. If you are creating a new class, you should see the class now and it is connected to the source shape with a generalization. Enter its name and press **Enter** to confirm editing.
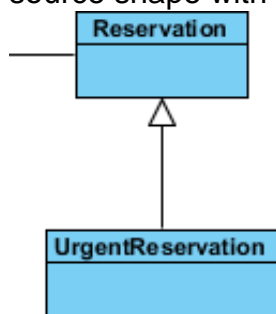
Creating dependency from/to attribute/operation

You can also add a dependency from and/or to an attribute or operation in class. To create such a dependency.
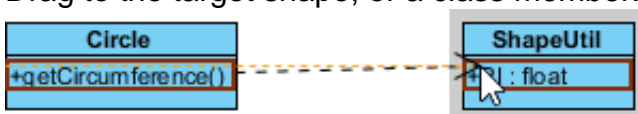
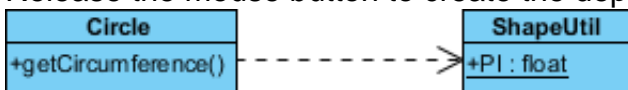1. Select **Dependency** from the diagram toolbar.

2. Press on the source shape or a class member.
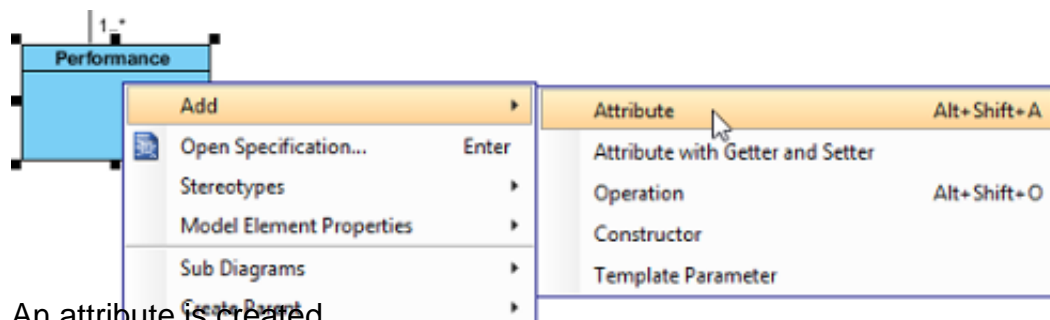

3. Drag to the target shape, or a class member.

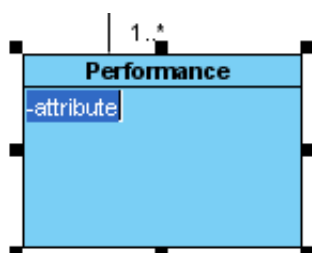4. Release the mouse button to create the dependency.

Creating attribute

To create attribute, right click the class and select **Add** > **Attribute** from the pop-up menu.
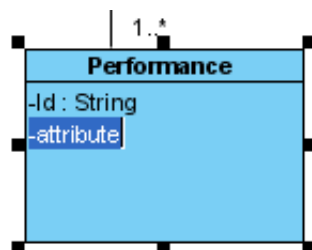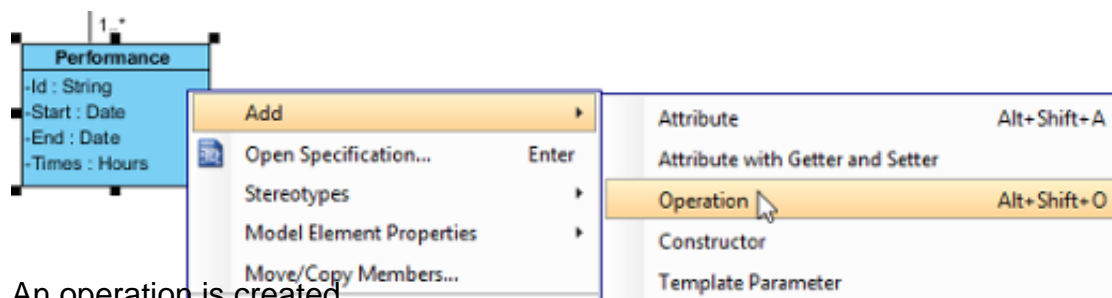

An attribute is created.

Creating attribute with enter key

After creating an attribute, press the **Enter** key, another attribute will be created. This method allows you to create multiple attributes quickly and easily.
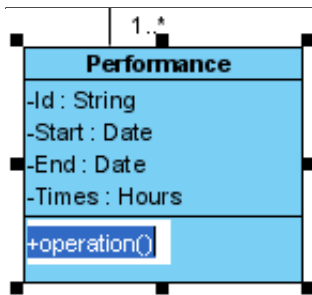

Creating operation

To create operation, right click the class and select **Add** > **Operation** from the pop-up menu.
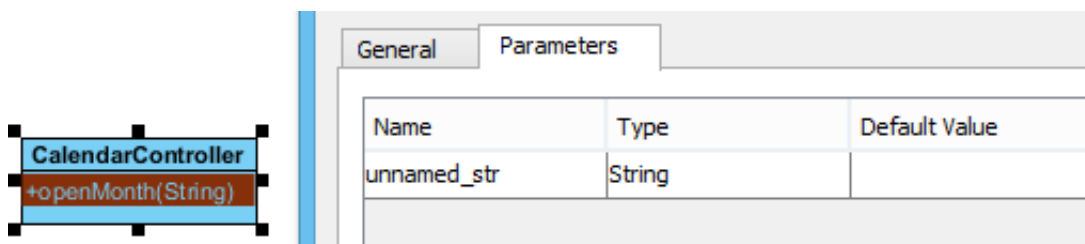

An operation is created.

Operation created

Similar to creating attribute, you can press the **Enter** key to create multiple operations continuously.

Showing just a parameter's type

When the name of a parameter starts with "unnamed_", its name will not be displayed in the class shape, leaving the parameter type (if defined).
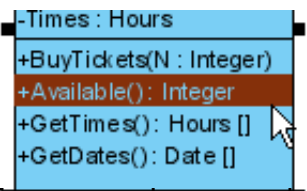

# Drag-and-Drop reordering, copying and moving of class members

To re-order a class member, select it and drag within the compartment, you will see a thick black line appears to indicate where the class member will be placed.
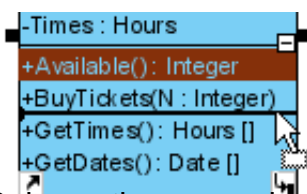

Release the mouse button, the class member will be reordered.

To copy a class member, select it and drag to the target class while keep pressing the **Ctrl** key, you will see a thick black line appears indicating where the class member will be placed. A plus sign is shown beside the mouse cursor indicating this is a copy action.

Release the mouse button, the class member will be copied.
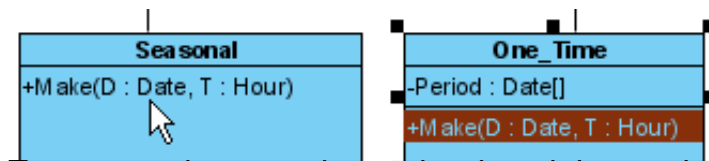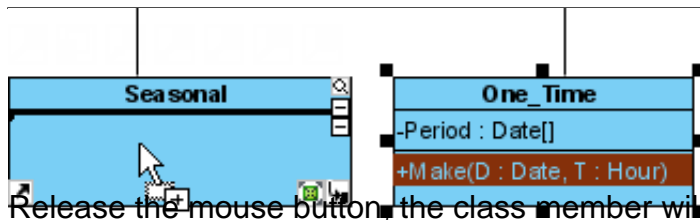
To move a class member, select it and drag to the target class, you will see a thick black line appears indicating where the class member will be placed. Unlike copy, do not press the Ctrl key when drag, the mouse cursor without the plus sign indicates this is a move action.
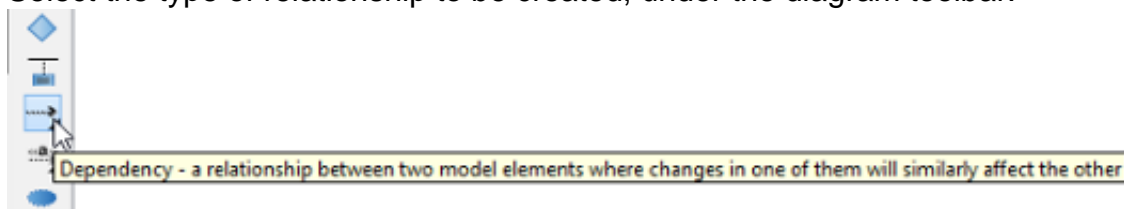

Release the mouse button, the class member will be moved.
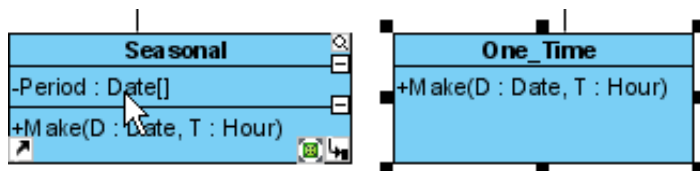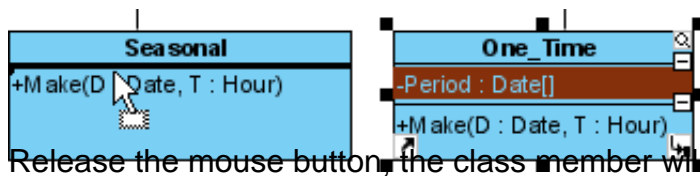
Selecting all class members

To select all members within a class, you can select any member first, and then press **Alt-A** to select the rest.

Relating class members

Relationships such as dependency and generic connectors can be added between attribute and operation of classes. To do this:
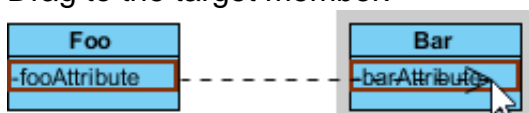
1. Select the type of relationship to be created, under the diagram toolbar.
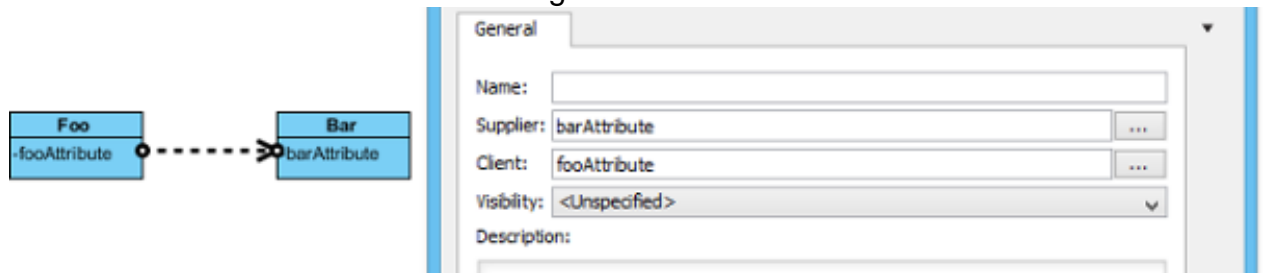

2. Move the mouse pointer over the source member.

3. Press on it and hold the mouse button.
4. Drag to the target member.

5. Release the mouse button to create the connector. While it looks like the connector is connecting the classes but not the members, if you check its specification you can see that the connector is indeed connecting the members.



Creating enumeration and adding enumeration literal

An enumeration is a special data type that consists of a pre-defined set of values, known as enumeration literals. Here are some of the common examples:

- Color (RED, GREEN, BLUE)
- Orientation (NORTH, SOUTH, EAST, WEST)
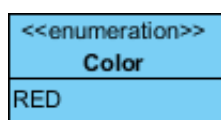- Switch (ON, OFF)

To create an enumeration in the UML diagram tool, select **Enumeration** from the diagram toolbar and click on the diagram to create one.
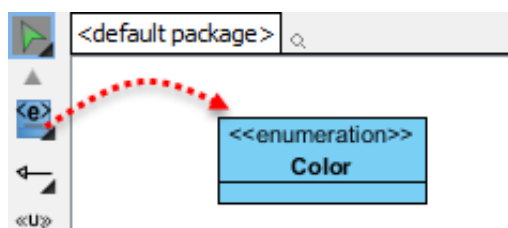
To add an enumeration literal, right click on the enumeration class and select **Add > Enumeration Literal** from the popup menu.
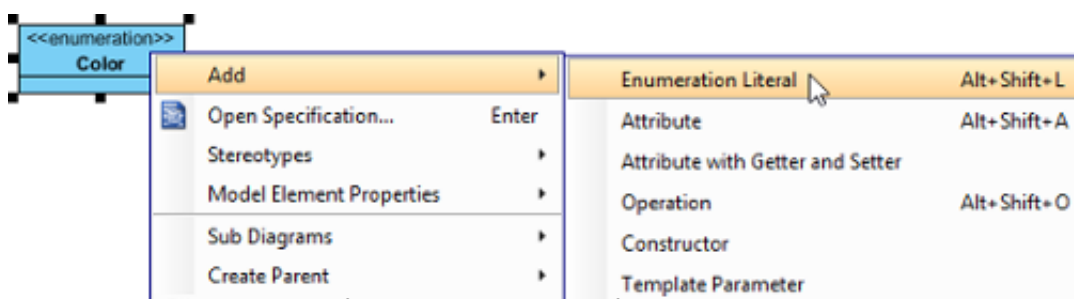

Then, enter the name of the literal and confirm editing.

Generalization set

A generalization set defines a particular set of generalization relationships that describe the way in which a general classifier (or superclass) may be divided using specific subtypes. To define a generalization set, select the generalizations to include, right click and select Generalization set
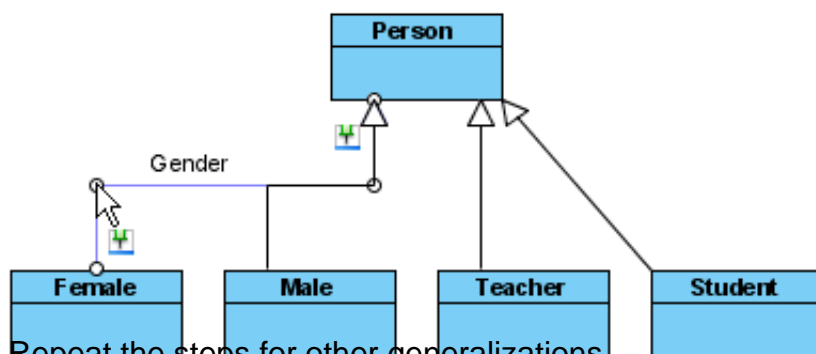
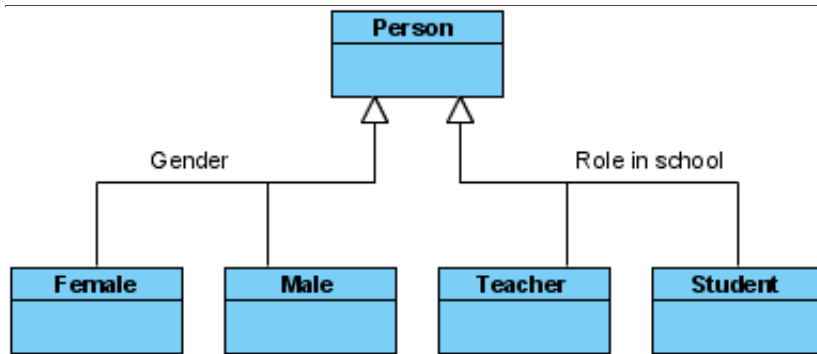> Create Generalization Set... from the popup menu.
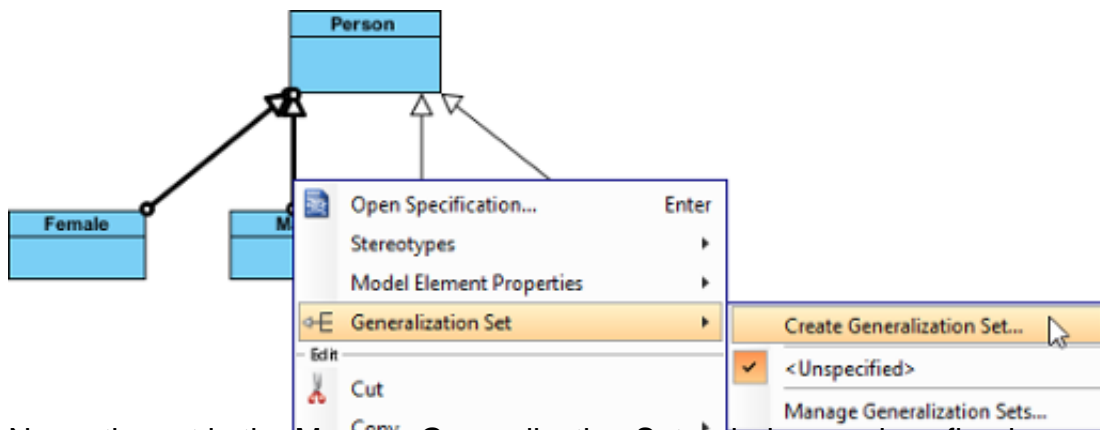
Name the set in the Manage Generalization Sets window, and confirm by pressing **OK**.
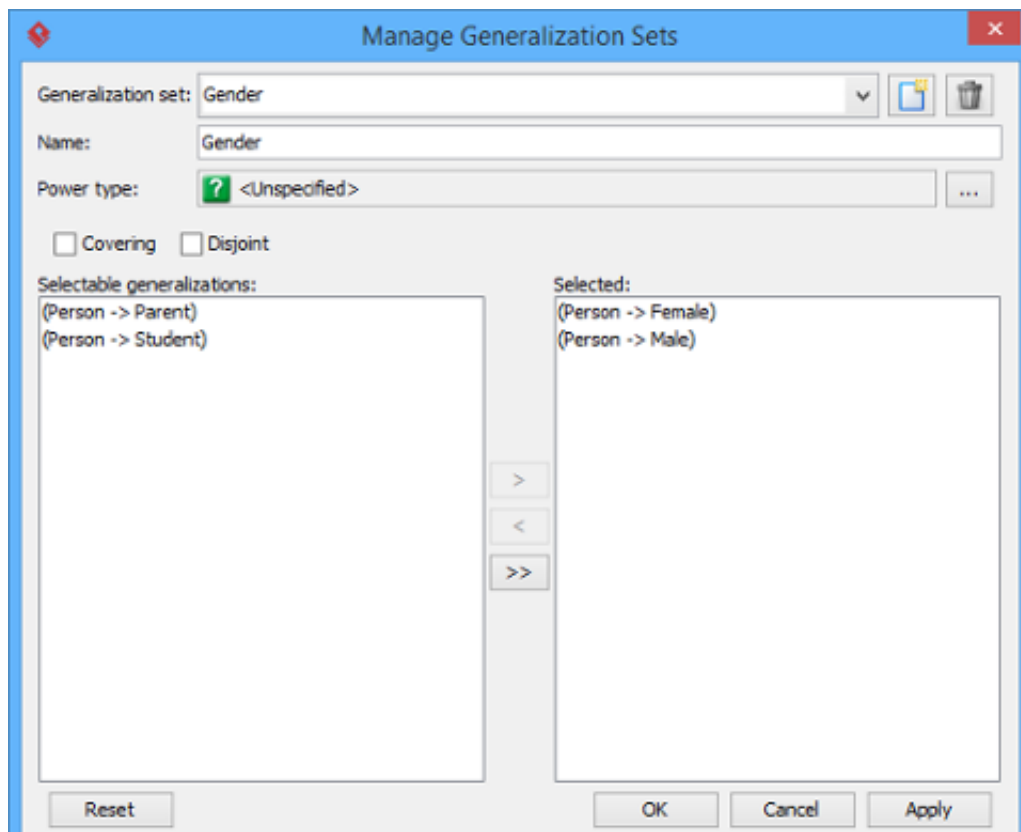
The selected generalizations are grouped. Adjust the connector to make the diagram tidy.

Repeat the steps for other generalizations.

Defining delegate method for class

When project's programming language is set to be Visual Basic or C#, it is possible to define delegate method for classes. To define delete method, right click on the class and select **Stereotypes > Delegate** from the pop-up menu.
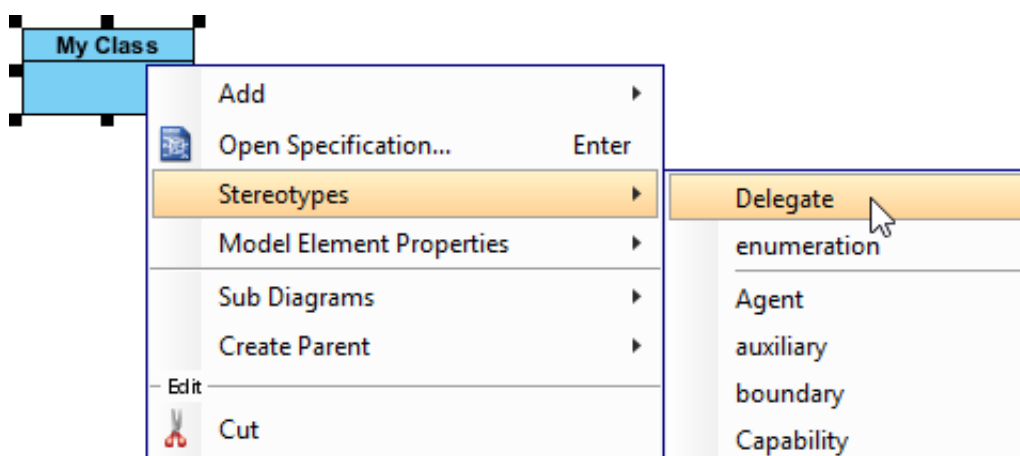
Hiding (and showing) attributes and operations

Per workspace

This applies to new classes that will be created in a project opened in specific workspace. To change the setting:

1. Select **Window > Project Options** from the toolbar to open the **Options** window.
2. Click **Diagramming** on the list.
3. Open the **Class** tab.
4. Click **Presentation** tab.
5. Change the settings for **Show attribute option** and/or **Show operation option**.
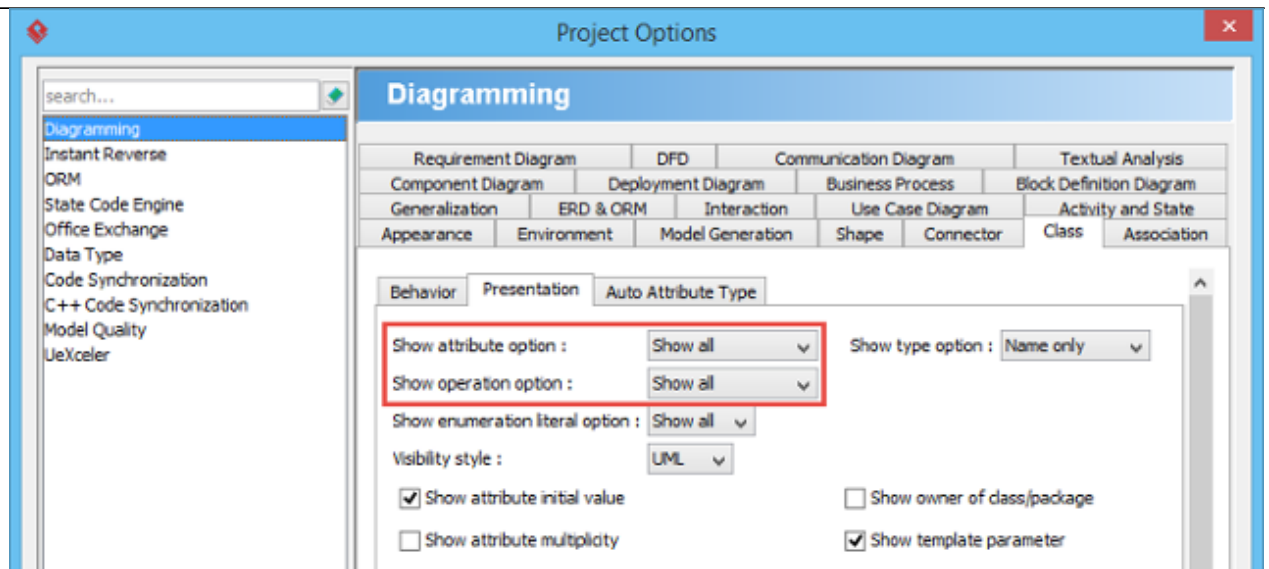
Per diagram

This applies to classes in specific diagram. To change the setting:

1. Right click on the class diagram to set the option.
2. Select **Presentation Options > Attribute Display Options / Operation Display Options** from the pop-up menu.
3. Select **Hide All / Show All / Show Public Only**.
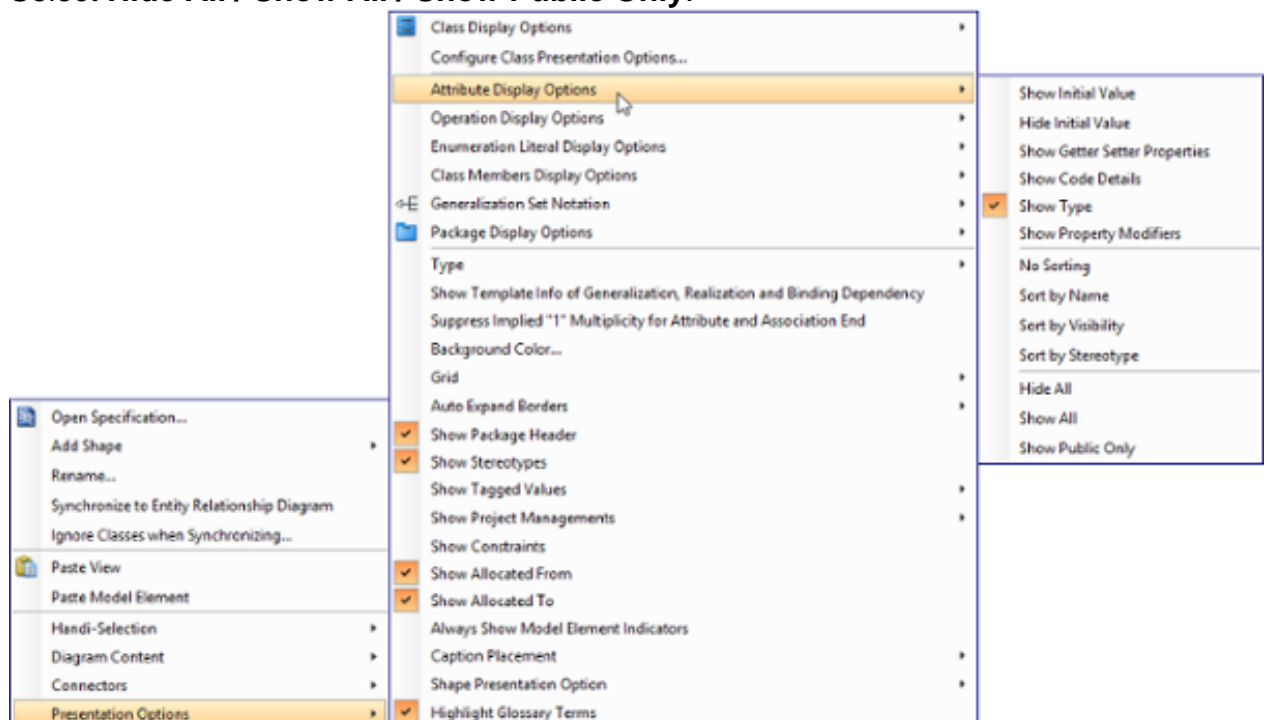
Per class

This applies to specific class. To change the setting:

1. Right click on the class to set the option.
2. Select **Presentation Options > Attributes / Operations** from the popup menu.
3. Select **Hide All** / **Show All** / **Show Public Only**.
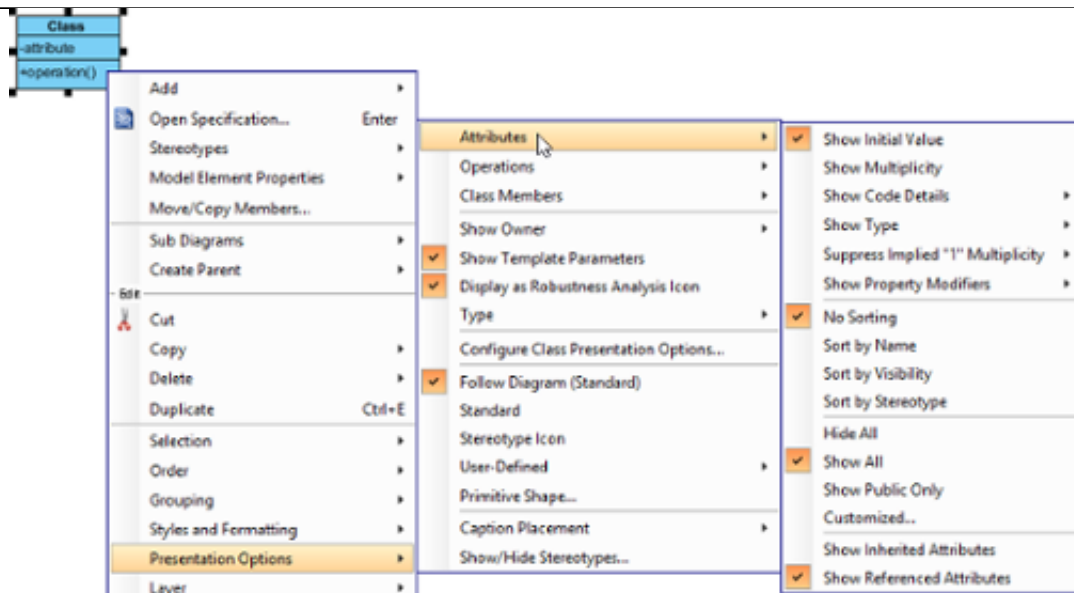
For specific attribute/operation

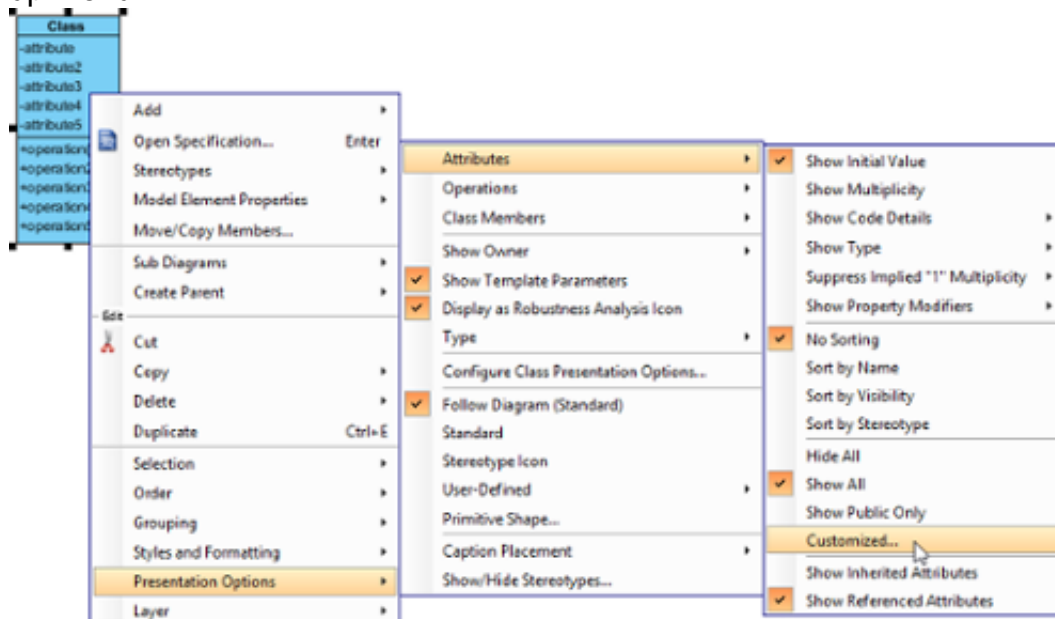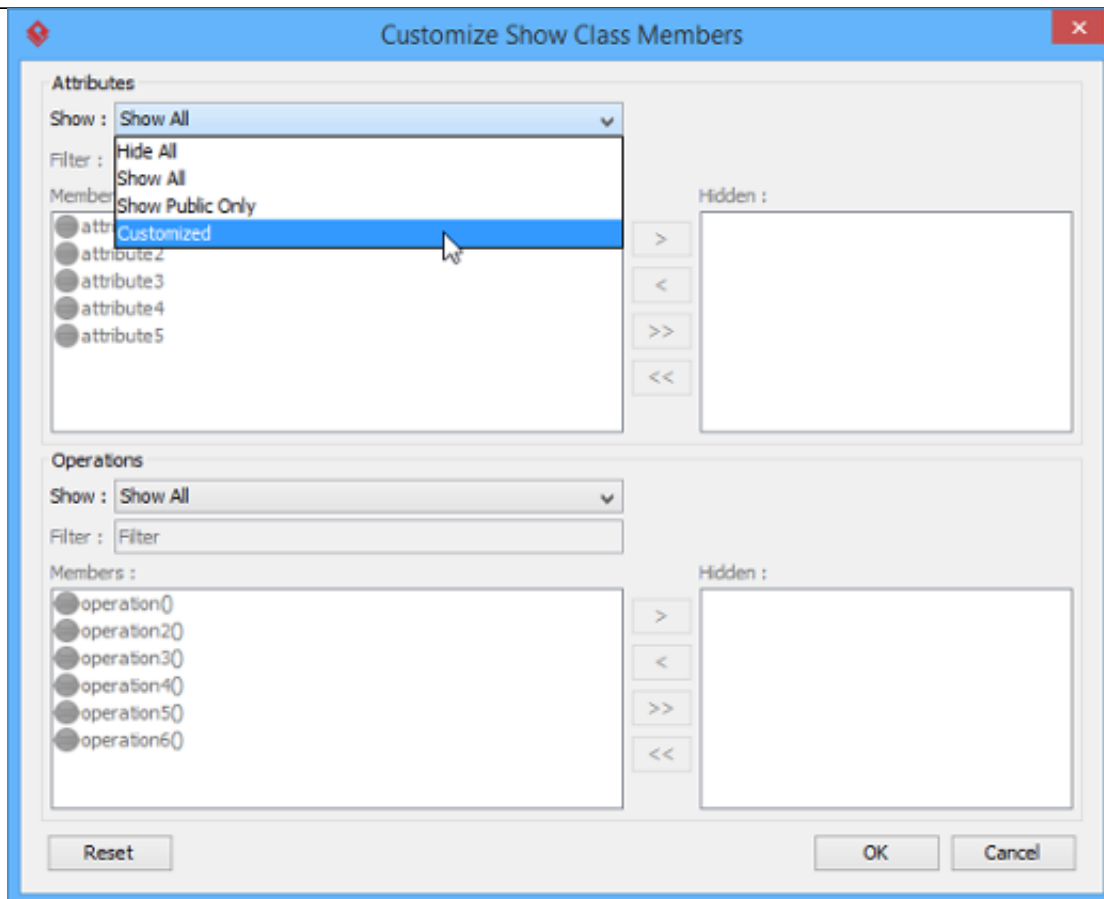Instead of showing or hiding all members or public members, you may show/hide specific class member per class. To do this:
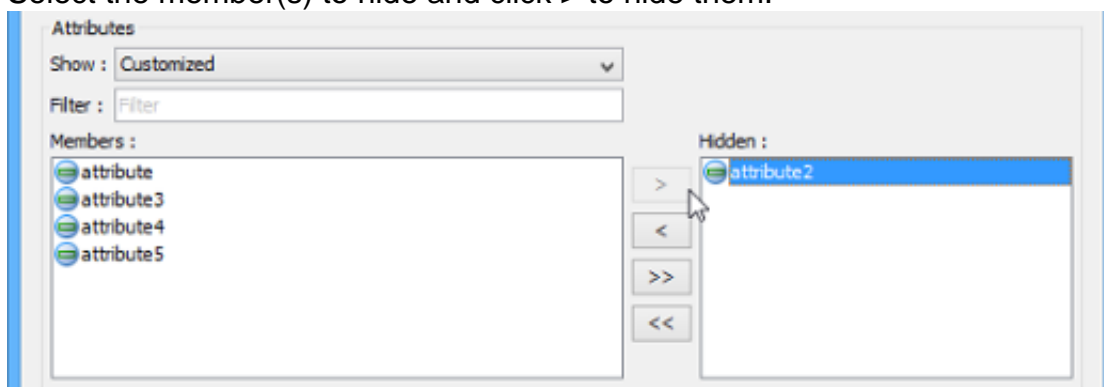
1. Right click on the class to set the option.
2. Select **Presentation Options > Attributes / Operations > Customized...** from the pop-up menu.

3. Select **Customized** under the drop down menu of **Show**.

4. Select the member(s) to hide and click **>** to hide them.

5. Click **OK** button to confirm.

Setting initial (default) value for attribute

Initial value can be set to an attribute, indicating the default value of the attribute when the owning object is instantiated. You can give a text value for initial value, or select an attribute of another class. To set initial value to an attribute:

1. Open the specification window of attribute by right clicking on the attribute and selecting **Open Specification...** from the popup menu.
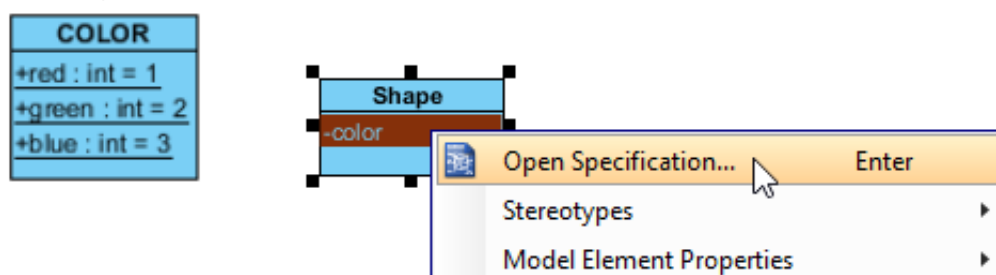
2. In the **General** page of the specification window, enter the initial value in initial value field if it is a text value, or popup the drop down menu to select a public and static field of any class to be the value.
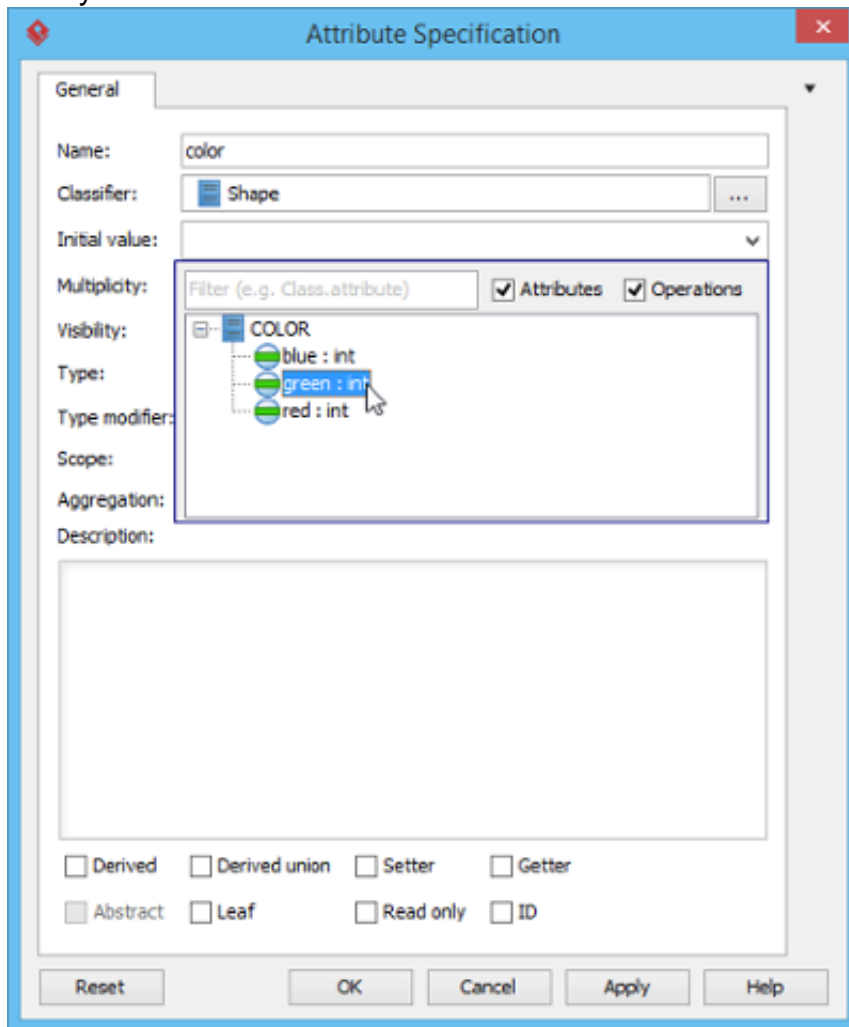

Note: In order to select the attribute of another class to be the default value, make sure the attribute you want to select is static (i.e. set to be in classifier scope) and is public (so that other classes can access).

3. Click **OK** to confirm.

Setting the ownership of association end

Ownership of association ends by an associated class may be indicated by a small dot. To set the ownership, right click at the association end where you want to set ownership, select **Owned by** in the popup menu, then select either the association or the class at the opposite end. By selecting class, the small dot will be shown.
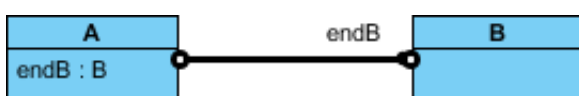
Sub-setting on association end

Take a look at the sample below. The subset on d indicates that the collection d, which is an

instance of class C, is a subset of the collection b, instance of class A.
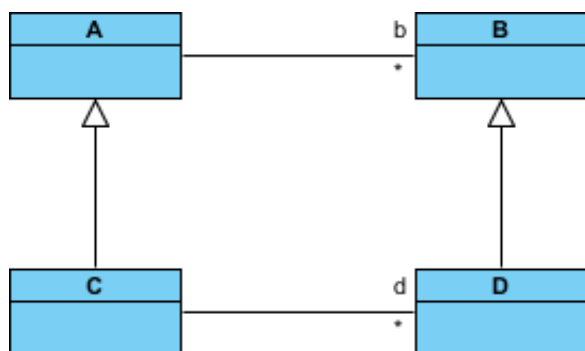
To define a subset on an association end:

1. Right click on the association (where the subset end exist) and select **Open Specification...** from the popup menu.
2. In the **General** tab, locate the association end where you want to define a subset. Click on **...** for the Role property of the association end.
3. In the **Association End Specification**, open the **Subsetted Association Ends** tab.
4. From the list on the left hand side, click on the role you want to define subset for. Click **>** to select it. If you do not see any role listing there, make sure your model respect the pattern similar to the class diagram above - The class of both association ends are subclasses, and there is an association connecting their superclasses.
5. Click **OK** to confirm and close the **Association End Specification** window.
6. Click **OK** to confirm and close the **Association Specification** window.
7. Right click on the association end and select **Presentation Options > Show Association End Property Strings** from the popup menu to show the subset.