AP ACTIVITY **4.2.7**

Design the Elevens Board (AP)

INTRODUCTION

Now that the `Card` and `Deck` classes are completed, the next class to design is `ElevensBoard`. This class will contain the state (instance variables) and behavior (methods) necessary to play the game of Elevens.

Materials

- Computer with BlueJ IDE

Procedure

1. Imagine playing a game of Elevens with a deck of cards. What items do you need? What actions would you perform?

2. With the items you needed for the live game, write the private instance variables needed for the `ElevensBoard` class.

3. Write an algorithm (in pseudo-code) that describes the actions necessary to play the Elevens game.

4. Open and create a BlueJ project for *ElevensActivity7* with the provided java files.

5. Examine the partially implemented `ElevensBoard.java`. Does the `ElevensBoard` class contain all the state and behavior necessary to play the game?

Hints:

- When you play the game, you may notice that toward the end of the game, the board can become partially filled. The empty places will have a value of `null` in the `ArrayList` that represents the board.
- If you cannot find a method in class, look at its parent class, or its parent's parent class.

`ElevensBoard.java` contains three helper methods. These helper methods are private because they are only called from the `ElevensBoard` class.

Where is the `dealMyCards` method called in `ElevensBoard`?

Check your answer

The method, `dealMyCards`, is called in the `ElevensBoard` constructor and the `newGame` method.

Which public methods should call the `containsPairSum11` and `containsJQK` methods?

Check your answer

The methods `isLegal` and `anotherPlayIsPossible` should call the `containsPairSum11` and `containsJQK` methods.

It's important to understand how the `cardIndexes` method works, and how the list that it returns is used.

6. Suppose that cards contains the elements shown below. Hand trace the execution of the `cardIndexes` method to determine what list will be returned. Complete the diagram below by filling in the elements of the *returned list*, and by showing how those values index `cards`. Use H for hearts, C for clubs, and S for spades. Note that the returned list may have less than 9 elements.

The `cards` array:

index:	0	1	2	3	4	5	6	7	8
value:	J♥	6♣	null	2♠	null	null	A♠	4♥	null

The *returned list:*

index:	0	1	2	3	4	5	6	7	8
value:	_____	_____	_____	_____	_____	_____	_____	_____	_____

Results of your `cardIndexes` hand trace:

7. Complete the following `printCards` method to print all of the elements of cards that are indexed by `cIndexes`.

```
public static printCards(ElevensBoard board) {
    List<Integer> cIndexes = board.cardIndexes();
    /* Your code goes here. */
```

CONCLUSION

1. Review your answer to which public methods should call the `containsPairSum11` and `containsJQK` methods. Which one of the methods needs to call the `cardIndexes` method before calling the `containsPairSum11` and `containsJQK` methods? Why?