

## Programming Project 8

### Assignment Overview

This assignment will give you experience on the use of classes.

This assignment is worth 50 points (5.0% of the course grade) and must be **completed and turned in before 11:59 on Monday, November 11, 2013.**

### Background

You will implement the FreeCell card game. Our goal is to simply enforce the rules for players. To see a copy of the rules, go to <http://games.aarp.org/games/freecell/freecell.aspx> . You can also have more information about FreeCell from this FAQ: <http://solitairelaboratory.com/fcfaq.html>.

More important than anything, familiarize yourself with the game by playing the game before considering programming. It is much easier to understand the game by playing it rather than reading the rules.

The game play proceeds as follows. Note that our rules are slightly more restrictive than the online rules in that we allow only one card at a time to be moved (makes your program easier to write). The online game actually allows only one card at a time, but allows you to move multiple cards as a short cut if that many cells are free—a complexity we are not asking you to implement:

1. The Start
  - a. One standard 52-card deck is used.
  - b. All cards are initially dealt to the tableau. All cards are visible.  
The tableau has eight columns (four have seven cards and four have six).
  - c. There are 4 foundations—one foundation for each suit. Initially they are empty.
  - d. There are 4 cells. Initially they are empty. Each cell can only contain 1 card.  
The cells are places to temporarily place cards during the play of the game.
2. The Goal
  - a. Move all the cards to the foundations.
3. Rules of Play
  - a. Only one card at a time can be moved.
  - b. Foundation
    - Each foundation holds only one suit and is built up from Ace to King.
    - You can move a card to the foundation from a cell or the tableau.
    - Once a card is on the foundation it cannot be moved off.
  - c. Tableau
    - i. The card at the bottom of a column may be moved to an open cell, a foundation or another column of the tableau.
    - ii. Moving a card to a tableau column follows these rules
      1. A card can only be moved to the bottom of a column.
      2. When you move a card to a column in the tableau you can only build down by rank and by alternating color. For example, you can move a Two of Hearts onto a Three of Spades (the pile goes down by rank, and alternate colors)
    - iii. An empty spot in the tableau may be filled with any card.
  - d. Cell
    - i. One cell spot can only contain 1 card
    - ii. The card may be moved to the tableau or the foundation.

Your program allows a user to play the game, ensuring that they follow the rules.

## Requirements

Implement the game in Python. Requirements are:

1. Use the provided Card and Deck classes, found in the cards.py file in the project directory.  
**Do not modify the cards.py program** as you will only turn in proj08.py.  
Simply import cards.py into your proj08.py.
2. You must use multiple functions in this game.
3. Create a function named play(), which starts the play of the game.
4. If the user makes a move that is illegal, you must inform them of the error and let user choose another move.
5. You must determine if a winning position is achieved. If so, report it and stop the game, printing out a “Winning” message.
6. Use this menu of options (**requirement**)
  - t2f T F - move from Tableau T to Foundation F (T and F are ints)
  - t2c T C - move from Tableau T to Cell C (T and C are ints)
  - t2t T1 T2 - move from Tableau T1 to Tableau T2 (T1 and T2 are ints)
  - c2t C T - move from Cell C to Tableau T (C and T are ints)
  - c2f C F - move from Cell C to Foundation F (C and F are ints)
  - 'h' for help (prints the prompt message)
  - 'q' to quit

Check for the following errors:

- a) trying to move a card in violation of the rules
  - b) incorrect command name, i.e. not a command in the menu
  - c) incorrect command format, e.g. a tableau specified as something other than an int or the wrong number of arguments.
7. After each move print the tableau, cell and foundation nicely formatted (use the online program as a guide)
  8. To provide a starting point we have provided a framework named freecellStart.py  
Using this framework is optional.

## Card and Deck Classes plus Display function

We provide a module named **cards** that contains a Card class and a Deck class. We also provide a sample piece of code (cardsDemo.py) that demonstrates how to use the cards module. The Card and Deck classes are general purpose for developing card games so they contain many methods that may not be used in any particular implementation. You are welcome to use all of them, but do not be surprised if there are many that you do not need for this project. The get\_rank() method returns the rank of the card: 1 for ace, 2-10 for number cards 2-10 (respectively), 11 for Jack, 12 for Queen, 13 for King.

## Deliverables

You must use handin to turn in the file **proj08.py** – this is your source code solution; be sure to include your section, the date, the project number and comments describing your code. Please be sure to use the specified file name, and save a copy of your proj08.py file to your H drive as a backup.

## Other good information

Notes:

1. Look carefully at the example cardsDemo.py program. It imports the cards module and uses the two classes and gives you a better idea how you can use them. These classes provide methods you may not need, but they should provide almost any method you do need.

2. When using class methods remember the parenthesis—no error is generated for missing parenthesis, but results will not be what you expect.
3. There are multiple parts to the game (setup, printing, game play, starting). Address each one individually and then put them together.
4. For playing the game, begin by assuming perfect input. Get that working and add error checking later.
5. Add as much error checking as you can. Error conditions will occupy quite a bit of code!
6. The program does not need to print every card in the foundations. Only printing the top card is sufficient.