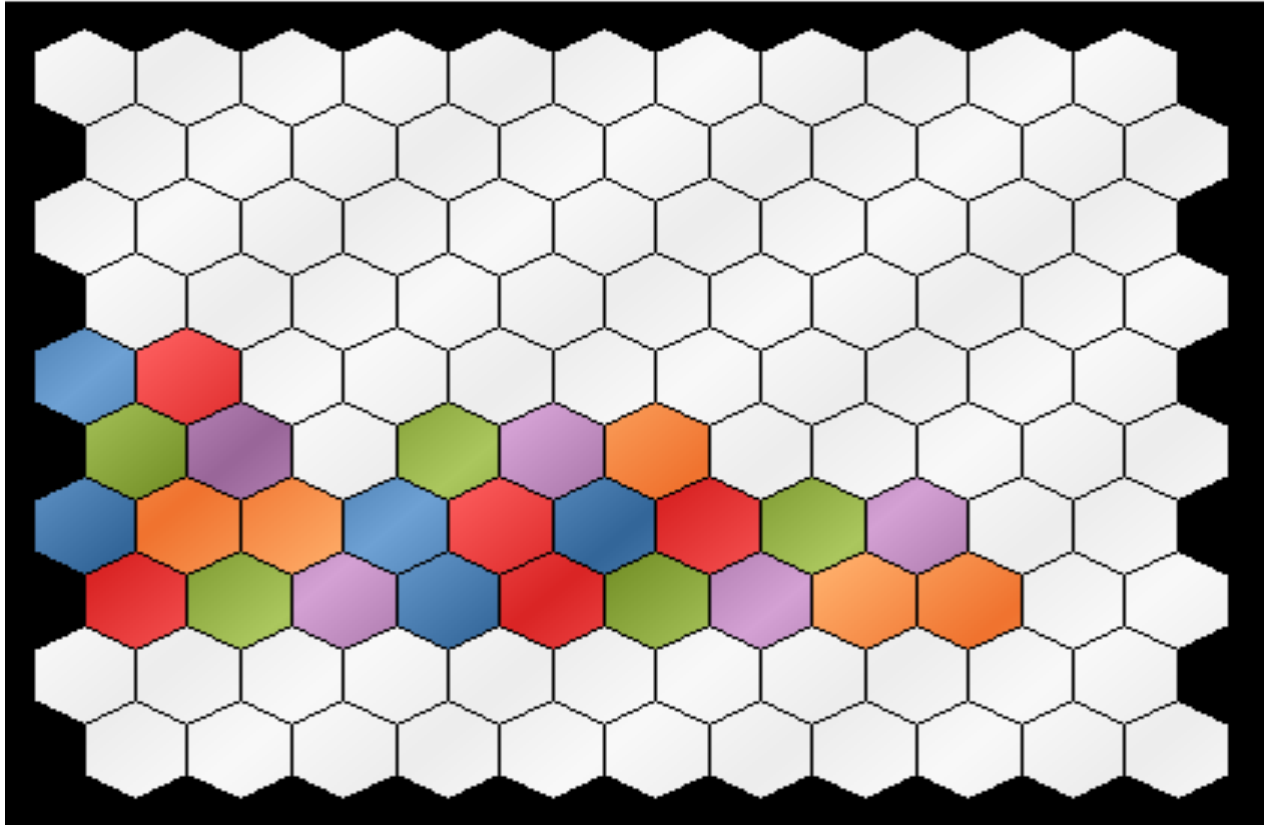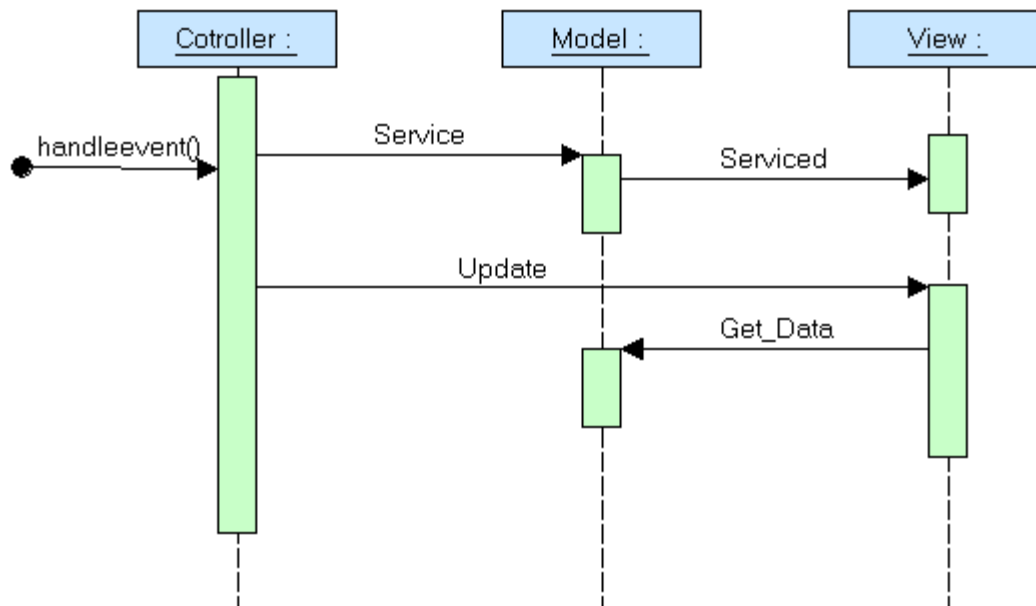# Programming Assignment 1

PENTAHEX PUZZLE

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OVERVIEW OF THE DOCUMENT:

1. Introduction
2. Game Design
3. Rules
4. Primary Features
5. Secondary features

1. INTRODUCTION:

The assignment was to create an interactive game using Java as the programming language and employing Model-View-Controller paradigm.
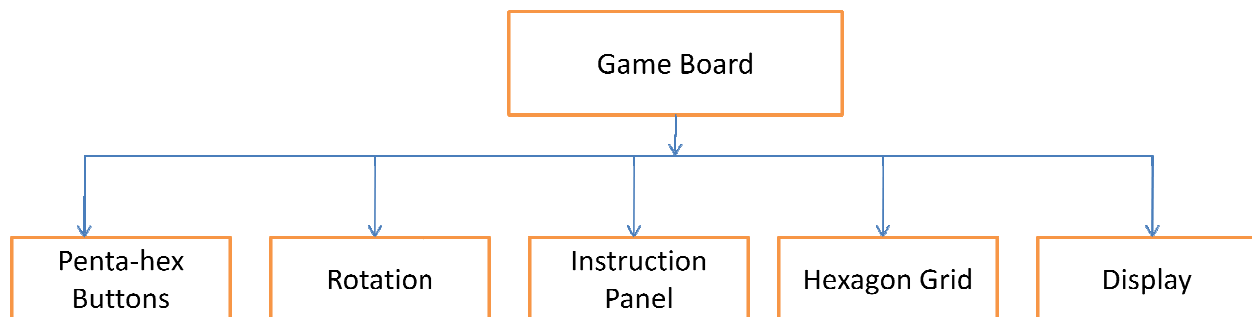

The above figure shows the Model-View-Controller paradigm. In the game the user clicks on a button which is handles by the controller. The controller then can pass it either to the view to make changes or pass to model to for some required data.

The game uses a grid which has 110 hexagons. User is given 22 Penta-hex's which are to be placed. Remember each Penta-hex consists of 5 hexagons and each Penta-hex is different for other. User has the option to rotate a Penta-hex so that it fits on the grid. So the game play is really simple, you fill the grid with the 22 Penta-hex's and you WIN!!!!! The game along with single player has a two-player option.

2. GAME DESIGN:

The game starts with a welcome screen which has the name of the game as well as the developer's names. The game board is divided into 5 sections. First section consists of the 22 buttons which are the 22 Penta-hex pieces. The second section consists of the rotation buttons which includes the Clock-wise and anti-clockwise rotation. This section also includes the "Deselect" button which allows you to deselect a button. The third section consists of the "Instruction Panel". This facilitates the ease with which the game can be played. The fourth section consists of the "Grid" which is the game-play area. The fifth section is where the user sees the Penta-hex, when the user selects it. This section is activated only when you press a button. This section is also used to display the results of rotating a piece. Hence the user can visualize the Penta-hex before it is put on the grid.

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                          │   Game Board    │
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                                  │
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    ▼          ▼              ▼              ▼              ▼
┌─────────┐ ┌──────────┐ ┌─────────────┐ ┌──────────────┐ ┌─────────┐
│Penta-hex│ │ Rotation │ │ Instruction │ │ Hexagon Grid │ │ Display │
│ Buttons │ │          │ │    Panel    │ │              │ │         │
└─────────┘ └──────────┘ └─────────────┘ └──────────────┘ └─────────┘
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3. RULES:

- The game can be played by a player or by two players.
- To select a Penta-hex from the group of Penta-hex's press the button indicated by the desired Penta-hex.
- To rotate the Penta-hex before placing it on the grid click on the 2 buttons, this allows clockwise and Anti-clockwise rotation.
- The piece is placed on the grid using the "Drag and Drop" method. This means that you simply drag the piece and drop it at the desired place in the grid.
- Once placed on the grid the Penta-hex cannot be removed or moved. Also it deactivates the piece from further game-play.
- Whenever a piece is selected all the other pieces move into "Deactivated mode", where you can't select any other piece unless you press the "Deselect button".
- The game gets over in 2 ways: (A) you place all the Penta-hex on the grid i.e. the grid is full. (B) You place the Penta-hex in a position from which it is impossible to achieve the (A).

4. <u>PRIMARY FEATURES:</u>

- Selection of Penta-hex: We increase the usability of the game by using buttons for selecting the Penta-hex pieces. Each Penta-hex is represented as an image and embedded on the button.
- Rotation: We have implemented both clockwise and anti-clockwise rotation. This allows the user to rotate the piece both ways which makes the game more interesting and increases the number of ways with which player can win.
- Deselect Button: when the user selects a piece all the other piece move to "Deactivate mode" which means that you can't select another piece if you have already selected a piece and have not placed it on the grid. If you feel you don't want the piece that you have selected you can just press the deselected button.
- Instruction Panel: The user would always see the instructions on the screen to direct him as to what his next move should be.
- Drag and Drop: This is one of the important feature of the game. It allows the user to simply drag the piece and place it where he wants to. To enhance the usability the user would see a pinkish ring around the piece, which tells where the piece would be placed. Also the game does not allow the user to place a piece to a location where the grid has a piece in place or it doesn't place a piece where it doesn't fit the grid. In such cases the piece is placed back to the display screen from which it can be rotated or deselected.
- Game over: The game also has a very complex logic that always runs in the background to recognize whether such a piece is placed which would make it impossible to complete the game i.e. to fill the whole grid. Hence as soon as it recognizes a situation where you have placed a piece which creates a gap which cannot be filled by any of the pieces, it declares the game is over.
- Multi-Player: The game has options for single player as well as two players. The game through its display panel notifies the user of whose turn it is.

5. <u>SECONDARY FEATURES:</u>

Some of the features mentioned below do not have an impact on the game play but have a tremendous impact on the look and feel of the game.

- Welcome screen: This is the feature that has a lot of impact on the user as to what he can expect. The welcome screen describes the Name of the game, developer's names as well as the start button.
- Player selection screen: The welcome screen is followed by the player selection screen. This makes the user aware of the multi-player feature of the game.
- Button appearance: The buttons change their appearance whenever some action is performed. For ex: When you hover over a button it would change to "Hover Mode".

This means the appearance is changed to let the user know the button on which he has his mouse pointer. When the user selects a particular button all the other buttons are deactivated. It is during this time that the 2 rotation buttons and deselect button is activated.