Design Document

Penultimate UML Builder

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1. Introduction

This document is designed to be a reference for any person wishing to implement or any person interested in the architecture and design of the Penultimate UML Builder (PUB).

1.1 Purpose

The purpose of this document is to provide a description of the design fully enough to allow the software development to proceed with the understanding of what is to be build and how it is expected to be built. The Design Document provides information necessary to provide description of the details for the software and system to be built.

2. Design Overview

2.1 Introduction

The PUB utilizes an MVC design pattern as its overarching structure. The following provides a brief, high-level overview of the major objects and functionalities for which the system will be responsible.

2.2 System Architecture

2.2.1 Model Classes

- **UMLDocument** - Top-level model object. Contains a collection of UMLSymbol objects.
- **UMLSymbol** - Abstract base class representing notational symbols in UML.
- **UMLRelationSymbol -** Model Class representing a relationship between two **UMLClassSymbol** objects. Holds information like parent and child class, relationship type, angle, etc.. Includes operations to be updated by GUIController.
- **UMLRelationType** - An enum class used to distinguish between different types of relations.
- **UMLObjectSymbol** - Abstract class which represents UML thing symbols.
- **UMLClassSymbol -** Class which represents a class box within a UML diagram. Includes operations to be updated by GUIController.

2.2.2 View Classes

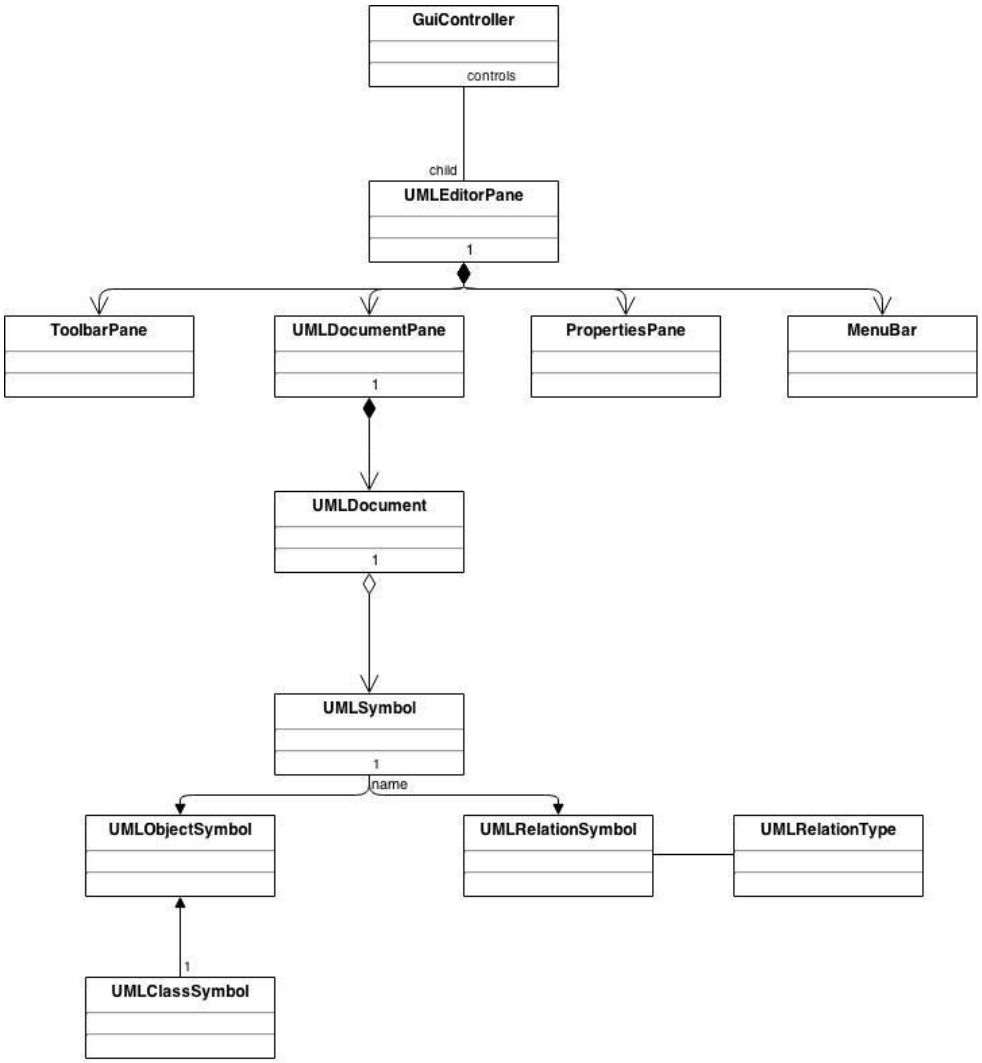
- **UMLEditorPane** - Extends JavaFX's **BorderPane** and serves as the top-level container for the view. Includes instances of **MenuBar**, **DocumentViewPane**, **ToolbarPane**, and **PropertiesPane**.
- **DocumentViewPane** - Handles the graphical representation of the **UMLDocument** and all the **UMLSymbol's** contained therein. It accepts user actions and communicates them to the GUIController.
- **UMLRelationView** - Handles the visual representation of the **UMLRelationSymbol** objects. Graphically represents lines as dotted or solid depending on relationship, determines the type of arrow head to be display and also draws the angle of the line between two **UMLObjectView** objects.
- **UMLObjectView** - Handles the visual representation of **UMLObjectSymbol** objects. Includes text fields corresponding to the fields in the **UMLObjectSymbol**. Accepts user input, which is propagated to the **DocumentViewPane**..
- **ToolbarPane** - Provides a visual representation of the possible operations that can be carried out on the UML document. Communicates with GUIController to determine the effect of user interactions with the **DocumentViewPane**.
- **PropertiesPane** - Represents the editable fields of the currently selected **UMLSymbol** object. Provides an interface for editing those fields and communicates with the **GUIController** to propagate those changes to the **UMLDocument**.

2.2.3 Controller Classes

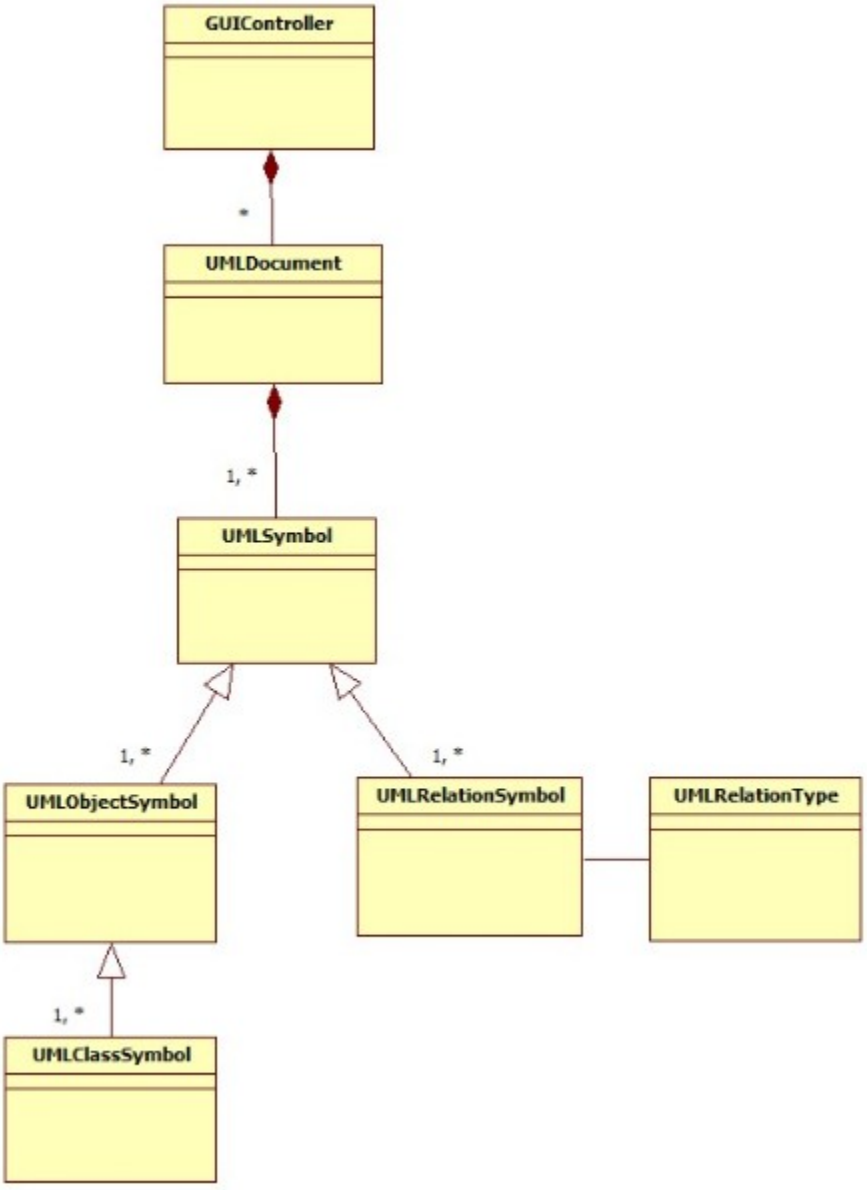
- **GUIController** - The class object that receives all inputs from the user interface and performs operation on the data model representing the class hierarchy of the current project being worked on. Important functionality for the GUIController includes initializing upon opening the software, saving the state of the data model, creating and maintaining new instances of UMLClass objects, Line objects, and changing the state of several objects within the system, for example when a class parameter is altered through user input.

2.3 System Architecture Diagram

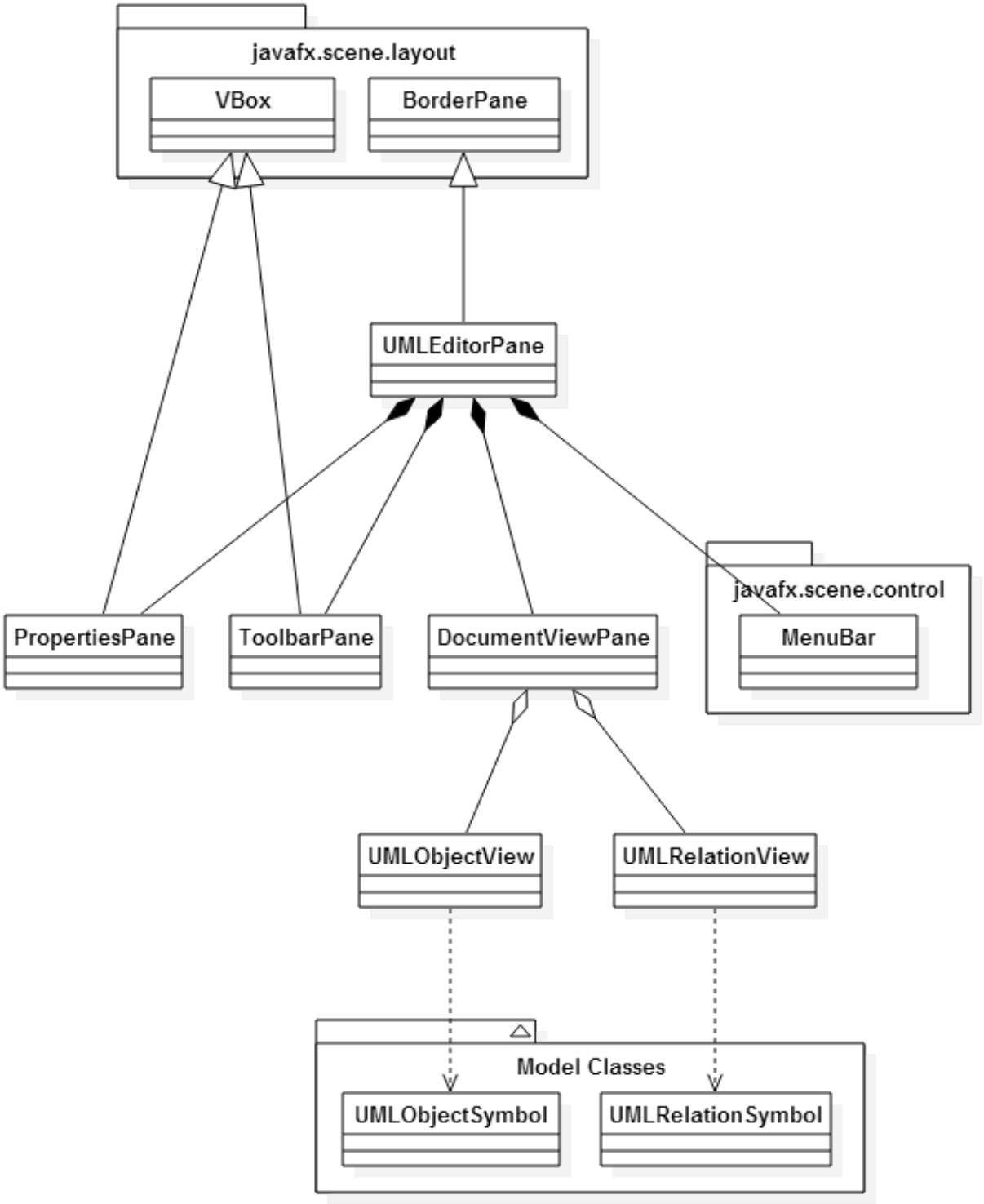
2.3.1 Overview UML



2.3.2 Model UML


GUIController
*
UMLDocument
1, *
UMLSymbol
1, *
1, *
UMLObjectSymbol
UMLRelationSymbol
UMLRelationType
1, *
UMLClassSymbol

2.3.3 View UML


javafx.scene.layout
VBox
BorderPane
UMLEditorPane
PropertiesPane
ToolbarPane
DocumentViewPane
javafx.scene.control
MenuBar
UMLObjectView
UMLRelationView
Model Classes
UMLObjectSymbol
UMLRelationSymbol

2.3 System Interface

2.3.1 User Interface

- The user interface will allow the user to easily generate UML diagrams. The user should be presented with the basic shapes and lines in order to create a basic UML diagram. The interface will need to show a view panel for the user to edit the current document, which will be changing constantly from the inputs of the keyboard and mouse. The interface will also have a panel of objects that will allow the user to add to the view panel.