COP3538
Project 2 – Go Fish!

Submission Requirements

- Submit your project folder via the FileUploader tool provided on the website
    - Follow the project submission guidelines for the class

Input File Requirements

- Cards.Input.txt (The card data file to load into the program)
- CardData.java (Class file that provides important functions to the Card class)
- Queueable.java (Interface file that dictates the methods to use in the PriorityQueue and Queue classes)
- Stackable.java (Interface file that dictates the methods to use in the Stack class)

Output File Requirements

- A screenshot image of the complete program output

Design Specification Requirements

Note: Refer to the sample output in the **Example Output** section below.

1. Create 8 classes (project, Card, Deck, Game, Player, PriorityQueue, Queue, Stack)
    A. The project class (the name will be whatever the project is called)
        1. This is the class that contains the **public static void main(String[] args)** method
        2. This class should only do three things
            a. Display programmer name(s) and project title on separate lines, followed by a blank line
            b. Create an instance of the Game class
            c. Call the Game.execute method
    B. The **Game** class (the Driver class)
        1. This class controls the operation of the program starting at the **execute** method
        2. This class must perform the following operations
            a. Prepare the game
                1. Create a card collection (the Deck class) with a size of 52
                2. Create 4 players (the Player class) each with a size of 15
                   Hint: Store the Player objects in an array.
                   Hint: Pass a reference of the Game object to each Player object (use the “this” keyword).
                    a. Give each player a name like “Player x” where x is a number between 1 and 4
                    b. Assign each player a number between 0 and 3
            b. Read the card data from the Cards.Input.txt input file and store it in the card collection
            c. Deal 7 cards to each player
               Hint: Give each player one card at a time.
            d. Play the game (see the **Game Rules** section for additional details on game play)
            e. Display the results of the game (see the **Example Output** section)
        3. The class provides the following **public** methods
            a. execute() – Performs the operations of the program (step 1.B.2.b – 1.B.2.e)
            b. getDeck() – Returns a reference to the **Deck** object
            c. getPlayer() – Returns a reference to the specified player
        4. The class provides the following **private** methods
            a. dealCards(int numCards) – Deals the specified number of cards to each player
            b. display() – Displays the results of the game
            c. playGame() – Plays the game according the rules (see the **Game Rules** section)
            d. readFile() – Reads the data from the input file into the program

C. The **Deck** class (a Collection class)
   Note 1: The Deck class **MUST** inherit the **Stack** class.
   Note 2: The Deck class requires a single constructor, but no other methods are required.
   1. The class constructor should accept a size parameter, which is passed to the Stack class
      Hint: Pass the size value using the **super** keyword.

D. The **Player** class (a different Collection class)
   Note: The Player class **MUST** inherit the **PriorityQueue** class.
   1. Initialize the object
      a. The class constructor should accept a size parameter, which is passed to the PriorityQueue class
         Hint: Pass the size value using the **super** keyword.
         Note: The priority queue will serve as the player's Hand (the cards he/she is holding).
      b. Create an instance of the Queue class.
         Note: The queue will serve as the player's Discard Pile.
   2. The class provides the following **public** methods
      a. display() – Displays the player's name, as well as the cards in his/her hand and discard pile
      b. doYouHaveAny(int card) – Determines if the player is holding the specified type of card in his/her hand. If so, the card (only one) is returned; otherwise, **null** is returned.
      c. getPosition() – Returns the player's position (a number between 0 and 3)
      d. playHand() – Performs the operations required to play a round (see the **Game Rules** section)
   3. The class provides the following **private** methods
      a. discard(Card card) – Stores the specified card into the player's discard pile
      b. displayHand() – Displays the cards in the player's hand
      c. displayPile() – Displays the cards in the player's discard pile
      d. drawCard() – Draws a card from the deck of cards (the Deck object)
         Hint: Use the Game object reference provided in step 1.B.2.a.2.
      e. getNextPlayer(Player currentPlayer) – Determines the player in the next higher position
      f. matchCards() – Searches the player's hand for matching pairs (2 cards) of cards, and if a match is found, the pair of cards are discarded to the discard pile

E. The **Card** class (a different Collection class)
   Note: The Card class **MUST** inherit the **CardData** class (provided in the **Required Files** folder).
   1. Initialize the object
      a. The class constructor **MUST** call the **generateFace**() and **generateSuit**() methods contained in the inherited **CardData** class
   2. The class provides the following **public** methods
      a. getFace() – Returns the card's face (2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K, A)
      b. getValue() – Returns the card's value (number between 0 and 12)
      c. toString() – Returns a String containing the card's face and suit values

F. The **PriorityQueue** class (start with the PriorityQueue class provided in the **Required Files** folder)
   Note 1: The PriorityQueue class **MUST** implement the **Queueable** interface.
   Note 2: The PriorityQueue class represents a player's hand.
   1. Initialize the object
      a. Create a **Card** array using the specified size to store Card objects
   2. Implement all of the methods defined in the Queueable interface

G. The **Queue** class (start with the Queue class provided in the **Required Files** folder)
   Note 1: The Queue class **MUST** implement the **Queueable** interface.
   Note 2: The Queue class represents a player's discard pile.
   1. Initialize the object
      a. Create a **Card** array using the specified size to store Card objects
   2. Implement all of the methods defined in the Queueable interface

H. The **Stack** class (start with the Stack class provided in the **Required Files** folder)
   Note 1: The Stack class **MUST** implement the **Stackable** interface.
   Note 2: The Stack class represents the deck.
   1. Initialize the object
      a. Create a **Card** array using the specified size to store Card objects
   2. Implement all of the methods defined in the Stackable interface

Additional Notes

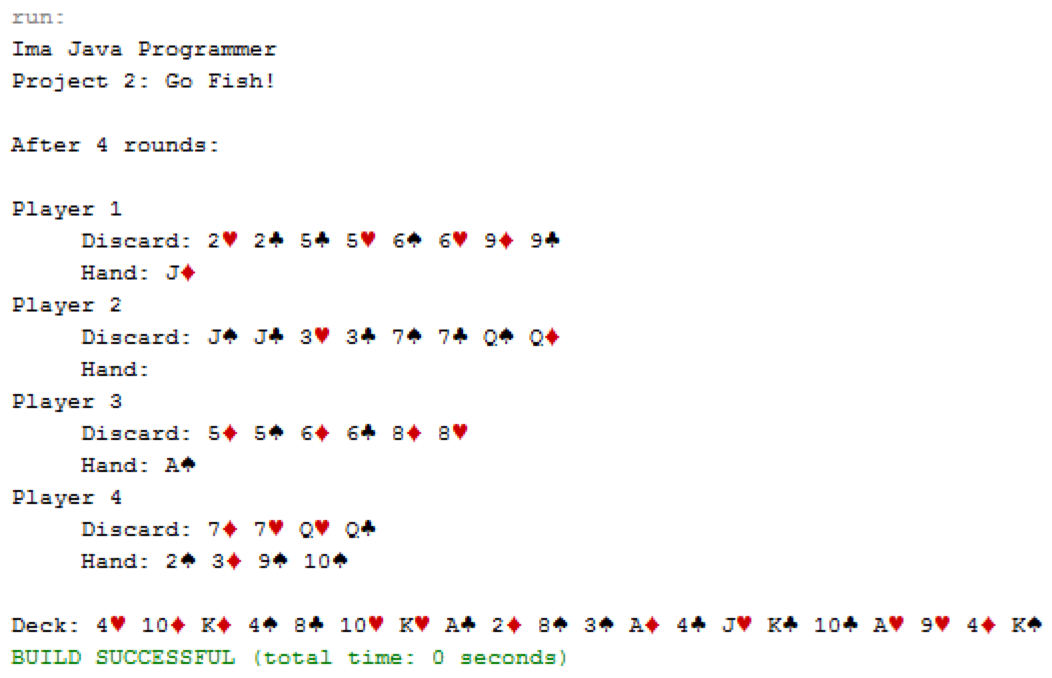
- Refer to chapter 4 of the textbook for assistance with the stack and queue algorithms
- **NO** additional methods or classes are allowed
- Do **NOT** modify any methods, classes or interfaces
- Ensure the source code conforms to the coding standards for the class
- Format the output using the **String.format** method
- Remove as much **redundant (duplicate) code** as possible. If a process must be completed multiple times, try to find a way to write the code only once, but still perform the code multiple times.

Game Rules (specifically for this project)

1. There are 4 players, and each player receives 7 cards
2. Cards can ONLY exist in the Deck (Stack), a player's Hand (PriorityQueue) or a player's Discard pile (Queue)
3. Game play
   A. Starting with the player at position 0 (Player 1)
      1. The player checks his/her Hand for pairs (2 cards) of matching cards
         a. If a pair exists, the 2 cards are moved to the player's Discard pile
      2. Next, the player tries to make a match with another player's cards
         a. The player selects the smallest card in his/her Hand
         b. Starting with the player in the next-higher position (NP)
            1. The player asks the NP "Do You Have Any" and states the card value
            2. If the NP has a card with the requested card value
               a. The card is removed from the NP's Hand
               b. The card is inserted into the player's Hand
               c. Perform steps 3.A.1 and 3.A.1.a
               d. The player's turn is over, and the next player's turn starts (go to step 3.A)
            3. If the NP does not have the requested card
               a. The player moves to the next NP (3.A.2.b.1)
      3. If none of the NPs had the requested card
         a. The player draws a card from the Deck and inserts the card into his/her Hand
         b. Perform steps 3.A.1 and 3.A.1.a
         c. Play continues to the next player (go to step 3.A)
4. Game play continues until one of the following two conditions occur
   A. Any player discards all of the cards in his/her Hand (no cards left in his/her Hand)
   B. No more cards exist in the Deck

Example Output

Important Note: The suit images ♥♠♦♣ ONLY work correctly in the NetBeans environment. If you are using an environment other than NetBeans, be sure to pass **false** as the second parameter of the CardData.generateSuit method to display H S D C in place of the suit images.



```
run:
Ima Java Programmer
Project 2: Go Fish!

After 4 rounds:

Player 1
     Discard: 2♥ 2♣ 5♣ 5♥ 6♠ 6♥ 9♦ 9♣
     Hand: J♦
Player 2
     Discard: J♠ J♣ 3♥ 3♣ 7♠ 7♣ Q♠ Q♦
     Hand:
Player 3
     Discard: 5♦ 5♠ 6♦ 6♣ 8♦ 8♥
     Hand: A♠
Player 4
     Discard: 7♦ 7♥ Q♥ Q♣
     Hand: 2♠ 3♦ 9♠ 10♠

Deck: 4♥ 10♦ K♦ 4♠ 8♣ 10♥ K♥ A♣ 2♦ 8♠ 3♠ A♦ 4♣ J♥ K♣ 10♣ A♥ 9♥ 4♦ K♠
BUILD SUCCESSFUL (total time: 0 seconds)
```