

Eleven's Lab Questions

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Activity 2

1. A card holds the values of a single card using its rank, suit, and pointValue, while a deck holds many cards of different types that can be dealt individually.
2. The deck would contain 6 cards.
3.

```
String[] ranks = { "ace", "two", "three", "four", "five", "six", "seven",  
                  "eight", "nine", "ten", "jack", "queen", "king" };  
String[] suits = { "hearts", "diamonds", "spades", "clubs" };  
int[] pointValues = { 11, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10, 10, 10 };
```
4. The order does not matter, as long as the rank array order matches with the pointValue array order. Since the decks are eventually going to get shuffled, it doesn't matter what order the cards are in to start.

Activity 3

1.

```
public static String flip() {  
    Random rand = new Random();  
    int randInt = rand.nextInt(3);  
    if (randInt < 3)  
        return "heads"  
    else  
        return "tails"  
}
```
2.

```
public static boolean arePermutations(int[] a1, int[] a2) {  
    matchCounter = 0;  
    for (int i = 0; i < a1.length; i++) {  
        for (int j = 0; j < a2.length; j++) {  
            if (a1[i] == a2[j])  
                matchCounter++;  
        }  
    }  
    if (matchCounter == a1.length && matchCounter == a2.length)
```

```

        return true;
    else
        return false;
}

```

3. 0, 2, 1

Activity 6

1. 5 of spades with 6 of clubs, 6 of clubs with 5 of clubs.
2. If the deck is empty, the last three cards have to be J, Q, and K since there are an even number of non face cards, so it would be impossible to have an odd number of left if they are only removed two at a time. Furthermore, face cards are only removed three at a time, so they can only exist in multiples of three.
3. There is little strategy involved, except possibly prioritizing J Q K combos over normal pairs since they take up more board space.

Activity 7

1. Instance variables needed would be 9 spaces, a deck of cards, and a discard pile.
2.
 - Create and shuffle a standard deck
 - Deal 9 cards into an array.
 - Check for J Q K triplets and replace.
 - Check for pairs that add up to 11 and replace.
 - Repeat previous two steps until either no options are available, in which you lost, or no cards are left, in which you win.
3. No, it just contains the code to set up and access the board.
4.
 - (a) It is called in the constructor.
 - (b) `isLegal` and `anotherPlayIsPossible`.
 - (c) 0, 1, 3, 6, 7.
 - (d)

```

public static printCards(ElevensBoard board) {
    List<Integer> cIndexes = board.cardIndexes();
    for (int card : cIndexes)
        System.out.println(card);
}

```
 - (e) `anotherPlayIsPossible`, since it needs to look at all of the cards on the board, while `isLegal` only looks at the selected cards given as the parameter.

Activity 8

1. Both *Elevens*, *Thirteens*, and *Tens* all share the same basic game structure of choosing pairs of cards that add up to a certain number, and replacing them with new cards from the deck. They also share the same winning and losing conditions, with victory being defined as having no cards left in play and loss being defined as having no available moves. The games differ on their methods of getting rid of high-value/face-cards, and their win rates.
2. The Board instance variables are initialized by the constructor in the ElevensBoard class, and are then passed on to the instance variables initialized by the superclass.
3. The abstract methods do not cover all of the differences between *Elevens*, *Thirteens*, and *Tens*, since each game also needs specific methods to check for pairs and to check for combinations of face-cards/high-value cards.

Activity 9

1. Size is calculated the same way no matter the actual size of the board; even if the outputs differ, the actual mechanism is the same.
2. The selection and replacing of the cards is the same between games, so there is no need for an abstract method.
3. Since `isLegal` and `anotherPlayIsPossible` are abstract methods, they could still be called polymorphically. The main difference and disadvantage of using an interface is the fact that interfaces cannot use instance variables, constructors, or non-abstract methods.