

# Creating new actions



You can find the code examples in

- `<modeling tool installation directory>\openapiexamples\actiontypes`
- `<modeling tool installation directory>\openapiexamples\simpleconfigurators`
- `<modeling tool installation directory>\openapiexamples\selectionactions`

## Step #1: Create a new action class

All actions used in a modeling tool must be subclasses of the [com.nomagic.magicdraw.actions.MDAction](#) class (see [javadoc](#) for more details). The following [MDAction](#) subclasses that are used for basic purposes are already created in a modeling tool:

- [com.nomagic.magicdraw.ui.browser.actions.DefaultBrowserAction](#) – an action class, used for a browser action. It enables to access some browser tree and nodes and is recommended to use for performing some actions with the selected browser nodes.
- [com.nomagic.magicdraw.ui.actions.DefaultDiagramAction](#) – an action class for a diagram action. It enables to access some diagram elements and is recommended to use for performing some actions with the selected diagram elements.
- [com.nomagic.magicdraw.actions.PropertyAction](#) – an action for changing some element or application property. It can be used for changing properties defined by a user.

You must override at least the [actionPerformed\(java.awt.event.ActionEvent\)](#) method and implement in it what this actions is going to do.

### Example #1: A simple action

```
class SimpleAction extends MDAction
{
    public SimpleAction(String id, String name)
    {
        super(id, name, null, null);
    }
    /**
     * Shows message.
     */
    public void actionPerformed(ActionEvent e)
    {
        JOptionPane.showMessageDialog(MDDialogParentProvider.
getProvider().getDialogParent(), "This is:" + getName());
    }
}
```

### Example #2: An action for a browser

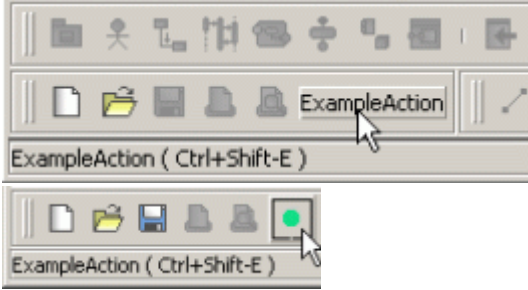
```

public class BrowserAction extends DefaultBrowserAction
{
    /**
     * Creates action with name "ExampleAction"
     */
    public BrowserAction()
    {
        super("", "ExampleAction", null, null);
    }
    public void actionPerformed(ActionEvent e)
    {
        Tree tree = getTree();
        String text="Selected elements:";
        for (int i = 0; i < tree.getSelectedNodes().length; i++)
        {
            Node node = tree.getSelectedNodes()[i];
            Object userObject = node.getUserObject();
            if (userObject instanceof BaseElement)
            {
                BaseElement element = (BaseElement) userObject;
                text += "\n"+element.getHumanName();
            }
        }
        JOptionPane.showMessageDialog(MDDialogParentProvider.
getProvider().getDialogParent(), text);
    }
}

```

## Step #2: Specify action properties

| Property                     | Function                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ID</b>                    | ID is a unique String for identifying an action. If the action ID is set to <i>null</i> , a new ID is generated. An action name can be used as ID. All MagicDraw (or another modeling tool developed by us) default actions IDs are defined in the <a href="#">com.nomagic.magicdraw.actions.ActionsID</a> class (for more details, see <a href="#">JavaDoc</a> ). You can use these constants for accessing actions. Do not use it as new actions ID. |
| <b>Name</b>                  | The action name is visible in all GUI elements.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Shortcut and mnemonic</b> | <p>Every action can have an assigned keyboard shortcut. Shortcuts can be customized from the <b>Environment Options</b> dialog box.</p> <div>  The action must have an ID assigned (not null). In other case, shortcuts cannot be restored after restarting an application. </div>                                                                                  |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Icon</b>        | <p>Every action can have a small and large icon. A small icon is described as <i>javax.swing.Action.SMALL_ICON</i> and can be used in menu items. A large icon is used in toolbar buttons. The action for a toolbar must have a large icon, otherwise it is displayed as a button with an action name.</p>  <pre data-bbox="280 569 1070 716">// setting an icon. On the toolbar, the button with an icon looks better than with the text. action.setLargeIcon( new ImageIcon(getClass().getResource ("main_toolbar_icon.gif") ) );</pre> |
| <b>Description</b> | The action's description that is shown as a tool tip text.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### Step #3: Describe Enabling/Disabling logic

There are two ways for controlling the update of the actions state:

#### 1. Add an action to the predefined actions group.

Actions can be added into one of predefined actions groups. All actions of the one group are disabled/enabled together. Conditions for groups enabling/disabling and status updating are predefined and cannot be changed.

Example:

```
MDEAction action = new MDEAction("Example", "Example", KeyEvent.VK_E,
ActionsGroups.PROJECT_OPENED_RELATED);
```

#### 2. Implement the `updateState()` method for the action.

Here you may describe all conditions when an action must be enabled and disabled. Example of the `updateState()` method for the browser shortcut menu action:

```
public void updateState()
{
    //action will be enabled only if there are some selected nodes.
    Tree tree = getTree();
    if(tree != null)
    {
        setEnabled(tree.getSelectedNode() !=
null);
    }
}
```

If the action is not added to any group, the `updateState()` method for all such actions will be invoked after executing any command and after closing/opening a project or window.

When some actions need to refresh their state, all actions without a group can be updated manually:

```
ActionsStateUpdater.updateActionsState();
```

## Step #4: Configure actions

Every action must be added into an [com.nomagic.actions.ActionsCategory](#) class. [ActionsCategory](#) is a small group for actions. It can be represented as a separator or submenu (a nested category).

Categories are added into the [com.nomagic.actions.ActionsManager](#) class, which is some kind of an actions container. One [ActionsManager](#) represents one GUI element – a menu bar, a shortcut menu, or a toolbar.

The following table explains how classes of a modeling tool maps into GUI elements:

|               | ActionsManager | Category    | Action    |
|---------------|----------------|-------------|-----------|
| Menu          | Menu bar       | Menu        | Menu item |
| Toolbar       | All toolbars   | One toolbar | Button    |
| Shortcut Menu | Shortcut menu  | Submenu     | Menu item |

Actions in *ActionsManagers* are configured by many *Configurators*. A *Configurator* is responsible for adding or removing the action into a strictly defined place and position between other actions.

There are three types of configurators:

- [com.nomagic.actions.AMConfigurator](#) - a configurator for a general purpose. It is used for menus, toolbars, browser, and diagrams shortcuts.
- [com.nomagic.magicdraw.actions.BrowserContextAMConfigurator](#) - a configurator for configuring managers for a browser shortcut (pop-up) menu. It can access a browser tree and nodes.
- [com.nomagic.magicdraw.actions.DiagramContextAMConfigurator](#) - a configurator for configuring shortcut menus in a diagram. It can access a diagram, selected diagram elements, and an element that requests a shortcut menu.

Once *ActionsManagers* for the main menu and all toolbars are created and configured, the actions can be only disabled but not removed later.

Shortcut menus are created on every invoking, so *ActionsManagers* are created and configured every time and actions can be added or removed every time.

### Example #1: Add some action into a browser's shortcut menu

```
final DefaultBrowserAction browserAction = ...
BrowserContextAMConfigurator brCfg = new BrowserContextAMConfigurator()
{
    // Implement configuration.
    // Add or remove some actions in ActionsManager.
    // A tree is passed as an argument, provides ability to access
nodes.
    public void configure(ActionsManager mngr, Tree browser)
    {
        // Actions must be added into some category.
        // So create the new one, or add an action into the
existing category.
        MDAActionsCategory category = new MDAActionsCategory("",
        "");
        category.addAction(browserAction);
        // Add a category into the manager.
        // A category isn't displayed in a shortcut menu.
        mngr.addCategory(category);
    }
    public int getPriority()
    {
        return AMConfigurator.MEDIUM_PRIORITY;
    }
};
```

## Example #2: add some action into main menu, after creating a new project

```
// Create an action.
final MDAAction someAction = ...
AMConfigurator conf = new AMConfigurator()
{
    public void configure(ActionsManager mngr)
    {
        // Searching for an action after which an insertion should be
done.
        NMAAction found= mngr.getActionFor(ActionsID.NEW_PROJECT);

        // The action found, inserting
        if( found != null )
        {
            // find the category of the "New Project" action.
            ActionsCategory category = (ActionsCategory)mngr.
getActionParent(found);

            // Get all actions from this category (menu).
            List actionsInCategory = category.getActions();

            //Add the action after the "New Project" action.
            int indexOfFound = actionsInCategory.indexOf(found);
            actionsInCategory.add(indexOfFound+1, someAction);

            // Set all actions.
            category.setActions(actionsInCategory);
        }
    }

    public int getPriority()
    {
        return AMConfigurator.MEDIUM_PRIORITY;
    }
};
```

## Step #5: Register Configurator

All configurators are registered in the [com.nomagic.magicdraw.actions.ActionsConfiguratorsManager](#) class. [ActionsConfiguratorsManager](#) enables to add or remove many configurators to every configuration predefined by a modeling tool.

All available configurations are accessible in the following way:

```
ActionsConfiguratorsManager.getInstance().
add<configuration_name>Configurator(configurator);
```

## Example: Add new configurator for CONTAINMENT\_BROWSER\_CONTEXT configuration

```
//See previous examples, how to create a configurator for browser
actions.
//Add the configurator into ActionsConfiguratorsManager.
ActionsConfiguratorsManager.getInstance().
addContainmentBrowserContextConfigurator(brCfg);
```