CS1110 Lab 11 (May 5-6, 2015)

First Name: _____ Last Name: _____ NetID: _____

The lab assignments are very important and you must have a CS 1110 course consultant "tell CMS" that you did the work. (Correctness does not matter.) This can be done any time up until May 13. Thus, if you have trouble with a problem, then you have one week to get help from the teaching staff. If you finish before the hour is over, then you can leave early or you can work on the current assignment. Indeed, you are not required to physically attend the labs at all. Just make sure your work is "checked off" by a consultant. And remember this: *The lab problems feed into the assignments and the assignments define what the exams are all about.*

1 Getting Set Up

Review Lectures 25 and 26 which cover the classes `Fraction`, `Card`, `Deck`, and `Hand`. From the Lab webpage download `Lab11.zip`. Unzip this file and house the contents in a folder/directory `Lab11`. In the command shell, navigate the file system so that this folder is THE CURRENT WORKING DIRECTORY.

2 The Card Class

Develop your answers by adding/modifying code to `ShowCard.py`.

(a) Modify the `__cmp__` method so that "ace" is high.

(b) Write code that keeps generating and printing random cards until at least one card from every suit has been displayed.

3 The Deck Class

Check your answers by adding code to `ShowDeck.py`.

(a) Write code that creates and shuffles a deck and then prints out how many times a card in the deck is followed by one of the same suit.

(b) Describe the output if the following code is run. Explain.

```
from copy import copy
D = Deck()
E = copy(D)
for k in range(47):
    D.pop_card()
print E
```

(c) Describe the output if the following code is run. Explain.

```
from copy import deepcopy
D = Deck()
E = deepcopy(D)
for k in range(47):
    D.pop_card()
print E
```

4 Poker

Develop your answers by adding/modifying code to `Poker.py`.

(a) Write a boolean-valued function `twoPair(H)` that returns true if and only if the `Hand` H contains two pair. This means that there are two different ranks R_1 and R_2 and two of the cards in `H` have rank R_1, two of the cards in `H` have rank R_2, and the rank of the fifth card is neither R_1 or R_2. Estimate the probability of this occurring.

(b) Add a function to `pop_weakest(H)` to `Poker.py` that pops the weakest card in hand `H`.

(c) Write a script that does these four things in order (1) Creates a deck. (2) Shuffles the deck. (3) Forms a poker hand by popping five cards from the deck. (4) Replaces the two weakest cards in the hand with two cards that remain in the deck.

5 The Class Fraction

Develop your answers by adding/modifying code to `ShowFrac.py`.

(a) Add a method `distToFloat(self,x)` to the class `Fraction` that returns $|f - x|$ where f is the fraction that `self` represents and `x` is a float.

(b) Making effective use `distToFloat`, compute the closest fraction to π with the property that f's numerator and denominator are both less than 1000