



RULES OF THE LPR CUP



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How and where should I upload solutions? How many times can I provide my solution? What file format to choose?

- 1.1 The Participant provides solution through Google Classroom. We do not limit the participants in the number of attempts, but each unsuccessful attempt leads to a penalty coefficient (see [paragraph 2](#)). In addition, we do not guarantee prompt checking if incorrect solutions are sent too often. And read the rules until the end. The last part is very important.
- 1.2 Solutions can be sent in pdf, png, jpeg format. It can be clear images of hand-written solutions or typed text in pdf format.
- 1.3 An important empirical fact: a link to a disk, a Google document, ~~to Siberia~~, etc. **are not** files of the formats above, and the Jury reserves the right not to check such solutions.

How many points can I get for the problem? Will evaluation criteria be published? What is the penalty coefficient?

- OMG! There will be no evaluation criteria. Deal with it.
 - For each problem you can gain 10 points. Points can only be obtained if the answer to the question of the problem is correct. If the problem consists of several questions, then each question is evaluated independently. The intermediary results are not rated.
 - Now about the penalty coefficient. There will be a lot of boring text, so just be patient. The solution to each part of the problem will be evaluated as:
- 2.1 Completely correct solution (Full). This means that the correct answer is given with an well-proved solution. In this case, the participant gets points indicated for this part in the conditions of the problem, which are multiplied by the penalty coefficient, determined by the number of unsuccessful attempts for this part and the number of hints received (see the rules for calculating the coefficient below).
 - 2.2 Inaccurate solution (Part). This means that the solution contains small errors (arithmetic errors or erratum that do not lead to a absurd answer). In this case, a notification is sent to the participant in Google Classroom that the solution to this part contains inaccuracies and that it needs to be completed to get points for the problem. For each solution that contains inaccuracy, the final score for this part is multiplied by a penalty coefficient of 0.9.
 - 2.3 Incorrect solution (Incorrect). The solution is incorrect from the physics aspect, contains errors in the application of physical laws, contains arithmetic errors that lead to the obviously absurd conclusion or the participant solved the wrong problem, the participant does not understand the fundamental points, etc. In this case, a notification is sent to the participant in Google Classroom that the solution to this part is incorrect and that it needs to be completed in order to get points for the assignment. For each wrong solution, the final score for this part is multiplied by a factor of 0.8.

- 2.4 If the problem has more than one question and the participant sends a solution containing solutions to only some of them, then each part that remained unsolved is evaluated as an incorrect solution.
- 2.5 Each hint that was given before the participant sent a solution to this part gives an additional factor of 0.7 to the coefficient. In each text of problems, there will be the information on the hints publishing dates.
- 2.6 If the participant found an error in his solution before the solution was checked, then the participant can replace it in his personal account. In this case, the penalty coefficient (Part or Incorrect) **is not applied**.
- 2.7 If the coefficient for the part becomes less than 0.1, it is taken equal to 0.1. In other words, for a completely correct solution to the problem, you are guaranteed to get at least 1 point.
- 2.8 Paragraph «**Dream of the Jury**». If the solution is typed or written so that it is impossible to understand anything in it, then such a solution is evaluated as incorrect. The degree of impossibility is determined by the subjective opinion of the jury and is not discussed.
- 2.9 Penalty coefficients do not affect points in future rounds.

Another word. The formula for calculating points for a problem:

$$P = \sum k_i \cdot p_i,$$

where P — the total score for the problem, k_i — the penalty coefficient, a p_i — the score for the i^{th} part. We recommend to look at the [example](#).

Really harsh. And how long does the checking take and how often does it take place?

- 3.1 The solution sent by the participant must be checked within 12 hours. If it has not been checked within the specified period, leave a comment in your personal account or write to [Official LRP Cup account](#), then the jury will see a notification. We ask you not to keep inside that the checking of the solution has been delayed. We hope that such cases will not happen a bit, but it may be different from what we are expecting.
- 3.2 **It's important!** Note that if you send a solution 12 hours or less before the Hint, we don't guarantee a checking before the Hint is published.
- 3.3 **It's important 2.0!** If the participant sends the wrong solution for the fifth time, then the jury cannot guarantee the participant the checking of the problem within 12 hours. In this case, the jury ~~does not guarantee anything~~ will continue to check, but the response time can be increased drastically.

3.4 It's very important! If you send the solution of the problem 3 times, which was evaluated with Part (not necessarily in a row), the Jury will give a small hint for what exactly the Part was given: insufficient justification, arithmetic, etc. If the Jury forgot about the hint, write [To the official account of the LPR Cup](#), then the Jury will see the notification.

3.5 You can send the same work several times in a row to get a small hint as soon as possible, but a penalty factor will be applied for each submission. At the same time, the Jury will have a total of 36 hours for all 3 checks. Think about such a step in advance, it may not be the most profitable in terms of time and points.

3.6 We are all human beings. And it happens that the Jury makes mistakes while checking. If we notice an error, then different scenarios are possible. In any case, we will contact you. We are sure that there will be no ~~there will not be that many~~ such cases at all.

3.7 If you have any doubts about the correctness of the checking, you can ask for a recheck of any of the version for your solutions that you sent before, and this solution will be rechecked by the member of the Jury, responsible for this problem.

Rechecking is equivalent to resending the solution with exactly the same coefficient setting rule. Therefore, if the problem is solved incorrectly, you risk getting an additional Part or even Incorrect. We cannot guarantee a recheck within 12 hours, because we have only one responsible for the problem per problem, and we really need him alive in the future.

3.8 Before the final rating the solutions of **all** leaders are rechecked. The score can become and higher, and lower.

Ok, if for the correct solution of one part I need the correct result in the previous part, but I didn't succeed or made a mistake at this part of the problem and could have done the second part correctly, will there be a penalty coefficient?

3.9 Yes. There is no any propagation error. We don't like it that much, but it will be more objective. The propagation error rule is enabled only if an additional indication is made in the text of the problem.

Okay, is there anything else?

Yes. There is a very important moment with a(an) ~~cheating~~ alternative scores. In some problems (and most likely in all), an alternative problem (it may consist of several questions) will be published as the last hint, which may lead to the correct solution. From this moment, the participant of the Olympiad has the opportunity to make a **CHOICE**. The participant can continue to send solutions to the main task, or can switch to an alternative task **at any time** before the final deadline. ~~But it's worth taking at least one step along this path.~~ In the case that a participant switches to an alternative task, he must clearly indicate this at the beginning of the sent solution. The maximum score for an alternative task is equal to the maximum score that you can get at the time of switching to it, multiplied by 0,7 (we recommend looking at [example](#)). The rules for checking an alternative

problem are the same as for the main problem. **Starting from the transition to an alternative problem, there is no possibility to return to solving the main problem.** Also, after switching to an alternative task **the points for the main problem are reset.**

Nothing is clear, but it seems great! Can I have a couple of examples? No problem!

Suppose there is a problem in which there were parts evaluated at 2, 2, 3 and 3 points. The participant submits his solution and receives Full (c) for the first part, Part (p) for the second and third parts and Incorrect (i) for the fourth. Then he got 2 points, and it is possible to get points for parts 2, 3, 4, but with a penalty coefficient. Then the Participant waited until the first Hint. Now his possible points for parts 2, 3, 4 have become less (see Fig. 1). The points received are highlighted in green.

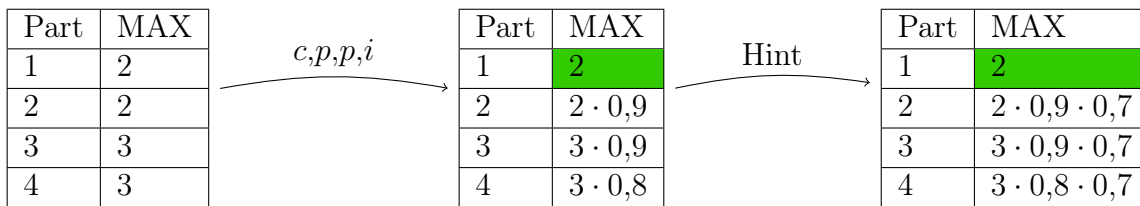


Рис. 1: The participant first submitted the work and received the coefficients and then a Hint went out.

If he now hands in the solution with all the parts solved, his final score will be equal to:

$$2 + 2 \cdot 0,9 \cdot 0,7 + 3 \cdot 0,9 \cdot 0,7 + 3 \cdot 0,8 \cdot 0,7 = 6,83. \text{quad}(\text{see Fig.2})$$

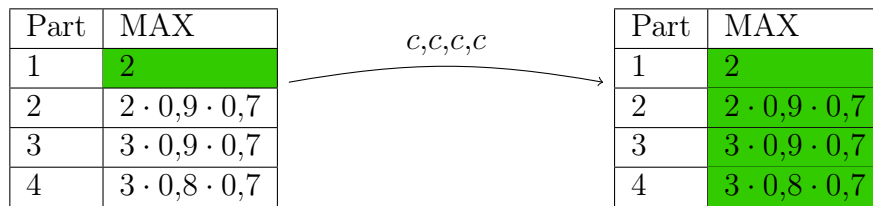


Рис. 2: After the Hint the Participant sent the rest and received Full for each of the parts.

If he does not send anything, then he will finally receive 2 points in the final rating. The Jury is very hopeful for the first (see Fig. 2) scenario.

Exercise (Points for an Alternative Problem).

The Problem of the Third Episode contains 2 parts. The first one costs x points,

1. (2 points) How much does the second part cost?

Part	MAX
1	2
2	$2 \cdot 0,9 \cdot 0,7$
3	$3 \cdot 0,9 \cdot 0,7$
4	$3 \cdot 0,8 \cdot 0,7$

The End of the Episode →

Part	MAX
1	2
2	0
3	0
4	0

Рис. 3: After the Hint the Participant **did not** sent the rest or didn't receive Full for those parts.

2. (8 points) It is known that the Participant immediately sent the solution and the first part turned out to be correct, and the second was evaluated on Part. At what values of x does it make sense to consider switching to an alternative problem?

The solution.

According to [rules](#) the sum of points is 10. Then the second part will cost $10 - x$ points. Thus, after the second Hint there will be x points, and the unresolved part for $1 - x$ points with a coefficient of $0,7 \cdot 0,7 \cdot 0,9$. Then the maximum for this task at the moment is

$$x + 0,7 \cdot 0,7 \cdot 0,9 \cdot (1 - x) = 4,41 + 0,559x.$$

This is the score that the Participant will receive if he submits the solution and receives Full for the second part. That means the maximum score he can get for an alternative:

$$0,7 \cdot (x + 0,7 \cdot 0,7 \cdot 0,9 \cdot (1 - x)) = 3,087 + 0,3913x$$

In this case, switching to an alternative problem will be beneficial only if $3.087 + 0.3913x > x$. I.e. $x < 5.07$. Otherwise, the Participant's current score is already higher than his maximum for the alternative. It is worth noting that it may not be possible to solve the alternative problem correctly right away. If there are more Parts received for it, then the final score will be lower (0,9 times for each Part).

Good luck!