Instructions for the Python Task Collection on Variables

This document serves as a short guide to give you some background information before you fill in the survey.

The survey provides a collection of Python tasks related to common errors in (Python) programming on the topic of variables. The programming tasks are divided into three different levels of difficulty, so-called 'classes'.

Classes:
The division into classes is based on Le et al. (2013) & Le & Pinkwart (2014). A short summary about the different classes and programming tasks is given in table 1 below

Class 1: **One solution strategy, one implementation**	**Class 2:** **One solution strategy, alternative implementation variants**	**Class 3:** **A known number of typical solution strategies**
● Tasks have a single correct solution ● A quiz which consists of a program, a question and a gap to be filled with correct value ● A template consisting of several slots in addition to an exercise description, system allows students to input only specific correct values into slots ● Students have to understand the given program	● Tasks can be solved by different implementation variants. ● Tasks are provided with a specific description. In addition to a problem statement, usually, a specification about the solution strategy to be applied is given or a program skeleton is pre-specified. ● A program template that contains several slots, and thus many implementation variants ● A given program statements whose	● Tasks can be solved by applying alternative solution strategies. ● Tasks enable students to apply different solution strategies which have been anticipated by the exercise's author(s) and allow students to implement each solution strategy in different variants

code and input a correct solution into a pre-specified gap	order can be changed ● Since students have the possibility to modify values (i.e., program statements), alternative implementation variants can be developed.	

Table 1: Description of different levels of difficulty (class 1, class 2 and class 3) for programming tasks, based on Le et al. (2013) & Le & Pinkwart (2014).

Structure of the Survey

- The survey contains 11 programming tasks and related errors for the concept of variables:
    - 7 tasks are related to 'class 1'
    - 3 tasks are related to 'class 2'
    - 1 task is related to 'class 3'.
        - This task does not only relate to the concept of variables but to 'mixed topics' as it is not possible to create 'class 3' tasks for one unique topic. The task tests a combination of knowledge and multiple errors can be expected.

Instructions for reviewers

Your feedback - as a reviewer - will help to ensure the quality and effectiveness of the tasks and the related errors.

I am seeking your input on three key aspects:

1. **Appropriateness of Difficulty Levels**
   I have assigned various Python tasks to the different classes. Please review the tasks and give your opinion on whether the tasks match the classes and therefore the difficulty level.
2. **Suitability of the Related Errors:**
   Each task is designed to cover specific concepts and potential pitfalls. I would like to know from you whether these tasks effectively address the errors and misconceptions mentioned?
3. **Identification of Further Common Errors:**
   I've tried to cover 'common errors' in Python for the concept of 'variables', but I think your experience might reveal other common programming errors. If you are aware of other common errors that might be relevant, please let me know.

Please now use the following link [LINK] and fill in the survey to provide feedback on these 3 key aspects.

References

Le, N.-T., Loll, F., & Pinkwart, N. (2013). Operationalizing the Continuum Between Well-Defined and Ill-Defined Problems for Educational Technology. IEEE Transactions on Learning Technologies, 6(3), 258–270. https://doi.org/10.1109/TLT.2013.16

Le, N.-T., & Pinkwart, N. (2014). Towards a Classification for Programming Exercises. https://www.semanticscholar.org/paper/Towards-a-Classification-for-Programming-Exercises-Le-Pinkwart/d7d7e2cdead886483a12f623863f41ab991dc167