Activity 6: Playing Elevens

Introduction:

In this activity, the game Elevens will be explained, and you will play an interactive version of the game.

Exploration:

The solitaire game of Elevens uses a deck of 52 cards, with ranks A (ace), 2, 3, 4, 5, 6, 7, 8, 9, 10, J (jack), Q (queen), and K (king), and suits ♣ (clubs), ♦ (diamonds), ♥ (hearts), and ♠ (spades). Here is how it is played.

1. The deck is shuffled, and nine cards are dealt "face up" from the deck to the board.
2. Then the following sequence of steps is repeated:
   a. The player removes each pair of cards (A, 2, … , 10) that total 11, e.g., an 8 and a 3, or a 10 and an A. An ace is worth 1, and suits are ignored when determining cards to remove.
   b. Any triplet consisting of a J, a Q, and a K is also removed by the player. Suits are also ignored when determining which cards to remove.
   c. Cards are dealt from the deck if possible to replace the cards just removed.

The game is won when the deck is empty and no cards remain on the table. Here's a sample game, in which underlined cards are replacements from the deck.

Cards on the Table									Explanation
K♠	10♦	J♣	2♣	2♥	9♦	3♥	5♠	5♦	initial deal
K♠	10♦	J♣	7♦	2♥	Q♠	3♥	5♠	5♦	remove 2♣ (either 2 would work) and 9♦
A♠	10♦	9♣	7♦	2♥	7♣	3♥	5♠	5♦	remove J♣ Q♠ K♠
A♠	10♦	10♠	7♦	3♣	7♣	3♥	5♠	5♦	remove 9♣ and 2♥ (removing A♠ and 10♦ would have been legal here too)
2♠	10♦	9♠	7♦	3♣	7♣	3♥	5♠	5♦	remove A♠ and 10♠ (10♦ could have been removed instead)
A♣	10♦	K♦	7♦	3♣	7♣	3♥	5♠	5♦	remove 2♠ and 9♠
6♦	K♣	K♦	7♦	3♣	7♣	3♥	5♠	5♦	remove A♣ and 10♦

<u>2♦</u> K♣ K♦ 7♦ 3♣ 7♣ 3♥ 5♠ <u>Q♦</u>   remove 6♦ and one of the 5s; no further plays are possible; game is lost.

An interactive GUI version of Elevens allows one to play by clicking card images and buttons rather than by handling actual cards. When `Elevens.jar` is run, the cards on the board are displayed in a window. Clicking on an unselected card selects it; clicking on a selected card unselects it. Clicking on the **Replace** button first checks that the selection is legal; if so, it does the removal and deals cards to fill the empty slots. Clicking on the **Restart** button restarts the game.

The folder **Activity6 Starter Code** contains the file `Elevens.jar` that, when executed, runs a GUI-based implementation. In a Windows environment, you may be able to run it by double-clicking on it. Otherwise you can run it with the command

```
java -jar Elevens.jar
```

Play a few games of Elevens. How many did you win?

Questions:

1. List all possible plays for the board 5♠ 4♥ 2♦ 6♣ A♠ J♥ K♦ 5♣ 2♠

2. If the deck is empty and the board has three cards left, must they be J, Q, and K? Why or why not?

3. Does the game involve any strategy? That is, when more than one play is possible, does it matter which one is chosen? Briefly explain your answer.