

International Mathematical Olympiad 2013

UK Student's Report

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Introduction

In the past few years, it has become a tradition for a report on the IMO to be written by the members of the UK team. An even more recent tradition is that there are two such reports. This report is in keeping with both of these traditions.

There is also a tradition in UK IMO reports that the report details interesting and entertaining events throughout the trip, starting and ending at a UK airport (typically Heathrow), or at the very least, starting somewhere in the UK. This report is not in keeping with this tradition.

The reasons for this break with tradition will shortly become clear. Meanwhile, I shall mention that the team this year consisted of Andrew Carlotti, Gabriel Gendler, Daniel Hu, Sahl Khan, Warren Li and Matei Mandache. Accompanying us were Geoff Smith, our team Leader; Dominic Yeo, our Deputy Leader; and Bev Detoef, our Observer C (observer with contestants).

Finally, I would have liked to have apologised for the excessive length of this report, and the delay in its publication. However, following the publication of the even longer¹ and later Balkans student report on the 10th of September, I feel that this is no longer necessary, or even appropriate.

Saturday 13th July

After a short flight from Brisbane, I arrive at Sydney airport, where I will be spending the night (in the nearby Holiday Inn). After a brief wait, I am surprised to find Angelo Di Pasquale, the Australian team leader, approaching from behind with two of his contestants (Alex Gunning and Alex Chua). It seems that they have found an alternative route to the baggage reclaim hall, avoiding the escalator that I had been watching for the past half hour.

¹This is true if your metric for 'length' is 'number of pages'. However, by any other reasonable metric, this report is in fact longer; Joseph Myers believes that it contains more words than any previous UK olympiad report. This is, unfortunately (or fortunately), what happens when you spend an hour a day making comprehensive notes.²

²I realise that this is now almost an apology.

Many of you will be wondering why I am in Australia, despite Australia being some 9000 miles off the direct route from the UK to Colombia. The answer is simple – immediately prior to the Pre-IMO camp, I was competing in the International Olympiad in Informatics, which took place in Brisbane this year. The IOI is similar to the IMO in many respects, and many of the people I met at the IOI this year I will subsequently meet again, ten days later, at the IMO.

I have, however, digressed from the chronological recounting of events. After meeting with these Australians, we set off in search of a shuttle to the hotel. The two Alexes seem determined to get lost as quickly as possible, initially getting off at the wrong hotel. Angelo, however, is quick to rectify this, and before long we are at the hotel. We eat dinner there before retiring to bed, having agreed to meet downstairs for breakfast at 6:00.

Sunday 14th July

I wake at 6:20, having earlier ignored my alarm, and hastily make my way downstairs. Surprisingly, no one has been banging on my door to wake me. In the lobby I meet the Alexes, who tell me that Angelo has not come down yet either. It turns out that his alarm was set to PM, not AM.

Since we are now too late to have breakfast at the hotel, we go straight to the airport, where we meet the rest of the Australian team, and their Deputy Leader Ivan Guo. After checking in and clearing security, we are finally able to obtain breakfast.

Our first plane will take us to Santiago, Chile, but has a stop in Auckland to collect more passengers. In Auckland we are made to disembark, and must traverse the full length of the terminal to pass through security again. Fortunately the terminal is small, and before long we are ready to reboard the plane.

For the second leg of the journey I swap seats with someone, whose boyfriend I was originally sat next to. This causes a little concern for Angelo, who for a few minutes is unable to find me. I end up sat next to Antonia Carvajal, one of 40 Chilean students who are returning from a six month exchange to Auckland, as part of the “Penguins without Borders” (“Pinguinos Sin Fronteras”) program. This provides me with an opportunity to see how much Spanish I can remember, though since their English is significantly better than my Spanish, most conversation with me takes place in English.

Saturday 13th July (2)

Due to the presence of a timezone anomaly, commonly known as the “International Date Line”, we revisit Saturday for a couple of hours.³⁴

³Pedants among you may wish to point out that ‘local time’ is not generally observed on a plane. I agree with this, but chose to ignore it for dramatic effect.

⁴Other pedants among you may like to point out that my division of events into days is not strictly based upon local time anyway. To this I have no good response.

Sunday 14th July (2)

Upon our arrival in Santiago (at which it is now unambiguously Sunday morning again), we are faced with a minor issue. When we checked in at Sydney, our bags were, oddly, checked though to Bogotá. It is quickly established that we will be unable to obtain our bags easily, so we decide to make do without them for the night.

Meanwhile, I have somehow come into possession of the Australians' mascot, a koala named Sampson, who carries a smaller koala named 'Sampson's Appendix'. I end up looking after him until the following morning, when I return him to the Australians. This is not the first time I have looked after Sampson for the night; unfortunately, like last year, I am unable to extract the Australians' secrets from him.

Our hotel is conveniently situated directly in front of the airport. After checking in, we proceed to the restaurant to have lunch. This is complicated by the staff there knowing very little English, but with my understanding of phrases such as "cuatros quesos" and "agua sin gas", we are able to get what we want.

In the afternoon we play some games, and attempt to do some geometry problems. Alex Gunning somehow manages to break his room card. Then, after another meal, we head to bed at the comparatively early time of 9:30 (or 11:30 AM Australian time).

Shortly before going to bed, I manage to conclusively answer a question that has been puzzling me for the past week. At the IOI I thought I had recognised a girl from Estonia as Sandra Schumann, a member of last year's (and this year's) Estonian IMO team. However, for a number of reasons, I had been struggling to convince myself of this. It did not help that guests at the IOI (of which she was one) are not listed on the website or in the program, and that some pictures from last year's IMO on Facebook that I expected to see her in were all in fact taken by her. Now, however, I am convinced that it is her.⁵ I decide that, having failed to have a proper conversation with her at the IOI, I should try to speak to her at the IMO instead.

Monday 15th July

I am woken in the morning at 4:27 by a plane, which is taking off on one of the two runways which run on either side of the hotel. Fortunately this is just three minutes before my alarm is due to go off, so little sleep is lost.

Since we are close to the airport, and we need to enquire about our bags, we decide to check in before having breakfast. At the check in desk we are told that our bags are now checked through to Santa Marta, and that we should get

⁵I have subsequently discovered that she is clearly identified in issue two of the IOI newsletter; presumably I either didn't pay much attention to it, or read it prior to seeing her at the IOI.

the labels changed at the gate. This seems reasonable, so we return to the hotel for breakfast.

Before returning to the airport, we discover that Gunning has lost his immigration card. We are told to go to the “immigration police” to sort it out. Fortunately, despite our suggestions to the contrary, this does not involve him being arrested. Instead, he merely has to fill out the relevant form, and have it stamped again.

Upon arriving in Bogotá, the Australians are faced with the challenge of determining whether or not they must declare their toy koalas at customs. Their conclusion is that they should, but customs doesn’t seem to care about them anyway.

Bogotá airport currently has a rather odd layout, in particular at the Avianca domestic terminal, where the gates consist of wheeled steps under a simple plastic covering. Subsequent research reveals that the airport is currently undergoing a major renovation, and that the domestic gates are temporary structures built in 2006, in the expectation that they would be demolished in the later stages of the renovation.

At Santa Marta, once we have collected our bags, we must pass a man who is checking baggage labels and baggage receipts. Since all our luggage is our own, we are not surprised to be let through unhampered. However, I subsequently discover that my baggage label claims that my bag belongs to Jonathan. This makes me wonder what they were actually checking.

For our transfer to our accommodation, Santorini Suites have provided a minibus. The minibus seems to be designed to hold as many seats as possible, with no consideration as to whether they can all be used simultaneously by people over the age of 3. Indeed, the front two rows, which face each other, are so close together that it is a struggle even to fit people on one of the rows. Nevertheless, we somehow manage to fit on the bus, along with all our luggage, and there is even room for another tourist on the bus too.

At the hotel, we attempt to check in, but are told we must pay for our rooms first. This is an issue, since Bev is supposed to be paying, and the rest of the UK delegation won’t be arriving for a few hours. To keep them happy, Angelo pays for the first night in each of the Australians’ rooms. I, on the other hand, must wait for the rest of my team before accessing my room.

After buying four bags of water from the shop on the corner, we go to a hotel restaurant for dinner. Most of us have pasta, but Angelo bravely chooses a burger, with lettuce, which he very quickly regrets.

Afterwards, Angelo and Ivan go to the reception to enquire about breakfast. 45 minutes later, we are fed up with lounging around by the nearby pool, and are about to go to reception ourselves when Gabriel appears outside. Following him, at various distances, are the rest of the UK delegation (excluding Geoff, Dominic, and me (of course)), along with Angelo and Ivan, and the UK team guide, María Rueda.

Back at our villa, we begin the lengthy process of choosing our beds. This is to play a key role in our safety, though we don’t currently realise this. Initially, it seems that we are all applying the algorithm of “wait for some other people to

choose their beds first”, but eventually all beds are claimed, and all people have beds. I end up on a bottom bunk with Daniel on the top bunk, while Gabriel and Warren have the other bunk bed. Matei and Sahl, meanwhile, have the luxury of a larger room with half as many beds. They also have a functioning toilet for a greater proportion of the stay; ours gets blocked on multiple occasions.

Meanwhile, Dominic has arrived. It seems that we have been charged for some rooms multiple times. I initially assume that this is because Angelo paid for some rooms earlier, but I subsequently discover that this is not the case. Fortunately, Bev and Dominic, with the help of María, manage to reclaim the duplicate payment.

Tuesday 16th July

Breakfast consists of a small buffet, in a different part of the resort. We quickly establish that most of the unused tables are unusable, due to the intensity of the sunlight at even this early hour. Fortunately there are a sufficient number of tables in more shaded locations.

For the second time this trip, the Australians have managed to break a room key. This time, however, the culprit is Ivan, who was clearly applying too much force when trying to lock the door. As a result their room remains unlocked for much of the week, before a replacement key is found.

After breakfast, we prepare for the first practice paper. This causes some difficulty, as there are an insufficient number of suitable workspaces in our villa. We improvise, using 3 tables taken from outside. I later discover that our troubles were trivial compared to those of the New Zealand team, who end up doing their practice papers on their beds (when they’re not too busy sleeping).

Four hours into the four and a half hour paper, Geoff decides he’s had enough, and attempts to stop the paper. Fortunately, we convince him to let us have the remaining half hour. This is not his first attempt to sabotage our practice papers – at our selection camp in Oundle, he gave out all four papers on the first day.

Once Geoff has announced the end for a second time (this time correctly), we are ready for lunch. This consists of a variety of breads, hams and cheeses, along with some fruit. The Australians join us in our villa for this.

In the afternoon we play a couple of games of ‘Mafia’, before some of us return to clear up after lunch. A third game is then interrupted by a debrief of the morning’s problems. Our results are mostly good, but many of us have been caught out by some complicated diagram dependencies on the geometry problem. Somehow the Australians have avoided these problems. I later discover that this is due to differing treatment of the word ‘side’. Dominic interpreted this as referring to a line, while the Australians interpreted this as referring to a line segment. The latter interpretation simplifies the problem considerably.

In the evening we have dinner in the same place as last night, though it is a new experience for the rest of the UK delegation. There is a bit of confusion about our orders, and Rachel receives the wrong dish. In weak (but hopefully

accurate) Spanish I explain the problem, and then tell them she doesn't mind. Nonetheless, she is given a free ice cream in apology.

Before going to bed, three of us go to the Australians' room. Jonathan decides to have a conversation with Sampson, with him supplying both sides of the conversation. I suggest that it is better to have such conversations in your head, in order to preserve the appearance of sanity. My observation, however, has the opposite effect.

Wednesday 17th July

This morning, after breakfast, Geoff leaves us. He is going to Barranquilla, where the Leaders will set the IMO papers for us. This is in some ways a relief, as it means that he will no longer be able to sabotage our practice papers.

During the paper, two Australian Observer As, Mike Clapper and Jo Cockwill, arrive, having spent a couple of days travelling here from Brisbane. Unfortunately, their luggage has made a rather less successful journey, and has failed to arrive with them. During lunch I discuss the IOI with Mike, having previously met him there during the practice session.

In the afternoon, the Australians introduce us to a game Rachel has brought with her: *Articulate!* The essence of the game is that we are divided into several teams, with each person taking turns to try clueing as many words as possible to their teammates in 30 seconds. We play *Articulate!* many times during the Pre-IMO camp.

In the evening we eat at the same restaurant again. I decide to order 'lomo fino', one of two dishes whose English translation is 'tender steak'. I subsequently receive a rather greenish-looking piece of meat; the waiter assures me that this is merely due to the effect of the blue lights in the room.

Thursday 18th July

This morning, Angelo, Mike and Jo also leave us. They will be joining Geoff at the leaders' site in Barranquilla.

After the morning's paper, it is time to prepare for tomorrow's paper. In this paper, we will be setting three problems for the Australians, and they will be setting three problems for us. Afterwards, we must mark each other's scripts and coordinate them with Dominic and Ivan.

We are given a shortlist of five problems, but are allowed to suggest our own problems too. Initially, most people seem to agree on Q5 from the shortlist, along with a geometry problem by David Monk, and a functional equation invented by Sahl and discussed on their journey here. The latter is later rejected, on the basis that it is too time consuming (consider IMO 2012 Q4, then double the number of cases), so we eventually use Q3 from the shortlist instead.

After making our initial selection, most of us decide to go swimming, for the first time since arriving here. We play both 'Marco Polo' and 'Mafia' in the

pool. Gabriel also introduces us to ‘Pool Wars’, a game which involves teams of two, with one person sitting on the other’s shoulders. The aim is to knock over the other team (or teams). This proves to be highly popular, and we later play it with some other teams at the IMO.

In the evening, we go into the centre of Santa Marta in four taxis. After visiting the cathedral, we go down to shore and sit on the sea wall. From the wall we see a major freight container terminal, and a man swimming through the sea with a large log.

Afterwards we go to a restaurant to eat. Initially we sit inside, but after ordering we are asked to move outside, apparently because they have a booking, and didn’t realise how long we would take to order. While eating we watch some of the street entertainment, which includes a beatboxer who is shouted down by a dog, and a man tossing a burning stick. It is suggested that Ross Atkins (an Australian observer in 2011, infamous for having approximately 0.5 beards) would enjoy the latter activity.

On the way back our taxi stops at a petrol station, and we are told to get out. Before long, however, we are allowed back in, and resume our rushed (and not entirely safe) journey home. There is some confusion about paying for the taxis, but this is resolved when the taxi carrying Maria arrives.

Later in the evening another IMO team appears at our door. The rest of the team guess that they are the Colombian team, who are staying in villa 4. (The UK and Australia are staying in villas 1 and 2 respectively.) However, I know better, having recognised one of them as Tom Kalvari (a member of the Israeli team), who I first met on the plane from Hong Kong to Brisbane for the IOI. Since they are staying in villa 3, all four of the large villas are now occupied by IMO teams. One of the team stays for a while to look at the problem we were discussing when they arrived, while Tom reappears later and discusses the IOI with me, and Israel with Gabriel. They leave after midnight, when Bev decides to evict them, and we go to bed ourselves fairly soon after.

Friday 19th July

This morning each team sits a paper set by the other team. Despite claims by the Australians that our paper would be hard, we find the first two questions fairly easy. The third question is an unusual geometry problem, which reduces to considering the areas of pentagons and pentagrams. Shortly before the end of the paper, the Australians’ guide, John, arrives at our villa. I attempt to deal with him, initially neither knowing who he is or realising that he speaks English, but quickly decide to call Bev downstairs. Simultaneously, Dominic appears outside, so I let them deal with him, and return to the paper.

After lunch we are faced with the challenge of marking the Australians’ scripts. I am marking Q3 with Gabriel. We quickly determine that Gunning’s script is the only one worth any marks, but initially believe it to have a major flaw in it. After an hour, and several rereadings, I suddenly notice that he has written exactly what we thought was missing, but because it is squeezed up

against the edge of the page (the left hand side being completely blank), we hadn't initially noticed it.

After coordinating our problem with Dominic and Ivan, we play 'Camps' with some of the Israelis. After much discussion, and many rejected proposals, we eventually agree that the scores will start at -1 , and reset to -1 if a pair loses a round (as opposed to 0, then ± 1 each round).

Later, the Colombians come out to use the pool, and with all four teams in the pool area, I am starting to find things a little too crowded. Fortunately, it is not long till we head to dinner. The Israelis come with us to the restaurant, but we eat by ourselves, telling them that to do otherwise would cause issues with the bill.

After a fairly mundane evening, we go to bed comparatively early, in preparation for tomorrow's competition. Whilst showering, I observe that the shower has two fundamental design (or construction) flaws. Firstly, the floor is sloped so that water flows away from the drain. Secondly, the door runner is designed so that water running down the door typically ends up outside the shower. This latter flaw is responsible for the bathroom floor being consistently wet throughout our stay.

Saturday 20th July

Today we are competing for the Mathematical Ashes, which will be decided upon our scores on the morning's paper. Since this paper is very important, we are mixed between the two rooms, with three people from each team going to the other team's villa. I stay in the same room, but end up on the table underneath the air conditioning unit, experiencing first-hand the difficulty of keeping paper on the table in such conditions. Unlike the previous occupant of this table, I decide to solve the problem, by moving the table towards the wall and out of the line of fire.

Our preliminary results, calculated on the basis of how many problems each person is claiming, suggest that the UK will win by a narrow margin of half a question. This is too close to tell before the papers have been marked. Instead of worrying about it, we play a game of Mafia, before going to the beach with John to play Frisbee. This takes place outside the Irotama Resort, where we will be staying during the IMO, showing just how close together the two resorts are. After a while, John leaves us to go to a guides' meeting, while we begin playing Ultimate (Frisbee). After a brief burial of Jason, we return to our villas to hear the results. It turns out to be even closer than we guessed – the UK has won by just one point, scoring 82 points to Australia's 81.

After dinner, some of us make some origami in the Australians' villa. Rachel shows Matei how to make a crane, and I show her my method, which uses more prefolding. I also make an octahedron and a plane, while one of Matei's planes embeds itself in the wall in a manner that would be hard to achieve even if it hadn't just travelled halfway across the room. Gunning, meanwhile, makes a teddy bear, with an impressive amount of detail.

I then return to my room and spend some time on the internet. Apparently there will be no internet access at the IMO until after the contest, so I intend to make the most of the Wi-Fi available here while I can. Shortly before I head to bed, Daniel comes out of the room to inform me that the bed is broken. Upon investigation, I discover that the wooden slats beneath his mattress are too short to be supported securely by the sides of the bed, and have thus fallen out onto the bottom bunk. I put them back up, but we agree that Daniel cannot sleep there tonight. He considers sleeping on the sofa (which may actually be a small sofa bed), but then realises that María has left (having gone to the Irotama in advance), so her room is now vacant. He sleeps up there, while I enter the bottom bunk, too terrified to move in the bed in case I am killed by a falling slat. (This would not be beneficial for the UK's performance in the IMO.)

Sunday 21st July

In the morning I wake up, thankfully still alive. After our normal breakfast we pack our bags, and I fashion a sign, indicating in Spanish that the bed is broken. The meaning seems to be clear, as when the staff come to check nothing is missing from the room (or, presumably, broken), they have no trouble understanding the problem.

We then leave for the Irotama, along with the Australians and Israelis. Thankfully, it is a short walk; in these temperatures we do not want to travel long distances with our heavy bags. After a few minutes we arrive at the first of the resort's towers, and we go into the reception there. María finds us there, and escorts us out to the reception that we are actually required to use, which means we must walk roughly the same distance again. Here we discover our room allocations – those contestants who attended the IMO last year (Daniel, Matei and me) are in room 87, while the others are in room 88. We are given two room cards for each room, and sent on our way.

After walking at least as far as the distance from our previous accommodation to the reception again, we eventually arrive at our rooms for the IMO. By this point we are completely exhausted, having walked about 4 times the distance we originally anticipated, and are very relieved to discover that the rooms are air-conditioned, and are currently comfortably chilled.

The two rooms are part of a building containing three similar rooms, each with two single beds, and a double bed larger than the two singles combined. Sahl, Warren and Gabriel's room also has a kitchen, including a fridge/freezer unit with the property that water stored in the fridge is too warm, while water stored in the freezer is solid. We also both have ensuite bathrooms with showers; ours has the useful property that it is impossible to lock yourself out, by virtue of having the rather less useful property that it is impossible to lock yourself in. Indeed, since the latch is the wrong way round, the handle must be used to close the door, while a gentle shove is sufficient to open the door even when it is 'locked'.

Once María has returned to us with our IMO bags and lanyards, we set out

in search of lunch. The resort contains many restaurants and bars, all of which would normally offer different types of food, but for the duration of the IMO they will all be offering similar buffet meals. The first place we pass, which is just outside our rooms, appears to have little variety, so we continue back along the edge of the beach till we reach a much larger ‘restaurant’ area – the “Cocos bar”. There appears to be a greater variety of food inside, and a far greater number of tables outside. As a result, this is where we end up eating the majority of our meals during the IMO.

After lunch we decide to purchase some water to keep in our rooms. Dominic and Bev take us to the store they had been using during the Pre-IMO camp, and we each carry one or two bags or bottles of water back to our room. Most of the bags of water will remain unopened in the fridge for the rest of the week.

On our way back we meet Ivan and Rachel, who have lost the rest of the Australian team. They come back with us to see our rooms, before leaving. We then go exploring ourselves. Ivan finds us again, and attempts to follow us discreetly, but we spot him immediately.

Our wanderings eventually lead to the Auditorium building, where we are surprised to find an Internet Room, with Wi-Fi easily accessible. While most of us utilise this precious and unexpected resource, Gabriel is given a lecture on the peculiarities of Serbian names by one of the Serbians. After a while we leave the room, with Gabriel abandoning his hat in his haste to escape. We then locate the Australians in the large swimming pool. While Gabriel returns to the Internet Room to get his hat, the rest of us go to our rooms (a 10 minute walk away) to change, so we can join the Australians in the pool.

After spending a couple of hours in the pool, we return to our rooms briefly, before having dinner with the Australians. During the meal, some Canadians appear. Calvin asks the other two which two people at the table are not contestants; we quickly point out that there are actually three such people. They are then so bad at identifying these people (with the exception of Bev), that I suspect they are actually pretty good. Nonetheless, after 20 minutes, we have tired of the game, and it is almost a relief when they finally guess correctly.

After dinner we go to the Australians’ room. They are on the 12th floor of the first tower we encountered (Irotama del Sol), and have a view of most of the resort from their balcony. It is also quite windy, though, so we go inside to begin playing Mafia. Before long, however, Dominic and Ivan come in, and send us to our rooms. Rachel leaves too – she is staying in a separate bungalow with two other girls she hasn’t yet met.

Monday 22nd July

Having agreed to meet María in the ‘main’ restaurant at breakfast, we are told upon leaving our rooms that we must eat in the smaller area near our rooms. After eating we go to find María, before heading to the buses that will take us to the opening ceremony. Unfortunately our frisbees have not yet arrived, so we will not be able to give out any gifts at the ceremony.

The opening ceremony is being held in Barranquilla, where the leaders are staying, so all the contestants must endure a two hour bus journey there.⁶ Upon arriving at our destination, we are made to disembark in the middle of a roundabout, where we are immediately met by the Australians. They ask us to check if any of us have lost anything, as they have lost a significant amount of US money between them. We suspect that their broken room key may be related to this.

As we enter the sports hall where the ceremony will take place, we pass a large number of performers in carnival costumes. This is slightly concerning, as it suggests that there may be a long performance during the ceremony. Unfortunately, our fears turn out to be true.

The ceremony begins with a rendition of the IMO hymn. I'm not sure who to blame for the poor quality of the sound, but I suspect that the sound engineer (if there is one) is largely responsible. This is followed by two speeches in Spanish. While Spanish is the official language of Colombia, and has more native speakers worldwide than English, I suspect the majority of people present would have preferred to have English translations as well (or, to save time, instead).

We are then subjected to the most tortuous Parade of Nations I have ever experienced (in four IMOs). It lasts about 70 minutes.⁷ The main reason for this long duration is that the contestants are accompanied by a display which shows a map of the world, and zooms in and rotates to show each country, its capital (including a photo), its flag, its leaders, its contestants, and some statistics. This is interesting, though not interesting enough to sustain 70 minutes of enjoyment, and also distracts from the real focus of the parade of nations: the contestants themselves. There are some benefits to the slow pace though. Some countries are seated in the wrong place,⁸ and while I had initially worried that they wouldn't appear at the right time, it quickly became obvious that this would not be an issue.

After the parade of nations, the leaders are instructed to leave, and we are relieved that we are finally going to be allowed to go, after almost two and a half hours. Then the carnival performers come back in and begin a long demonstration. There are about half a dozen groups of performers, and it is another half an hour before the first group finishes. At this point most of us walk out; this is rather disrespectful, but we are fed up and wish to return to Santa Marta today, and not tomorrow. We are also desperate for lunch, which was due at two. It is now three o'clock.

At 3:45, we are finally delivered our food, and there is once again cause for complaint. The vegetarian food is not vegetarian. Fortunately this turns out to be a simple error: the label on the boxes declaring the contents to be vegetarian has been crossed out, but this was not noticed when they were handed out.

⁶Usually the leaders come to the contestants instead, presumably on the basis that transporting 100 people is much easier than transporting 600 people.

⁷For comparison, the parade of nations at the 2012 Olympics (for over 10000 athletes) was only about 100 minutes.

⁸For instance, last time I checked, Estonia and Mexico do not follow the UK alphabetically; their location behind us would suggest otherwise.

On the return journey I realise that we are travelling in a convey escorted by the police. As a result, we stop on several occasions to regroup. There is also a lot of unnecessary overtaking of other coaches. By the time we get back to the resort it is long past six o'clock. The evening is uneventful, except for Sahl becoming sick as we prepare for bed.

Tuesday 23rd July

We rise at 6:30 for an early breakfast, before getting on a bus to go to the competition site (which is a hotel further up the coast towards Santa Marta). Sahl is, fortunately, feeling well. It is an hour before we will enter the exam rooms, so I spend my time walking round in circles looking for other teams to speak to. I find the New Zealand team, many of whom I remember from last year's IMO, and also speak to Jeroen Huijben, a member of the Dutch team who was sat next to me at the closing ceremony last year. I also speak to Gordon Lessells, the Irish Deputy Leader; the Australians; and the Finnish Deputy Leader, whom I remember from a game of Mafia in 2010, when he was a contestant.

When I enter the exam room, I am disappointed to see that the 'clocks' consist of pieces of paper, with a five minute resolution, and an accuracy of far less than this, if my experience of timekeeping at the RMM is anything to go by. In fact, the 'clocks' turn out to be accurate to within a minute, but their actual resolution is only half an hour. Natalia Chen, one of the New Zealand team, is sat nearby, and I convey my disappointment to her with gestures – she responds similarly. We are both pleased, however, when we realise that we can see an online stopwatch being used on a computer at the front of the room. Not everyone is in a position to see this though, and I feel that the differing precisions of time available is a little unfair.

Before the exam begins, we are given a series of instructions six times – once each in Spanish and English in three different parts of the room. Then we are told to begin (again, multiple times). Initially I confuse myself by attempting to read the English and Spanish versions of the paper in parallel (the sentence structure occasionally differs between the two). However, within an hour, I have solved the first two problems and am beginning to write them up. This is satisfying, as I am hoping for at least two problems each day, which is generally good enough for a gold medal. I also subsequently make significant progress on the geometry problem, Q3, proving that the circumcentre of $A_1B_1C_1$ lies on the perpendicular bisector of one of the sides of ABC .

After the exam, we meet Dominic and Bev outside the lobby, and decide to walk back along the beach, rather than cramming ourselves into the coaches again. It is a nice 20 minute walk, in which we can easily discuss our work with Dominic. All of us are claiming solutions to Q1, and five of us have solutions to Q2, though Gabriel ran out of time to write his up fully. I am the only person claiming progress on Q3. Dominic tells us that Ivan claimed to have solved Q2 almost as soon as they had access to the questions; however, Ivan soon admitted

that it was his problem-setting skills and not his problem-solving skills that were responsible, as Q2 was in fact his own submission.

In the afternoon I sit by the pool with Rachel for a bit while waiting for the others to arrive. I then go and change myself, and return to find them playing ‘piggies in the middle’, with three in the middle. After playing this and some of our usual games, most of the others decide to go to the ‘spa’. Gabriel, Bev and I leave the pool soon after and attempt to find them, but go to the wrong spa – they are on the third floor of the Australians’ building, while we are looking in a separate building near to the main pool. Having failed to find them, Gabriel and I go back to our rooms to change. Gabriel discovers that one of the disadvantages of having two room cards for each room, one of which (for their room) is non-functional, is that he cannot currently get into his room. This is not a great issue now, but will later prove to be quite troublesome.

After dinner, I decide to wander off to look for people on a ‘random walk’, which consistently follows the same non-random route around the most populated public areas of the resort. As usual, I end up at the internet room, until 2am BST, which I convince myself is equivalent to 10pm local time, and thus a little late to be up on the night before a paper. I leave with the intention of going to bed, but soon realise my mistake – it is in fact only 8pm.

I once again begin following my ‘random walk’, and soon spot a group of contestants racing along the path with a porters’ trolley. This is clearly inappropriate behaviour, and I am thankful that the UK team does not participate in such antics. I am considering how best to distance myself from them when one of them says “Hi!” to me. It turns out to be Gabriel, with most of the UK and Australian teams forming the remainder of the people involved. Inevitably, when they try to pass the restaurant (almost a bottleneck in the resort), they are reproached by Dominic and Bev, who are sitting at a table there with Ivan.

We then all go to the Australians’ room to play Mafia, along with a Ukrainian contestant, Yevhenii Diomidov, who happens to be the person sitting in front of me during the exams. As before, we are only part way through a game when Dominic and Ivan come in to send us to our rooms. I suggest that playing Mafia in the evening may not be a good idea, though after the paper tomorrow we will have less reason to go to bed early. Dominic seems a little impatient, and will not allow me to recheck my counting when I count 51 cards in my pack. I subsequently confirm that I am indeed missing a card; it is not found by the Australians until several days later.

While walking back to our rooms, Dominic says that he “isn’t implying that we should go to bed, but it may be good idea”. This seems like a clear implication to me, but one which I am willing to follow. Daniel, who seems to be spending more time asleep than the rest of us (during mornings, evenings and early afternoons), is already doing this.

Wednesday 24th July

In the morning Gabriel realises he has lost his lanyard. This could be a problem, as we are required to show our lanyards to get into the exam hall. María makes some enquiries, and tells us that he will be allowed in if he shows his passport. This works, and he then returns it to Bev immediately for safekeeping.

Despite the stricter rules outside the exam rooms (deputy leaders and observers are no longer allowed into the lobby), the atmosphere inside the exam rooms before the exam seems to be more relaxed. Natalia comes over to my table and speaks with me and the Ukrainian in front; I manage to add 5 pieces of chocolate to my previously non-existent food supplies. Natalia subsequently joins Sandra Schumann and Alex Jartseva (from Estonia), who are speaking to Lauren Denny (from South Africa) at her table nearby. She later tells me that she had had dinner with the Estonians last night when she was unable to find her own team.

The paper today feels even easier than yesterday, and before long I have solved the first two problems, and begin writing them up. In the process I find two holes (one of them pretty large) in my solution to Q5; I am later told that there is a third hole,⁹ but that it can be fixed by reordering my lemmas, so I somehow manage not to lose marks for it. I also manage to solve Q6, but my solution is sufficiently complex that I don't have enough time to explain everything fully.

After the exam we once again walk back to our resort. Everybody in the team is claiming solutions to Q4 and Q5, while two other people are also claiming to have made progress on Q6. This seems like a very strong performance for the UK, with almost perfect scores on four of the six questions, but we don't yet know whether other teams found the paper easier than usual too.

Back at the resort we eat lunch near our rooms, rather than at the central restaurant area. The New Zealand team are also eating there. Then the rest of the UK team go to the 3rd floor pool in the Australians' tower to swim. I go up too, intending to use my laptop up there, but it is too hot and there is no shade, so I go off elsewhere. I am also unable to use the Wi-Fi, which we were told would be available after the contest.

Going downstairs, I meet Natalia again, who tells me that we can get Wi-Fi codes from the reception. Unfortunately, with over 500 contestants now having access to the Wi-Fi, the hotel's network is struggling to cope, and the connection is very slow. This explains why I couldn't even reach a login page earlier.

The leaders are supposed to be arriving soon, so we remain around the reception area, where we are soon joined by Byung-Cheol Cho and Stephen McConnachie (a New Zealand Contestant and Observer C respectively). The buses eventually arrive, with characteristic lateness, and I meet Geoff, for the first time in a week. I fill him in on the day's news while he checks in, and then he is led off to a bus for the short journey to his hotel building. Dominic subsequently arrives, and we walk there together, arriving well before Geoff.

⁹ $a \geq b \Rightarrow ka \geq kb$ is false if $k < 0$.

Having seen Geoff's room, I then leave the two of them together and resume wandering.

Before long, I find some of the New Zealand team again, sitting on a stone bench near the table tennis tables. While I am getting something from my bag, Natalia spots some violin music in it – she is surprised to discover that I play the violin, as she and BC do too. Dominic, who also plays the violin, made a similar observation (of my music) last week. While we are talking, Sandra, Alex and Lauren pass, and stop to talk to us (mainly Natalia) for a bit.

I spend the rest of the afternoon with the New Zealand team, and eventually end up having dinner with them, at a restaurant adjacent to the North Pool (a pool in which we never swam). Before we leave, Ian almost breaks a glass. We decide not to linger too much longer.

Afterwards, some of us go to the internet room, where we discover the rest of the UK team. They have just been on a tour of the auditorium building, finding, among other things, the scripts from this morning. We go to the Australians' room and play several games of Articulate and Mafia, before I go to bed. Some of the others stay up considerably later.

Thursday 25th July

I get up fairly early, while the rest of the team seem to be still asleep, and have breakfast with Bev. I then go over to the table where some of the Dutch and New Zealand team are sitting. Once they have finished eating, some of the Dutch begin playing a game called 'Last Card'. Since this appears to be almost indistinguishable from 'Mao', we decide to begin playing that instead. I define some standard rules, but there is some controversy over the presence of jokers, and they initially seem to result in the addition of five cards to my hand, independent of who plays them. I subsequently decide to target Natalia with them. She then targets me in retaliation, and as a result, when the game ends, I am holding (or trying to hold) 38 cards in my hand.

After eating lunch with the UK team, I return to some members of the New Zealand and Dutch teams, and we go to the internet room before attending a talk in the auditorium about tilings.

After the talk, most of the UK team go swimming in the third floor pool. I intend to join them, but end up using my laptop outside the lifts instead. Natalia is similarly distracted. We discover that not only do we both play the violin, but we have both played the same medley of themes from *Pirates of the Caribbean* (though her orchestra cut out some of the good bits).¹⁰ However, our attempts to find recordings of our performances are scuppered by a poor internet connection and my inability to remember where I found a full recording of our orchestra.

Later, we go to the coordination area to find out the results of the day's coordination. After three problems, the UK has only dropped one mark. Un-

¹⁰See <https://www.youtube.com/watch?v=3f5mziFNhzE&t=164> and <http://vimeo.com/2174369>

fortunately, the coordination tomorrow will be much harder, and many more marks will be lost. Geoff discusses my work on Q3 with me. It seems that while what I have proven is, as Ivan has previously told me, worth three marks, I fail to make my methods clear in my rough work, including some contradictory material that implies I am assuming the problem is true. Geoff is not sure if he will be able to get any marks for me. This loss is more annoying than any marks I have lost in the past, as I had considered writing up my work in full during the contest, but had chosen instead to try to complete the problem. Had I written up my work, it should have been worth a clear 3 marks.

There are also complications in our approaches to Problem 6. Over dinner, Dominic discusses our scripts with Matei and me. It seems that Matei has found a different solution to either of the official solutions, and Dominic is trying to work out how easy it is to complete. I, meanwhile, have done one half of the problem using one of the official solutions, and the other half using the other official solution, with a messy join where the two parts meet. By the end of the meal, Dominic is satisfied that my method is valid, but that there is a small hole elsewhere, where I considered something to be obvious enough to ignore during my rushed write-up. This will end up costing me a mark.

After dinner some of the UK and Australian teams go to the Australians' room to play 'Bartok'. I join them some time later, and conclude that their game looks rather more like 'Mao' than 'Bartok'. We interrupt the game to check out the 'international dance', which is beginning at 10 o'clock near the pool. I get separated on the way there, and they are gone by the time I arrive, so I end up speaking to Natalia and Christina Meyer. By the time I return to the Australians' room, they are just beginning a game of 'Mao'. We play this until around midnight, then go to our rooms soon after.

Friday 26th July

When I wake this morning, I find myself looking at a large number of cats. It seems that our veranda, which has played host to a couple of cats throughout the week, is becoming more popular: there are now five cats out there. Since Matei and Daniel are also waking up, I wait for them before going to breakfast.

After breakfast, Peter Gerlagh, Michelle Sweering (both from the Netherlands) and Natalia begin playing a game called 'Hanabi'. This is a collaborative game, where the players are aiming to create five piles of five cards, with each pile containing cards numbered 1 to 5 in a particular colour. This is made significantly harder by preventing each player from seeing their own cards, and limiting the amount of communication allowed. When they finish their game, we decide to play a five player game (with those three, me, and another New Zealander, Jaewhan Kim). We end up spending the whole morning in my room playing this game three times, and never manage to score more than 23.

At lunch, I manage to acquire one of the Australians' koalas by mysterious means: the first I know of it is when I find it clinging to my t-shirt. I fasten it securely to my lanyard, to the frustration of Natalia, who tries (and fails)

to remove it while I am almost dozing off during the afternoon's talk. Despite being barely awake, I am able to follow the gist of the talk, which is about Harald Helfgott's proof of the Ternary Goldbach conjecture, given by Harald Helfgott himself.

Afterwards, some of us, including Natalia, Peter, and me, go to the internet room. Peter tries to teach us a new card game. During the first round (played with 'open' hands) the Estonians come in, and Sandra comes over to us briefly. We observe that we are failing to understand the game, and seem fairly uninterested. As a result we end up watching New Zealand videos on YouTube instead. I also go and check on the UK's coordination a couple of times. It seems that the UK have begun coordinating Q6 at around three hours earlier than their booked time of 5:30, which is probably a good thing, as they spend around two hours in the coordination room.

In the evening I have dinner with the UK and María. They all leave when I go to get pudding, so I go to the Australians' table instead, where the contestants all flee the moment I sit down.

Having been abandoned by the UK and Australia, I return to the Dutch and New Zealand teams, and we agree to play Mafia in the lobby of the Irotama del Sol, on the basis that it is the indoor location where we will be most visible to other people. This strategy seems to work, as after our first game, two South Koreans ask to join us. Following a longer than usual discussion on how to pick people at random, I decide to devise a completely random approach. This is put into place, with the result that I am 'lynched'. In a following game I again suggest a random method, this time using my laptop's random number generation. Again I am selected and lynched.

Meanwhile, I am regularly refreshing a page on the IMO official site, waiting for the results to appear. Their eventual appearance results in the immediate cessation of our game of Mafia, and everyone crowds round my laptop to see them. It turns out that one of the South Koreans, who have by now disappeared, is one of the two contestants in first place.

Once everyone has seen as much of the results as they want to, most people go up to the Australians' room. I, meanwhile go out on a brief wander. When I return I meet Natalia coming out of the lift; she is fetching her team's mascot to show it to her roommate. We then return upstairs, and I discover that her roommate (or one of them; her other is Michelle) is a Mongolian called Zolboo Chuluunbaatar.¹¹ She doesn't appear to be interested in joining our games, and instead looks at the results on my laptop.

When I enter, a long of game Mafia is just ending, with Rachel having to choose which of Gabriel and Jason is the Doctor, and which is the Mafia. She eventually guesses wrong, to Gabriel's delight. The next game, by contrast, is very quick, with convincing evidence from the 'paparazzi', and 'lovers' in the mafia, together allowing us to take out the mafia in two days with virtually no discussion.

¹¹Readers with a good memory may remember her from last year's report, though I did not realise this immediately.

We then begin a game of Mao; this goes on for several hours, and we soon move down to the lobby to allow some of the Australians to sleep in peace. The game eventually ends when Daniel, Matei and Sahl give up, I go out and Natalia is the only one left in. Afterwards many of us go to the internet room; I leave soon after and return to my room.

Shortly before I go to bed, Matei, Gabriel and Warren return. Sahl has taken their only working key, and gone to sleep, and we are unable to wake him, even by banging on the door from our veranda into their room, which is conveniently located immediately behind the head of his bed. As a result, Gabriel ends up trying to sleep on our sofa, while Warren uses a spare corner of Daniel's massive bed.

Saturday 27th July

There is an excursion arranged for this morning, and, unlike the previous ones (which appeared to actually be talks in the auditorium), it involves leaving the resort. We decide not to go, supposedly because of reports from some of the deputy leaders that their excursion was incredibly tedious and boring. In reality, I suspect the fact that most of us are asleep for much of the morning may be far more significant. I later hear conflicting reports about the excursion, with a positive first-hand report from Sandra and Alex contradicting the more negative second-hand reports I hear via many other people.

After lunch, most of the UK and Australians, along with Natalia, go swimming. When I arrive, they are playing 'piggy in the middle' with two balls, but they are both thrown to me before I enter, and one of them bounces away into the distance, never to be seen again.

The pool is closed early, to allow them to set up for the 'banquet' after the closing ceremony, so we go up to the small pool on the 16th floor of the 'Irotama del Mar' building. Here we meet the Irish and Icelandic teams, with whom we engage in mock-nationalistic debates. Gabriel and one of the Icelanders also spend a while discussing the feasibility of bouncing a ball off a nearby window and its surround without it falling to the ground (much to Dominic's despair). Before long, though, we have to leave to prepare for the closing ceremony; the Irish try to interpret this as a surrender.

When we meet up with Dominic, Bev and Geoff in the lobby of the 'Irotama del Mar' building, Dominic spots some packages containing BMO booklets on the reception desk. We put them in his room, intending to distribute them at the dinner later. Their appearance is a surprise, as the last we had heard was that all our packages were stuck in customs. Our frisbees, unfortunately, never make it through customs.

The bus that will take us to the closing ceremony is incredibly cramped. Most of us have trouble squeezing into our seats, and Geoff ends up sat in the centre of the back row. We then have to wait a while for the other buses to be loaded, before making the 25 minute journey as a convoy. Our destination turns out to be the memorial to Simón Bolívar, who played a key role in Latin

America's struggle for independence in the early 19th century.

While waiting for the ceremony to begin (which is, surprisingly, only half an hour late), I bump into Jessica Weitbrecht (one of the Irish team) again. She is going round affixing yellow smiley-face stickers to various people according to the following rule: "You receive one sticker for every competition that she has attended and you have attended (including this IMO)". I complain when she only gives me one sticker, as we were also both at EGMO 2012.¹² This results in the following clarification: "You receive one sticker for every competition that she has met you at".

The ceremony eventually begins at 18:30, a few minutes after sunset.¹³ It begins with the laying of a wreath in the memorial, accompanied by a group of soldiers. Then, unlike at the opening ceremony, all the speeches are in English. This is, however, the only significant improvement. The sound system is still pretty dodgy, with several microphones placed directly in front of one of the speakers. They also have unusual arrangements when a trio of young children (oddly introduced as the "Child King of Barranquilla") play several pieces (one would have been sufficient) on an accordion, a drum, and a guacharaca.¹⁴ Apparently, the best way to amplify an accordion is for someone to hold a microphone against one end, and then to move it to the other end for solos in its bass register, with the microphone repeatedly knocking the player's hand.

Despite the setbacks in the rest of the ceremony, they manage to carry out the presentation of medals fairly successfully, with the only minor issue being a discrepancy between the number of medallists named and the number of people on stage awarding medals, for the first set of bronze medallists. It is, however, very hard to see the medallists (even from the second row), due to the number of people crowding forwards to take photos.¹⁵

The photographers (mostly leaders and deputy leaders) aren't the only thing making it hard for me to see the medallists. Due to the late hour, it is now getting quite dark, so the cameraman supplying footage to the screen has attached a very bright light to his camera. Unfortunately, it is often pointed out into the audience, blinding anyone foolish enough to try to look at the screen behind him to see what this very bright light is actually illuminating.

The introduction to the penultimate section of the ceremony is, like the rest, given in both English and Spanish. However, on this occasion, the English and Spanish have completely different meanings. The Spanish requests that "the Colombian team come forward", while the English that follows is a request for "the South African team to come forward". To Geoff's delight, Dr Sizwe

¹²She attended officially as a contestant, while I merely met the coordinators for an hour during a five hour wait for the BIO (British Informatics Olympiad) final that year to begin.

¹³This is significant, as the ceremony is taking place outdoors, and, if the opening ceremony is anything to go by, will probably last a long time.

¹⁴This is a percussion instrument played by scraping wires along a ridged tube, which Dominic suggested might be the result of briefly showing someone a picture of a violin, and then asking them to make one.

¹⁵At the IOI, a similar thing occurred, with the medallists struggling to get past the photographers. As a result, they kept asking people to move back and make space. No such requests were made here.

Mabizela gives a brief presentation about next year's IMO; this bodes well for the length of the speeches next year.

The closing ceremony, like the opening ceremony, ends with a dance presentation. As at the opening ceremony, we get up and begin leaving while it is still taking place, although since getting up is necessary to view it properly (they are performing beside the memorial that we were sitting in front of), this feels less impolite. Somehow we manage to lose Gabriel. Bev is a little concerned by this, but as Geoff is also missing, we guess that they have probably left together ahead of us. (We later discover that Gabriel was with Jessica, and Geoff was with them until they became separated while boarding buses.)

The journey back begins with a long wait while we form a convoy. I suspect that the first people to depart spent more time waiting than actually travelling on this journey. The synchronicity also has the disadvantage that we all arrive back to get dinner at roughly the same time.

Dinner tonight takes place beside the pool, on tables of a size that more closely approximates the size of our delegation than those we have sat at previously. Geoff and Gabriel are found with little difficulty, and Dominic and I fetch the BMO booklets from Dominic's room. These are given out primarily by Gabriel, who goes round all the tables wearing a Union Flag and carrying the UK sign slotted down the back of his shirt. He is assisted by Jessica (despite claiming to find her 'irritating'), and later also by Daniel.

While I am eating pudding, other teams are starting to leave, so there is a sudden rush to begin the most important presentation of the evening. Requests are made to summon Angelo, and I volunteer to fetch him, but before I can go Dominic requests a team photo. It is eventually decided to proceed without him. Geoff begins the presentation, and, due to its highly important nature, it is translated into the other four official languages of the IMO: French, Spanish, German and Russian. Each translator adapts and (usually) improves on the humour (though it must not be forgotten that this is a serious presentation). Eventually, after much suspense, it is announced that the winner of the 'golden microphone' is . . .

Actually, first I'll tell you what the 'golden microphone' is. Each year, many people make many official speeches to the IMO jury. The most prolific speaker, who, supposedly, "speaks first and thinks later", is awarded the 'golden microphone', which is usually neither golden, nor a functioning microphone.

Anyway, this year, the 'golden microphone' is won by Angelo. Ivan collects it on his behalf, before giving the speech that Angelo would have given, thanking Angelo's friends and wife for "putting up with him". Angelo appears minutes later, and I inform him that Ivan said some kind words for him, while Ivan hands over the Barbie toy microphone that constitutes this year's award.

Afterwards, I go to change out of my uniform, before returning again. There are now many more people dancing on the stage. Natalia reports that a moment ago Gunning was dancing, along with some other Australians, and that it was an amusing spectacle. I also get a koala from Natalia (I thought koalas were Australian), but return Gunning's to him, after a failed attempt to surreptitiously fasten it to my clothing.

Outside the pool area, I meet some of the Irish and Icelandic again. Jessica asks to see my gold medal, and then suggests that I give it to her after I ‘accidentally’ reveal that I have two other IMO gold medals at home, and surely don’t need three of them.¹⁶ When her appeals to my apparent ‘kindness’ fail, various other means of obtaining my medal are suggested, including threats and seduction. None of the suggestions are likely to work though, particularly after I’ve heard about them.

Natalia then appears, and joins me in the entrance to the pool area, where I have been leaning on the counter looking across to Jessica on the other side. I ask her to argue my case. She attempts to shake hands with Jessica, but she is too far away, until Jessica comes into the staff area behind the counter. Another member of the Irish team comes in, and attempts to climb into a towel bin at the exact moment that an employee approaches. He gestures to them to leave the area, before using the wheeled towel bin to barricade the door. It is clearly an effective measure, as none of us go back in.

Afterwards, I participate in a game of Mafia in the lobby of the ‘Irotama del Sol’. I then watch two more games, which Natalia narrates, while I make some notes for my report (it has been an eventful day, and I may not have another opportunity to make notes until after we leave tomorrow).

At about 3:00, the first few teams begin departing. At past IMOs, there has been a board listing the hotel and airport (or station) departure times for every single participant. However, this year almost everyone is taking one of only a dozen flights out of Santa Marta, most of which go to Bogotá, making such a display unnecessary. Instead, a copy of the resort’s transfer schedule is put up. Confusingly, this includes some arrival times, for guests of the resort who are arriving while we depart.

Since I am unable to find out when the people I know are leaving (except by asking them, which can be very hard if I am unable to find them), I decide to go to the central reception every time a group is departing, in case any of them are people I would like to see. Thus, at shortly before 3:00, I leave the lobby to see if I know anybody departing at 3:00. Natalia decides to come with me. I discover that the Mongolians are leaving, but no one else I know is, so I do not stay for long.

We then go past Natalia’s room, and she picks up her violin (or rather, a school violin that she is borrowing so that hers does not become damaged), intending to get me to play it somewhere. She has brought it to the IMO so that she can practise for the finals of the New Zealand Chamber Music Contest, in which she will be competing in roughly five days time (allowing for timezone differences). So far, no practice has taken place.

We sit on the bench near the table tennis again, and, like last time, soon see Alex, Sandra and Lauren going past. We speak to them for a bit, before they continue down to the beach. We then go round to the pool area, where we

¹⁶Incidentally, these, along with a bronze medal from 2010, mean that I am now occupy first place in the UK IMO Hall of fame, ranked by medals achieved. In other measures, such as total score over all years, I fall behind Simon Norton and John Rickard, whose total scores of 120 and 115 respectively slightly exceed my total of 111.

meet the Canadian Deputy Leader, Robert Morewood. He tries to identify the instrument Natalia is carrying, as well as our nationalities.

We then continue talking for close to an hour, before Natalia and I leave just before 5:00, and go to the 15th floor of the 'Irotama del Sol' building. We sit on the stairs (which run up the side of the building), intending to watch the sun rise over the Sierra Nevada,¹⁷ as Peter recommended doing so to us. Robert joins us again soon after, and we wait for the sunrise, while trying to not fall asleep.

Sunday 28th July

At six o'clock we agree that the sun has risen behind a cloud, so go back down, a little disappointed. Natalia goes to her room for a rest (having been less successful in her attempts to not fall asleep on the stairs), while I go to breakfast, where I meet some of the UK and Australian teams. I then go to see the Dutch team, who are leaving at 7:00. Natalia also wakes and leaves her room briefly to see them before they go.

Once the Dutch team have gone, I go to my room to pack my bags. As usual, this takes place in two stages: unpacking anything left in the suitcase (i.e. almost everything), then putting everything back in. Surprisingly, I manage to close the suitcase on my first attempt, though it is about 3kg overweight.

I then do some other stuff; unfortunately my notes are very vague about what happened between 8:15 and 9:30, so I have no idea what that stuff might be. By 9:30, I am hungry again, so I go to have a second breakfast. This time I end up sat with Sandra and Alex. I manage to find out why Sandra was at the IOI (essentially, she "really wanted to go"). We also end up discussing Estonia and the Soviet Union for a while.

Before long, it is almost time to leave. I go to get my bags from my room, and once again leave the rest of my team, some of whom are still packing. On my way to the reception I pass Tom by the pool area entrance, before passing Natalia's bungalow and banging on the window. She is awake, and has been practising on the violin. I also meet some of the Australians again before departing.

The front seats of the shuttle bus that takes us to the airport are crammed full of suitcases. Dominic is concerned about this, as he has sensibly chosen to sit opposite them, where they will fall if the pile is too unstable. Fortunately, the suitcases pass the stability test, and we arrive at the airport safely.

At the airport we manage to check in with little trouble. There is some trouble with my suitcase – it has a hole in it, and they won't take it unless I sign to say that it is damaged. This doesn't take long though. Some of us then get some food – I have a tomato and mozzarella dish, after seeing two other people having the same thing.

¹⁷The Sierra Nevada de Santa Marta is a mountain range that contains the fifth most prominent peak in the world, though nobody is certain of which peak it is. Both Pico Cristóbal Colón and Pico Simón Bolívar have an elevation of about 5700m, and the higher of the two has a prominence of about 5000m.

The airport also has Wi-Fi, which I use. It has the curious property of having virtually no capacity most of the time, but every couple of minutes it is suddenly capable of transmitting large amounts of data instantaneously. I can find no reasonable explanation for this behaviour.

At the gate, I see the Norwegian team playing a variant of Set. They have laid out the cards in a two-dimensional representation of a $3 \times 3 \times 3 \times 3$ array, and are using these four coordinates as an additional four properties for each card. I am impressed that they have managed to find four sets despite these additional restrictions. Ingerid tells me that they only play this way to waste time.

Soon there is an announcement about boarding, and they have to clear the Set cards away. This is puzzling, as our plane hasn't even landed yet. However, the plane soon arrives, and before long we are on our way to Bogotá: the first leg of our journey home.

In Bogotá we eat a late lunch, and barely have time to finish it before going to board the plane. However, when we arrive at the gate, we discover that security would like to search my suitcase. This necessitates a walk to the far end of this portion of the airport, where the search area is located. There is a queue of five people outside the door, but because our flight is almost ready to depart, I am allowed to skip this. The search turns out to be a quick look at the items near the top of the suitcase. They also pull out my IOI silver medal from lower down. I then have to close my suitcase. This turns out to be rather difficult, until I have identified all the objects that they moved and returned them to their original spaces.

On the plane we are offered a meal in the evening. Unusually, I struggle to eat this. It could be because I had already eaten four meals in a day that will last for less than 24 hours. However, as I was almost falling asleep, I suspect the night spent awake may be to blame instead.

Monday 29th July

Our transfer through Madrid airport is a fairly familiar one. Indeed, we made an almost identical transfer while returning from the IMO in Argentina last year. We even eat at the same restaurant again. The main difference is that we don't first go to a different gate, and see the plane we were originally supposed to be on departing without us.

Matei is also viewed with some suspicion at both security points. This is because he is carrying an urn containing a suspicious looking substance. Gabriel tries to account for them, using an analogy to the cricketing Ashes. Once we've cleared security, Bev takes the Ashes off Matei, safe in the knowledge that she no longer risks being investigated for having them in her possession.

The remainder of our journey home is almost uneventful. However, just as we are about to touch down on British soil (or tarmac), the pilot opens the throttle, and we get to see an unusual aerial view of Heathrow Airport. While going around, the pilot informs us that our aborted landing was due to

the aircraft in front (an Azerbaijan Airlines Airbus A320) failing to clear the runway quickly enough.

On our second attempt, we land successfully, and before long we are all going our separate ways again.

Conclusion

Once again, this has been a highly enjoyable IMO. For this, and for my previous IMOs, there are many people to thank. However, unlike last year, I won't bother naming any of these people: you know who you are anyway.

It seems strange, after so many years of IMOs, that this is to be my last as a contestant. Hopefully I will continue to see many of the people I have met here in other contexts in the future. If I'm lucky, I may even get to go to the IMO again one day. Either way, my four IMOs have been amazing experiences that I shall never want to forget.