



**LAB 1: Introduction to Unified Modeling Language (UML) and Visual Paradigm for UML Software as a CASE\* Tool**

\* Computer Aided Software Engineering

**OBJECTIVES**

- Introduction to UML notations and diagrams.
- Hands on exposure of “Visual Paradigm software for UML” involving analysis and design with UML diagrams.

**INTRODUCTION**

**Definition of Unified Modeling Language (UML)**

- UML is a standard language for specifying, visualizing, constructing, and documenting for large software systems, as well as for business modeling and other non-software systems.
- Considered a very important part of developing object oriented software and software development process.
- UML uses graphical notations to express design of software projects and its requirements.

**Common Types of UML Diagrams**

UML defines several types of diagrams: class (package), object, use case, sequence, collaboration, statechart, activity, component, and deployment.

Type	Description	Diagram Display
Use Case Diagram	Use case diagrams model the functionality of system using actors and use cases.	<p>The diagram shows two stick figures representing actors. The left actor is connected to three ovals labeled 'Use Case'. The right actor is also connected to three ovals labeled 'Use Case'. A dependency arrow points from the middle use case of the right actor to the middle use case of the left actor, labeled with the stereotype &lt;&lt;uses&gt;&gt;.</p>



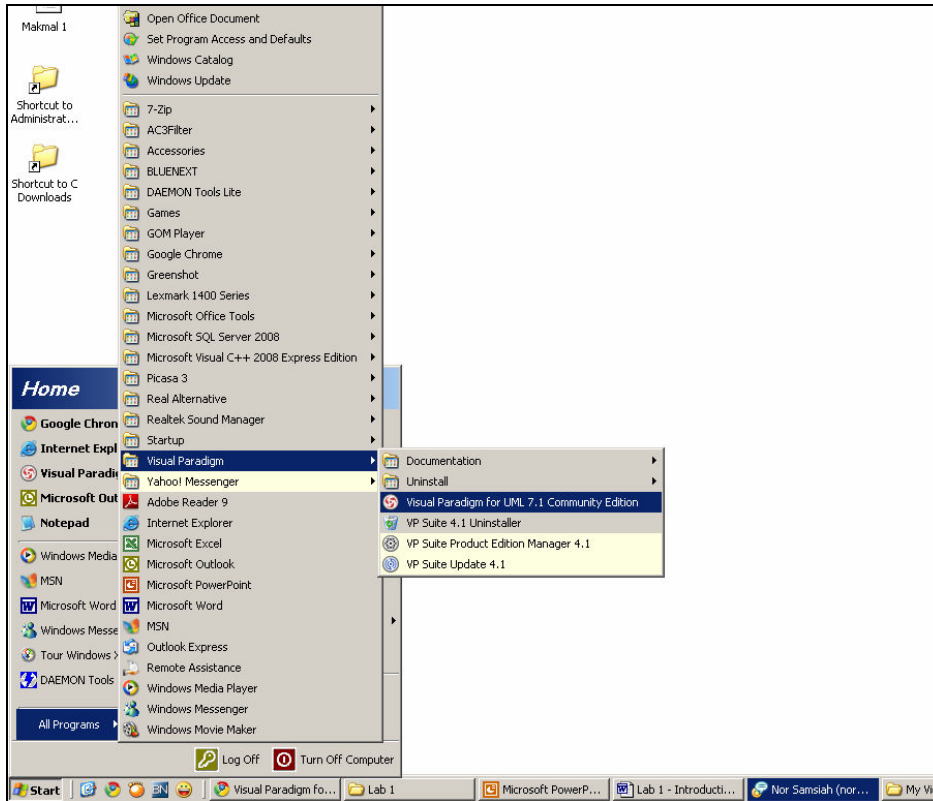
<p>Class Diagram</p>	<p>Class diagrams are the backbone of almost every object oriented method, including UML. They describe the classes of the system, their inter-relationships, and the operations and attributes of the classes.</p>	
<p>Object Diagram</p>	<p>A diagram that shows a complete or partial view of the structure of a modeled system at a specific time. They can be used to test class diagrams for accuracy. useful for exploring “real world” examples of objects and the relationships between them</p>	
<p>Sequence Diagram</p>	<p>Sequence diagrams describe interactions among classes in terms of an exchange of messages over time.</p>	
<p>Interactions Diagram</p>	<p>Represent interactions between objects as a series of sequenced messages. Collaboration diagrams describe both the static structure and the dynamic behavior of a system.</p>	

Modified after: <http://www.smartdraw.com/resources/tutorials/Introduction-to-UML>



## USING Visual Paradigm for UML (VP-UML)

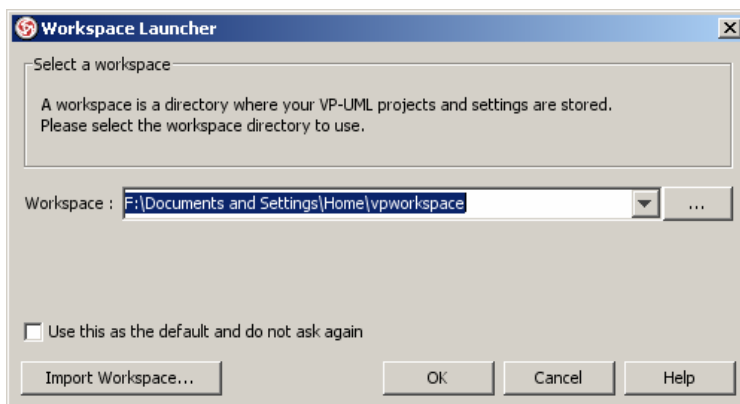
### Launching VP-UML and Workspace Configuration



- To activate an instance of VP-UML:  
In windows desktop, highlight and click “START > Visual Paradigm > Visual Paradigm for UML 7.1 Standard Edition”.

A workspace launcher will be displayed when VP-UML is started:

It is recommended to set your workspace path in your Documents folder.



The workspace launcher dialogbox

If you want to disable the workspace launcher from appearing again, check “Use this as the default and do not ask again” at the bottom of the window box.

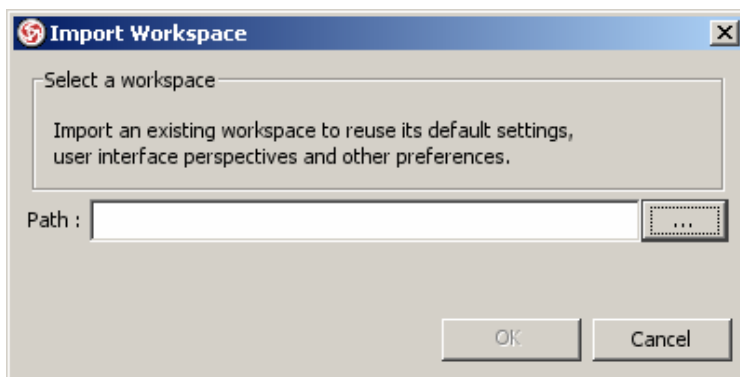
This will cause the VP-UML to automatically open the selected workspace next time.

Please note that a Workspace is an important directory which stores all your project settings / configurations, diagrams and reports / analysis.

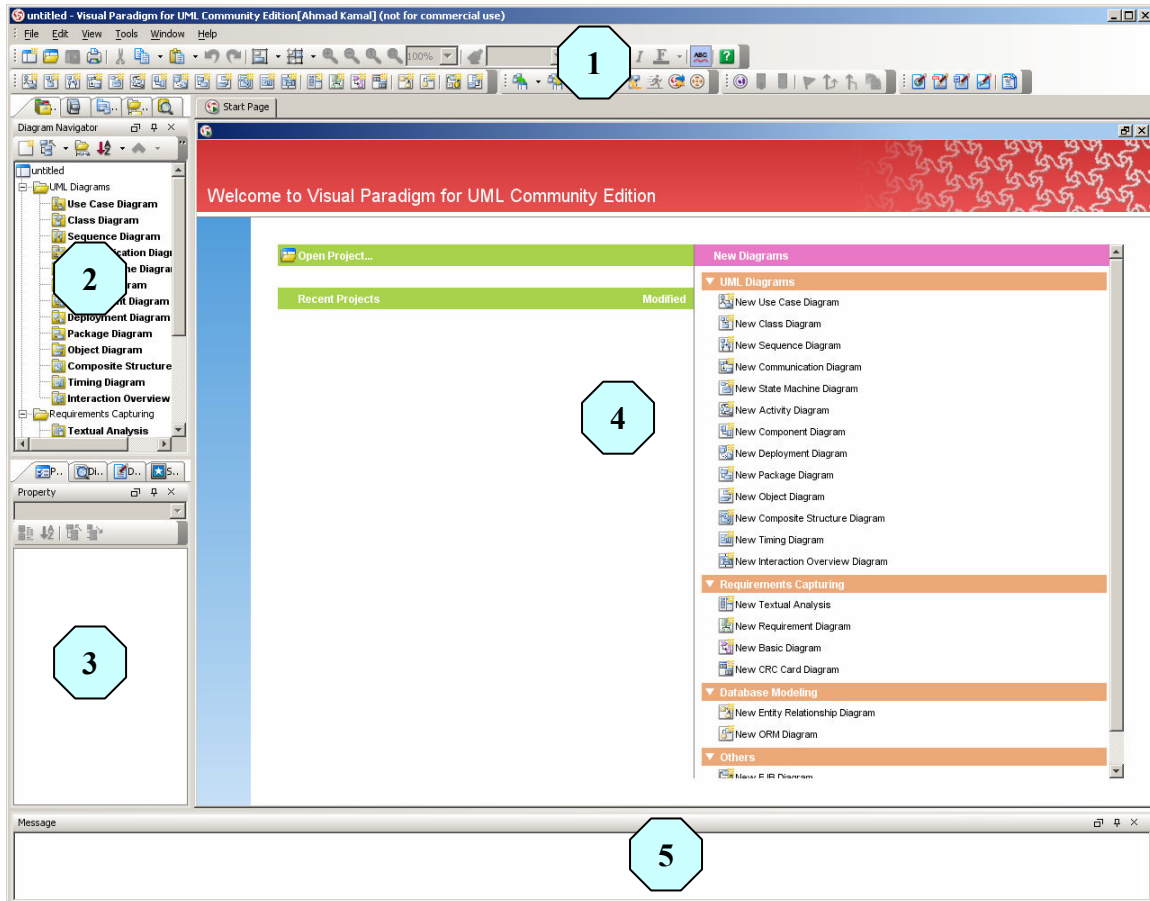
### **Importing an (existing) workspace**

VP-UML also allows the import of an existing workspace, usually the case when such workspace is located elsewhere, or existed previously. To do this, click the “Import Workspace” button to launch another dialog box.

The path of the existing workspace can be defined in the dialog as shown below:



## Interface Overview

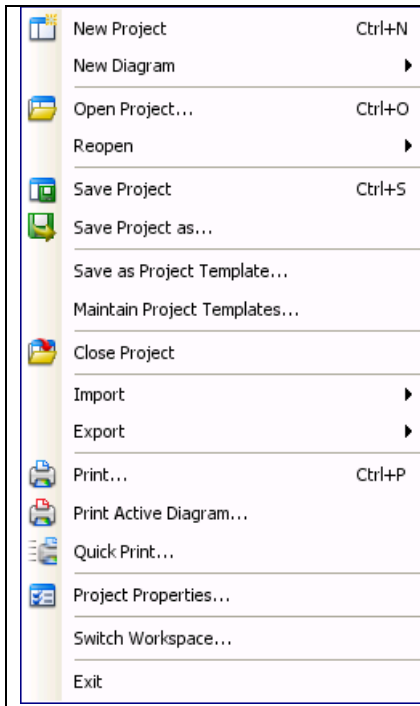


No	Name	Description
1	Menu and Toolbar	Options for configuration, editing and execution.
2	Diagram Navigator	Various explorers placed here for accessing project data from different domains and listing of diagrams.
3	Various Auxiliary Panes	Auxiliary panes displaying panes like property pane, preview pane, documentation pane and stencil pane shown here.
4	Diagrams Pane / Analysis Pane	Diagrams are displayed in this frame. Reports or analysis are also shown here.
5	Message Pane	Messages generated by various operations displayed here.



## Menu Toolbar

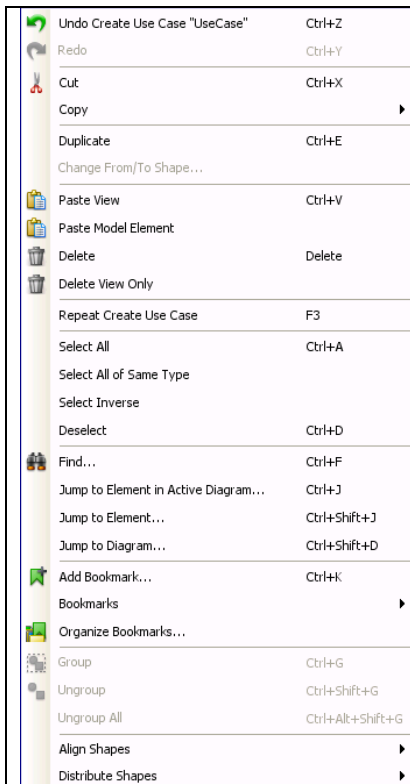
### Menu Toolbar > File Menu



The File Menu in short allows project and file control features:

- Create a project
- Create a diagram
- Open and saving of projects
- Project Template related operations (Saving and Maintenance)
- Import of project data from different UML software file formats

### Menu Toolbar > Edit Menu



The Edit Menu enables:

- Undo and Redo
- Cut or Copy
- Select everything in a diagram
- Jump to a diagram or an element
- Grouping
- Shapes alignment and distribution








### Menu Toolbar> View Menu

	<p>The View Menu enables:</p> <ul style="list-style-type: none"><li>▪ Show / hide a pane</li><li>▪ Show and manage grid</li><li>▪ Management of layers</li><li>▪ Zoom diagram in and out</li><li>▪ Manage nickname and style</li></ul>
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### Menu Toolbar> Tool Menu

	<p>The Tool Menu allows:</p> <ul style="list-style-type: none"><li>▪ Generation of reports</li><li>▪ Publish project</li><li>▪ Perform use case scheduling</li><li>▪ Open various kinds of element grid</li><li>▪ Configure requirements</li><li>▪ Configure programming language</li><li>▪ Perform Integrated Development Environment (IDE) integration</li><li>▪ Perform Teamworks operation</li><li>▪ Management of shapes through Shape Editor</li><li>▪ Management of license keys</li></ul>
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### Menu Toolbar> Window Menu

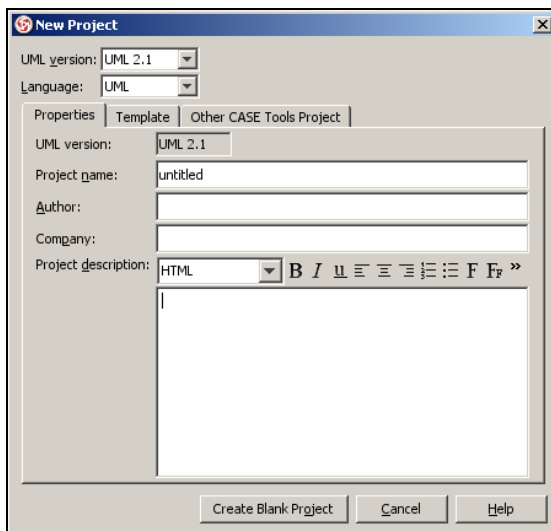
 Previous Diagram      Alt+Left	<p>The Window Menu enables:</p> <ul style="list-style-type: none"><li>Navigation between opened diagrams</li><li>Rearrangement of diagram windows</li><li>Switching to another diagram</li><li>Close diagram/s</li></ul>
 Next Diagram      Alt+Right	
 Tile	
 Cascade	
Navigate      ▶	
Switch to Diagram...      Ctrl+Shift+E	
 Start Page	
Close Active Diagram      Ctrl+W	
Close Other Diagrams	
Close All Diagrams      Ctrl+Shift+W	

### Menu Toolbar> Help Menu

 Visual Paradigm for UML Enterprise Edition Help	<p>The Help Menu allows easy access to VP-UML manual and online help.</p>
Mouse Gestures...	
Visual Paradigm on the Web      ▶	
Maintenance      ▶	
Show Loaded Models...	
Customize UI...	
About Visual Paradigm for UML Enterprise Edition...	

## CREATING PROJECTS

Each diagrams and model elements created in VP-UML must be defined within a project. To create a project, click under Menu toolbar, “File > New Project”, and a dialog box will pop out.



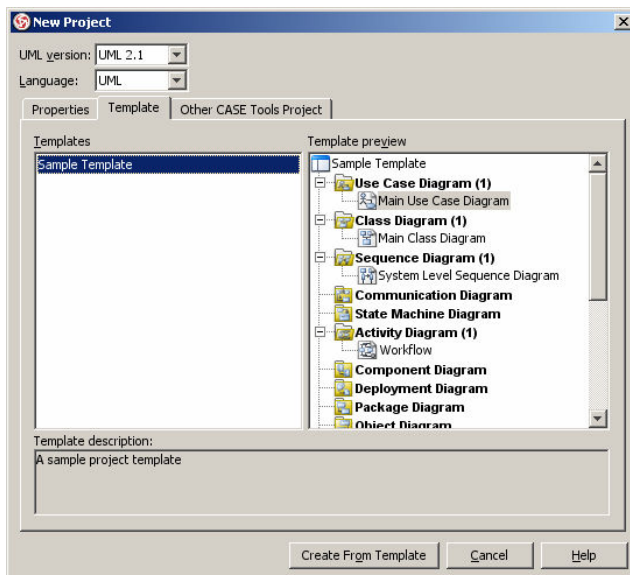


- Apply the following options as part of your project specification:
  - UML version : UML 2.1
  - Language : Java
  - Project Name : Exam Registration System
  - Author : <your\_name>

Note that for this lab conducted in UKM, Java is the preferred language, although any language integration (with VP-UML) is possible.

- Press the “Create Blank Project” button when done.

## Creating projects by Project Templates

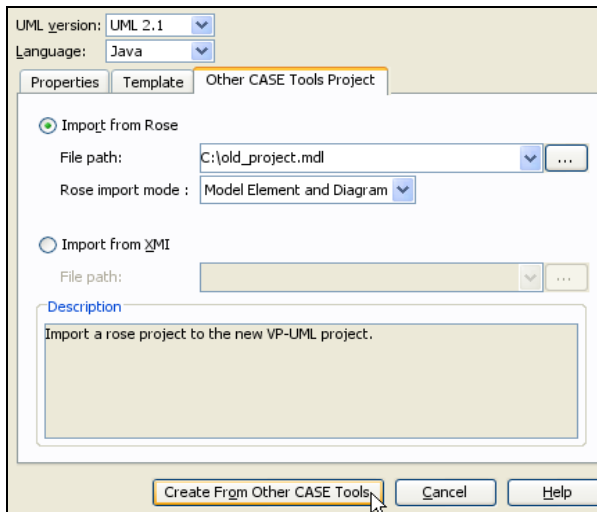


Some users who have been using VP-UML for some time may have their own preferences when creating a new project. For example, he might want to have at least 10 predefined Use Case diagrams in each of his new project.

To allow this, a project template can be defined to be used later when creating a new project.

- To create project from template, select the Template page and select “Sample Template”, then click “Create from Template” button.  
Notice that your project will have each 1 Use Case Diagram, Class Diagram, Sequence Diagram and Activity Diagram compared to a blank project.

## Creating projects by importing other CASE tool project

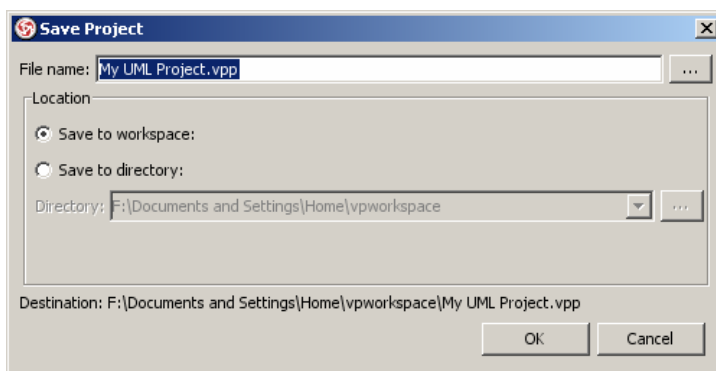


For users wishing to migrate from other legacy projects with other CASE tools (e.g Rational Rose, AgroUML), those projects can also be imported into VP-UML. To do this:

- Select the “Other CASE Tools Project” page, and select either Import from Rose to import a Rational Rose project (.mdl), or Import from XMI to import XMI file exported from the CASE tool.
- Click “Create from Other CASE Tools” to import the project.

## Saving Projects

Visual Paradigm for UML saves all project content to a single file, with file extension .vpp.



To save a project, select under Menu Toolbar, “File > Save Project”. The first time you save the project will cause the Save Project dialog box to appear (shown above).

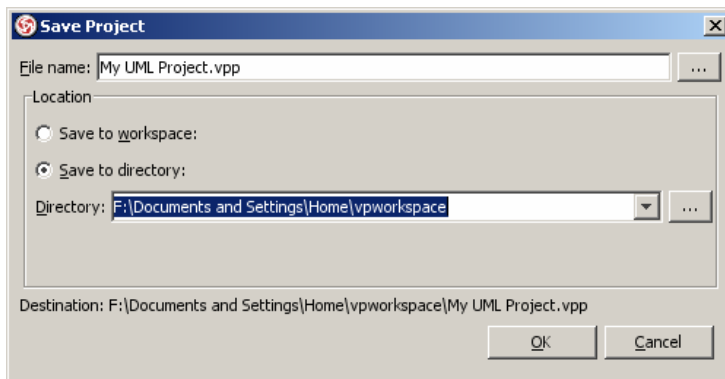
Note that you can also save your project either in your predefined workspace or a specific directory.

### Saving project > to Workspace

To save project to workspace, select Save to workspace. The project file will be saved in the workspace directory, as shown above.

### Saving project > to Directory

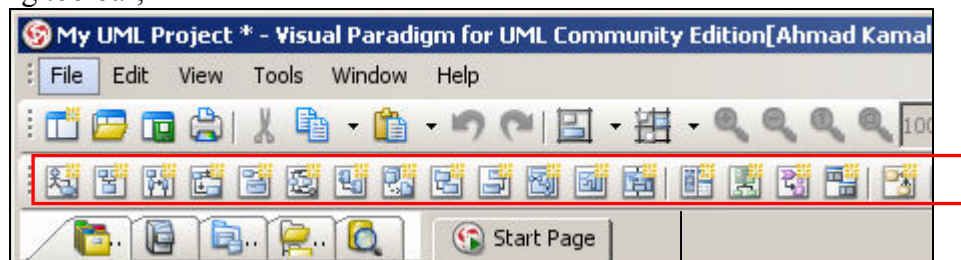
To save project to a specified directory (other than workspace default path), select “Save to Directory” and specify the direction path in the “Direction” field.



## CREATING, DELETING AND MODIFYING DIAGRAMS

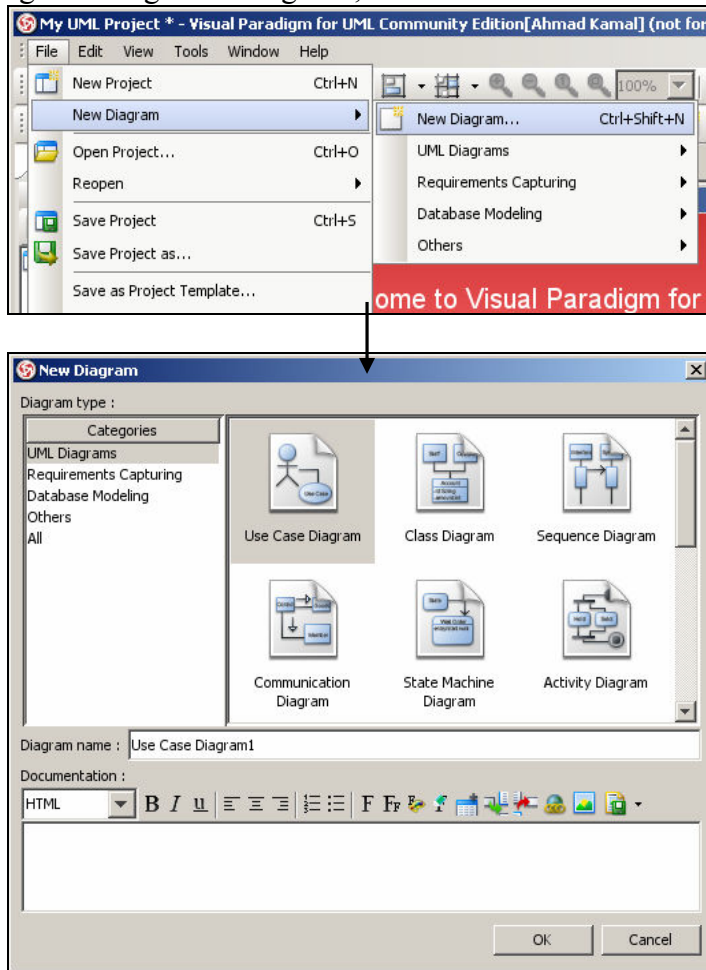
You can create a diagram in a number of ways:

- Using toolbar;

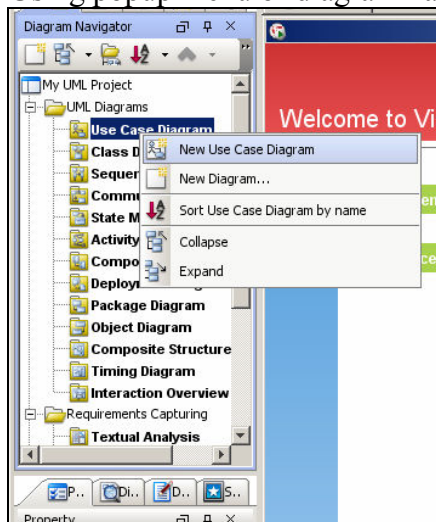


Diagrams Shortcut Icons

- Using new diagram dialog box;

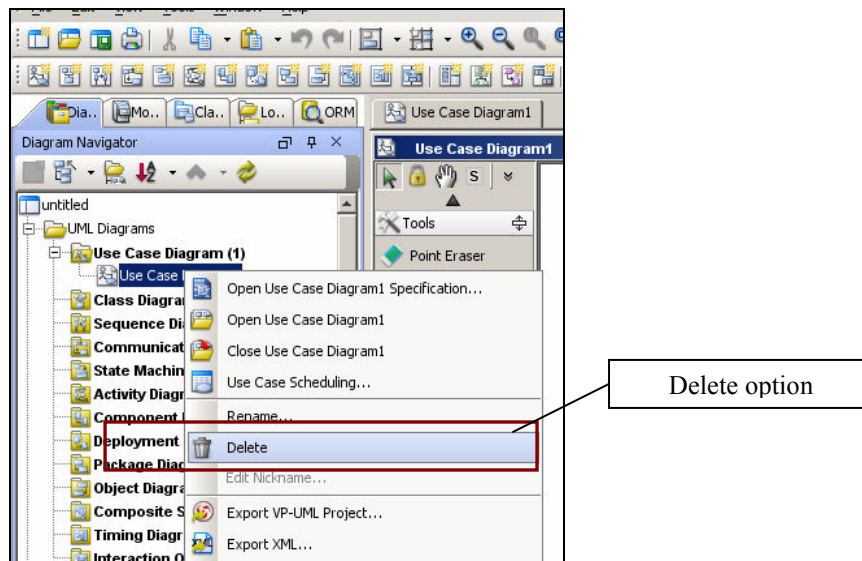


- Or, Using popup menu of diagram navigator.

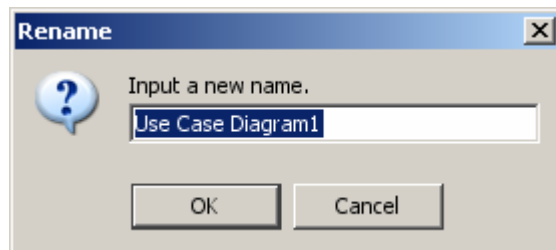


Similarly, you can also delete a diagram in the diagram navigator. To do this, create a diagram first by:

- Under the Menu Toolbar, click “File > New Diagram > UML Diagrams > Use Case Diagram” to create an empty Use Case Diagram.
- Now highlight “Use Case Diagram1” by right clicking and click the Delete option. The diagram will be deleted.



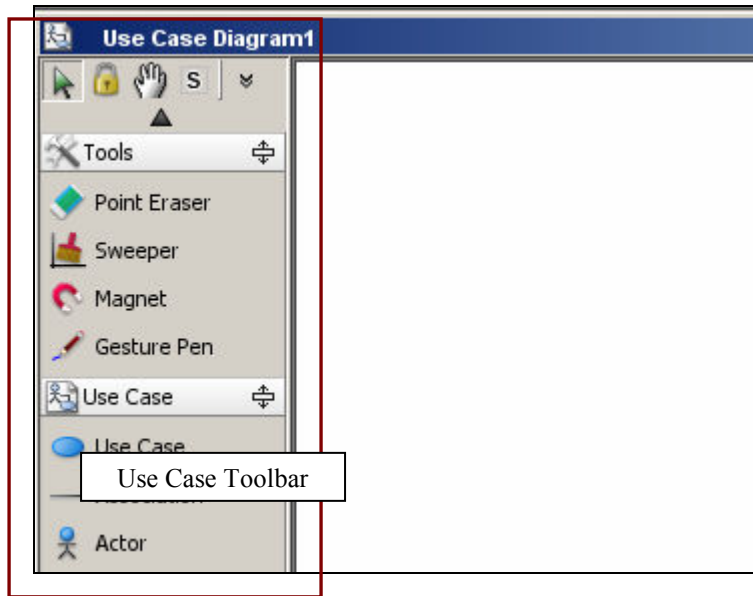
Also remember that you can rename your diagram at anytime, choose the “Rename” option instead of “Delete” to perform renaming of diagram. Try this.



## **WORKING WITH DIAGRAMS AND ITS ELEMENTS**

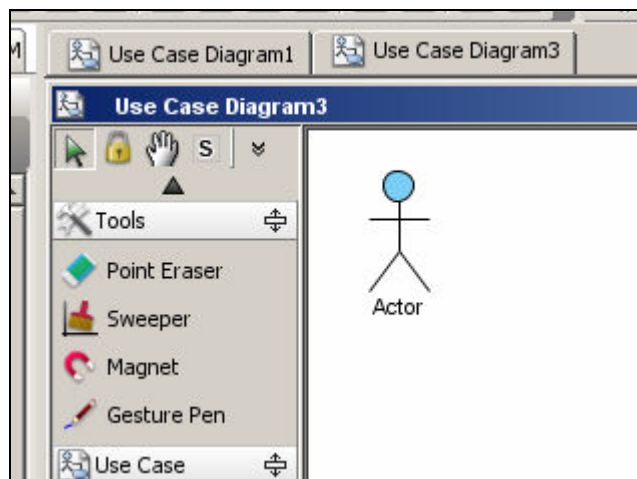
To illustrate the usage of diagrams and its elements, we need to create a new diagram. We will use a Use Case Diagram for this (more of Use Case models to be covered in Lab 2). For now, follow the steps below:

- Under the Menu Bar, click “File > New Diagram > UML Diagrams > Use Case Diagram” to create an empty Use Case Diagram.

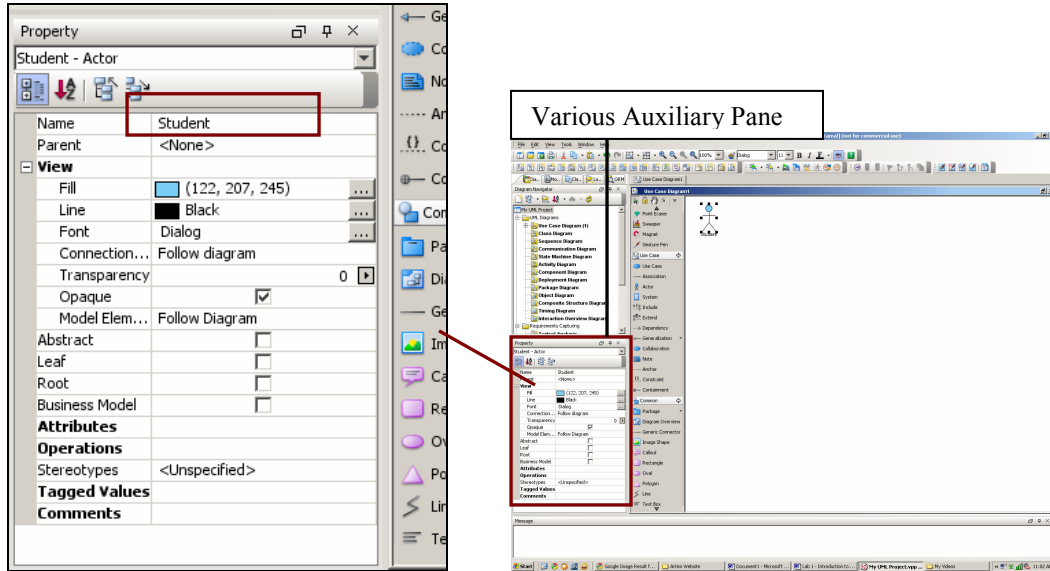


Notice that the Use Case Diagram Toolbar will be attached to the diagram pane which includes all elements of a use case.

- Click the Actor symbol in the use case toolbar and click once again anywhere in the Diagram Pane. An Actor will be created.

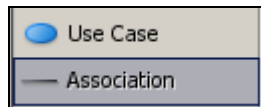


- Notice that in the Various Auxiliary Pane, the Property Tab highlights the created Actor item. You can also modify the property of the Actor here.  
Rename the Actor name as Student.

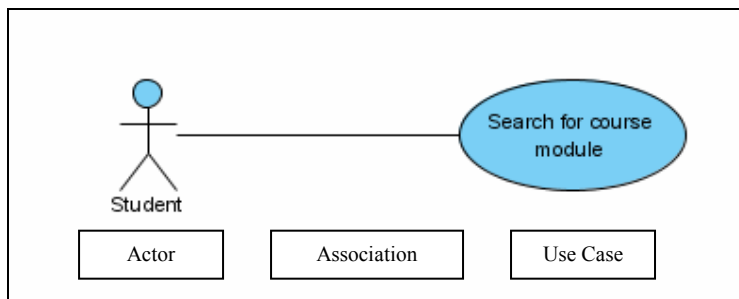


Property tab displaying highlighted element's properties to edit properties such as Name.

- Using the same methods when creating the actor above, try to produce a use case and associate it with the created actor. Detailed steps below:
  - Create a new Use Case and name it “Search for course module”.
  - Create an association and link the actor “Student” with use case “Search for course module”.



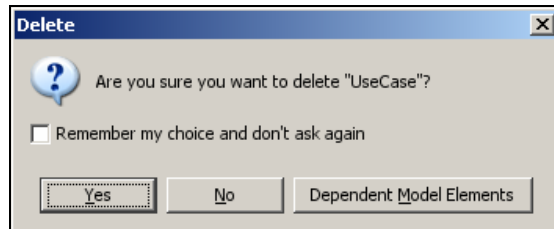
- You should get a diagram shown below:



A simple use case diagram.

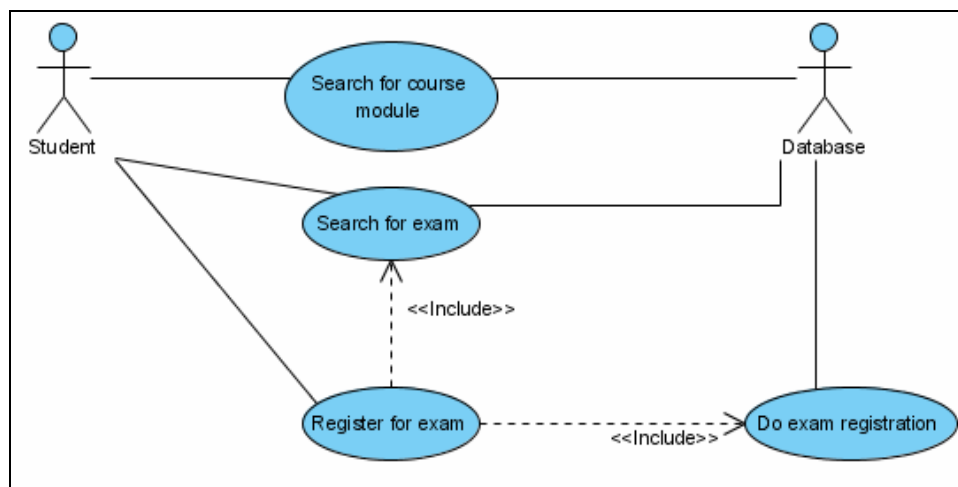
- Now try to left click and drag the use case around and notice that the association will still preserve the relationship of both the actor and its use case.  
This allows for flexibility and modification in the design of the diagram.
- To delete an element, several ways are possible. Try any one below:
  - Left click the use case “Search for course module”. Under Menu Toolbar, click “Edit > Delete”; OR,

- Left click the use case “Search for course module”. Then Press keyboard key “Delete”; OR,
- Right click the use case “Search for course module”. Click on the “Delete” option.



A dialog box will appear to ask for delete confirmation. If (AND ONLY IF) you want to disable deletion confirmation, tick the “Remember my choice and don’t ask again”.

- As an exercise to familiarize yourself with VP-UML diagram activity, try to create a simple use case diagram as shown below:



Use Case Diagram for a Student Exam Registration System Example

#### Use Case Flow of Events:

- Student search for a module from the database.
- Student search for an examination from the database.
- Student registers for an examination, which needs to search for a specific examination.
- When student registers for an examination, the request of exam registration is processed and records updated into the database.

#### Use Case Description

Use Case	Description
Search for course module	Provide a simple search functionality of courses which will be displayed in table format.
Search for exam	Provides a list of registered exams of the student to help





	the student register for one / many exams.
Register for exam	A student can register for an exam.

End of Lab 1.