

# CS 251

## Program 03

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Main topics: Writing Classes  
Declaring / Using Instance Variables  
Writing Instance Methods  
Accessors and Mutators  
Constructors  
public vs private

### Program Specification:

1. You are to first to write a Class named Card.java:  
A simple class which models a single playing card (from the deck of cards that has been described in Howeworks 1 and 2) by its two defining characteristics, which are its *suit* and its *rank*. Your Card class must adhere to the following:
  - (a) All instance variables must be private
  - (b) Include the standard public accessors
  - (c) Include the standard private mutators  
You must not set suit nor rank to something that is not in the domain of the mapping that is inherent to your **String toString()** method. Do nothing when an argument is invalid.
  - (d) All access of instance data by the other instance methods is made via the accessors and mutators.
  - (e) Include the standard *default* constructor  
By default a Card is the Ace of Clubs.
  - (f) Include the standard *specifying* constructor
  - (g) Contain a method **Card clone()** which creates and return a reference to a copy of the *calling* Card object.
  - (h) Contain a method **boolean equals(Card guest)** which returns whether or not guest has the same suit and rank as the *calling* Card object.
  - (i) Contain a method **String toString()** which returns a String representation of the *calling* Card object's suit and rank in some reasonable format.
2. You are then to write a Class named CardDriver.java:  
A simple class which "tests" Your Card class by carrying out the following actions:
  - (a) Declare and create an array of Card, of size 52 (A deck).
  - (b) Fill the deck with the 52 unique playing cards (in any order).
  - (c) Apply 100 random transpositions of cards to the deck.  
A transposition:
    - Generate two random indices (each in the range 0 to 51)
    - Swap the two cards at these indices.
  - (d) Display the contents of the deck, from index 0 to index 51.
  - (e) Find and display the index of the Queen of clubs in the deck.

Sample run(s):

<display all the cards in your deck>  
<in what ever fromat you have choosen>

The Queen of clubs was found at location 42

### **Submission:**

1. Use your web browser to open:

<https://uwm.edu>

2. Select [Current Students] from the top menu bar
3. Select [Canvas] from the drop down menu
4. Login to Canvas
5. Click on the COMPSCI 251 block
6. Click on Assignments
7. Click on Program 03 in the left center of the current window
8. Click the **Submit Assignment** button in the right top of the current window
9. Click the **Browse** button in the left center top of the current window
10. Use the *File Upload* pop-up window to find the file you wish to submit
11. Click on this file name in the right panel of the *File Upload* pop-up window
12. Click the **Open** button in the *File Upload* pop-up window
13. Click the **Add** button in the bottom right top of the *Submit a File* pop-up window
14. Click the **Submit Assignment** button in the left bottom of the current window