We are Pandamiao.

There are three of us, Wei Liang, Ranald, and Kien. Wei Liang is a fourth year student, good at math problems. Ranald is a third year student, graduating next semester, well known as a fast coder and good at data structure. Kien is the youngest member but has joined the most ICPC contests (10 Regionals + 1 World Final). He is good at DP and geometry.
We have been worked together as a team since 2017. That year, we were the champion of The 2017 ACM-ICPC Asia Manila Regional Contest. In 2018, we were the champion of The 2018 ACM-ICPC Asia Nakhon Pathom Regional Contest. However, we have never been advanced to the World Final.

Since all of us will graduate next year, this year has been our last time participating in ICPC. We all wanted to do the best, to end our ICPC life with the best results.

“That was our last regional contest. The feeling was like the last lecture of a professor, the last work day of a worker, the last school day of a student. I thought about all my competitive programming skills. After the contest, all the skills would be forgotten to give space to other stuff. It was similar to the feeling of soldiers after the independence day. They had spent their whole life sharpening their survival skills. However, after one day, all these skills would never be used again. Their life changed to another period in which many people might wonder ‘What am I going to do now?’"

To end our ICPC life in the most gorgeous way, we decided to sign up the two hardest sites, which are Yokohama and Taipei - Hsinchu.
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The 2019 ICPC Asia Yokohama Regional Contest

The contest was hosted by Keio University, Japan, from 16 to 18, November, 2019.

15 Nov 2019 - Departure

That was a tough day for all of us. Kien had two presentations, one final exam. Ranald also had one final exam.

We had a 2.5-hour flight at 22:05 from Changi Airport to Don Mueang International Airport (Bangkok, Thailand) and then another 6-hour flight to Narita International Airport (Chiba, Japan). We arrived at about 8 AM on 16 Nov 2019.

Adi Yoga was our coach for this contest. He took an earlier flight to Yokohama for team registration.

Adi Yoga was the person who did all the admin stuff for us (hotel booking, flight booking, visa application, etc).

16 Nov 2019 - Yokohama - Rehearsal Day

Before the rehearsal

When we arrived to Narita Airport, we decided to take a train to Yokohama. The train map in Japan was so complex. Kien was stunned when first looking at the train map, which looked like a graph with 100000 vertices. Anyway, that did not matter since Wei Liang and Ranald had been familiar with travelling in Japan.
We made a risky decision to buy a ticket for a train which would start in 5 minutes. After running for a while, we successfully took the train. That turned out to be a good decision since the next train would come 30 minutes later.

The train cabin in Japan was different from the ones in Singapore. The atmosphere was so quiet so that some people did sleep comfortably in the train. From the cabin, we could see a wide and beautiful landscape outside. It looked like mix between the peace of Vietnam and the cleanliness of Singapore.

After alighting the train, we found the way to Hotel Monterey Yokohama. Since we were not allowed to check in (because we came too early), we waited for our coach, Adi Yoga.

Adi Yoga came at about 12 PM. After checking in, he took us to a Ramen store nearby for lunch.

During the rehearsal

After lunch, we went to the Yokohama Sanbo Hall for registration. After completing some procedures like identification, taking photos, etc, we went to the contest hall.

This time, our provided t-shirts were pink.

The contest hall was big, but looked like a made-up store room. It only had a few windows on one wall. To improve the air circulation, the organizer had to turn on some fans.

Our workstation had a laptop, an external monitor, and an external keyboard. We felt good that the keyboard was comfortable.
After the opening speech, there were some reminders about the rules of the contest. Then, we had one hour for practice session.

It was illegal to bring edible mascots.

The practice session was similar to other regional contests we had joined so far. There were 4 problems which were quickly solved by the team. We took note some abnormal details like “default terminal shell not working in Geany”. The judging system worked very well with almost no issues. The printing service was also fast and reliable.

The fun time was the introduction of all the teams. A long time before, when the organizer asked us to provide a slide of team introduction, we did not know why. It turned out that they combined the slides of all the teams together and show them in the introduction session. Each team was invited to the stage for a short introduction. Some teams were very funny. One team trolled the organized with a black slide to fake the end of presentation. Some other teams also made people laugh by funny costume, weird introduction speech, or simply a funny team name.

After rehearsal

After that, we had dinner with Adi Yoga. He took us to a restaurant of sashimi. We were filled with full of seafood.

After dinner, we went to a Lawson store to buy food and drink. We did not spend much time there since the shop was about to close. Then, we walked back to our hotel.
17 Nov 2019 - Yokohama - Contest Day

Before contest

That was a beautiful day. Although it was quite cold, we only needed to wear a light jacket. We had breakfast at the hotel. The food was nice and the view was great.

We then walked to the contest hall to check in and got ready for the contest.

During contest

The contest started at 09:30 AM.

Link to the problem statements:

Link to the analysis and solutions:

After looking through all problems, we realized there were no trivial problems. We solved the easiest problem (Problem A: Fast Forwarding) at 0:26, and the second easiest problem (Problem B: Estimating the Flood Risk) at 0:43.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>26</td>
</tr>
<tr>
<td>B</td>
<td>43</td>
</tr>
</tbody>
</table>

Ranald solved H (Problem H: Parentheses Editor) at 1:04. It was a data structure problem. He used only 45 lines of code.
After reading problem E (Problem E: Reordering the Documents) and simplifying it, Kien asked Wei Liang to solve it. It turned out that Kien’s simplified version was even harder than the original problem. However, Wei Liang still managed to solved it at 2:05.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
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<tbody>
<tr>
<td>E</td>
<td>125 (+1)</td>
</tr>
</tbody>
</table>

For problem G (Problem G: Ambiguous Encoding), Kien made an amateur mistake: when there are multiple target states, we cannot stop immediately after one target state is found. He debugged by generating random inputs and find a failed test case, which was {0, 00, 000}. He succeeded at the second submission at 2:36.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
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</thead>
<tbody>
<tr>
<td>G</td>
<td>156 (+1)</td>
</tr>
</tbody>
</table>

Problem I (Problem I: One-Way Conveyors) remarked the first time we coded 5 DFS functions in a source code. After a WA, we succeeded at the second attempt at 3:43.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>223 (+1)</td>
</tr>
</tbody>
</table>

In the remaining time, Wei Liang was thinking about C while Kien was working on D, a geometry problem. We did not find the correct solution for both problems.

After contest

We got the ninth place after the contest. This was not a good result for us. Anyway, that result had been estimated given that Yokohama was the hardest site. We did not feel sad much.
After dinner, Wei Liang and Ranald bought food and drinks, while Kien was walking with a friend around Yokohama.

18 Nov 2019 - Going to Tokyo

We took a boat from Yokohama station to Tokyo. After that, we went to Hotel Mystays Nippori.
After dinner, Kien met a friend and asked for recommendation about where to visit in Tokyo. His friend gave us a list of places. We then had a discussion to plan for the next day.

19 Nov 2019 - Tokyo

We decided to go to 4 places in Tokyo.

In the morning, we went to teamLab Planets, a place with full of imagination.

“teamLab Planets is a museum where you walk through water. It consists of 4 vast exhibition spaces with 7 distinct artworks.”

After that, we had lunch at Udon Shin restaurant. That was a famous restaurant. We had to queue for about one hour. The restaurant was very small with limited space. Anyway, the quality of food did not disappointed us. The noodles were hand made therefore preserved the amazing freshness. Best Udon ever.
After that, we went to Asakusa, a famous temple in Japan. The place was very crowded with full of tourists. We took some photos at the iconic entrance. We bought some souvenir there and proceeded to the main temple.

We had dinner with Kien's friend at Uogashi Musashi Restaurant.
The 2019 ICPC Asia Taipei-Hsinchu Site Programming Contest

20 Nov 2019 - Moving To Taipei

We had a flight from Narita Airport to Taiwan Taoyuan International Airport. Then, we had dinner at a dumpling restaurant.

Ximen walking district was our next destination. The streets was crowded. All the stores were decorated with colorful lights.
21 Nov 2019 - Shifen and Jiufen

Contrary to Kien, who was new to Taiwan, Ranald and Wei Liang have had many vacations in Taiwan. Therefore, Ranald and Wei Liang gave Kien a list of options to choose. Kien chose to go to Shifen and Jiufen.

Our plan was as follows: Ranald and Kien go to Shifen and Jiufen. Wei Liang visits a friend. Later, gather at Jiufen.

Shifen

Kien and Ranald decided to take trains to go to Shifen. There was a light rain. It took us less than 2 hours to travel to Shifen.

The first place to visit was the iconic railway track. That was a crowded place. Many visitors stood on the railway tracks and took photos. Some of them bought and released sky lanterns to pray for good luck. Ranald asked Kien if he wanted to released one. Kien refused due to the worries about environmental harms. Instead, Kien and Ranald walked along the streets to buy food and souvenir.
Kien was very excited with his new camera. He walked around Shifen and took a lot of photos. After one hour at Shifen, Kien and Ranald took a train to go to Jiufen.

Jiufen

When we arrived at Jiufen, the rain got very heavy. One umbrella was not enough for a long time. Hence, Ranald bought another umbrella at a convenient shop. Despite having two umbrella, our clothes and our shoes were getting wet. That made the weather feel even colder. We walked into the old village.

Our first thing to do was to find the famous taro ball soup. However, that was not an easy task. The street was crowded. We had been walking a long way in the cold and rainy weather before we finally found the correct stall. Nonetheless, the food did not disappoint us. We happily enjoyed the taro ball soup in spite of the fact that our shoes were totally wet. In the meantime, Wei Liang said he was about to come. We contacted with him and chose a place to meet up.

After that, we walked around Jiufen and quickly got tired due to the bad weather. We then decided to go back to the hotel by bus. Since our hotel was near to one of the last stops, most of us slept along the way.
Banqiao

When arriving at the hotel, we quickly had a bath, changed our clothes, dried the bags and shoes. After everything was done, we went to Mega City at Banqiao to find a place for dinner. We ended up with having dinner at a convenience store. That was the final event in that long day.

22 Nov 2019 - Appearance of Prof Tan

Kien was worried about his 4 upcoming exams. Kien decided to spend one day studying at the hotel.

Ranald and Wei Liang went out together at Kaohsiung. Because they would go to Kaohsiung for the whole day, they were worried about Kien since Kien did not know Chinese.

However, Kien prepared for that. He went for breakfast and lunch by himself. He even managed to go to a bank to exchange money. Kien managed to survive a whole day without saying a Chinese word.
In the afternoon, Prof Tan came at about 5pm. His hotel was very near to our hotel. He called each of us when he came. Since Ranald and Wei Liang was outside and Kien was studying, we told Prof Tan to meet us on the next day.

23 Nov 2019 - Taipei Hsinchu - Rehearsal Day

The morning did not have much events. Three of us had light breakfast in a food stall nearby. Then, we went to Carrefour Market to buy food, drinks, and souvenirs. After that, Prof Tan met us. We had lunch in a food market.

Then, we walked to National Taipei University of Business for the registration. After taking photo, getting the t-shirts, we went to the contest hall. The contest hall was big. Inside, we could see 13 letters from A to M. It meant that there would be 13 problems in the actual contest.
The practice session was similar to other regional contests. There were nothing much to take note except that there were one strong team, which ACed all the problems by using half the time we used. 13 problems meant there would be a lot of easy problems. If this contest was a speed contest, we would lose by them.

The contest venue was very near to our hotel. Within 10 minutes, Kien went back to the hotel, took the mousepad.

After the practice session, we went for dinner at a food stall which was adjacent to the hotel.

After dinner, we went back to hotel and talk about our ICPC life. The next day would be our last day of ICPC life. We recalled our time in competitive programming. We had spent so much time coding and learning competitive programming skill. After the next day, all these skills would be forgotten to give space for other stuff.

While talking about our history, Kien asked the rest: “Have I ever successfully solve a geometry problem in a regional contest?” The answer was surprisingly no. In all the regional contests before, Kien only successfully solved one geometry problem, which was the one in Singapore site. However, Kien said that could not count as a success since he got some bugs and spent so much time debugging the problem which he called “a very easy geometry problem”.

Wei Liang said Kien should focus on DP problems since Kien’s DP skills were good. Then we talked about the time in Manila site. In that contest, Kien read a DP problem and said
“this is a very easy problem”. It turned out that the problem was a difficult one. After that contest, we were the only team which could solve that problem.

After that, Wei Liang opened the problems last year and discussed with the remaining members. We sorted the problem by the difficulty in the descending order. When we moved to the second or third hardest problem, Kien identified that was a DP problem. After a while, he found the DP formula which could solve the problem in $O(n^3)$. Ranald said: “well, we have to do some optimizations”. After a few seconds, Kien said “I can solve this on $O(n^2)$”, which is sufficient to AC the problem. We realized that Kien should be the person so solve all the DP problems.

Wei Liang and Ranald had an idea: if there were any geometry problem, they would hide them so that Kien would not see it. Ranald and Wei Liang would only reveal the geometry problem to Kien after there were no other solvable problems. Additionally, if there were any DP problems, Kien would be the person to solve it.

24 Nov 2019 - Taipei Hsinchu - Contest Day

Link to the problem statements:
https://drive.google.com/open?id=1l2_j50GgPCNvCRLvBi0Mv8iXA0Eyqzug

Link to the test data and sample codes:
https://drive.google.com/open?id=1cNaHA7ZMc5SiygUHEnY6SllpV1DyO8uk

During contest

The contest started at 10:50.

Since there were many problems, there must be many easy problems. Wei Liang looked through all the problems and quickly passed the solutions to Ranald to code. Ranald and Wei Liang solved 5 problems in 29 minutes.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
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<tbody>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
</tr>
<tr>
<td>K</td>
<td>9</td>
</tr>
<tr>
<td>J</td>
<td>18</td>
</tr>
<tr>
<td>H</td>
<td>29</td>
</tr>
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</table>

In the mean time, Kien coded E, a tricky problem with many corner cases, and got ACed at 70th minute.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
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</thead>
<tbody>
<tr>
<td>E</td>
<td>70</td>
</tr>
</tbody>
</table>

Ranald coded A, a tedious backtracking problem using A-star algorithm. In the meantime, Kien was working on B, a DP problem, and Wei Liang was working on M, a math problem.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>129</td>
</tr>
</tbody>
</table>

After 2 hours working on B, Kien submitted his code and prayed for an AC. It was impressive that we got an AC at the first attempt. Problem B was a hard DP problem on tree. We was the first team who solved B.

In the meantime, Ranald was working on problem I while Wei Liang was stuck at F and M.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>198 (first to solve)</td>
</tr>
</tbody>
</table>

After solving B, Ranald and Wei Liang revealed problem L to Kien. That was a geometry problem which used a similar technique in the geometry in Singapore site. Kien believed that he must solve that problem so that he could forget the failure in Singapore. After about 60 minutes, he submitted the code and got an AC at the first attempt.

In the meantime, Ranald and Wei Liang were still stuck.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Time to solve</th>
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<tbody>
<tr>
<td>L</td>
<td>261</td>
</tr>
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</table>

After ACing L, Kien believed that he should help Wei Liang or Ranald. Kien looked through all the remaining problems and aggred that I and M were the only solvable problems

30 minutes left.
Kien tried to read Ranald’s and Wei Liang’s code and soon realized that we did not have the ability to debug their code. Kien went to the window to find his solution for problem I, the problem Ranald was trying to solve, independently.

5 minutes before the contest, Kien found a solution for problem I. But that was too late.

The contest ended at 15:50.

After contest

We won the third place, solved 9/13 problems. That was a happy ending for all of us.
After the contest day, we went to a night market to celebrate our result.

Final words

ICPC has been one memorable part of our life. After the contests at Japan and Taiwan, we officially ended our ICPC time. From now, there will be no more ICPC contests, but the memories will still be in our mind forever.

We would like to thank Prof Steven Halim, Prof Tan Sun Teck for being the caring coaches in our whole university life. Thanks Prof Adi Yoga for all your help in Yokohama regional contest. Last but not least, we would like to thank our sponsors: Indeed, Seagroup, SenseTime, Jump Trading, HRT, and DRW for giving us such memorable experience.

Good bye, ICPC!