

CS101- Algorithms and Programming I

Lab 09

Lab Objectives: Classes and Objects

For all labs in CS 101, your solutions must conform to the CS101 style guidelines (rules!)

1. Create a class, `FlashCard` that has the following functionality. All data members should be private.
 - a. Each `FlashCard` has a question, an answer, and a level of difficulty (between 1 and 5).
 - b. Constructor: initializes the question, answer and difficulty level to the values passed as parameters. The difficulty level should be initialized using the `setDifficulty()` method (see below).
 - c. Get methods for question, answer and difficulty.
 - d. Set methods:
 - `setQuestion()` – sets the question to the value passed as a parameter.
 - `setAnswer()` – sets the answer to the value passed as a parameter.
 - `setDifficulty()` – if the value passed as a parameter is between 1 and 5, sets the difficulty to the value passed as a parameter, otherwise sets the difficulty to zero.
 - e. `reverseCard()` : swaps the questions and the answers. If Turkish words are the questions and English words are the answers, English words become the questions and Turkish words become the answer.
 - f. `equals()` : two `FlashCards` are equal if both the question and the answer are the same (case not important)
 - g. `toString()` : returns the string representation of a `FlashCard` in the format: "question-answer:difficulty", for example: "elma-apple:2"
 - h. `showFlashCardQuestion()` : displays the `FlashCard` *question* formatted as shown:

```
*****
*               *
*               *
*               *
*   tekrar     *
*               *
*               *
*               *
*****
```
 - i. `showFlashCardAnswer()` : displays the `FlashCard` *answer* formatted as shown:

```
*****
*               *
*               *
*               *
*   repeat     *
*               *
*               *
*               *
*****
```

Hint: `showFlashCardQuestion` and `showFlashCardAnswer` have the same functionality but use different data. You may want to create a helper method, `formatOutput` that takes a parameter and determines whether to print the question or the answer.

2. Download the application, `FlashCardApp.java`, and complete the following. You can use the sample data in the file `turkish_english_words.txt`, complete the following. Each line in the file contains a Turkish word, the English translation, and the difficulty. The tokens on each line are tab delimited.
 - a) `read_cards(filename)`: opens file with the name passed as a parameter. You can read data from files using `Scanners`. The method has been partially implemented; you should fill in the statements indicated in the comments. The method should do the following:
 - Create a `FlashCard` object for each line in the file. In the sample run, the question is the Turkish word and the answer is the English word, but you can choose the order.
 - Add each `FlashCard` to a list.
 - Return the list of `FlashCards`.
 - b) `bubbleSort()`: takes an `ArrayList` as a parameter, and sorts in ascending order of question (alphabetic) using the bubble sort algorithm.
 - c) In `main()` do the following:
 - a. Create a list, `flashCards`, with data from the file `turkish_english_words.txt`.
 - b. Input a number (n) of `FlashCards` the user would like to generate.
 - c. Create a list containing n random cards from the list of `flashCards`. You should get a random `FlashCard` from the list, and if it is not already in the new list, add it to the new list. Stop when n unique cards have been added to the list.
 - d. Sort the generated list of `FlashCards` by question.
 - e. For each card in the list, display the question and input the answer from the user. If the answer is correct, increment the users score and display a message.
 - f. If the user answers incorrectly display a message and add the incorrect `FlashCard` to a list containing the wrong answers.
 - g. Once the user has guessed for all `FlashCards`, display their score and the wrong answers if any.
 - h. See sample run below for details.
 - i. Try reversing the questions in the `FlashCards` to test the Turkish translation for English words.

Sample Run:

Enter the number of flash cards to generate: 5

Let's play!

```
*
*
*
*   balik   *
*
*
*
*
```

Enter your guess: fish

Correct!

```
*
*
*
*   yaris   *
*
*
*
*
```

Enter your guess: race

Correct!

```
*
*
*
*   düşünmek
*
*
*
*
```

Enter your guess: think

Correct!

```
*
*
*
*   olsun
*
*
*
*
```

Enter your guess: be

Wrong answer!

Let's see the correct answer:

```
*
*
*
*   get
*
*
*
*
```

```
*
*
*
*   vadeli
*
*
*
*
```

Enter your guess: fee

Wrong answer!

Let's see the correct answer:

```
*
*
*
*   term
*
*
*
*
```

Your score: 3 / 5

Words you need to review:

olsun-get:5

vadeli-term:5