CME1212 Algorithms and Programming II
Homework 2

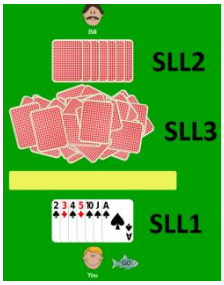
Upload your program from *DEUZEM SAKAI* until **12 May 2024, 23:55.**

Write a Java program for a simple version of ***Go Fish*** game.
https://cardgames.io/gofish/

The game is played with 24-card deck (4 times numbered from 1 to 6).
The game is played by 2 players (human vs computer).

Objective
The objective of the game is to collect as many "books" as possible. A *book* is four cards of the same rank. The player with the most books at the end of the game wins.

Dealing and setup
First, cards are dealt to the players, each player gets 7 cards. Once the dealing is done, the rest of the deck is put in a random pile on the table.

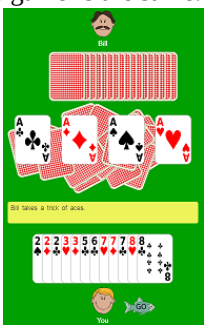


There are three single-linked lists (SLL):
1- SLL1 to hold the cards of the first player (human)
2- SLL2 to hold the cards of the second player (computer)
3- SLL3 to hold the cards on the table

Asking and fishing
The game is opened by your turn. You ask the computer for a particular rank. For example, you might ask if it has any sixes. You may only ask for the ranks that you already have at least one card of. For instance, if you don't have any sixes, you can't ask for them.
- If the computer has any sixes, then it must give them to you, and you get another turn and can ask again.
- If the computer doesn't have any sixes then it will tell you to "Go Fish" which means that you will draw one card from the pile on the table. After this operation, if you obtain four cards of six, then you get a book.

When the computer plays, it randomly selects and asks a rank that it already has at least one card of. The rest of the game is the same.

Scoring
If you have 4 of the same rank then you show the cards to the other player, and then place them in a pile next to you. This is called a *book*. The player with the most books at the end of the game wins.



End of the game
If one of the players (human or computer) finishes all the cards in his hand, the game is over.
The winner should be displayed, if exists. The game may also be ended without any winner (in the case of tie like a scenario given below).

```
                                        Table
You:       5 5 5                book: 3          1 1 2
Computer: 3 3 3                 book: 3

Game is over.
Tie!
```

The program must display all steps until the game is over.

highscoretable.txt

Kaan 12
Ali 14
Yeliz 13
Cem 8
Can 14
Pelin 15
Ece 10
Sibel 5
Ayşe 12
Berk 4

High Score Table
Read an unsorted file "*highscoretable.txt*" and then create a Double Linked List (DLL) to hold them in a sorted way (from the best player to the worst one). At the end of the program, if you win, ***according to the total number of turns completed until the game ends***, your score (*the number of completed turns*) will be added to the high score table. If turn number is less than the others in the high score table, the player is placed at the top. In other words, finishing the game with fewer turns is the main purpose. If computer wins, there will be ***no update*** in the high score table.

If the player earns a score within the top results, he/she will be displayed in the High-Score table. If the same score exists in the table, the new score should be inserted to the next of them. Delete the last record if it is required since the table must contain maximum 10 items.

In your program, you can use single-linked list and double linked list as you want, but you must use only single-linked list and double linked list, don't use other data structures such as array, stack and queue.

Write your own single-linked list and double linked list classes. Don't use array or array list or list data structures embedded in Java. Don't use stack or queue. Don't use a string as the primary data structure in the main solution, instead of SLL or DLL.

This homework will be graded by Res. Asst. Orkun ÇINAR.
You can ask your questions him from the "**FORUM** -> **Homework 2 - Questions**" part of the *DEUZEM SAKAI* software.

Sample output:

```
Turn: 1                                          Table
You:      1 2 2 2 5 5 6        book: 0           1 1 6 3 5 4 3 4 4 3
Computer: 1 2 3 4 5 6 6        book: 0

You ask: 2

2 2 2 2
-------------------------------------------------------------------------------------------
Turn: 2                                           Table
You:      1 5 5 6              book: 1            1 1 6 3 5 4 3 4 4 3
Computer: 1 3 4 5 6 6          book: 0

You ask: 1

-------------------------------------------------------------------------------------------
Turn: 3                                          Table
You:      1 1 5 5 6             book: 1          1 1 6 3 5 4 3 4 4 3
Computer: 3 4 5 6 6             book: 0

You ask: 5
-------------------------------------------------------------------------------------------
Turn: 4                                          Table
You:      1 1 5 5 5 6          book: 1           1 1 6 3 5 4 3 4 4 3
Computer: 3 4 6 6              book: 0

You ask: 6
-------------------------------------------------------------------------------------------
Turn: 5                                          Table
You:      1 1 5 5 5 6 6 6      book: 1           1 1 6 3 5 4 3 4 4 3
Computer: 3 4                  book: 0

You ask: 1

Computer says "Go Fish"
-------------------------------------------------------------------------------------------
Turn: 6                                          Table
You:      1 1 1 5 5 5 6 6 6    book: 1           1 6 3 5 4 3 4 4 3
Computer: 3 4                 book: 0

Computer asks: 3

You say "Go Fish"
-------------------------------------------------------------------------------------------
Turn: 7                                          Table
You:      1 1 1 5 5 5 6 6 6    book: 1           6 3 5 4 3 4 4 3
Computer: 1 3 4               book: 0

You ask: 1

1 1 1 1
-------------------------------------------------------------------------------------------
Turn: 8                                          Table
You:      5 5 5 6 6 6          book: 2           6 3 5 4 3 4 4 3
Computer: 3 4                  book: 0

You ask: 5

Computer says "Go Fish"
-------------------------------------------------------------------------------------------
Turn: 9                                          Table
You:      5 5 5 6 6 6 6        book: 2           3 5 4 3 4 4 3
Computer: 3 4                  book: 0

6 6 6 6

Computer asks: 3

You say "Go Fish"
-------------------------------------------------------------------------------------------
Turn: 10                                         Table
You:      5 5 5                book: 3           5 4 3 4 4 3
Computer: 3 3 4                book: 0

You ask: 5

Computer says "Go Fish"
-------------------------------------------------------------------------------------------
Turn: 11                                          Table
You:      5 5 5 5              book: 3           4 3 4 4 3
Computer: 3 3 4                book: 0

5 5 5 5
-------------------------------------------------------------------------------------------
Game is over.

You win the game !!


What is your name: Mehmet
```

```
High Score Table

Berk  4
Sibel 5
Cem   8
Ece   10
Mehmet 11
Kaan  12
...
```

Notes

1- Upload format

Step1: Create a new folder, named by your student number and name (without any space)For example: 2015510012_Ali_Tas

Step2: Copy all java files into this folder

Step3: Compress the folder **2015510012_Ali_Tas.zip**

Step4: Upload the file **2015510012_Ali_Tas.zip** from *DEUZEM SAKAI*

2- Don't use **ENIGMA** or any other extra library.

3- If you are late, your grade will be decreased by 10 points for each day. After five days, your assignment will not be accepted.

4- Assignment must be your individual work.
Cheating is strictly prohibited.
All source codes will be automatically compared with each other by using a program.If any cheating occurs, your assignment will be graded with **zero (0)**.

5- Your program must work correctly under all conditions. Try to control all possible errors.

6- You should use meaningful variable names, appropriate comments, and good prompting messages.