LAB 5: Classes
Thursday October 23rd /Tuesday October 28th
SITE - University of Ottawa Fall 2025
Due ONLINE Wednesday, November 5 at midnight
In groups of up two students
/10

We explore classes again in this lab assignment. We will look closer at classes working together and using loops and indexing. We explore a class object as variable in another class (aggregation).

Lab Assignment 5
/10

Card game 21:

The example consists on writing a program that allows the user to play card game 21.
The user receives one card at a time and after each card, decides whether to continue or not. The goal is, by adding the points of the cards the user has in hand, to get as close as possible to 21 without exceeding this value. If the user is over 21 he loses, otherwise the computer's turn. If by the time it stops it is over 21 or less than the user, the user wins, otherwise the computer wins.
An ace is worth either 1 or 14.

3 classes are given (attached files).

- `Card` class must make it possible to:
  - create a Card: constructor
  - know its value: `value()` (given inline method)
  - write (display) information (color and value): `write()`

- `CardsSet` class :

  The `cardsSet` class should be able to represent both the entire deck (52 cards) and the set of cards a player has in hand.

  The operations to be performed are:
  - create an empty set : constructor (inline, given)
  - create a new set that corresponds to the 52 cards : `novSet()`
  - shuffle these cards : `shuffle()`
  - know how many cards are in the set : `numCards()` (inline given method)
  - take a card from the set : `take()`
  - put a card on the set : `put` ()
  - find out the card in position *no* in the set : `lookIn (no` = 1 for the top of the set)
  - remove all cards from the set : `empty` () (inline given method)

- `Player` class :

The `player` class must allow to:
- take a card from the top of the packet and put it in the hand : `play` ()
- count the points of the cards in hand, both for the user and for computer : `countPoints`()

Question 1: **(2 MARKS)**
Implement the following method for `Card` class:

- `write()` : displays the color followed by the value of each card.
  (values are from 1 to 13 (11 for jack , 12 for queen , and 13 for king))

Question 2: **(5 MARKS)**
Implement the following methods for `CardsSet` class:

- `novSet()`
- `shuffle()`
- `take()`
- `put()`
- `lookIn`(no = 1 for the top of the set)

To shuffle the cards, you can use the standard `rand` function which allows you to obtain random numbers. The process will be initialized with the `srand` function to which the result of the `time` function will be passed as a parameter.
So, you need to include the following if you do so:

```
#include <cstdlib>
#include <ctime>
```

Question 3: **(3 MARKS)**
Implement the following methods for `Player` class:

- `play()`
- `countPoints()`

considering:

- If each player has his own packet of cards in hand, the packet in which we draw is common to both players, so packet is a reference: &
- `computer` is declared as *constant* because this player attribute does not change
- the `play` function may use a *boolean* variable to know if we want an additional Card or not.
- the `counPoints` function is private because it is used internally by the `play` function. If we exceed 21 points, we count the ace for 1, otherwise it is counted for 14.

Complete the requested methods in the attached `myFile.cpp` source file and submit it along with the `myFile.h` header file and other given files.

Note: You are NOT ALLOWED to modify the provided programs including main. You can however add PRIVATE member functions if you wish and call them with the existing functions.

```
/*Example of output*/
```
Hello!
A new game?
y

You get Card: 5 of Clubs

Your score is 5 points
Any additional Card ? y
You get Card: Ace of Spades

Your score is 19 points
Any additional Card ? y
You get Card: 9 of Hearts

Your score is 15 points
Any additional Card ? y
You get Card: 8 of Clubs

Your score is 23 points
You lost!
A new game?
y
You get Card: 8 of Spades

Your score is 8 points
Any additional Card ? y
You get Card: King of Spades

Your score is 21 points
You won!
A new game?
n

Submit your work ONLINE (one zip file only) before Wednesday, November 5th at midnight

Instructions

- Create a directory that you will name Assignment5_GroupNum, where you will replace Num with your group number.
Put all the following files in your compressed directory Assignment5_GroupNum.zip for submission in the Brightspace Virtual Campus.

Files :

- ✓ README.txt
- ✓ myFile.cpp, myFile.h, …

- Don't forget to add comments in each program to explain the purpose of the program, the functionality of each method and the type of its parameters as well as the result.
- In the Assignment5_GroupNum directory, create a text file named README.txt, which should contain **the names of the two students**, as well as a brief description of the content:

Student Name:
Student Number:
Course Code: CSI2372A

Academic Fraud:

This section of the assignment aims to raise students' awareness of the problem of academic fraud (plagiarism). Consult the following links and read both documents carefully:
https://www.uottawa.ca/current-students/academic-regulations-explained/academic-integrity
University regulations will apply to all cases of plagiarism. By submitting this assignment:
1. You confirm that you have read the above documents;
2. You understand the consequences of academic fraud.