

Homework 2

CS201 - Data structures & Algorithms
Spring 2024

This homework is to help you practice with arrays in Java. We will **not grade your coding style** but you should **make your code as readable as possible**.

Question (Poker hand): In poker, players form sets of five playing cards, called hands, according to the rules of the game. Each hand has a rank, which is compared against the ranks of other hands participating in the showdown to decide who wins the pot

https://en.wikipedia.org/wiki/List_of_poker_hands

Specification: Your task is to implement a class named "Poker_hand_hw2" to rank and compare poker hands. This class has

1. A constructor that gets an array of 5 strings representing 5 cards. In each string, the last character represents the suit (H: Heart, D: Diamond, C: Club, S: Spade) and the preceding characters represent the card rank (2, 3, 4, 5, 6, 7, 8, 9, 10, J, Q, K, A). An `IllegalArgumentException` is thrown in the case the input is not in this format.
2. A method "get_category" that has no parameters and returns an integer representing the category of this hand (9: straight flush, 8: four of a kind, 7: full house, ..., 1: high card), we do not have "Five of a kind" in our settings.
3. A method "compare_to" that gets another hand (i.e. an object of `Poker_hand_hw2` class) as a parameter and returns an integer which is either -1, 0, or 1 if this hand is ranked lower, equal, or higher than the other hand respectively.

Sample test cases:

```
// IllegalArgumentException is thrown since the input has only 4 cards
String[] cards = {"2H", "4C", "10S", "AS"};
Poker_hand_hw2 sample_hand = new Poker_hand_hw2(cards);

// IllegalArgumentException is thrown since the input has an unknown card "1H"
String[] cards = {"1H", "4C", "2H", "10S", "AS"};
Poker_hand_hw2 sample_hand = new Poker_hand_hw2(cards);

// Full house
String[] cards = {"4H", "4C", "10H", "10D", "4S"};
Poker_hand_hw2 sample_hand = new Poker_hand_hw2(cards);
System.out.println(sample_hand.get_category()); //7

// One pair
String[] cards = {"AH", "4C", "10H", "8D", "AS"};
Poker_hand_hw2 sample_hand = new Poker_hand_hw2(cards);
System.out.println(sample_hand.get_category()); //2
```

```

// Hand_1 > Hand_2 since Full house > Flush
String[] cards = {"4H", "4C", "8S", "8D", "4S"};
Poker_hand_hw2 hand_1 = new Poker_hand_hw2(cards);
String[] another_cards = {"AH", "4H", "10H", "8H", "JH"};
Poker_hand_hw2 hand_2 = new Poker_hand_hw2(another_cards);
System.out.println(hand_1.compare_to(hand_2)); //1

// Hand_1 < Hand_2 since both have two pairs but the second pair of hand_2 is larger
String[] cards = {"KH", "KC", "8H", "8D", "JS"};
Poker_hand_hw2 hand_1 = new Poker_hand_hw2(cards);
String[] another_cards = {"10S", "KS", "10H", "KD", "4H"};
Poker_hand_hw2 hand_2 = new Poker_hand_hw2(another_cards);
System.out.println(hand_1.compare_to(hand_2)); //-1

// Hand_1 = Hand_2 since both are straight with the same highest card
String[] cards = {"JH", "QC", "8H", "9D", "10S"};
Poker_hand_hw2 hand_1 = new Poker_hand_hw2(cards);
String[] another_cards = {"8S", "10H", "QH", "9H", "JS"};
Poker_hand_hw2 hand_2 = new Poker_hand_hw2(another_cards);
System.out.println(hand_1.compare_to(hand_2)); //0

```

Implementation & submission:

1. Create a file **"Poker_hand_hw2.java"** and add the line **"package com.gradescope.cs201;"** at the beginning (otherwise Gradescope can not find your class).
2. Add your code into this file and submit it to Homework 2 on the GradeScope to test your solution.