CS 250
Program 09

Due: Monday, April 24th

Main topics: Random number generators
Programmer defined methods
Arrays

Program Specification:

You are to write methods that will allow you to emulate a deck of cards to be used to play games of chance

Deck Description:

- There is a *deck* of 36 cards:
  - Each *card* has value - a number in the range of [1, 9] printed on it - 9 possible values.
  - Each *card* has a suit - ["Club", "Spade", "Heart", "Diamond"] printed on it - 4 possible suits.
  - Thus we will use the numbers from 0 to 35 (inclusive) to represent the cards.
  - Given a `card` ([0, 35]): the card's number is given by `card % 9 + 1`; the card's suit is given by `card / 9`, where 0 = "Club", 1 = "Spade", 2 = "Heart", and 3 = "Diamond".
  - The deck is "cut" by picking a random point to divide the deck, and then swapping the stack of cards below the cut point with the stack at and above the cut point.
  - The deck is "shuffled" by doing the following repeatedly: "cut" the deck, then divide the deck exactly in half - creating two stacks, and finally recombining the two stacks back into one by selecting the top card from each stack (in alteration).

Rules and Requirements:

- You must represent the deck of cards using an `int` Array of of size 36.
- For each of the following headings / descriptions, write and use a method that adheres to it:
  - `public static int cardValue(int card)`
    Return the integer value ([1, 9]) of `card`
  - `public static String cardSuit(int card)`
    Return the suit (["Club", "Spade", "Heart", "Diamond"]) of `card`
  - `public static void displayCard(int card)`
    Prints `card` in some reasonable report format.
  - `public static void initDeck(int[] deck)`
    Assign the elements of `deck`, such that each element's *value* is the same as its *index*.
  - `public static void cutDeck(int[] deck)`
    1. Generate a random number (`cut`) in the range 6 to 24 inclusive.
    2. Create two new `int` arrays (`top, bottom`): the size of `top` being `cut`; the size of `bottom` being 36 - `cut`.
    3. Copy the values of `deck` (from index 0 to index `cut - 1`) into `top` and the values of `deck` (from index `cut` to index 35) into `bottom`.

4. Copy the values from `top` and `bottom` back into `deck`, such that the the values of `bottom` (in the same order they were in) occupy the indicies from 0 to 36 - `cut` - 1, and the values of `top` (in the same order they were in) occupy the remaining indicies.

- `public static void shuffleDeck(int[] deck, int n)`
  The following is performed exactly `n` times:
  1. Cut the deck
  2. Create two new `int` arrays (`top, bottom`), the size of each being 18.
  3. Copy the first half of `deck` into `top` and the second half of `deck` into `bottom`.
  4. Copy the values from `top` and `bottom` back into `deck` such that: the even indecies of `deck` hold the values of `top` (in the same order they were in); the odd indecies of `deck` hold the values of `bottom` (in the same order they were in).
- `public static void displayDeck(int[] deck)`
  Prints the cards in `deck` in some reasonable report format.

- Write a `main` method to test your methods for correctness.

Notes and Hint:

1. You will need to be creative when writing your `main` method to make sure that you have tested all of your methods adequately.

Submission:

1. Use your web browser to open:

   `https://uwm.courses.wisconsin.edu/`

2. Login to D2L
3. Under *2172 - Spring 2017* you should see *CEAS-Computer Science* and under that *Intro Computer Programming*
4. Click on Intro Computer Programming
5. Click on **Dropbox** in the lower top menu bar
6. Click on **Program 09** in the *Programming Assignments* folder of the the current window
7. Click the **Add a File** button in the left center of the current window
8. Click the **Upload** button in the right top of the *Submit a File* pop-up window
9. Use the *File Upload* pop-up window to find the Java source code file you wish to submit: e.g. *Program09.java*
10. Click on this file name in the right panel of the *File Upload* pop-up window
11. Click the **Open** button in the *File Upload* pop-up window
12. Click the **Add** button in the bottom right top of the *Submit a File* pop-up window
13. Click the **Submit** button in the top / bottom right right of the current window