

Exercises for the Class Elements of Computer Science: Programming Assignment 10

Submission of solutions until 3:00 p.m. at 19.01.2022
at `moodle.uni-trier.de`

- Every task needs to be edited in a meaningful way!
- Please comment your solutions, so that we can easily understand your ideas!
- If you have questions about programming or the homeworks, just ask your teachers!
- **Submission that can't be compiled are rated with 0 points!**

Exercise 1 Technical Dictionary (without evaluation; main for tests)

Write a class `TechnicalDictionary` to assist in learning technical terms with a computer.

A class `Entry`, which should store the following data, is helpful for this;

- `String technicalTerm` denotes the term that should be learned,
- `String explanation` for a brief explanation,
- **double** `learned` for an evaluation of how well the word was learned.

External access to these components should only be allowed with getter/setter methods, furthermore you should write a `toString` method.

The constructor for `Entry` should have the two strings as parameters and set them accordingly, where the variable `learned` should be initialized with 0.

The class `TechnicalDictionary` should then have the following characteristics:

- A `TechnicalDictionary` must contain an array with 1000 references of the type `Entry`.
- This array is to be created in the constructor (containing 1000 null references). The scanner used for the input should be passed as the only parameter in the constructor and stored in an (already given) instance variable so that the method `exercise()` given below has access to it.

- With a method `enter(String technicalTerm, String explanation)` a new entry should be added to the lexicon (and replace a null reference in the field).
- Another method `exercise()` should now search for the entry with the least knowledge in the lexicon and output the technical word. Then the method should first ask the user if he knows the explanation of the entry.

The user should then be able to indicate with an empty entry (i.e. Return-Key only) that he wants to see the explanation of the technical term.

The user can then specify whether he actually knew the explanation. An empty input signals 'yes', in this case the value of the variable `learned` should be increased by the value 1. A non-empty input means 'no', then the value of the variable `learned` is halved.

- The `toString` method should output the entire dictionary content including the knowledge values (but of course without the null references), one entry per line.

The predefined `main` method creates a technical dictionary with 3 entries, lets the user practice ten times and then outputs the technical dictionary so that the learning success can be controlled.

There is again a hidden sample solution that shows you how the program should run. To create your own solution, you must exchange two selected lines in the source code of the class `TechnicalDictionary`.

Exercise 2 Cookbook (Evaluation: predefined main method)

The default is an abstract class named `Recipe` containing four methods: `recipeName()`, `ingredientsList()`, `equipment()` and `preparationTime()` (in minutes). It also contains a (static) `main` method for a simple test of the solution.

Get out of `Recipe` three classes `Pizza`, `Sandwich` and `Risotto`. The `recipeName` and special ingredients should be placed in the constructors. General ingredients, the required cooking utensils and the preparation time result from the concrete class:

- `Pizza`:
General Ingredients: Yeast Dough, Tomatoes, Mozzarella, Oregano
Equipment: Oven, Pizza Plate, Rolling Pin
Preparation Time: 40
- `Butterbrot`:
General Ingredients: Butter
Equipment: Knife, Cutting Board
Preparation Time: 3
- `Risotto`:
General Ingredients: Rice, Vegetable Bouillon, Parmesan

Equipment: Pot, Stirring Spoon

Preparation Time: 40

The `ingredientsList` should consist of the general ingredients for the basic recipe and the special ingredients from the constructor.

The default `main` method should therefore lead to the following output:

```
1 Name:      Pizza Salami
2 Ingredients: Salami, Yeast Dough, Tomatoes, Mozzarella, Oregano
3 Equipment:  Oven, Pizza Plate, Rolling Pin
4 Duration:   40.0
5 Name:      Pizza Diavolo
6 Ingredients: Salami, Peperoni, Yeast Dough, Tomatoes, Mozzarella,
7              Oregano
8 Equipment:  Oven, Pizza Plate, Rolling Pin
9 Duration:   40.0
10 Name:     Ham Sandwich
11 Ingredients: Brown Bread, Ham, Butter
12 Equipment: Knife, Cutting Board
13 Duration:  3.0
14 Name:     Toast Hawaii
15 Ingredients: Pineapple, Cheese, Butter
16 Equipment: Knife, Cutting Board
17 Duration:  3.0
18 Name:     Pumpkin Risotto
19 Ingredients: Pumpkin, Rice, Vegetable Bouillon, Parmesan
20 Equipment: Pot, Stirring Spoon
21 Duration:  40.0
```