Proceedings of IYSC, (2022), vol. 11

Journal homepage: http://journals.sdu.edu.kz/index.php/iysw

GOALS OF CONDUCTING AND MOTIVATION FOR PARTICIPATION IN PROGRAMMING COMPETITIONS

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Abstract

The International Collegiate Programming Contest (ICPC) in Kazakhstan has a long tradition. However, the popularity of ICPC gained significant popularity only after the beginning of the widespread use of personal computers and the rapid growth of the circle of their users. In this article, we performed a comprehensive analysis of the problems associated with the preparation and holding of such Olympiads.

Organization of the on-site ICPC olympiad could be a challenging problem to the different logical, specialized, organizational, and indeed political issues. The Kazakhstan encounter of facilitating Worldwide programming contests from the viewpoint of the specialized and logical committee. The goals of the organizers of competitions in sports programming and the motivation of their participants are analyzed. The role of moral and psychological factors in the framework of participation in such competitions is shown. Considered: a set of language tools allowed for use in solving problems; methods of preparing and holding competitions for schoolchildren and students. Information about the main sports programming competitions held in Kazakhstan is presented.

Keywords: Programming Olympiad, IOI, Contest, ICPC, Sports Programming

Introduction

The most popular and well-known programming competition among university students is the International Student Programming Olympiad (ICPC). It was first held in 1977 as part of the ACM Conference on Informatics. Since then, the Olympiad has been held annually under the auspices of the Association for Computing Machinery (ACM).

ACM ICPC could be a group understudy competition, which forces certain confinements on the composition of participants: university understudies or graduate understudies of the primary year of ponder are not more seasoned than 24 a long time ancient, each team consists of three individuals. Understudies cannot take an interest more than twice within the last organize and more than five times within the territorial determination.

The group is entrusted with the ought to fathom as numerous of the proposed tasks as conceivable in a constrained time. Some time recently the ultimate, there are a few territorial choice stages (quarter-finals and semifinals), for which the colleges of the comparing locale can designate any number of teams. However, no more than one group from one college can get into the ultimate, which is held each year in a distinctive nation.

The organizers of the ICPC are usually higher education institutions, state educational authorities and corporate structures (in the latter two cases, with the participation of higher education institutions). On a competitive basis, the ICPC is attended by: schoolchildren (mainly of the senior classes); students of universities and technical schools (mainly in specialized specialties); graduate students of the first years of study. On a non-competitive basis, ICPC can participate also postgraduate students of senior years of study, teachers, etc. The motives for the participation of schoolchildren in the ICPC are usually: confirmation of their own skills and abilities in conditions of direct competition with other participants; support the reputation of schools (colleges), receiving awards giving the right to out-of-competition to universities, etc.

Analysis of the goals of conducting and motivation for participation

A. Olympiad for Schoolchild

For schools, the goals of holding internal Olympiads and participating in ICPC are higher levels are: the organization of extracurricular activities that stimulate programming; selection of schoolchildren to prepare for competitions of higher levels; hiding the reputation of schools at district, city, regional ICPC, etc. [1]

The objectives of participation in the ICPC of school education authorities in the regions: evaluating the levels of training of schoolchildren in various educational institutions in ICPC; selection for admission to universities. [2] For universities, the costs of holding ”school” Olympiads are justified by increasing their competitiveness in the regions, career guidance and selection opportunities.

B. Olympiad for University Students

People who become champions and receive medals at the final of the competition, as a rule, begin to study at school, most of them have some success at school olympiads. Why do students need it? Even leaving aside such pleasant things as the opportunity to travel to cities and countries where tournaments are held and make new acquaintances with like-minded people, as well as an interest in programming and a passion for competition, there are several important dividends that can be drawn from such an experience.

Firstly, the Olympiad involves and motivates a person to write a lot of code, and as a result, he writes it quickly and without errors. This is very useful in future professional activities. When this person comes to get a job, where he will be interviewed, for example, for the position of a developer, he will be offered to solve the same Olympiad problems. [3] If he has the appropriate

experience, he will easily get the desired position.

Secondly, in general, achievements in these competitions are an indicator of a student's strong intellectual abilities. [4] During their participation in ACM competitions, students acquire the skills to find optimal solutions to fairly complex problems, which helps them to successfully process large amounts of data that they have to deal with when working on real projects.

Thirdly, of course, prestige. The participants of the Olympiads spend a huge amount of time and energy, but the medal of international competitions is an excellent result, which increases the attractiveness of a university graduate in the eyes of potential employers. For example, the ACM/ICPC finals are regularly sponsored by IBM, which offers cash prizes to tournament winners, as well as internships or jobs for members of the gold-winning teams.

C. Benefits for Universities

For universities, the participation of their teams (and individual participants) in the ICPC makes it possible to compare the quality of students' training in the field of programming in an explicit way, and improves the repute of universities at the regional level and in the system of higher education in Kazakhstan. There is no increase in their competitiveness in the market of postgraduate education services, potentially contributing to obtaining certain types of grants, etc. Within the framework of the ICPC, universities can carry out internal selection of students to attract them in research and contractual activities, work on grants, admission to postgraduate and master's programs, etc. to work - both during the period of study and after graduating from university.

The level of corporate interest in such contacts reflects the fact that the preparation and conduct of most of the ICPC interregional and international level is sponsored by large commercial firms working in the field of informational technologies.

To a lesser extent, ICPC is used as a platform for the selection of future employees by government bodies and research organizations. [5] From the point of view of the Ministry of Education and Science of the Kazakhstan, the implementation of the ICPC helps to improve the training of students in areas related to information technology: it allows you to compare (with a number of reservations) the quality of such training in different universities; contributes to increasing the authority of Kazakhstan universities at the international level, since, unlike a number of Olympiads in other areas, domestic ICPC are either open or continue in the form of international competitions.

Methodology for the preparation and conduct of the icpc

In Kazakhstan, ICPC mainly has two directions - for schoolchildren and students, and sometimes schoolchildren also take part in student Olympiads. Competitions can be held in person, in online (remote) and in hybrid mode. Information technologies are widely used during the ICPC - both within the local area networks (LAN) and using the Internet.

Among schoolchildren, competitions are usually held in the individual standings, and among students - mainly in the form of competitions in teams of three people. Objectively, the team form of the competition allows: to instill in participants the skills of teamwork, distribution and coordination of efforts (which is very useful in view of their future work in organizations).

New commands regarding the scope of work within the framework of the ICPC (in the simplest case: algorithmization tasks, actual programming, preparation of tests); in some cases to develop the division of tasks between team members. Usually participation in one team of persons is allowed and representing various educational institutions (i.e. national teams).

The preparatory stage of the organization of the ICPC in the general case includes:

Determining the timing of the implementation

Preparation of tasks and sets of tests for them, distribution of information about competitions (or posting this information on the site)

Preparation of registration rules for individual participants or teams

Development of competition regulations

For both face-to-face and distance competitions, registration is usually provided. Participants, which allows you to determine in advance the required number of computers in other places (according to the number of participants). For mixed form competitions, a preliminary (qualifying) round is usually held in a remote form, and it may have a duration from several hours to several weeks. The content of the tasks is usually given to participants in Kazakhstan, but English can be used for ICPC of sufficiently high levels (only English is used at international competitions). In most cases, the text of the task conditions is accompanied by 2-3 simple tests (input data + results) so that the participants can test their developments offline.

An analysis of the nature of the problems used in the framework of the ICPC shows that their successful solution requires knowledge not only in programming techniques, but also in a number of areas of applied mathematics, methods of algorithms, etc. Therefore, the composition of teams for Olympiad can be of a mixed nature, i.e. include not only programmers. The language

tools that can be used to program solutions to problems within the framework of the Olympiad are, as a rule, rather limited. By standard the rules of the World Cup in Programming (ACM-ICPC), it is allowed to use three languages(C, C++. Java). [6] However, some competitions allow the use of other languages, in particular Free Pascal, as well as Delphi. During ICPC, benefits are usually allowed for any literature and personal records, but it is forbidden to use any other electronic form, personal computers or calculators, mobile devices, links, pre-designed libraries of procedures, etc. Most face-to-face competitions are held in one round. Its standard duration is 5 astronomical hours. For entry-level competitions, it is often used to check the work performed by the jury in the "manual mode" after the end of the competition.

However, for any serious ICPC, participants are given the opportunity to check the correctness of their decisions in on-line mode - within the LAN during face-to-face competitions and via the Internet, if these competitions are remote. Such an automated check is carried out on a system of tests, and their number is greater than that given in the conditions of the problems. available to participants. The number of attempts (sending solutions to problems for verification) is usually not limited, but participants are awarded penalty points for incorrect solutions.

Solutions are considered incorrect: containing syntax errors that exceed the allowable limits on the computation time (time limit) or the amount of RAM (memory limit). The last two types of errors are used to encourage participants to use algorithms that are computationally efficient. [7] At the same time, if the solution satisfies the indicated limitations, then additional points for increased computational efficiency are not awarded. For incorrect decisions, participants are awarded penalty minutes, which in the end are taken into account only for decision tasks. There is usually no limit on the number of attempts per task.

Conclusion

During the preparation for the Olympiads for the intermediate control of the received knowledge pupils and students can participate in remote Internet programming olympiads. The experience of participating in such competitions helps to increase the level of the subject preparation of the participant, since he get acquainted with the technologies of holding Olympiads; receives sets of tasks and their criteria evaluation, the ability to solve problems in conditions close to the conditions of real Olympiads in virtual competition with other participants, as well as its self-development, self-knowledge.

It should not be forgotten that successful participation in programming tournaments gives young

programmers the opportunity to obtaining a prestigious and well-paid work in the computer industry, and for schoolchildren - the possibility of entering and further education in prestigious universities of the country. Thus, systematic work on the preparation for Olympiads in Informatics provides conditions for the effective development of giftedness of students.

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