

BALKAN MO 2011: TOTALLY NOT THE OFFICIAL STUDENT REPORT

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[2016 Edit:

This is an unofficial report for the UK team's involvement in the 2011 Balkan Mathematical Olympiad, in Romania, by one of the students. This is an international maths competition involving typically 20 countries, of which about half are "official" nations taking part from the actual Balkan geographical area, and the other half are "unofficial" guest nations from other invited countries, which may differ from year to year. The UK sends their best team available under the self-imposed rule that nobody may enter this competition more than once. 2011 was the 28th Balkan Mathematical Olympiad, and unfortunately it was the first one which was only 5 days long, in contrast to all 27 previous ones which were 7 days long. A result of this was that there was far less site-based entertainment such as guided tours than there historically have always been. So we had to organise a lot of entertainment ourselves, instead of relying on entertainment provided by the event. "Entertainment", however, ought to be interpreted in a very loose sense of the word in both instances used in the last sentence. This is made clear throughout the report. This report was written in full in July 2011, with absolutely no further edits at all since then, except for spelling and grammar corrections, with the exception of adding this background paragraph in 2016. The Olympiad's official site was <http://www.bmo2011.lbi.ro/> but this link is now broken; it can still be accessed via Wayback Machine. Wow, my writing style has changed an absolutely incredible amount in the last five years. Oh, and finally: in the 2012 olympiad, apparently they had the full 7 days back, a significantly easier paper than ours, and not one, not two, but THREE swimming pools (in contrast to our 0). Now I'm envious.]

The Balkan MO was held in Iași, Romania, between May 3rd or 4th and 7th or 8th, depending on how you count it. The UK sent a team of 6 there, with the usual rule that nobody could go if they'd been before, so the team was selected as:

GBR1 James Aaronson
GBR2 Sam Cappleman-Lynes
GBR3 Martin Chan
GBR4 Sherry Jiang (not there)
GBR5 John Hyunjik Kim
GBR6 Joshua Lam

and the leaders were:

GBR7 Geoff Smith (Leader)
GBR8 Rosie Wiltshire (Deputy Leader)

and the football scores were:

Barcelona 1-1 Real Madrid (3-1 aggregate)

Man United 4-1 Schalke (6-1 aggregate)

The questions are available on the official report [27].

As you may have already seen the scores we obtained I make no allowances for spoilers so here they are:

SPOILER ALERT IN OPPOSITE LAND

Name	Q1	Q2	Q3	Q4	Total	Medal
James Aaronson	10	4	10	10	34	Gold
Sam Cappleman-Lynes	10	0	4	0	14	Bronze
Martin Chan	10	0	5	0	15	Bronze
John Hyunjik Kim	10	0	4	0	14	Bronze
Joshua Lam	10	1	10	1	22	Silver

What follows is **definitely not** the official student report. It's more of a diary-based item written from my own observations, detailing all the main events down to their little quirks and underlying bizarre themes that constantly recurred throughout the camp. If anyone wants to take ideas and stuff from this to create an official student report, they're more than welcome to. Same goes for editing this and posting it on the mailing list, but you're probably going to have to do a lot of editing to get it into any sort of reasonable format. And it's also way too long.

A NOTE ON DATE/TIME FORMATS

Time formats are given in **Swatch Internet Time**. Basically, Swatch Internet Time was an attempt made a while back in the nineties to decimalise time and avoid confusion over timezones. The meridian chosen is Biel Mean Time (BMT), and since Biel is in France, this corresponds to GMT+1, or equivalently British Summer Time. The day is divided into 1000 ".beats", yes, there is a full stop there, it's part of the spelling. So midnight would be @000 (yes it's written like that) and @500 would be midday and @100 would be 2:24 AM and so on.

Of course, an important difference here is that this is **invariant of timezone**. So if it's @680 in England then it's @680 in Tokyo and Los Angeles and Antarctica. This is because the whole point of Swatch Internet Time, as you can deduce from its name, is to provide an unambiguous way for people to meet up on the internet at any given time, so you won't have to bother with changing a specified time to your local time. To this purpose, there is no real need for anyone to be more accurate to the nearest .beat (86.4 seconds), so a .beat isn't generally subdivided anywhere. (I think fractional beats always round

downwards.)

Since Romanian time is 2 hours ahead of BST, if you want to convert all the @.beat notation used in this report to boring analogue time, you'll have to add 2 hours to get the local time. So for instance @250 would be 8 AM.

The date format here is just an indicator of how many days have passed since January 1st. So January 1st would be 0 and December 31st would be 364 (364 or 365 for the pedants) and so on. It makes date calculations a lot easier. This is, I think, completely independent of Swatch Internet Time, and it isn't invariant on timezone - you just take your local date.

If you like the idea and want all your internet sojourns to be timestamped in Swatch Internet Time with the additional date format, you can convert basically any internet forum to it by:

- Log in.
- Go to your profile and then "Board preferences" or similar.
- Change your timezone to GMT+0 WITHOUT DST. I'll explain this below.
- There should be a thingy in it that says "My date format:" Click the drop-down menu and select "Custom..."
- In the text box that appears type "z/Y @B", then save your preferences.

And there you have it. The reason for standardising your timezone is that for some obscure reason that I really don't understand - but I do believe it has a purpose - is that Swatch Internet Time ISN'T invariant of timezone if you change it. Now one subtle point. Because the meridian for Swatch Internet Time is GMT+1, not GMT, that means there's a bit of a mess-up between the z and the B. Just before 11pm GMT on, say, June 23rd 2011, the datetime would be 173/2011 @999, because of the 1 hour difference. But as it goes to 11pm, the date doesn't change because that's measured in your local time, so 11pm would be 173/2011 @000, and just before midnight would be 173/2011 @041. But only then does the date change, so shortly after midnight would be 174/2011 @042. Might be a little confusing at first - it was for me - but you'll get used to it. You won't fix this by altering your internet timezone since all that does is display what the datetime was X hours ago - so the date only ever changes between @041 and @042. But in the report below, Swatch Internet Time is standardised to BMT while the z is local, so the date changes between @916 and @917.

Swatch used to market watches that displayed Swatch Internet Time on them. These went out of circulation in the early noughties. I wonder why.

But the concept is still marketed on the Swatch official website:

http://www.swatch.com/zz_en/internettime.html

TUESDAY 122/2011

I arrive at the airport slightly late at about @680 because of somehow overestimating the speed of the London Underground. The rest of the team are there, with the exception of Sherry, whose whereabouts are as yet uncertain. We begin check-in shortly after, for our first flight that will take us to Bucharest later in the evening. It turns out that Sherry was unable to attend because she was rejected for a visa... again. So Great Britain are now a team of five.

But first, the general plan is to have lunch at an airport restaurant before we leave, knowing the "variable quality of Romanian food" [0]. The chosen restaurant is wagamama, where I reveal that the last (and only) time I went there I contracted food poisoning for a week. Geoff asks why I didn't mention that outside the restaurant and I reply that my voice wouldn't be heard over the majority vote. Not wanting to risk anything again, I decide not to order anything, since Team GBR already have one down, and we've barely started. (Note: If you're ever unfortunate enough to have to participate in a chess tournament while suffering the first symptoms of food poisoning, watch out for bishops. They are far, far more deceptive to the eye. [1])

Just before boarding the flight the conversation turns to various geometry-related topics such as what happened to Unit 11 of PEG? (If you have a copy, try looking at the contents page and...) And if you have two parallel portals, and thread a rope through one so that it comes out of the other one and tie it to itself, do you have a line or a circle? [2] Literally just before boarding the flight Rosie points out a distracting beeping noise from somewhere - and I realise it's coming from the alarm clock that ever so helpfully set itself to 250 beats modulo 500 - somehow - and had turned itself on. I very distinctly recall NOT setting it to 6 o'clock. Who the hell did that?! This must be The Curse Of The Magical Time-Travelling Alarm Hand or something - probably just as bad as the other IKEA one which went off randomly during a 20-beat period before it was supposed to go off - I'm rambling now. Gah. During the rather uneventful BA flight to Bucharest we get served pretty decent airline food - by which I mean pretty decent for an airline - by which I mean food that contains fewer than 10 E-numbers and fewer than 4 unidentifiable objects lurking around and fewer than 3 words on the description which I have to look up in the dictionary.

We land at about @900. Since we're in Romania right now, this is pretty late, verging on the cusp of midnight, and immediately move to...

WEDNESDAY 123/2011

... baggage collection, which passes without any difficulties. A coach then takes us to the RIN 4* hotel which, as Josh points out, has a Union Flag on the top which could be worth nicking, since nobody brought one with them.

Having never previously been to any hotel with more than three stars in my whole life, I am somewhat awestruck by the EPIC AMAZINGNESS of the entire place. As an example, they play classical music in the lifts that somehow harmonises with the phone ringing at reception so you can't tell that there's a phone

ringing until it gets picked up. Josh and John mention that in their room they found "interesting" channels on the TV as a consequence of flicking through them in order. After watching reports of Barcelona 1-1 Real Madrid (without any mention of brawls [3]) which sends Barcelona through 3-1 on aggregate, [4] I finally go to bed after a long day of travelling at about 10. (That's 10.beats, not 10 AM. So about quarter past 2 in the morning (local time (I hope you appreciate my totally accurate usage of brackets (I do (they're great(!))))))

After (collectively) waking up a bazillion times during the night we settle down for breakfast at the totally unearthly beat of @250, where we first sample Romanian food, and try working out what's edible and what isn't by sight, with limited success. We leave the hotel immediately after and arrive at Bucharest airport by coach in good time for the next flight to Iasi at @400.

While on the flight, the maths talk begins. I start by giving them a strange puzzle I found in some random place in the middle of nowhere: let ABC be a triangle with D, E on AB, AC with $\angle BAC = \angle ABE = 20$ and $\angle EBC = 60$ and $\angle DEA = 30$, find $\angle DEB$ using only Euclidean geometry and no measuring. [5] After a while the problem is returned to me, unsolved, with groans that they dislike the problem... I don't blame you, it IS really as annoying as Annoying Orange. [6] So Sam+James decide to get their own back by presenting an even stranger binomial coefficient sum directed at me to prove that it equals 1. Their grins from that side of the plane I interpret as a sign to not try too hard on doing it, and they tell me that it can be solved by rewriting it as a sum of probabilities of flipping coins in a certain way. At this point the fun begins. I reveal to them that I posted the exact same problem on MathLinks a long time ago except rephrased in terms of coin flipping - and I didn't recognise this in any way as being the same problem when James had rewritten it using a cunning integration trick as a sum of binomials. Sam then informs me that he actually got the problem from MathLinks in the first place by reading a post from "some random guy". O_____O. This is totally incredible. The irony of this is just sickening.

The rest of the journey passes uneventfully as the full force of this IRONY hits me in the face very slowly and it feels like being hit by an iron. WHAT?... I didn't... Did I just make that pun? I deserve to be shot. That was ATROCIOUS. I mean... It feels like being hit by a water balloon in slow motion, exactly like that time lapse YouTube video, which is included in the footnotes for the benefit of those who haven't seen it: [7]

We arrive at just before @450 and depart from Geoff and Rosie where they head their separate ways for the next few days, and take a coach to our own hotel, where we meet our two guides for the trip, whose names I have somehow embarrassingly forgotten. D:< (And I can't even remember whether there were 2 or 3 of them. Gah.)

When we get to the hotel it turns out that the rooms are each going to sleep 3 people. Now there are 5 of us and 3 doesn't go into 5 but it goes into 6 so we're now sharing one room with an Indonesian. Slightly surprising that the Indonesians are going to the Balkan MO. Sam and James greet him instantly upon seeing him. Well that's the room arrangements sorted out.

The hotel room's spacious, but not like the 4* RIN hotel we went to last night. (Shame.) But it's still a respectable hotel room, with TV and en-suite shower and all that. After watching snooker for a while we have lunch at some strange restaurant called "BOLTA RECE", where we'll be having almost every meal for the next four days. At first glance Romanian food looks rather similar to Hungarian food, but over the course of the trip differences will start to become evident.

In the afternoon we decide to pass the time at the local college library where nothing much happens except for people watching me play Tetris - and fail somewhat. (The MathLinks stuff can stay out of this, alright??) Attempts at exchanging money result in nothing once we discover that we need a passport to do that. After a rather pointless afternoon we return to the hotel where Sam and James are trying to make the aforementioned binomial sum even more obscure (I've had enough irony for the day, thank you!!) and, not wanting to do maths like the other two I play calculator tetris (see later on for an explanation) and clear 103 lines in 28 minutes (19 .beats). The Tetris God was being annoying today. He gave me 6 square pieces in a row. (Thou art a cruel... and ANGRY GOD! ... (LINE P---er, no...)) [8]

After dinner during which we find out that the Romanians' idea of a salad is fermented, James and Sam invade our room, leaving the Indonesian guy in the other room on his own, sleeping after a long flight, which is fair enough. The three of us order the two invaders to sit on the floor, and they comply under pain of torture. (Not really.) Any attempts at doing maths are soon banished by the TV turning on and Man United playing Schalke in a very one-sided Champions League semi-final where United effortlessly run out 4-1 winners on the night, 6-1 on aggregate. [9]

At @910 Josh announces that he's broken the shower door. Well done, Josh. *sarcastic applause* "Broken" would be an understatement. The shower door has totally come off its hinges. The day concludes with John trying to fix it with limited success until...

THURSDAY 124/2011

... well, about @930 or so.

At @950 I have a shower, and while doing so, sing an entire rendition of The Complete History of the Soviet Union Arranged to the Melody of Tetris. [10] When I emerge from the shower I observe that all my stuff has mysteriously gone missing, leaving a bare mattress and a lot of extra visible floor where my belongings used to be. Upon further inspection I notice that all my belongings and suitcase and the bed duvet and sheet and pillows and everything have for the most part reappeared behind the TV, with some stuff on the windowsill and/or next to the cupboard. After collecting my stuff together, with the exception of my trainers which are still unaccounted for, I go to sleep.

Somehow I managed to sleep through the night (I don't usually do this). In the morning at about @230 the 2 invaders ramble into the room again just as I'm looking for my trainers and I describe the story of last night to them. The trainers emerge under my bed... somehow. I swear they weren't there before!? Whatever. Presumably that would be the end of that. (Or not, as the case would be.)

After breakfast involving something that suspiciously looks and tastes like cheese we head off for the opening ceremony which starts at @310. It mostly involves a lot of chocolate and some leaders giving 1-minute speeches. (And they kept pronouncing the word "winner" as "wiener".) One of them (I think he was the Italian?) couldn't think of anything to say and simply asked for chocolate instead. After the opening ceremony and some group photos and chocolate given out and a lot of hesitation around what we're supposed to be doing (during which time all the food gets snatched up by everyone else. Nice move) we head back to the hotel, where I try and catch up on some shut-eye.

Not that I ever got to sleep anyway, but I get up at @440 to find that my chocolate has mysteriously vanished during my slumber. And it's not behind the TV. In the process of looking for my chocolate, my Pringles disappear also as mysteriously. I scour the room looking for said property without success, then go to lunch.

At lunch, mischievous plans are devised to make it look like we've eaten more food than we actually have. The traditional cover-everything-up-with-lettuce-leaf doesn't quite work because we have insufficient lettuce leaf to cover everything up. Pudding arrives and it's some bizarre sort of bread roll covered with sugar and what looks suspiciously like cheese. There's a hole in the middle. Josh's plan is to insert the uneaten gherkins in the hole to cover up their existence. Nice try, but that's way too risky. And you lot told me that this should go in the student report, so don't blame me if you're wondering why these silly stories are in here anyway.

At the hotel room I discover that my chocolate has walked all the way to the far side of the room and hidden itself inside a wall lamp, and that my Pringles have refrigerated themselves. I mistakenly think that this is the end of this, but as soon as I set foot in the toilet my chocolate migrates itself again with Josh's help (most probably, either that or it was John). Soon after we set off to the mall for a spot of bowling. Josh narrowly wins and I contemplate the existence of something else that I'm awful at. We mention the possibility of our bowling scores reflecting our eventual test scores modulo 41. (I'd get 35, woot. But James would have beaten me by three. Grrrowr.)

After dinner (This place has WAY too many dogs. D:< Seriously.) I spend a further 110 .beats or so looking for chocolate, and realise that I've probably expended more calories looking for it than there are actually in it. During my fruitless searching, I become increasingly frustrated, and eventually lose it and open a bag of airline pretzels and I pretzel Josh while he's trying to sleep. (Possibly the first recorded usage of "pretzel" as a verb in the history of the English language.) Besides Josh, everyone else finds this hilarious. The next few .beats are spent watching Josh clear his mattress of foodstuffs. I go to bed BEFORE midnight for the first time in ages.

FRIDAY 125/2011

After getting up I finally locate my chocolate early this morning under John's mattress at about @245. He's continually been denying that it's ever been there. Liar. After breakfast (which contains unclear

cheese... again) it's time to head off for the exam.

When we get to the exam room it turns out that instead of having one big room, everyone does the exam in separate rooms of about ten. Their food supply consists of 2 Snickerses, [11] a banana, an apple, and a bottle of water. (Frankly given all this, I'm not sure what the paper plate is there for. I mean, you don't need a paper plate if you're eating chocolate or fruit or water, right? Maybe the plate's edible in itself? Whoever gets to go to the Balkan MO next year might test out this theory. But I digress.)

The exam lasts from @312 to @500. (There aren't any clocks in there. Well at least not in my exam room. Not even boring old analogue 24-hour technophobic ones, let alone Swatch Internet Time-flavoured ones.) After the exam everyone meets up just outside the [What's the name of that exam building again?] and discuss how well we did. Looks like everyone's done question 1 and the easy part of question 3 (constructing the good set and showing that k is maximal); James is claiming full solutions to questions 1, 3 and 4, Josh has finished question 3; and I've guessed a construction for the latter part of question 3 which looks like it's the same as James's, but didn't have time to prove it. Nobody did question 2, despite James's 26 pages of... erm... stuff, which might pick up something if he gets lucky. James says that the paper was close to his ideal paper; Sam says it was far from his.

It transpires that during the exam James asked whether a prime counts as a prime power. The response was simply "YES". I also asked a question, as a joke concerning whether the word "trapezoid" in question 1 meant the American English or British English meaning. All I got in response was "A trapezoid, for our purposes, is a quadrilateral with at least one pair of parallel sides." Hmph. Well at least that continues the tradition of the British team submitting spurious questions. [12] (Just to clarify, in British English a TRAPEZIUM is a quadrilateral with at least one pair of parallel sides and a TRAPEZOID is an obscure, nowadays rarely used, word for a quadrilateral that ISN'T a trapezium. And in American English the two definitions are switched round.)

We leave the [unnamed place as above] and for the next while I have absolutely no idea where we're going until we get to BOLTA RECE again, via the hotel. At lunch Josh mentions that he found a lot of sesame in his hair during the exam. (That must have been really distracting for him. I mean, imagine you're doing an exam, right, and you're scratching your head, stuff falls out, and you discover (by experiment or otherwise) that it's edible! Om nom nom nom. I know they provided you with food, but finding a supply of food where you don't expect it might just keep you occupied for a while.) [13] We're about to leave lunch when the Kazakhs try and persuade us to stay for pudding. We decide to do so depending on what the pudding is. ... It turns out to be cheese. Instant synchronised 5-person-stand-and-flee.

We're taken to Geoff's place (Geoff's hotel has a sex shop about 10 metres' walk away from it. I wonder why.) where we tell him how we did. Turns out that the easy bit of question 3 is worth 4/10, more than what we'd thought, and that question 2 was hard because they didn't have any easy algebra questions (if I remember correctly). Geoff mentions that he thought the paper was harder this year.

We return to our own hotel at about @600 and, sensibly, take a rest. And yesterday Rosie bought enough Mars bars from some local supermarket (Or was it the mall? I don't remember.) for everyone to have 3 each, and they're being handed out. Unfortunately for me, Sam has jumped in on the act and decided that my 3 Mars bars are ideal targets for magic [14] disappearing tricks. I locate one of them instantly inside the huge pile of duvets, and another one some time later inside the toilet roll holder in Sam's bathroom, while inadvertently unravelling all his toilet roll in the process. The third one, as of yet, still remains out there.

At @706 John says "It's 3 minutes to 7. Shall we go to dinner?" At @707 everyone is just outside the hotel door only for us to realise that we've forgotten whether dinner was at 7pm or 8pm. By @708 we're back inside the hotel and find out that it's actually at 8pm. That was just embarrassing. We spend the remaining spare time playing whist by Sam's rules, which he insists are some official rules of some variation of whist. I personally think that he made up this variation himself. He denies this. We go to dinner for real at @748. (I know this paragraph is totally pointless. I just put it here because I was bored.)

While at dinner, all eyes turn to an amusing conversation (in English) between ITA2 Federico Borghese and FRA3 Baptiste Louf. The conversation begins with a typical discussion of what they bought at the mall that afternoon, then moves on to discussing whether France or Italy is better for sightseeing, then to their own national football teams (Zidane and the headbutt...) then to personal insults, eventually leading up to ITA2 saying to FRA3 "Your hair looks like Justin Bieber". OUCH.

So they were supposed to put on this disco in the evenings after the exam. The guides said that there were 130 people and the room was only meant to contain 60 so it might be full. We hesitate on whether we want to go, but I offer a suggestion in favour, since so far much of the collective entertainment experienced by the UK team has involved hiding all my stuff a lot of times, and I feel it's time for something different. So we get to the disco at @808 and find out that this "disco" is in a room next to the reception in the HOTEL. And it didn't have 60 people in it. It had exactly ZERO PEOPLE in it. Even the DJ himself was only there like half the time. Well that was a waste of time. I wonder what everyone else is doing. We spend a few minutes/.beats at the disco in a bit of confusion then return to our rooms (or "room", since the 2 invaders have comfortably housed themselves in it now), where I finally locate my third Mars bar on top of the big cupboard.

At @850 we go to the disco again only to find that the ONLY PEOPLE who are there are about a dozen of the guides and the DJ. The guides are at this point desperately trying to get us to dance. But there's still basically NOBODY THERE. We spend an hour there for no real reason, while Josh and John sort of join in, as do ITA2 and FRA3 plus a few others, maybe. I said zap a lot. Nothing much happened.

SATURDAY 126/2011

Back at the hotel room I sing the Complete History of the Soviet Union to Tetris [10] again out of boredom while carefully guarding my stuff. We watch a bit of TV and go to sleep. (Also, the Indonesian

person now seems to have vanished and taken all his stuff with him. This is bizarre. (Maybe Josh hid him behind the TV... (No, he's not there.))

@250 the next morning and I'm in a sort of comatose zombie-like state. In my opinion this is way too early to do anything that involves moving or thinking. My refusal/inability to get out of bed means that over the next 80 .beats Sam hides my suitcase and my trainers (both of which I retrieved), James hides my calculator (which I haven't yet), and Sam hides all the other stuff on the table like my oystercard inside the 3cm gap between the TV stand and the floor, then gives it back to me when he realises that there's no discernible way of me finding it. I also have 2 towels and 2 more Mars bars thrown at me to try to wake me up and James recites "I know a way to wake Martin up" a hundred million times. (Approximately. I lost count at around 77 million.)

Rosie enters and tries to get me up without success. Question 4 coordination is done and the marks are 10-0-0-0-1, so James is well on his way to a decent score. (Scores are given in the order of the list of students, as indicated by Geoff's text messages.)

So we go out sightseeing that morning for no real reason other than that the guides want us to do it and that there's nothing else to do here other than hide all my stuff. (For those of you who are/will be going to the IMO, although I've never been, I'm sure that there's going to be a lot more entertainment, like international frisbee tournaments, to name an example. I can guarantee you they're much more fun than hiding people's Mars bars. Or maybe that's just me. [15]) I don't remember much from this bit. All I remember is that we visited some church and some castle somewhere, that I forgot to bring my camera and what they look like. [16] I was still half asleep. I mean, come on, it's not even @400 yet.

Rosie receives two more texts from Geoff which say that Question 2 was coordinated as 4-0-0-0-1 and Question 1 as 10-10-10-10-10. Speculation arises as to where James's 4/10 for question 2 came from. Maybe the coordinators didn't want to endure reading through his 26 pages of algebra bash and just decided to give him some marks and get it over with.

We go to the mall and I try to grab some sleep again while we're in the coffee shop. This doesn't work but that means I'm still awake while all of YOU try to leave quietly enough so that I won't notice. Har har.

We take a few photos inside the posh hotel that the leaders live in. Geoff comes walking (The original text said "waddling", but I edited it) along with the question 3 results. 10-4-5-4-10. Gah. I was hoping for more than 5 with my guessed construction, but whatever. James's 34 is one of the highest marks ever; Geoff says it's a confirmed gold, while Josh is probably going to get a silver. Plus three middle-of-the-range bronzes, so overall a good result for Team GBR.

John claims to have a bit of a cold. This is all obviously down to wagamama.

So apparently rumour has it that one of the students from Montenegro came out of the exam thinking

that question 2 was really easy. This is, of course, the inequality that James bashed out for 26 pages and we haven't yet met anyone who's claimed a solution. Apart from him. His solution? It basically (not exactly but close enough) goes along the lines of: Add 0 to both sides, and use AM-GM on everything on the LHS and 0. This shows it's greater than or equal to 0. Epic win. If I were marking this I'd give it a comedy mark. (Or maybe a Special Prize for the silliest solution. Like the golden pen, but with silliness the criterion rather than length. [17]) (How Not To Write A Solution: #1)

James is commenting on his texts to his mum in the tram. He says he sent a message saying "I didn't even solve question 2" and his mum replied "Oh well I hope you're enjoying yourself there". She probably didn't get the message.

We get back to the mall at just before @490 and decide to have lunch at some Italian restaurant. The others order three pasta dishes and a salmon dish while I choose a pizza. When the food arrives it becomes clear that I'm going to be taking the longest over this one. As everyone else finishes, they all start staring at me eating, and John (I think) starts a running commentary over watching me eat as if it were a spectator sport. All of you really freak me out. It's somewhat creepy. 38 .beats later and I finally finish the pizza after Sam took 1/8 of it to speed things up. Sam points out that there exist "World's Biggest Burger"-type things where if you're at some restaurant and you finish this burger in one go you get free food for a lifetime [18], and he says that I could potentially manage that by eating very slowly indeed. (James points out that this will take me a lifetime.) (It's a bit like the theory that I can drink arbitrarily large amounts of alcohol by drinking it slowly enough that my liver digests it faster than I can actually drink it. However, the difference is that this has actually happened.)

At this point I'm wondering why there is a bouncy castle in the mall basement. Perhaps it's there to save those people who fall over the sides of the escalators, but this is merely speculation. At the same time, Sam is wondering what would happen to a snake if it went through a portal and tried to eat itself.

Back at the hotel I finally find my calculator under John's bed. The next 60 .beats or so are very uneventful so we go back to Bolta Rece at @625 for some meal that comes between lunch and dinner. By text message the medals are revealed as 1 gold 1 silver and 3 bronze - strangely everyone congratulates Josh on his silver before James on his confirmed gold. Sam finishes his meal and has the food taken away, then has the same meal returned to him again by someone who thinks he hadn't received it yet. He proceeds to eat the meal again. Also it is at this point that we see Teodor von Burg (Serbia, Balkan MO winner 2009 and 2010) on the other table with the Serbians, looking particularly glum for some reason. (I think.)

Back at the hotel at @670 Sam shows me a very quick way to complete my argument for question 3 to a full solution. Now I'm incredulous that the bit I missed could possibly be worth 5 marks. Maybe more like 1. Could've finished my solution easily enough in the exam if I had more than just a few minutes left and my brain hadn't turned into porridge, but finding the configuration without proof was certainly worth more than 1 mark. Growrrrr.

The closing ceremony for the Balkan MO has been moved back to @729 this evening, since some nations wanted to leave earlier tomorrow morning, so this is perhaps why we had dinner ridiculously early. (Aside note: If you look up the Balkan MO dates for the past few years, you'll notice that this year the Balkan MO was 2 days shorter than all the previous years in which it's been held. They used to have three full days of sightseeing and stuff, not just one. I have no idea why they shortened it, but I think it's a great shame. The more days off school I get, the better. So getting them to take ANOTHER half day off the schedule is, well, frown-inducing, for lack of a better term.)

At the closing ceremony scoresheets get passed around and it's revealed that James actually came 0th proper in the whole contest with 34/40. The next contestant was Omer Somebody from Romania A with 33/40. Well, congratulations to him; we decide to keep this a surprise and don't tell him, so he only finds out when they announce his name zeroth at the medal ceremony. And we contemplate not having any UK flags. Groan. Teodor von Burg surprisingly only got 23. Oh, and the medal boundaries were 30-17-10. Gah. 17 for a silver!? I'm just left ruing what might have been with my "solution" to question 3. So gutted. >:(Well - at least everyone in the UK team got a medal (well, everyone who's here) which is definitely a fantastic achievement in itself, and worthy of celebration. Come on, there's no need for floccinaucinihilipilification. [19] We also all received certificates accompanying our medals and guide books on Iași.

The ceremony ends at just after @770 and James is being made to appear in front of numerous cameras for being 0th while the UK team try to get group photos while he's not being chased by paparazzi. (Slight exaggeration there.) However, my eye turns to the far corner where a group of people are playing some classic tunes on the so far unused piano. I seize the chance and begin to play the Pokémon red/blue trainer battle theme tune [20] on the piano, which immediately attracts a lot of cameras, maybe even more than James did. Of course, the initial excitement fades slightly as they realise that the Pokémon battle theme is one of those tunes that loops round and never ends, and when I get halfway through my 4th iteration [21], John comes and tries to shut the piano lid on my fingers. I reopen it and proceed to play Tetris and Super Mario before the team threaten to board a taxi leaving me behind. This was probably my most significant contribution to the Balkan MO 2011.

After a taxi ride back to the hotel in the pouring rain and darkness, we arrive at @795, and the rest of the evening passes uneventfully enough with a lot of TV watching, Pringle eating, and Sam doing NPEG [22]. Sam also mentions that his bowling score and his test score are congruent mod 41. That's significant at the 5% level. Perhaps all the future Balkaneers from the UK should go bowling, because that way one team member is GUARANTEED to know what his test score is. That's been scientifically proven. [23] And the "disco" which was meant to be on tonight does not exist.

SUNDAY 127/2011

I go to bed at nine. (Beats.)

Nothing's scheduled this morning until the flight, because the closing ceremony was last night. John's

alarm wakes me up at about @230. I spend about 30 .beats lying in a comatose zombie-like state again and soon everyone goes to breakfast except for Sam who is still horizontal. I contemplate doing to Sam what I did to Josh the other day but with water instead of pretzels, but I decide against it.

Breakfast contains something recognisable as an omelette and... wait for it... NO CHEESE!!!!1!!1 WOW! For once we get a meal where we can work out what everything is. This is incredible. Sam is still horizontal upon our return.

We have about 60 .beats until we have to take our bags downstairs to the hall. Josh looks at the vast quantity of discarded empty water bottles strewn across the carpeted landscape/floor. He suggests that we use them for tenpin bowling. This idea quickly materialises in the form of 17-empty-water-bottle bowling with a nonempty water bottle as a bowling ball. I challenge Sam to one round and emerge 16-7 up at the end of it. Perhaps I'm not that bad at bowling after all. Well, practice makes perfect.

I don't think I should include here the bit about me walking slowly enough through a doorway to diffract by virtue of the de Broglie wavelength (and failing) [24], but if you want to put that in this report, go for it.

We leave the hotel room at just after @370, leaving behind 26 bottles of water (of which 9 contain water), and 3 packets of pretzels and a squished banana, which have been used to fill the flower vase for absolutely no reason at all. (The banana was mine. I took it from the contest but I haven't eaten a banana in ages and don't intend to start now.) (And it would later transpire that, though I was not to know this at the time, my pyjama trousers are still in the hotel room. Damn.)

We make our parting farewells to the guides (and FRA3, the well-established Justin Bieber doppelgänger, is there to meet us at the hotel exit before we board our minibus). After a quick minibus journey (with Geoff and Rosie) to the airport, we await our first flight to Bucharest. I show Geoff my question 3 almost-solution. He explains that, although the construction that I'd guessed was correct, the thingy that I'd written at the end of my solution that says "(I haven't proved it yet)" killed it off. And apparently that's cause for the coordinators to attack a script. What... I thought they did positive marking, like they do in A-Levels. Personally I think this rule makes as much sense as eating pizza on the toilet just because you traded your TV for some magic beans. [25] But there's nothing I can do about it now. It sort of compares with Tom Lovering's IMO 2007/3 solution which says "Is this a line? Is this useful? Probably not" and got 2/7. Grrrowrrrrrr. I'm slightly depressed now, to the extent that I don't bother eating the airport ice cream. (How Not To Write A Solution: #2)

Flight to Bucharest takes off at about @450. After the initial turbulence dies down, along with Sam's attempts to try and get me to do 3-D Euclidean geometry for which I will definitely not have any sort of use in the rest of my entire life [26], I whip out my calculator and a piece of paper and a pen, and proceed to use the calculator to generate random integers between 0 and 6 which correspond in a predetermined fashion to Tetris blocks, and draw them on the paper, crossing out lines as they're cleared. For those who don't already know, this is called Calculator Tetris. (Its greatest use is to pass

time in exams once you've already finished. I managed to get my entire physics set to do this in C3 in January. I won with 36 lines cleared, and still got 100%.) Geoff looks over my shoulder. "That's ridiculous, Martin," he says. Perhaps he'll understand once I explain the rules to him, and its usefulness in exams. Well, maybe. His official report doesn't say much. [27]

38 lines in 13 minutes (9 .beats) is slightly slower than my usual pace, mainly because of the turbulence. We arrive slightly ahead of schedule and have ages until the next flight, and this time is spent playing silly word games and...

At some point during check-in, Josh asks me what my favourite song is. Cue pandemonium. Of course, my favourite song could be none other than "999 springs to flush down" from the Simpsons. [28] Now Sam gets the reference, and starts to continually sing it in unison with me, and I can tell you that having 2 people singing this infamous song is A LOT more fun than just doing it yourself (like I did in Italy during the team maths challenge last year...) and it's also considerably MORE annoying for the observer. So we get all the way to 953 springs to flush down before Geoff decides to veto any singing of recursive verse until he's out of earshot. [29]

We have lunch at Burger King. Of course, everyone can at least agree that Burger King food is better than BOLTA RECE food. For one thing, at least we know what we're eating.

During the return flight (which lasts over 130 .beats...) I try to catch up on some shut-eye again but fail miserably. Nobody else is doing anything, so at @730-ish I grab my Calculator Tetris kit again and go for it. This time, though, the Tetris God [8] was being generally favourable, in that He didn't give me a sequence of blocks that was too annoying, and He always granted my line piece within a short while of my necessitating it. I cleared 117 lines in half an hour (21 .beats), then the aircraft lands and I'm now back in England.

Almost on the instant of arrival, Sam stirs up conversation by asking, "How many springs did we get to?" I reply "953", and you can probably work out what happened next. Geoff says, "I'm not out of earshot yet," but his tone of voice definitely suggests that he's basically resigned to let us torture everyone with our recursive verse.

At the arrival lounge, at about @765, Geoff hands out certificates of participation to everyone, amongst general laughter and jokes of how it's the taking part that counts. And with this presentation, we all depart our separate ways, and this marks the end of the Balkan MO 2011, characterised by Sam and I singing against the backdrop of the airport, "You flush one down, it swirls around, 907 springs to flush down."

Credits

Thanks to:

Er... well, Geoff for acting as UK Team Leader and fiercely doing all the coordination for Team GBR; and Rosie, for acting as Deputy Leader and buying us all Mars bars; and the UKMT in general for doing all the admin stuff, including James Cranch for acting as a supportive contact and following the drama as it unfolded; and our guides (whose names are 404 Not Found) for providing various ways to entertain ourselves before and after the exam, that don't involve nicking my stuff; and all the other people who organised the Balkan MO 2011 and made all this possible (names not included); and to James, Sam, John and Josh for being great company and [sarcasm] organising a lot of very entertaining hide-and-seek games involving my suitcase (twice), Romanian chocolate bar (twice), Mars bars (thrice), trainers (twice), calculator, Pringles, water bottles and oystercard. [/sarcasm] [30]

References, footnotes, and other supplementary stuff:

[0] Ed Godfrey.

[1] This is personal experience...

[2] <http://www.blameitonthevoices.com/2010/04/straight-line-or-circle.html> - Portal is a video game. For those who aren't aware, "portals" are coloured orange or blue, and exist in pairs such that any object moving through a portal will emerge through the other portal in the direction in which it is pointing. Conservation of magnitude of momentum applies, but not direction.

[3] This was the second leg of the semi-final. The first leg, which Barcelona won 2-0, was marked by one of the most famous brawls in recent footballing history.

[4] I also got distracted by the availability of room service, the safe, mini-bar, brushes, sewing kit (?!), 6 towels, fake plants, previews of Man U vs Schalke FC, and the incredible fact that the shower actually works for once.

[5] Found in some random book on computer programming, although this has nothing to do with programming. The silly "rules" are not mine.

[6] http://www.youtube.com/watch?v=ZN5PoW7_kdA - The Annoying Orange

[7] <http://www.youtube.com/watch?v=90VyvOhPmA0> - Time Warp - Water Balloon to the Face

[8] <http://www.collegehumor.com/video/5767906/the-tetris-god> - The Tetris God

[9] Man United won the first leg 2-0. Barcelona were to beat them 3-1 in the final and win the Champions League.

[10] <http://www.youtube.com/watch?v=hWTFG3J1CP8> - Complete History Of The Soviet Union, Arranged To The Melody Of Tetris

[11] <http://answers.yahoo.com/question/index?qid=20080926070053AALKpCr> - What's the plural of "Snickers"?

[12] Remember 2009 IMO and the whole "What is a grasshopper?" saga...

[13] Writing the bit in brackets was not my original idea. I am most definitely not THAT crazy. That was someone else's interpretation of the quote.

[14] Not.

[15] Source: Other people's IMO student reports.

[16] Latin/Greek students might like the use of zeugma in this sentence.

[17] Golden Pen: Traditionally awarded for the longest/ugliest UK solution that is actually correct. There weren't that many golden-pen-worthy solutions here. John's one-page trig bash to show that the angle between a median and the opposite side of similar triangles is the same is basically all we've got.

[18] These do exist, but I can't reference any.

[19] Keep this word, so I can get credit for the longest word ever used in an Olympiad report.

[20] http://www.youtube.com/watch?v=2Jmty_NiaXc - One of the best video game tunes ever.

[21] Or 3rd, if you count from 0th.

[22] New Problems in Euclidean Geometry, by David Monk.

[23] <http://xkcd.com/882/>

[24] Wave-particle duality: the de Broglie wavelength of something is given by h/mv where h is the Planck constant. If this wavelength is comparable to the size of the gap which you're moving through, you get diffraction. This explains electron diffraction. So if I'm moving through a doorway that's 1 metre wide, and my mass is 51 kilos, then I'd need to be moving at about 1.3×10^{-35} m/s. Tricky, this.

[25] On rereading this, I have absolutely no idea why I wrote this sentence. If you're wondering whether it makes any sense, it's not supposed to, I think.

[26] Andrew Hyer: "Any geometry problem can be solved by putting it into Cartesian coordinates and feeding it into a computer. Therefore geometry is pointless." He says he got the quote from someone else, but I don't remember whom.

[27] <http://www.imo-register.org.uk/2011-balkan-report.html>

[28] In the Simpsons episode "The Old Man and the 'C' Student", Bart ruins Springfield's chances of hosting the Olympics, and the 1000 springs that Homer bought to act as an Olympic mascot therefore have to be disposed of, once he can't find any use for them. So he flushes them all down the toilet while singing "999 springs to flush down". Soundclip can be found here: <http://springs.ytmnd.com/>

[29] There was a paper published once about songs like this, in which it was proved that the complexity of songs like this is $O(\log n)$. It's definitely worth a read. You can find it here: http://www.cs.utexas.edu/users/arvindn/misc/knuth_song_complexity.pdf

[30] On internet forums, [...] and [/...] are bbCode tags used to format text. So for example, [b]something[/b] would appear as **something**. [sarcasm]Obviously the sarcasm tags exist.[/sarcasm] [30]

Random pointless statistic

For every possible mark out of 10, there existed at least one person who got that mark on one of the questions, and a total score of 21. The number 21 is also the unique number with this property.

Quotes

Martin: "Let's all wake her [Rosie] up in the middle of the night. You [Sam] do 1AM, you [James] do 2AM, I do 3AM, you [John] do 4 and you [Josh] do 5."

Rosie: "Martin, do you value your life? 'Cause you're not going to have much of it left if you wake me up tonight at 1, 2, 3, 4 and 5." (Wednesday evening)

Sam: "Unidentified meat in unidentified soup with unidentified floating bits followed by more unidentified meat with unidentified something else... as in something that's going to be cheese." (Friday night)

ITA2 to FRA3: "Your hair looks like Justin Bieber." (Friday at dinner)

Josh: "I found a lot of sesame in my hair during the exam. I wonder why." (Friday at lunch)

Josh: "Let's nick all his stuff." (Saturday morning while I'm not up yet)

Josh: "I think I've broken the shower door..." (Wednesday night)

Sam: "If a snake went through a portal could it eat itself?" (Thursday at the mall)

James: "I know a way to wake Martin up." (Saturday morning, about 100000000 times)

John: "It's definitely NOT there." (Thursday evening. He meant that the chocolate wasn't under his mattress. Well guess where I found it...)

Martin: "If you're really small you can run under the hurdles." (About how to win Olympic hurdle races, Saturday evening)

Geoff: (Trying to pronounce wagamama.) "Wamagama." (Saturday morning)

James: "Why is Martin crazy?"

Sam: "That's an RMM6-level problem."

Martin: "That's an unsolved problem." (Friday night)

Sam: "How do you get Pikachu on a bus? Pokémon."

Martin: "That was the worst joke. Ever."

Sam: "Thanks for your feedback. Do you know any better Pokémon jokes?"

Martin: "Why shouldn't you take a Pokémon into the shower? Because it might PIKACHU!"

Geoff: "Hm."

James: "See, even Geoff approves."

Geoff: "My 7-year-old daughter would like that."

Sam: "That was even worse than my joke!" (On the flight back)

Sam and Martin: "999 springs to flush down, 999 springs, You flush one down, it swirls around, 998 springs to flush down!

998 springs to flush down, 998 springs, You flush one down, it swirls around, 997 springs to flush down!

997 springs to flush down, 997 springs, You flush one down, it swirls around, 996 springs to flush down!

996 springs to flush down, 996 springs, You flush one down, it swirls around, 995 springs to flush down!

995 springs to flush down, 995 springs, You flush one down, it swirls around, 994 springs to flush down!

994 springs to flush down, 994 springs, You flush one down, it swirls around, 993 springs to flush down!

993 springs to flush down, 993 springs, You flush one down, it swirls around, 992 springs to flush down!

992 springs to flush down, 992 springs, You flush one down, it swirls around, 991 springs to flush down!

991 springs to flush down, 991 springs, You flush one down, it swirls around, 990 springs to flush down!

990 springs to flush down, 990 springs, You flush one down, it swirls around, 989 springs to flush down!

989 springs to flush down, 989 springs, You flush one down, it swirls around, 988 springs to flush down!

988 springs to flush down, 988 springs, You flush one down, it swirls around, 987 springs to flush down!

987 springs to flush down, 987 springs, You flush one down, it swirls around, 986 springs to flush down!

986 springs to flush down, 986 springs, You flush one down, it swirls around, 985 springs to flush down!

985 springs to flush down, 985 springs, You flush one down, it swirls around, 984 springs to flush down!

984 springs to flush down, 984 springs, You flush one down, it swirls around, 983 springs to flush down!

983 springs to flush down, 983 springs, You flush one down, it swirls around, 982 springs to flush down!

982 springs to flush down, 982 springs, You flush one down, it swirls around, 981 springs to flush down!

981 springs to flush down, 981 springs, You flush one down, it swirls around, 980 springs to flush down!

