EECE 2560: Fundamentals of Engineering Algorithms

Project #2

Write a program that allows the user to play the card game flip. Flip is played by one player with a standard deck of 52 cards. The game has the following steps:

1. The cards are shuffled three times.
2. The player keeps taking cards until the player decides to stop and end the game.
3. To take a card, the player turns over the top card on the deck and
   (a) receives 10 points for an ace,
   (b) receives 5 points for a king, queen or jack,
   (c) receives 0 points for an 8, 9 or 10,
   (d) loses half their points for a 7,
   (e) loses all their points for a 2, 3, 4, 5 or 6, and
   (f) receives 1 point extra, in addition to the above, for a heart.
4. The goal is to end the game with the most points.

Fully implement a `card` class that stores a single card. A card includes a value and a suit (club, diamond, heart or spade). You should include constructors, set, and get functions, and an overloaded print operator.

Fully implement a `deck` class that stores the cards in a deck in order. A deck of cards should be implemented using a linked list of nodes, each of which contains a single card. The deck object should contain a pointer to the first card in the deck. You should include a constructor that creates a deck with all the cards in order (2-A, clubs to spades) and an overloaded operator that prints the cards in the deck.

Exceptions should be thrown for all error conditions and all exceptions should be caught.

Write the program that allows the user to play the card game flip:

1. Add a copy constructor and overloaded assignment operator to the `card` class.
2. Add a copy constructor, overloaded assignment operator, and destructor to the `deck` class
3. Add a function `deal` to the deck class that returns the top card in the deck by value. The card is also removed from the deck.
4. Add a function `replace` to the deck class that is passed a card as a parameter by value. The card is placed on the bottom of the deck.
5. Add a function `shuffle` to the deck class that shuffles the cards. Use any algorithm to shuffle the cards that puts the cards in a random order. It is acceptable to move cards around, and not reorder nodes.
6. Write a global function `playFlip` that plays the game by reading instructions from the keyboard and printing the results to the screen.