



BIRZEIT UNIVERSITY
COMP1331 – COMPUTER AND PROGRAMMING

Assignment # 3

Objectives:

1. To declare array reference variables and create arrays.
2. To develop and invoke methods with array arguments and return values.
3. To use multidimensional arrays.
4. To use Ragged Arrays of objects to store data.
5. To use immutable String class.
6. To use the StringBuilder class to process mutable strings.

Specification

Submission: Online through ITC.

What to submit: Your **own** well-structured and well-commented JAVA files (.java) and PDF file

Deadline: 22/8/2022 by 8pm. (The online submission will be disabled after this time).

Important

- Academic **honesty**:
 - This is an individual assignment. Individual assignments must be each student's own work.
 - Copying 1 line from a friend or the internet will be considered cheating.
 - Cheating will result in an official university disciplinary review and the University regulations will be strictly enforced.

Task1: String Anagram

Write a method that checks whether two words are anagrams. Two words are anagrams if they contain the same letters in any order. For example, **silent** and **listen** are anagrams. The header of the method is:

```
public static boolean isAnagram(String s1, String s2)
```

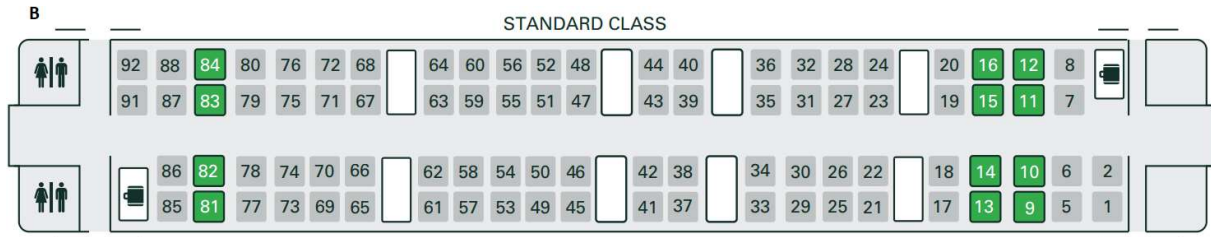
Note: to make its simple, assume no letter duplication in the same word (ما في تكرار احرف في نفس الكلمة).

Write a test program that prompts the user to enter two strings and, if they are anagrams, displays *two strings are anagrams*, and displays *two strings are not anagrams* if they are not anagrams.

Task2: Train System

The following figure shows a train seat-numbering plan. Seat-numbering plan shows how the seats are laid out. In each row we have 4 seats. In total, we have 23 rows.

Note: first and last row has 2 seats only.



Step1:

Create a **Seat** class that has:

- Private int *seatNumber* with getter and setter methods.
- Private String for *passenger name* with getter and setter methods. Note: if name is *null* this means seat is empty.
- A constructor that takes seat number.
- A method *isEmpty* that returns if the seat is empty or not.
- A *toString* method that returns a string represents seat object's information.
- A static method *isValid* that takes a seat number and returns if the seat number is valid or not.
- A static method *getRow* that takes a seat number and returns the train row number if the seat number is valid.
- A static method *getColumn* that takes a seat number and returns the train column number if the seat number is valid.

Step 2:

Draw the **UML** diagram for the **Seat** class

Step 3:

Create a **Train** class that has the following:

- A private static ragged array of *seats* reflecting the mentioned train seat plan.
- A method to reserve a seat. This method takes seat number and passenger's name. If the seat is empty, the seat will be reserved for the passenger and returns *true*. If not, it will returns *false*.
- A method to delete a reserved seat. If the seat is not empty, the seat will be deleted and returns *true*. Else, it will returns *false*.
- A method to delete all reserved seats.

Good Luck!