

Class Model Description

Package: View

SudokuGame: This is the main class of the project from which the main method is called.

- It extends JFrame class for defining frames.
- It instantiates 3 classes (ControlPanel, SudokuPanel, ButtonPanel) and defines the positions of these panel positions on the main screen.
- It also defines three different controllers to handle the operations performed by the users on those panels.

Control Panel: This class creates the controls for selecting a game using game levels and numbers.

- It extends JPanel class for defining the panel for Game Selection.
- After creation of game selection panel, it adds a combo box which has different game level options (Easy, Medium, Hard and Evil), a text box to enter the game no and a button to select the game with entered user input.
- It also adds the events to handle the user input for combo box, text box and button which are handled by ControlPanelController Class.

SudokuPanel: This class creates the Sudoku i.e. the actual game view, in which user enters the values.

- It extends JPanel class for creating the Sudoku Panel.
- It then calls the Cell class and creates the cells on this Sudoku Panel and creates a Sudoku Grid.
- It implements Observer Class to notify the user for the updates or changes made to the Sudoku grid when the user selects some different game.
- It also sets the Game i.e iterates the game object to place the values in correct cell.
- It adds the events to handle the user input for the cells which are controlled by SudokuController Class .

Cell: This class extends JTextField for creating text boxes of defined size and properties which can take user input.

- It has setNumber() method which takes the input number and a boolean variable to check if the input number is system generated or user entered. It also differentiates the user entered number with system generated number by assigning different colours for both.
- It also has getter method to get the number from the cell from position X and Y of the game.
- It also has a CellDocument Class which extends PlainDocument Class. This class is made to add constraint to the user input like User can only enter numbers in the cell and numbers should also be between 0 to 9.

Button Panel: This class extends JPanel for creating Panel which has Validate Button to check if the user has provided the correct solution for the selected game or not.

- It creates a button and adds the event to handle the user input for button which is controlled by ButtonController Class.

Package: Model

GameList: This class is used to create a hashmap with list of all games mapped to their game number.

- It has a method `getGameData()` which reads all the games from the text file and sets them in the map with the key value as their game number.

Game: This class contains the main logic for handling the entire Sudoku Game.

- It extends class `Observable`.
- It has various getters and setters for the values entered by user (game level, game no and cell values).
- It has a `generateGame()` method which gets the game based on user selection from the list of games and then calls the `generateGameForDisplay()` to set the game with only few numbers displayed.
- It has a `generateGameForDisplay()` method which generates random numbers based on difficulty level selected by user and accordingly generates blank spaces in the game.
- It has `checkAllValuesEntered()` method to check if user has entered all the values in 9x9 grids.
- It also has a `isValid()` method which checks for the solution provided by user. It checks if the solution is correct or not. It updates the changes made by user and notifies the user about the changes.

Package: Controller

ControlPanelController: It controls the user operations on Control Panel.

- It implements `ActionListener` and `KeyListener` class and so has default implemented methods: `ActionPerformed()` and `KeyReleased()`.
- The `KeyReleased()` method sets the value entered by user for game number in the `setUserEnteredVal()` method of Game Class.
- The `ActionPerformed()` method sets the combo box value of game level selected by user in `setGameLevel()` method of Game Class.
- It then calls the `newGame()` method of Game class to generate a new game on click of button (Go to this puzzle) based on user selections.

SudokuController: This class controls the user actions on Sudoku Panel.

- This class implements `KeyListener` class.
- It has default implemented method `KeyReleased()`. This method gets the value entered by user and sets in the current Game object at the defined cell (X and Y position) of the game. It uses the `setNumber` method of Game and Cell class to set the value.

ButtonController: This class controls the user actions of Button Panel.

- It implements `ActionListener` Class and so has default implemented method i.e. `ActionPerformed()`.
- This method firstly checks for if the user has entered all the numbers in 9 X 9 grids. If the user has entered all the numbers it checks if the solution is correct or not. It calls the methods of Game Class in model package to validate the solution.