



COMPUTER SCIENCE 12B (SPRING 2020) PROGRAMMING IN JAVA

PROGRAMMING ASSIGNMENT 2

Program Description:

This assignment will test your understanding of the use of the `Scanner` objects, `Strings`, file processing, `Random` objects, `Arrays`, and everything covered so far.

Modularity in your code is very important, YOU MUST USE STATIC METHODS.

Write five programs to solve the following problems. Write each program in a different file with extension `.java` Named your programs/files `Problem1.java`, `Problem2.java`, etc.

Problem 1: (For this problem you are not allowed to use arrays)

Write a reverse Hangman game in which the user thinks of a word and the computer tries to guess the letters in that word. Your program must output what the computer guessed on each turn, and show the partially completed word. It also must use pseudorandom functions to make guesses. That is, it should not simply try all the letters in order, nor should it use the user's input to its advantage. A sample run of your program might be as follows:

NOTE:

1. You are not allowed to use `String` methods that have not been discussed in class.
2. Because this program uses pseudorandom numbers, you won't be able to recreate this exact log.

```
>>Please enter a word for me to guess(letters only):  
>>hello  
>>My guess: n   current status: ____  
>>My guess: l   current status: __l_  
>>My guess: x   current status: __l_  
>>My guess: o   current status: __llo  
...
```

Problem 2: Write a program that reads a file containing data about the changing popularity of various baby names over time and display the data about a particular name. Each line of the file stores a name followed by integers representing the name's popularity in each decade: 1900, 1910, 1920, and so on. The ranking ranges from 1 (most popular) to 1000 (least popular), or 0 for a name that was less popular than the 1000th name. The following lines are a sample of the file format:

```
Sally 0 0 0 0 0 0 0 0 0 0 886  
Sam 58 69 99 131 168 236 278 380 467 408 466
```

Your program should prompt the user for a name and search the file for that name:

This program allows you to search through the data from the Social Security Administration to see how popular a particular name has been since 1900.

Name? **Sam**

If the name is found, the program should display data about the name on the screen:

```
Statistics on name "Sam"
1900: 58
1910: 69
1920: 99
...
```

NOTE: For this problem, use the provided file `names.txt`

Problem 3: Write a method called `isUnique` that accepts an array of integers as a parameter and returns a boolean value indicating whether or not the values in the array are unique (`true` for yes, `false` for no). The values in the list are considered unique if there is no pair of values that are equal. For example, if passed an array containing `{3, 8, 12, 2, 9, 17, 43, -8, 46}`, your method should return `true`, but if passed `{4, 7, 3, 9, 12, -47, 3, 73}`, your method should return `false` because the value 3 appear twice.

You should also write the `main` method, which interacts with the user, calls the static method `isUnique`, and prints the result.

Problem 4: Write a method called `longestSortedSequence` that accepts an array of integers as a parameter and returns the length of the longest sorted (nondecreasing) sequence of integers in the array. For example, in the array `{3, 8, 10, 1, 9, 14, -3, 0, 14, 207, 56, 98, 12}`, the longest sorted sequence in the array has four values in it `(-3, 0, 14, 207)`, so your method would return 4 if passed this array. Your method should return 0 if passed an empty array.

You should also write the `main` method, which interacts with the user, calls the static method `longestSortedSequence`, and prints the result.

Problem 5: Write a method called `priceIsRight` that mimics the guessing rules from the game show *The Price is Right*. The method accepts as parameters an array of integers representing the contestants' bids and an integer representing a correct price. The method returns the element in the bids array that is closest in value to the correct price without being larger than that price. For example, if an array called `bids` stores the value `{200, 300, 250, 1, 950, 40}` the call of `priceIsRight(bids, 280)` should return 250, since 250 is the bid closest to 280 without going over 280. If all bids are larger than the correct price, your method should return -1.

You should also write the `main` method, which interacts with the user, calls the static method `priceIsRight`, and prints the result.

Guidelines:

For this assignment you should limit yourself to the Java features covered in class so far (lecture 11). Although we will cover other topics while you are working on this assignment, do not use any of those features.

Grading:

You will be graded on

- **External Correctness:** The output of your program should match exactly what is expected. Programs that do not compile will not receive points for external correctness.
- **Internal Correctness:** Your source code should follow the stylistic guidelines shown in class. Also, remember to include the comment header at the beginning of your program.
- **Comments and Style**

Submission:

Create a folder containing your Java source code (programs). Compress (zip) the folder and upload it to Latte by the day it is due. For late policy check the syllabus.