

# 2020 ICPC Asia Jakarta Regional Contest

Site Report, Team “MLG”

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## About Us

Our team consists of a freshman, a sophomore, and a junior. The team was formed early this year, with Minh (previously from Send Bobs to Alice) coming together with Long (previously from Pokemon Goh), and Guangxuan (NUS freshman).

We named ourselves MLG to represent our initials- Minh, Long and Guang. MLG is also the acronym for Major-League-Gaming, a video gaming organization that hosts pro circuits in a variety of games from shooters to fighter games. Having MLG as a team name serves as a reminder to constantly perform "MLG sick plays" such as first solving hard problems.

## Training and Practice Contest

Training was held at NUS SR1 from 14th to 19th December, with the practice contest on 18th. This year, training was held while Singapore is still under phase 2 of COVID control measures. Strict safe management measures were strictly adhered to during the training and final contest. Firstly, everyone was to wear masks as much as possible, except for when eating and drinking. Next, teams of 3 sat around their workstations, while minimizing interactions between members of different teams. Finally, the occupancy limit of SR1 was strictly adhered to, with each member's attendance during training and contests being monitored closely for contact tracing purposes.

The training problems were selected by Steven, consisting of 11 ~ 13 problems of varying difficulty. We found the training helpful in familiarizing ourselves with the contest environment.

Furthermore, we also used this opportunity to practice our team strategy- such as problem identification, communication, and team debugging.

The practice contest made use of past year problems from Jakarta regionals. Since Minh and Long have already seen the problems, made a few submissions to familiarize ourselves with the ICPC judging system.

## Outside the contest Hall

I spent 20 minutes waiting around for the final verdict on whether I could re-enter the contest hall, and another 10 minutes before finding the contest scoreboard and problems statements. At this point in time- most teams have solved problem M, the easiest problem. Some teams have already gotten their second AC, with either problem A or E.

I followed the scoreboard, quickly browsing through all the easy questions such as A, B, C, E. They were all relatively easy. I have no doubt that my team can finish all of them quickly, though we did not get any first solves for any of these questions. By the 131 minute mark, all these easy questions have already been solved. MLG was top for a moment, which was surprising since MLG had no first solves.

For medium difficulty questions, there are F and J. Once again I know that Minh and Long can solve these questions, so I was not too worried. Unsurprisingly, F took 27 and J took 42 minutes. 3Sophomore solved these problems earlier, but MLG achieved a significantly lower penalty time for the 8 solves so far.

Hard problems include D, H, I, K, L. I knew that L was impossible from the very start- a geometry problem with a probability (counting) combination is too much to handle. I predicted that the champion team would solve K and one of D, H, or I before ending the contest with a score of 10 solves.

MLG had 100 minutes to solve 2 hard questions. While this would be manageable on training sessions with all 3 of us around, it is much more difficult this time round with only Minh thinking of the hard problems while Long is coding the medium problems. I thought of a solution for K making use of a 2d range sum segment tree, so I moved on thinking that was the correct solution.

Later on, 3sophomore first solved D, so I tried to solve D once again. Revisiting my past thoughts on D, I observed the solution would involve a clever simulation method that has a fast amortized runtime. It is nearing the last hour, while MLG has not made any progress on the hard questions yet. I get worried thinking about which hard question MLG would attempt.

Not too long after the scoreboard froze, MLG submitted for K for the second time. This would be the last submission MLG makes during contest time. By now, MLG had the lowest penalty time

for 9 solves, but it is still highly possible for 3sophomore or ((i^c)>>2)/p|c) to overtake us by solving the 10th problem.

Within the last 40minutes, I spent my time thinking of H. I discovered the underlying graph on which we must find the MIS on. However, I oversimplified the underlying graph so this will not work out straightaway. Nevertheless, I believe the underlying graph details can be worked out given more time or some help from a teammate.

The final 20 minutes felt like an eternity. I was hoping that MLG would submit for another hard problem, but this did not happen. Now I can only hope that none of the teams can solve a 10th problem. The contest ended after a short but nerve wrecking wait. The unbelievable has happened- MLG remained top throughout the scoreboard freeze!

## Inside the contest Hall

The contest was much more challenging & memorable than we ever expected! In ICPC contests, teams almost always compete with three members. However, due to some administrative mistakes, our team had to compete with only 2, and the verdict of not allowing our third member came only 5 mins before the contest had started. At that moment, we decided to just try our best to see the limits of a 2-person team.

The first 2 hours were very challenging as we couldn't get any first solves and always needed to follow top teams (and we haven't had this situation before). But at the 131-minute mark, we solved the 6th problem and went to 1st place. At this moment, we realized we were having a good advantage in time penalties, and if we did the rest of the contest right, we could win it! And suddenly the team started to feel the pressure.

We solved the 7th problem at the 158-minute mark with just 1 submission, further extended the gap between us and the 2nd team. But this was when the lack of one member started to kick in. At the 184-minute and 193-minute marks, we were down to the 2nd and then 3rd position. But once again, due to the time penalty advantage, we solved our 8th problem at the 200-minute mark and jumped to 1st place again.

The contest only had 100 minutes left, so we decided to focus on solving just two more problems since we predicted it would be hard for any team to solve 11. The two problems we chose were K and I, and we decided to do K first. Surprisingly, Our team came up with a solution that is much easier than expected and was able to implement it in just 43 mins. At the 243-minute mark, we and another team both had 9 problems solved, and our time penalty was considerably better than them. We knew that if we could solve one more, we would surely win!

We tried to solve I for the rest of the contest, but at the 294-minute mark, we realized that our algorithm was indeed wrong and unfixable. At that moment, the only thing we could do was to monitor the other team and hope that they couldn't solve the 10th problem. That 6-minute wait was the most nerve-wracking wait any of us has ever had.

Finally, the contest ended, and we were very surprised & happy that we won the contest!

But the contest didn't stop there, as we needed to wait for 4 more days for the successful appeal to ICPC Headquarters to allow for our third member to join the team in the World Finals.

For Minh, it's his 3rd time winning a Regional contest, and 2nd time winning the Jakarta regional contest. For Long and Zhang, it's their first time winning a Regional contest, and this win means a lot for them.

Our team's target for the World Finals 2021 is probably to get a good result and hopefully, to get the first ICPC medal for NUS.

## Reflections and Acknowledgments

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On a personal note from Long: I would like to thank Jump Trading for recruiting me as an intern just 2 weeks before the contest, and it really helped to boost my competing spirit.