

Bangladesh Olympiads in Informatics

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Abstract. This paper details the growing popularity of olympiad-type academic competitions in Bangladesh. We concentrate on improving our students' ability to solve problems, develop programming skills, analytical skills, and emphasize in developing skills other than rote-memorization. These initiatives have already paid dividends as is perceived through increasing participation, which emphasizes the most cost-effective method to gain excellence: competition.

Key words: IOI, informatics, BMOC, BIOC.

1. Educational Demographics

The country has very limited natural resources, with a surplus only in human resources. In 1972, we had a population of 75 million, with some 7791 secondary schools and 1.84 million students compared to 161 million people, 19,040 schools and 7.5 million students in 2011 (Bangladesh Bureau of Educational Information and Statistics). Female students are catching up with their male counterparts both in count and performance. We have five years education in primary schools, then another five years in secondary schools after which two years college education that is prerequisite for admission into universities. Teacher–student ratios in primary, secondary, college and universities are respectively 1 to 43, 34, 30, and 35.

2. Introduction of Olympiads

The government has been providing some 300 million textbooks annually in the hope that students from disadvantaged strata of society benefit from some education. In spite of the best efforts, our schools and colleges suffer from shortages in infrastructure, laboratories, library facilities, and adequate count of teachers. Under the circumstances, some educationists had been considering ways to overcome this deficit and empower our young people with praiseworthy skill.

Our kids grow in competitive environment on limited resources. They must work hard to ensure their survival. Some 17–18 years back, we convinced dynamic editor Matiur Rahman (of the *Prothom Alo* (<http://www.prothom-alo.com/>), one of our popular daily newspapers), to allocate space to publish math puzzles and problems for our

younger readers. The response was astonishing. Thousands of students stormed into the newspaper office with their solutions. They were soon joined by older people, as well! This gave us a great boost for continuing the initiative. The newspaper ultimately had to employ extra staff to evaluate the thousands of submitted solutions.

Some 12–13 years age, we organized a mathematics olympiad for secondary and college (not university) students that resulted in massive participation of students and the presence of guardians and teachers. The Bangladesh Mathematical Olympiad Committee (BMOC) was formed to give our initiative an institutional shape. Again, *The Daily Prothom Alo* came forward to publicize olympiad activities and popularize them for the masses. Additionally, the Dutch-Bangla Bank came forward with financial support. We commenced organizing olympiad activities under the banner of the mathematics festival that was organized in 17–18 areas across the country, each with about a thousand participants.

Winners were given tickets to participate in national mathematics olympiad. Unlike the international version, we started the olympiad in four groups:

- Primary (up to grade 5);
- Junior (up to grade 8);
- Secondary (up to grade 10);
- Higher secondary (up to grade 12).

with the hope of familiarizing younger students with these sorts of competitions.

The first Bangladesh team to the International Mathematics Olympiad participated in Mexico in 2005. In a short time, Mathematics Festivals have become extremely popular thanks significantly to the involvement of a celebrated writer, Professor Md Zafar Iqbal, who is also an idol of the young generation. We are successfully exploiting this platform not only to raise the level of analytical and problem-solving skills but also to encourage students to be good human beings with patriotism, honesty, and tolerance, to make friendships in different localities, to learn collaboration skills, to obey parents, and maintain good health. In order to inspire students, we frequently bring celebrities like popular singers, literateurs, TV personalities, actors of all kinds, and scientists. Since 2005, we have a team every year and our students are winning medals from this event.

Alongside the mathematics olympiad, we also initiated an informatics olympiad as well. In fact, our students had been competing in the World Finals of International Collegiate Programming Contests with reasonable success since 1998. Students of BUET have an enviable record of qualifying for each World Finals since they started participation. In 2000, the BUET team outperformed teams of many world-famous universities and occupied the 11th position (The 24th ACM International Collegiate Programming Contest World Finals). In 2006, some 100 top programming students were selected from around the world, and a representative from Bangladesh occupied the 79th position! Moreover, many students who participated in ICPC contests have been offered coveted jobs at Microsoft, Google, and other famous ICT based companies.

These successes gave impetus for students to sharpen their programming skill first by participating in online contests organized by the University of Valladolid (Valladolid Online Judge Site) and then in inter-university contests organized by individual universities.

Nowadays, we have a Bangladesh National Computer Programming Contest organized every year, and then some 4–5 additional contests organized by universities.

We started programming contests for school students a little while later with the first team participating in Mexico in 2006. Since then, we have been sending teams to the IOI annually. While our school curriculum is not as supportive and up to the level for participation in IOI, we have been inspiring our school students to participate in university-level contests. In 2005, when our team very sadly failed to get Polish visas, they participated online and won a silver medal. The team participated as an IOI team in ICPC regional contest unofficially and came on top of the ranking. This gave us further impetus for consolidating with our initiatives.

Winning a silver medal at IOI 2009 held at Plovdiv, Bulgaria by Md Abirul Islam boosted our school students' interest in sharpening their programming and problem-solving skills. Our students have also started participation in International Physics Olympiad and have won medals there, too!

3. Preparation for Olympiads

Apart from publishing mathematics problems in a popular daily newspaper, BMOC began organizing math camps with the participation of winners of National Mathematics Olympiad not only for selection for IMO but also for enabling more junior students to sharpen their math skills. Students are usually given some books specially meant for participants of IMO. Winners of olympiads and participants of IMO work as mentors in these camps. Finally, based upon performance in various tests, the final team is selected for IMO. Students also participate in Asia Pacific Mathematical Olympiad on a regular basis for sharpening their analytical skills.

Professor Md Zafar Iqbal leads The Bangladesh Informatics Olympiad Committee (BIOC) to organize Divisional Informatics Olympiads in five divisions. Unlike BMOC, though, BIOC organizes these olympiads on the same day. Usually, local universities come forward to shoulder the responsibility of hosting these contests while responsibility of problem-setting and judging are shouldered by ICPC world finalists and university contestants. Usually, Divisional Informatics Olympiad problem sets are based on math problems some of which can also be coded.

While Mathematics festivals are attended by thousands (due to unavailability of computers), usually some 50 students participate in the informatics olympiad in each division with some 50 winners chosen from different divisions to participate in National Informatics Olympiad. While BIOC was not as fortunate to have sponsor from its beginning, we have now a wise and generous sponsor in the PHP family, headed by the philanthropist Sufi Md Mizanur Rahma. They have shouldered the financial responsibility of BIOC activities since the 2012 IOI.

Every year, after NIO, we invite high-ranking students to participate in selection contests for ultimate selection to the IOI team. Moreover, throughout the year, we encourage our school students to participate in USACO (USACO Training Program Gateway), Valladolid (Valladolid Online Judge Site), Chinese (ACM-ICPC Online Judge), and Russian

sites (Timus Online Judge), Codeforces (Codeforces), Codejam (Google Code Jam 2013) and Topcoder (ToCoder) contests. Students also participate at the online site (Light Oj) created by one of our own computer programming enthusiasts.

This year, we could do a little more. A seven-day camp for informatics olympiad participants was organized alongside a university level contest at a university. Then again, in the month of March, we organized yet another camp at BUET for some 20 students in which they were taught aspects of programming and different algorithms. They sat live tests and three more tests were taken online for final selection of our national IOI team. Students are taught problems similar to those in IOI.

4. Conclusion

We can see a bright future for Bangladeshi students in these academic contests. Students have enormous interest in participating in live contests as well as in online ones that are organized by different sites. They are incrementally demonstrating tremendous problem-solving skills, occasionally outperforming their seniors in universities.

We have been planning to refine the overall procedure now that we have ongoing sponsors to support our activities. There is very much a possibility that soon all olympiads will come under a common banner like TIFR in India. For a limited-resource country like Bangladesh to meet the challenges of the 21st century globalized world and its competition, needless the human resources should be adequately educated and gain the skills of science and engineering – in particular those of ICT in the context that our present Government has declared to create Digital Bangladesh. The only cost-effective way of earning this level of excellence is through competition. We are striving to earn excellence in the field of education through the introduction of olympiad-type popular competitions among young population of the country.

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M. Kaykobad, dr., is a professor in the CSE Department of Bangladesh University of Engineering and Technology, Dhaka. He has been one of the pioneers of introducing academic competitions (like Olympiads) in Bangladesh and has been leading BUET teams to the World Finals of the ACM ICPC since 1998 in addition to his association with the IOI teams of Bangladesh. He is a fellow of the Bangladesh Academy of Sciences and is a distinguished alumnus of the Flinders University of South Australia. He is a prolific column writer in the popular daily newspapers always emphasizing great importance of education for developing nations. His fields of interest are algorithms and theory of computational complexity.