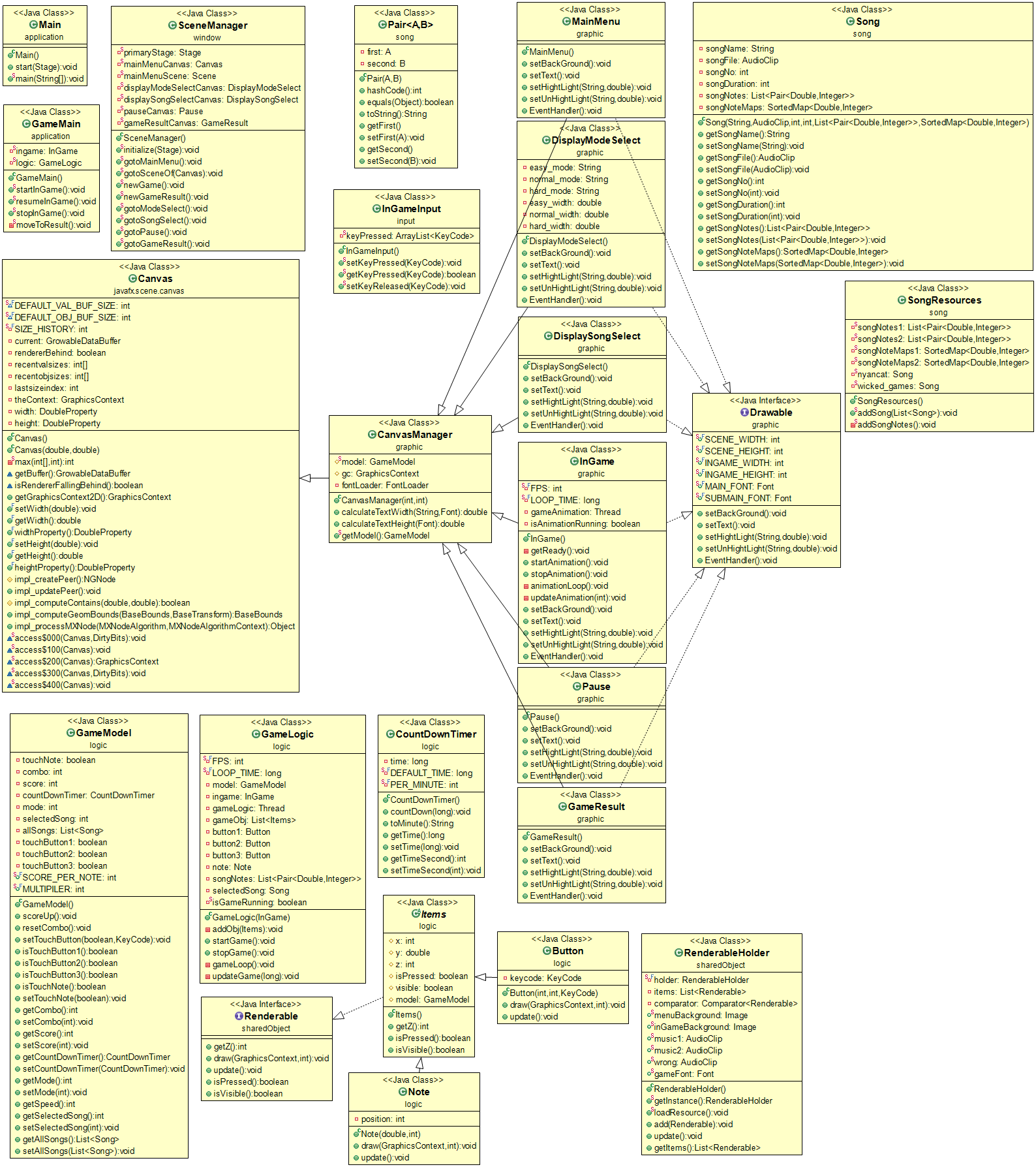
3. Implementation Detail

The diagram of the program is shown in Figure 6 below. There are 7 packages, in the total of 21 classes and 2 interfaces. The first package is application package which have 2 classes, Main and GameMain. Next package is graphic package, contains all canvases in this game and Canvas manager. It contains CanvasManager, DisplayModeSelect, DisplaySongSelect, GameResult, InGame, MainMenu, Pause and the interface, Drawable. Next package is input, contains InGameInput. Next one is logic package, contains Button, CountDownTimer, GameLogic, GameModel, Items, Note class. Next is sharedObject, which contains RenderableHolder class and Renderable interface. The song package contains Pair, Song, SongResources class. Last one is window package, contains SceneManager class. The UML diagram is shown below.



***Figure 6: The UML diagram of the program***

3.1 Package application

3.1.1 Class Main extends Application

3.1.1.1 Method

|  |  |
| --- | --- |
| + void start(Stage primaryStage) | The main entry for the JavaFX applications. There are the code setOnCloseRequest to completely close the application. |
| + void main(String[] args) | An entry of the application. |

3.1.2 Class GameMain

3.1.2.1 Field

|  |  |
| --- | --- |
| - InGame ingame | For call the canvas and startAnimation |
| - GameLogic logic | For call startGame |

3.1.2.2 Method

|  |  |
| --- | --- |
| + void startInGame() | - Initialize the fields  - Go to the scene of ingame  - Start the logic and animation threads |
| + void resumeInGame() | Move back to ingame canvas |
| + void stopInGame() | - Stop the logic and animation threads  - Call moveToResult method |
| + void moveToResult() | - Initialize the result canvas  - Move to that canvas |

3.2 Package graphic

3.2.1 Class CanvasManager extends Canvas

3.2.1.1 Field

|  |  |
| --- | --- |
| # GameModel model | To collect the data from user and use it in the whole game |
| # GraphicContext gc | To draw of each canvas |
| # FontLoader fontLoader | To use calculate width and height of the text |

3.2.1.2 Constructor

|  |  |
| --- | --- |
| + CanvasManager(int sceneWidth, int sceneHeight) | - Initialize canvas by setting the width and height  - Initialize fontLoader with Toolkit.getToolkit().getFontLoader();  - Initialize model when the model didn’t initial before. |

3.2.1.3 Method

|  |  |
| --- | --- |
| + double calculatedTextWidth(String text, Font font) | Calculate the string width |
| + double calculateTextHeight(Font font) | Calculate the string height |
| + GameModel getModel() | Return model |

3.2.2 Class MainMenu extends CanvasManager implements Drawable

3.2.2.1 Constructor

|  |  |
| --- | --- |
| + MainMenu() | - Set the width and height with SCENE\_WIDTH and SCENE\_HEIGHT  - Initialize gc  - call the setBackground(), setText(), EventHandler() methods |

3.2.2.2 Method

|  |  |
| --- | --- |
| + void setBackground() | Set the background of canvas with menuBackground in RenderableHolder |
| + void setText() | Set the text of canvas  - Title  - Description  - Esc: Exit Game |
| + void setHighLight(String selected\_mode, double selected\_width) | Blank method (not use, but need to implements) |
| + void setUnHightLight(String unsel\_mode, double unsel\_width) | Blank method (not use, but need to implements) |
| + void EventHandler() | Add listener to listen when user press  - Escape: Exit Game  - Other keys: Move to next canvas |

3.2.3 Class DisplayModeSelect extends CanvasManager implements Drawable

3.2.3.1 Field

|  |  |
| --- | --- |
| - String easy\_mode | String “Easy” |
| - String normal\_mode | String “Normal” |
| - String hard\_mode | String “Hard” |
| - double easy\_width | Width position to draw easy\_mode |
| - double normal\_width | Width position to draw normal\_mode |
| - double hard\_width | Width position to draw hard\_mode |

3.2.3.2 Constructor

|  |  |
| --- | --- |
| + DisplayModeSelect() | - Set the width and height with SCENE\_WIDTH and SCENE\_HEIGHT  - Initialize gc  - call the setBackground(), setText(), EventHandler() methods |

3.2.3.3 Method

|  |  |
| --- | --- |
| + void setBackground() | Set the background of canvas with menuBackground in RenderableHolder |
| + void setText() | Set the text of canvas  - Title  - Modes  - Esc: Back |
| + void setHighLight(String selected\_mode, double selected\_width) | Set the text highlight when user chose it |
| + void setUnHightLight(String unsel\_mode, double unsel\_width) | Set the text unhighlight when user left it |
| + void EventHandler() | Add listener to listen when user press  - Escape: back to previous canvas  - Enter: choose the selected mode and move to next canvas  - Up/Down: Change the highlight position |

3.2.4 Class DisplaySongSelect extends CanvasManager implements Drawable

3.2.4.1 Constructor

|  |  |
| --- | --- |
| + DisplaySongSelect() | - Set the width and height with SCENE\_WIDTH and SCENE\_HEIGHT  - Initialize gc  - call the setBackground(), setText(), EventHandler() methods |

3.2.4.2 Method

|  |  |
| --- | --- |
| + void setBackground() | Set the background of canvas with menuBackground in RenderableHolder |
| + void setText() | Set the text of canvas  - Title  - Songs  - Esc: Back |
| + void setHighLight(String selected\_mode, double selected\_width) | Set the text highlight when user chose it |
| + void setUnHightLight(String unsel\_mode, double unsel\_width) | Set the text unhighlight when user left it |
| + void EventHandler() | Add listener to listen when user press  - Escape: back to previous canvas  - Enter: choose the selected song and move to next canvas  - Up/Down: Change the highlight position |

3.2.5 Class InGame extends CanvasManager implements Drawable

3.2.5.1 Field

|  |  |
| --- | --- |
| - int FPS | 60 Frames per second |
| - long LOOP\_TIME | Time between each update of a game animation |
| - Thread gameAnimation | Thread of animation |
| - Boolean isAnimationRunning | Variable that control the thread loop to start or not |

3.2.5.2 Constructor

|  |  |
| --- | --- |
| + InGame() | - Set the width and height with INGAME\_WIDTH and INGAME\_HEIGHT  - Initialize gc  - call the EventHandler() methods |

3.2.5.3 Method

|  |  |
| --- | --- |
| - void getReady() | Show the screen that count down before the game start |
| + void startAnimation() | - Initialize gameAnimation  - Set isAnimationRunning = true  - Start the animation thread |
| + void stopAnimation() | Set isAnimationRunning = false |
| - void animationLoop() | Loop the animation  - Call getReady()  - Start the song  - Loop while isAnimationRunning is true, call the updateAnimation |
| - void updateAnimation(int count) | - Set background  - Render the items from RenderableHolder  - Set text |
| + void setBackground() | Set the background of canvas with inGameBackground in RenderableHolder |
| + void setText() | - Add score and combo text at the top left  - Add song name and time at the top right |
| + void setHighLight(String selected\_mode, double selected\_width) | Set the text highlight when user chose it |
| + void setUnHightLight(String unsel\_mode, double unsel\_width) | Set the text unhighlight when user left it |
| + void EventHandler() | Add listener to listen when user press  - Escape: go to the pause canvas  - A, S, D: always return only 1 tick if the user hold the button or not |