Final Project Documentation - RUMMY!!!

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Instructions Video YouTube Link:
- https://youtu.be/ZR4nrzRJuSE
- This video is embedded in the Instructions WebView, but the link is here if you find that more convenient to use.

UI Development: The user interfaces (views) in this project were created using JavaFX Scene Builder.

Architecture:	Model(s):	{PlayerModel.java. AboutModel.java}
	Views:	{Rcw5k2AboutS21.fxml, Rcw5k2InstructionsS21.fxml, Rcw5k2Player1S21.fxml, Rcw5k2Player2S21.fxml, Rcw5k2WelcomePageS21.fxml}
	Controllers:	{Rcw5k2AboutS21Controller.java, Rcw5k2InstructionsS21Controller.java, Rcw5k2Player1S21Controller.java, Rcw5k2Player2Controller.java, Rcw5k2WelcomePageS21Controller.java}

Required Elements:

1. Object Oriented Elements that you wrote the code for:
    a. Classes
        i. AbstractModel.java
        ii. Card.java
        iii. Deck.java
        iv. PlayerModel.java
        v. Rcw5k2RummyS21.java (main class)
    b. Subclasses
        i. AboutModel.java extends AbstractModel.java (line 14)
        ii. Rcw5k2AboutS21Controller.java extends Switchable.java (line 34)
        iii. Rcw5k2InstructionsS21Controller.java extends Switchable.java (line 24)
        iv. Player.java extends AbstractModel.java (line 20)
        v. PlayerControllerSuperClass.java extends Switchable.java (line 23)
        vi. Rcw5k2Player1S21Controller.java extends PlayerControllerSuperClass.java (line 33)
        vii. Rcw5k2Player2S21Controller.java extends PlayerControllerSuperClass.java (line 33)

        viii.   Switchable.java extends AbstractModel.java (line 22)

        ix.   Rcw5k2WelcomePageS21Controller.java extends Switchable.java (line 24)

  c. Abstract class
- i. AbstractModel.java
- ii. Switchable.java

  d. Interface
- i. CardInterface.java

2. Code elements Utilized:
  a. Collection Classes:
      i.   Deck.java
- Utilizes ArrayList<Card> to store the shuffled deck of cards (first use line 20)

      ii.   PlayerControllerSuperClass.java
- Utilizes ArrayList<Boolean> to set and reset information on the past "clicked" state of the ImageViews within the Player1 and Player2 views (first use line 187)

      iii.   PlayerModel.java
- Utilizes ArrayList<Card> to store the 7 cards in a player's hand at any given time (first use line 22)

      iv.   Rcw5k2Player1Controller.java
- Utilizes ArrayList<ImageView> to store all the fxml ImageViews in a single variable (first use line 37)
- Utilizes ArrayList<Text> to store all of the fxml Texts in a single variable (first use line 38)
- Utilizes ArrayList<Boolean> to store information on the past "clicked" state of the ImageViews within the Player1 and Player2 views (first use line 39)

      v.   Rcw5k2Player2Controller.java
- Utilizes ArrayList<ImageView> to store all the fxml ImageViews in a single variable (first use line 47)
- Utilizes ArrayList<Text> to store all of the fxml Texts in a single variable (first use line 48)
- Utilizes ArrayList<Boolean> to store information on the past "clicked" state of the ImageViews within the Player1 and Player2 views (first use line 39)

      vi.   Switchable.java
- Utilizes HashMap<String, Switchable> to store the controllers used for switching scenes (line 28)

  b. Exception Handling
      i.   Rcw5k2AboutS21Controller.java
- Throws IOException (line 56)
- Try Catch Block used to retrieve about images from the about package (line 76)

      ii.   Rcw5k2InstructionsS21Controller.java

- Throws IOException (line 41)
iii. Player.java
- Throws IOException (line 24)
iv. PlayerControllerSuperClass.java
- Try Catch Blocks used to retrieve card images from the rcw5k2rummys21cardimages package (line 199)
v. Rcw5k2Player1S21Controller.java
- Throws InterruptedException (first use line 175)
vi. Rcw5k2Player2S21Controller.java
- Throws InterruptedException (first use line 175)
- Try Catch Block used to set the discard ImageView to the blue back of the card upon completion and resetting of the game (line 445)
vii. Rcw5k2RummyS21.java
- Throws Exception (line 22)
viii. Switchable.java
- Throws IOException (line 56)
- Try Catch block used to add controllers to the HashMap (line 38)
ix. Rcw5k2WelcomePageS21Controller
- Throws IOException (first use line 42)

3. Clearly Defined Model:
a. PlayerModel.java
- Used to store the "in hand" cards of each of the two players in the game. Models player1Model and player2Model are both declared in line 53 of Rcw5k2Player1Controller.java and Rcw5k2Player2S21Controller.java respectively. MVC - namely using firePropertyChange - is NOT fully implemented in the game logic (rcw5k2rummys21 package). This is because once the game logic was finalized, it was going to be too time consuming to implement firePropertyChange with the amount of time I had left before the submission deadline. Even so, the game logic (rcw5k2rummys21 package) does partially implement MVC in that the models (PlayerModel.java) stores all of the player data and does not directly communicate with the view, only through the controller. However, it does not use firePropertyChange.
b. AboutModel.java
- AboutModel.java stores two string data's, one for the image filename and one for the textbox text to be displayed to the scene. AboutModel.java and Rcw5k2AboutS21Controller.java fully implement MVC architecture and firePropertyChange.

4. Multiple Scenes with dynamic scene display:
a. Rcw5k2AboutS21.fxml
- Main menu button returns to Rcw5k2WelcomePage.fxml
b. Rcw5k2InstructionsS21.fxml
- Main menu button returns to Rcw5k2WelcomePage.fxml
c. Rcw5k2Player1S21.fxml and Rcw5k2Player2S21.fxml

- Both scenes and stages are loaded once the Play button is pressed in Rcw5k2WelcomePageS21.fxml
- Both of these scenes are dynamic based on the application state
    1. Swapping of location of images within a scene
    2. Interaction of discard images between stages
    3. Dynamic text fields based on current state of the game
    4. Dynamic text fields that throw nonfatal errors if the game is not played correctly by one or both of the players

    d. Rcw5k2WelcomePageS21.fxml
- Play button begins the game and loads 2 stages: Rcw5k2Player1S21.fxml and Rcw5k2Player2S21.fxml
- Instructions button switches scenes to Rcw5k2InstructionsS21.fxml
- About button switches scenes to Rcw5k2AboutS21.fxml

5. About Page:
   a. Clicking the About button on Rcw5k2WelcomePageS21.fxml with take you to Rcw5k2AboutS21.fxml which contains information about the inspiration behind the app and about the developer.
   b. Clicking the Instructions button on Rcw5k2WelcomePageS21.fxml with take you to Rcw5k2InstructionsS21.fxml which contains a WebView which explains the rules and play of the game.

6. Save and Load data:
   a. No save and load data is utilized in this project. Due to Prof. Wergeles absence during week 13, I decided to not worry about the 5 points I am losing here and instead implement some bonus opportunities. Namely, the use of multiple stages within the game and the WebView embedded YouTube video on the Instructions page are hopefully enough bonus to overcome the point losses in this category.

7. Bonus:
   a. Use of multiple dynamic stages within the game itself (Rcw5k2Player1S21.fxml and Rcw5k2Player2S21.fxml operate simultaneously as well as their respective controllers)
   b. Use of a WebView in Rcw5k2InstructionsS21.fxml to explain the use of the app as well as how to play the game.