

# Solving Bebras Tasks: Does the Order Matter?

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**Abstract.** In the international Bebras contest, pupils and students aged between 6 to 18 solve a series of 9 to 15 challenging questions involving computer-science concepts. The precise way to display the list of tasks to the participants can be different in each country: different backends, different options. In many countries, tasks are classified as easy, medium, or hard for each of the defined age categories. In Switzerland, within each category, the order of the tasks is randomized—but all tasks tagged as easy are always listed before the medium ones, which are in turn listed before the hard ones. In this poster, we depict the results of the analyses we ran to look at the order in which successful participants solve questions. Does the randomization of the task penalize participants that happen to obtain an “unfavorable ordering”? As task authors, we know that evaluating the difficulty of the tasks is itself difficult and often done according to intuition/experience—we thus examine whether ordering the tasks according to their true difficulty, as obtained by the global participants’ scores, would have favored the global score.

**Keywords:** Bebras tasks · Computer science contest · Assessment of difficulty

## 1 Introduction & Context

The international Bebras contest<sup>1</sup> aims to promote computer science in schools [3]. As its name implies, it comes in the form of a contest: in most countries, participants have to individually solve a series of problems (hereafter referred to as “tasks”) within a given amount of time.

Switzerland is no exception. There are five selections of tasks to target five age groups, from around age 8 to the end of high school, typically around age 18. Each participant has 9, 12, or 15 tasks to solve, depending on their age. More info about how such tasks are created and edited can be found in [4]. Figure 1 shows the typical user interface participants are presented with (here, in German). On the left ❶, the list of (here) 12 tasks to solve. The first one is here selected, and thus displayed on the main part, center-left ❷.

The set of tasks to solve, for a given age category, remains the same. One third of the questions are classified as easy by the task authors and contributors and are here shown in a first group of 4 tasks ❸. Within this group, the 4

<sup>1</sup> <https://www.bebas.org>

tasks are shuffled, and are thus likely to appear in a different order to another participant. Then follows another group of tasks ④, which have all been classified as having a medium difficulty. The 4 tasks here are also shuffled. Finally, the same holds for the final third of the task set ⑤, with tasks classified as difficult.

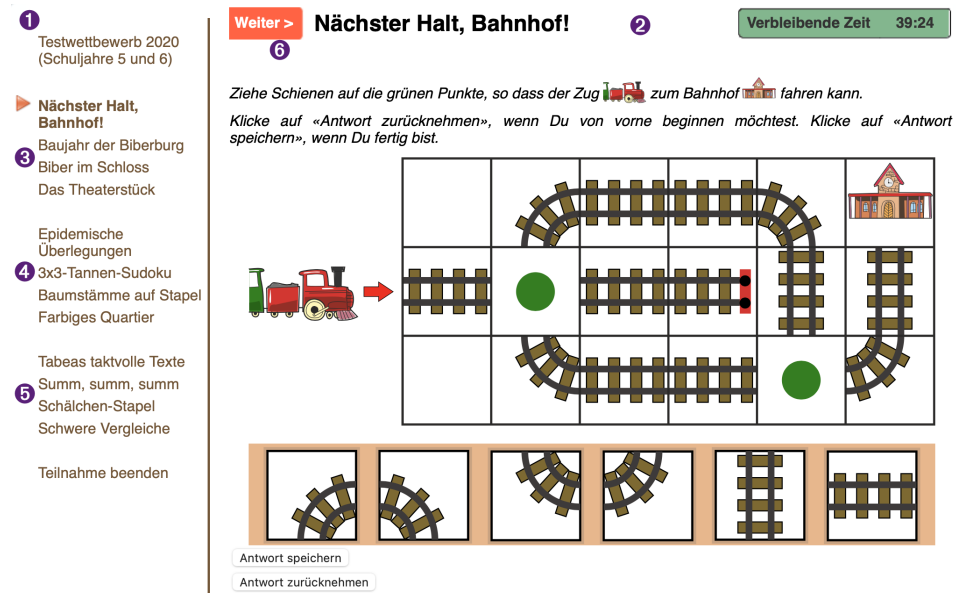


Fig. 1. A screenshot of the contest's user interface shown to participants.

Participants can work on the tasks in the order in which they are presented to them, from top to bottom (by clicking on each task's title successively, or by using the Next button ⑥). But they also have access to any task anytime and they can thus also jump from one task to the other without any restrictions.

## 2 Research Questions

Basing our analysis on about 30 000 answers to the contest of a part year, we propose to investigate and represent graphically in this poster the findings related to these research questions:

- **In which order do participants solve tasks?** Do they use the random-access possibility or do they mostly solve tasks in order?
- **Do participants who solve tasks linearly perform differently?** Is there a correlation between a high global score at the contest and the way a participant has solved questions? For instance, are participants who choose the next question to solve the ones who know best what to spend their time

on next, or are they rather the ones that give up on a given question and pick a random one next?

- **Does the order in which tasks are presented matter?** Is it a good idea to shuffle the tasks within the difficulty groups in the first place? We know assigning a difficulty level to a task is by itself not an easy thing to do [5]; often, the end results show that, e.g., a task in the easy group was in fact less often solved correctly than another one classified as medium or hard [7,1]. The literature widely reports (albeit in different settings than ours) that the order of questions in a questionnaire affects the participants' behavior in some ways [6,2]. Thus, we wonder whether participants whose task shuffling resulted in the easier question being listed first performed differently (or behaved differently in their question-solving strategy) than those who had the harder tasks first.

We will finally draw conclusions from these results to adapt the way we will run the context in the next years.

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