The 2018 ICPC Asia Nakhon Pathom Regional Contest

Site Report, Team "Send Bobs to Alice"

Background

The ICPC Nakhon Pathom Regional Contest was held at Mahidol University from 15 to 18 November, 2018. In the competition, 69 teams of three members were to solve 12 problems in 5 hours. The top teams would be awarded and granted a chance for a slot in the 2019 ICPC World Finals.

This year, NUS sent two teams to compete in Nakhon Pathom. Our team, "Send Bobs to Alice", consisted of three CS freshmen. Being the rookie team of NUS, we saw the contest as an invaluable opportunity to gain experience and prepare for the years to come.

Arrival

The first day was rather uneventful, except for the fact that Ming caught a bad cold right before arriving at Changi Airport. He was extremely exhausted, to the point he could not move an inch and desperately asked his teammates to buy him some food. To his dismay, none of the snacks was suitable for him, and his body angrily refused to digest anything he tried to eat. To make things worse, the airport restaurant would not open until an hour later. Finally, we got to the restaurant, and Ming refilled himself with some tea and a bowl of Wanton noodles, before departing at 12.45.

After the flight, we had to travel by car for another two hours, before finally arriving at Mahidol University. The rest of the day went fast since everyone was tired. However, instead of sleeping through the night to prepare for the next day, we decided to do a previous ICPC contest for fun. As the intention was to relax, we picked a supposedly-easy contest and used three computers instead of one. It served as a pretty decent warm-up, as all three members had the chance to think and implement without much pressure. We all went to sleep at 4 a.m.

Practice session

In testing round, we try to implement everything as clean and fast as possible. Johnny got first AC on a trivial problem. Tuan read C and found it was a basic shortest path problem, then told Ming to confirm the correctness of the solution and send it to Johnny. After 10 minutes coding, Johnny got his second accepted problem with Ming's support. While Johnny was coding, Tuan and Ming discussed B, which was a data-structure problem with many edge cases. This problem was Johnny's interest and he quickly started to implement it after C was done. We got

our first Wrong answer verdict at the first try. We tried to generate small test cases and immediately found a wrong one. We fixed a small bug, submitted again and received an Accepted.

The contest

At the beginning of the contest, we read all the problems and tried to estimate their difficulties. After five minutes, we concluded that C and F were the first easy problems and proceeded to implement them. Johnny got C accepted in first try after 14 minutes. Right after that, Ming decided to implement F instead of telling Johnny the solution. This proved harmful; as Ming was the less consistent member of the two in terms of implementing, he bumped into a lot of pitfalls and even forgot to follow the output format. As a result, Ming had two submissions for F rejected, before finally finishing at 0:32, scoring a first-to-solve award for his team. Despite struggling to get such an easy problem, Ming was really happy as he finished a problem on his own for the first time in a Regional Contest! While Ming was coding F, Johnny found viable solutions for D, a simple greedy and J, a somewhat trivial floating-point precision handling problem. He took quite some time to make sure the answer was precise enough, before submitting at 1:01. We were quite confused getting a Wrong Answer verdict, with Johnny switching to another approach using differentiation, which, while doable, was obviously an overkill. However, Ming insisted that the initial solution was correct and there was a bug at printing out the result, as Johnny's solution output 0.00336E-015 on one test case instead of 3.36669E-018 as per instructed by the statement. We fixed that exact bug and got Accepted at 1:19, losing our second first-to-solve to a Vietnamese team. Right after that, Ming explained his initial ideas for problem L to Johnny, only for Johnny to quickly find out that it was a massive overkill. He quickly came up with a much simpler solution which stunned Ming for a second. Meanwhile, Tuan polished his ideas for problems E and A, and after Johnny got L and D accepted, proceeded to code A. However, his approach was extremely prone to traps, and Tuan spent the rest of the contest's second hour debugging his code, to no avail. We crossed the 2-hour mark with five problems in hand, with our fellow NUS team Pandamiao on the top.

As Tuan couldn't seem to find the flaws in his approach, Ming asked Johnny to implement E using Tuan's ideas, and tried to figure out another way to tackle A. Although he could neither prove nor disprove Tuan's approach, Ming was able to come up with an almost foolproof solution, which basically did exactly what the statement asked. The team agreed that it would be best to implement Ming's idea, which may take some time, instead of trying to fix Tuan's code. As a result, we solved E and A back-to-back in just 3 minutes. We were left with B, G, H, I, and K unsolved. H and K, being pure implementation problems, were the easiest among them. Johnny started coding H and finished at 3:08. To our disappointment, the straightforward solution got a Wrong Answer verdict. Problem H itself was (intentionally, we supposed) poorly written, with the key constraints vaguely mentioned. After switching to K and got Accepted on first try, we tried to guess the actual constraints for H with some submissions, to no avail. Looking at the scoreboard, there had been a few passed solutions; however, none of them were top teams and the contest organizer indirectly confirmed the hidden constraints in a clarification.

With those observations, we concluded that there must be some invalid test cases, and we would have full rights to request rejudgement after the contest. To further confirm our claim, Ming suggested removing the upper-limit on Johnny's solution and submit, which would cause Time Limit Exceeded should there be no answer in the constrained range. To our disbelief, it returned an Accepted verdict! Apparently, removing the upper-limit was what most teams did to get Accepted. We entered the "frozen hour" with 9 problems solved, sitting at third place.

The final hour was the most challenging, as we were left with only difficult problems. We had an approach for I and B, and decided problem I was less tedious. It turned out to be a mistake, as the easy $O(RC\log(R)\log(C))$ approach might not run within time limit, while the $O(RC\log(R))$ one was hard to implement correctly in just an hour. As we chose the latter option, we could only fix all the bugs minutes after the contest ended, and thus got no more points in the final hour.

After the contest, we asked some top teams about their last hour performance, and were happy to learn that Pandamiao got two more, finishing the contest with 11 problems. However, we did not expect ourselves to retain our spot at the podium, as there were many strong teams only one problem below us after first 4 hours. After the late lunch, we gathered to see the final result. For some magical reason, we were able to keep our third place! After a moment of confusion, we realized that problem H was definitely rejudged, and we got it right on the first try, boosting our penalty only 11 minutes ahead of the next team. Needless to say, we were extremely joyful to receive a second runner-up award on our very first ICPC Regional representing NUS.

Aftermath

After the closing ceremony, we were all tired. Kien invited us to go to some night market (to buy souvenirs for his girlfriend). Before shopping, we went to the nearby food street again to have dinner. As usual, we stopped at a random street food stall. Thanks to google translate, we easily ordered the food. Surprisingly, they were very cheap, about 40 baht per dish (2 Singapore dollars). Finishing the dinner, we took 2 cabs to Khao San road in Bangkok, a night "market" recommended by Kien. It was actually a walking promenade, surrounded by bars and food booths. While Kien was busy with his 8-MCs course (the hardest course of the semester), we were trying some local food there such as banana cakes, mango sticky rice and laughing balloon. Johnny decided to have a 300-baht haircut, and he was very satisfied. Kien also bought some jewelry.

On the final day, we split into 2 groups: one go for the tour (Kien, Tuan), the other sleeping at the hostel and later go to Central Mall for some relaxing experience. After that, both groups reach the airport at around 6:30pm for the returning flight. This concludes our report of 2018 ICPC Nakhon Pathom regional.