

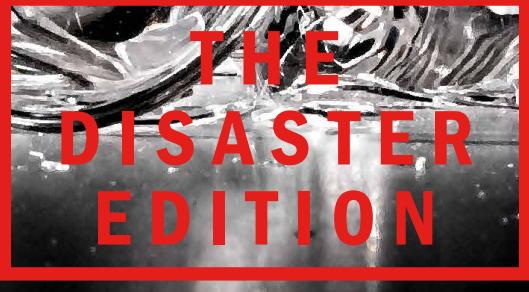
STUDY ASSOCIATION

G E W I S



SUPREMUM

VOL 52 N° 0



THE
DISASTER
EDITION



EDITORIAL

DISASTER. That's one way to describe the previous Supremum edition. It arrived early this academic year, instead of late last year, mainly due to a summer break and a shortage of members. Therefore, we have named this edition of Supremum the disaster edition: to remind ourselves, our readers and our writers of disasters in their life, to reflect on it and to work on it.

EDITOR IN CHIEF Anne Nijsten

For us, this means that we have yet another year until the summer break disturbs the academic life. And, more importantly, we got many newly interested people who want to contribute to this magazine. We are always looking for more members, however. So, if you are curious what Supremum is about and maybe interested in helping us to create the next editions, let me know!

For you, this means you have survived the first months of the academic year, and now have some time to explore what GEWIS members, the M&CS department and companies want to share with you. Have fun reading this edition!

P.S. The answer to the strawpoll is 'Vruchtenhagel'.

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CHAIRMAN'S NOTE

To adhere to the theme, I could write an article that is a complete disaster. Instead, I will write about disasters and how you can try to avoid them. But what is a disaster? How does a disaster become a disaster? How to avoid a disaster? And when you cannot avoid it, how can you solve the disaster?

TEXT Kees Voorintholt

At the moment of writing, already three months have passed since the start of my board year, but it does not feel like that yet. The whole board is still very motivated and full of energy for the rest of the year, which is the basis to avoid disasters. We did not encounter any disasters yet during our board year and in the upcoming nine months we hope this will stay the same.

“ The whole board is still very motivated and full of energy for the rest of the year ... ”

But before I can tell you how to avoid a disaster, it might be helpful to explain what a disaster is for me. A disaster for me as chairman is a problem that does not get tackled in time and grows to a much bigger problem than it originally was. For example, one of my tasks as chairman is to make sure the board keeps functioning well. Disaster would be a moment that some of the board members would not want to work together, if a discussion that was not resolved in time. To avoid the disaster, the discussion should be resolved in time, this requires energy and time and it is not the most fun thing to do during your board year. But when you will leave it, in the end it will require much more time and energy to have the board members work together again and solve the disaster.

“ ... as a team, you're stronger than alone . ”

Like I just said, avoiding a disaster requires energy and time, but for every disaster it is different how to tackle the problem. There is only one similarity, which is that you should be proactive and take your responsibility. When I find a problem, the most important thing to do first is to get more information. In case of a discussion, try to find out the arguments of both sides and find out what they want. The next thing to do is acting on the information you received. You could start the conversation with both parties to solve the discussion. If everything works out, you avoided a disaster and then you can be proud on yourself.

There will be moments, probably for me during the upcoming 9 months as well, where the disaster cannot be avoided, despite the effort you put into it. This is not a problem if it does not happen all the time, you will gain a lot of experience and might learn something for the rest of your life from disasters. So, don't be afraid to encounter a disaster once in a while and ask for help in case you do, because as a team, you're stronger than alone.

FROM THE DEAN COUNTDOWN TO DISASTER

The theme of this Supremum edition has a Latin and Greek origin, meaning “ill-starred”. So, it seems fitting to take a look at the role of mathematics and computer science in (preventing) disasters in space. Probably, it is better to say “the role of mathematicians and computer scientists”. Human error is still more often than not the cause of great misfortune. Take the infamous example of NASA's Mars Climate Orbiter. In 1999 the \$125 million spacecraft burned up in Mars' atmosphere. One software module calculated the force the thrusters needed to exert in pounds of force. A separate piece of software took in the data assuming it was in the metric unit newtons. A costly mistake, but at least no human lives were lost.

TEXT dr. Robert van der Drift (managing director)

Our space exploration began just a few decades before. We all remember the name of the first human on the moon. Apollo 11 took Neil Armstrong there for his one small step. But who recalls the name of the woman that made it all happen? Margaret Hamilton was director of the Software Engineering Division (by the way, Margaret was one of the persons to coin this term) of the MIT Instrumentation Laboratory, which developed the on-board flight software for NASA's Apollo space program. The task of her team was daunting. Imagine the assignment for your Software Engineering Project would read like this: create a program that brings a rocket with humans into lunar orbit, lets two of them descend in a module to the surface of the moon, takes them back up and back to earth. Alive. So imagine having to write software that works the first time it runs, and run perfectly, or people will die. Oh, and your computer has only 2048 words of erasable magnetic-core memory and 36 kilowords of read-only core rope memory.

They made people land on the moon with a computer that had about 0.08 percent of the processing power of a present-day mobile phone with only 145,000 lines of code (Google has about 2 billion lines). Now, in some movies it looks like Neil and his crew prevented disaster by overriding the software and taking manual

control. The hero saves the day! The truth is that a “program alarm” in the lunar module known as “error code 1202” brought Mission Control within seconds of scrubbing it. What happened? During training and simulation for the mission, this code had never come up. Anxiety levels rose quickly in the lander. It turned out to mean “too much information”. Neil and his team had left the radar on, which together with the other landing tasks, generated too much information for the computer to process. Luckily, MIT had invented a nifty little routine. The programmers had anticipated this overloading might someday occur, and so had established a system internal aspect that would automatically do a fast reboot and then a memory restore to try and get the computer back underway prioritizing important tasks. The rest is history.

In the decades that followed, humans have celebrated enormous space successes and seen some expensive failures. Landers on Mars, samples of distant comets brought back to earth, and high-resolution images of Pluto, a once famous planet. None of this would have been possible without software. Let's share some of the spotlight!

EDUCATION FIRST

Oh boy, it's that time of the year again. First-year students are starting to get used to life at the university, while senior students are trying their best to remain motivated for the rest of the year. The first exams of the year have passed and their results have set the tone for the rest of the year. In the meantime, every mathematics student is contemplating ending it all because they have to try Analysis 1 for the n th time (with n larger than acceptable).

TEXT Bas Gieling

Amidst all this stress, there is one thing that will make your day: watching first-year students run around trying to find out where their next instruction or lecture is. So, especially for all the first-year students, here is a quick quiz that may help you get around the campus just a little bit more easily.

QUESTION 1: MY INSTRUCTION IS IN ATLAS ON FLOOR 4, WHAT DO I DO:

- A. I take the stairs like the sporty person I am!
- B. Where's the elevator? My already exhausted body couldn't even make it to floor 2 using the stairs.
- C. I make my FYC chairman carry me up the stairs.
- D. "Atlas"? Can I eat that?

QUESTION 2: I'M IN AUDI AND I HAVE TO GO TO VERTIGO, BUT IT'S RAINING... WHAT DO I DO:

- A. It's only 106,45 meters, I'm not made of sugar, I can handle the rain!
- B. I take the 4,2435 times longer route through the walking bridges via Atlas, Meta and Matrix. I could use the extra exercise anyway.
- C. I don't go at all and I start boycotting the building Vertigo as a whole, because their stairs at the entrance suck.
- D. "Verti-what?"

QUESTION 3: THE CHAIRMAN OF MY FYC HAS RESERVED A ROOM IN "IPO" (??) FOR THE MEETING. WHAT DO I DO:

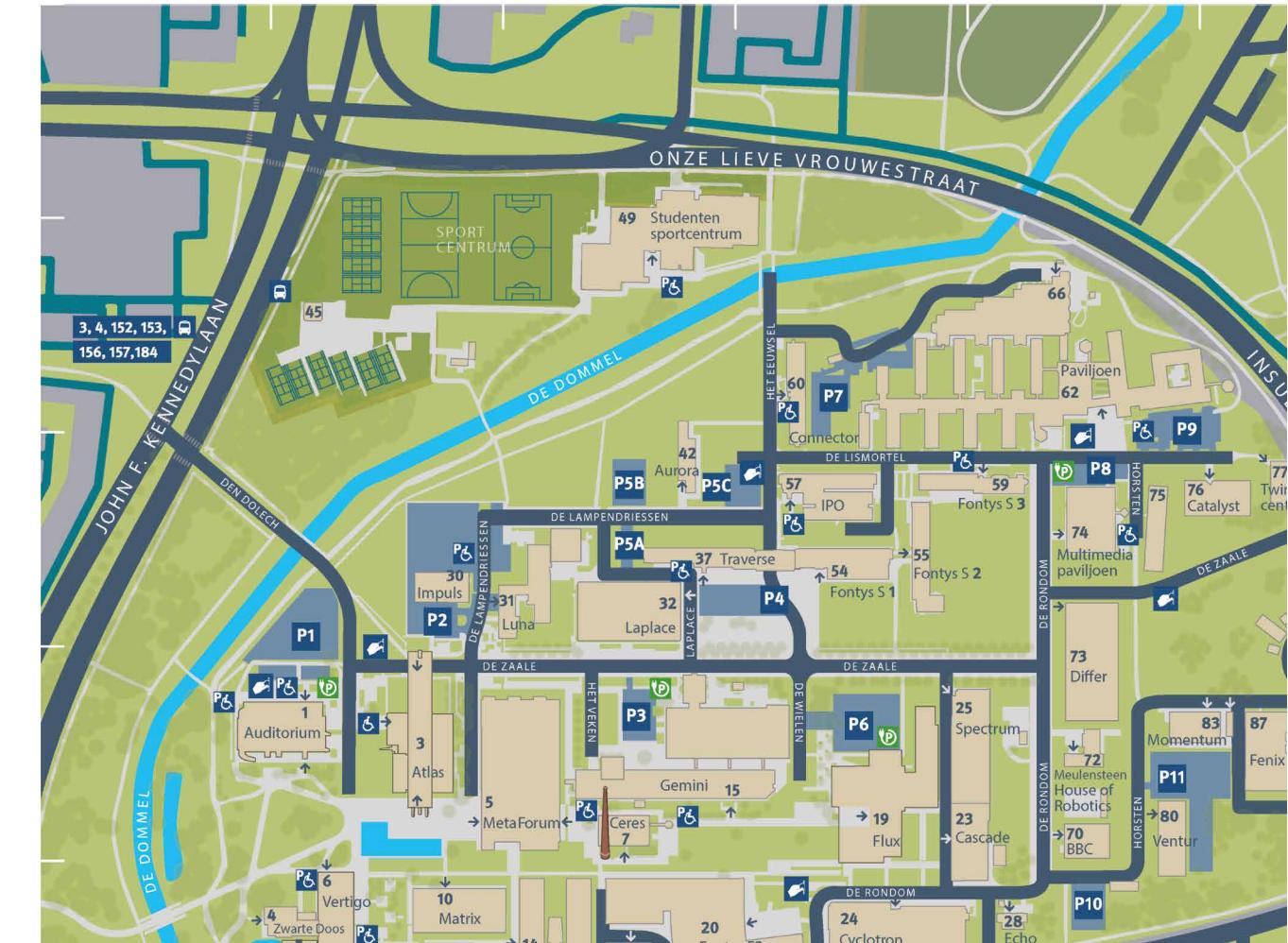
- A. I ask fellow students where this interesting sounding building is located and I take some extra time in advance to find the room I need to be.
- B. Depose him, the clown!
- C. Lol my chairman is too incapable at life to even reserve a room.
- D. "IPO"? Is that an illness?

QUESTION 4: I HAVE TO BE IN "HELIX WEST 1.21", WHAT DO I DO:

- A. I use the compass that I always have with me to determine the wind directions and choose the proper side of the building this way.
- B. I let fate decide which class I'll follow today and use a coin flip to choose left or right.
- C. That building contains more deadly chemicals than my grandmother's underwear drawer.
- D. "Helix"? Sounds like a cat name.

QUESTION 5: MY WORKSHOP IS IN "INNOVATION SPACE", WHAT DO I DO:

- A. I'm a computer science student so I stay as far away as possible from something called "Innovation".
- B. I think I remember giant "Innovation Space" RGB letters on the front of some building, that's probably it.
- C. I go to Innovation Space but instead of going to the workshop I join a student team.
- D. "Innovation Space"? Give me back the old Matrix!



QUESTION 6: I'M IN GEMINI AND I'M REAAAALLY HUNGRY, WHAT DO I DO:

- A. I steal my FYC chairman's lunch.
- B. I use my FYC chairman's bank card to buy food at the OG Spar in Luna.
- C. I eat my FYC chairman.
- D. "Gemini"? Sounds like a place where my FYC chairman would reserve a meeting room, as far away from GEWIS as possible.

QUESTION 7: I HEAR A SENIOR STUDENT TALK ABOUT SOMETHING CALLED "PAVILJOEN", WHAT DO I DO:

- A. I ask the friendly chap what "Paviljoen" is.
- B. Run and hide. I've heard about this place before and I believe they eat babies there.
- C. I ignore him. I don't like people.
- D. "Paviljoen"? Is that what the "P" in "PTSD" stands for?

Studying at a university on a campus takes some getting used to. Having to run around from one building to the other may sometimes seem very tiring and it could take up a lot of time. Most of the time is lost trying to find your own way around though; the golden tip here is to just ask fellow students! Especially senior students will often know where to be, so don't hesitate to ask them.

Just like asking practical questions to your fellow students, asking me any educational questions may make your life a lot easier too. Just walk by in the GEWIS room, approach me at a Thursday "borrel" or send an e-mail to co@gewis.nl. You can also use this e-mail address to send me your answers and explanations to the quiz. In return, I'll send you the "correct" answers!

SUPER-SNELLE PERFORMANCE DANKZIJ SERVER-SIDE RENDERING MET NODE.JS

Dat het gebruik van JavaScript en technieken als Angular, Vue en React in front-ends enorm in populariteit is gegroeid, is alom bekend. Vanuit user experience ook wel terecht. Je ontwikkelt met JavaScript dynamische, interactieve applicaties met een moderne, onderhoudsvriendelijke architectuur. Wellicht iets minder bekend is dat JavaScript, dankzij Node.js, tegenwoordig ook aan de serverkant kan worden gebruikt. Verbeterde support en groeiende populariteit van het Node.js platform hebben daar sterk aan bijgedragen. Inmiddels is het cutting edge technologie dat vooral op performancevlak applicaties sterk kan verbeteren.

TEXT ISAAC

WAT IS NODE.JS?

Op softwareplatform Node.js ontwikkel en draai je JavaScript applicaties. In tegenstelling tot veel andere JavaScript-toepassingen, worden deze applicaties niet uitgevoerd in de browser maar op de server. Node.js maakt hierbij gebruik van de JavaScript engine V8, die ook wordt gebruikt in het populaire Google Chrome. Door het JavaScript-ontwerp komt Node.js specifiek goed tot zijn recht in real-time webapplicaties en in applicaties die real-time grote(re) hoeveelheden data requests moeten verwerken. Voorbeelden van grote spelers die Node.js voor hun diensten inzetten, zijn onder ander PayPal, Netflix, eBay en Walmart.

DE KRACHT VAN SERVER-SIDE RENDERING MET NODE.JS

Node.js vult een belangrijke behoefte in: ontwikkelen van snelle, schaalbare applicaties. Het past bijvoorbeeld uitstekend binnen een microservices architectuur. De belangrijkste voordelen op een rij:

SUPERIEURE PERFORMANCE:

het client-side renderen van een pagina kan soms lang duren, zeker op mobiele devices. Iets dat automatisch leidt tot een slechtere gebruikerservaring. Door de pagina al te renderen aan de serverkant laat je gebruikers minder lang wachten. Op conversiegerichte pagina's heeft dat uiteraard direct een positief effect.

ZOEKMACHINE GEOPTIMALISEERD:

door pagina's server-side te renderen, zijn pagina's beter indexeerbaar voor zoekmachines. Dat in tegenstelling tot client-side rendering, dat web crawling door bots kan vertragen. De structuren van de pagina's zijn immers slechts leesbaar voor bots. Server-side rendering met Node.js tilt SEO en conversieratio's naar een hoger level.

HYDRATION:

met de inzet van Node.js haalt de browser na de eerste keer pagina laden alleen nog data op die nodig zijn om voor gebruikers de pagina te updaten. Het mooie aan Node.js is dat het dezelfde codebase kan gebruiken als de front-end, in tegenstelling tot bijvoorbeeld .Net,

PHP en Java omgevingen. Zo heb je de voordelen van server-side en client-side rendering in één.

NODE.JS IS CONTAINER-READY:

met het lichtgewichtige, modulaire systeem van Node.js ontwikkel je losstaande, schaalbare applicaties. Die modulaire architectuur gaat perfect hand-in-hand met een microservices architectuur en containers.

BACK-END-VOR FRONT-END & MICROSERVICES

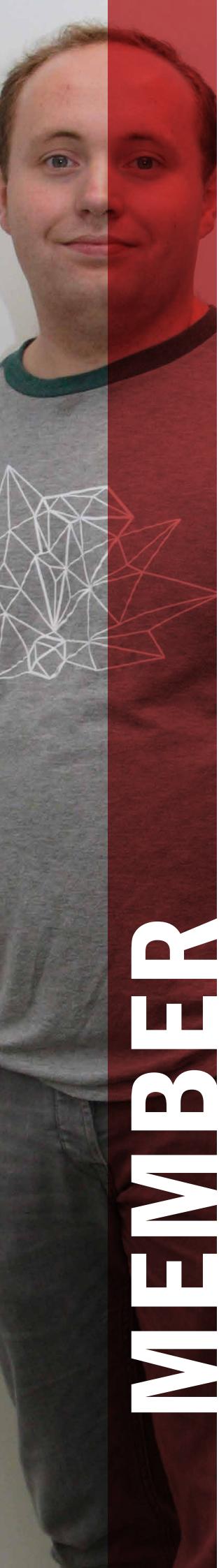
Kenmerkend aan Node.js is de mogelijkheid tot calls naar allerlei typen APIs. Je kunt Node.js eenvoudig inzetten als 'back-end-voor-front-end' (BFFs). In deze opzet worden kleine, losstaande APIs ontwikkeld die zijn geoptimaliseerd voor specifieke front-end onderdelen van de applicatie. Dit ontlast de back-end ontwikkelaars en biedt mogelijkheden tot optimalisatie voor specifieke use-cases. In de praktijk zet je met zo'n architectuur een stuk sneller en flexibeler (nieuwe) proposities in de markt. Het werkt bovendien ook uitstekend wanneer je een snelle website, aanvraagstraat of portaal wil neerzetten met een zware back-end. Geheel passend in een microservices architectuur: laat applicaties doen waar ze goed in zijn. En Node.js is bij uitstek geschikt om BFFs te hosten en om front-ends te renderen en daarmee de performance van applicaties sterk te verbeteren.

“ Geheel passend in een microservices architectuur: laat applicaties doen waar ze goed in zijn. Node.js is bij uitstek geschikt om front-ends te renderen en daarmee de performance van applicaties sterk te verbeteren. ”

- Ralph, Senior Front-end Developer, ISAAC



ISAAC



WELCOME ALL TO RADIO GEWIS!

With this phrase, Ingmar opened radio GEWIS at 8 o'clock on intro Monday. At first, we had no idea whether it was actually working or not. Let's be honest, if anyone told us that we would build and host a radio station for a week, we would have laughed them out of the room. Even better, we laughed ourselves out of the room when Ingmar and Sabine presented their idea at the borrel after the General Members Meeting. But after a couple of beers, people start to overestimate themselves and before you even notice you are two Whatsapp groups richer. What have we gotten ourselves into...

TEXT Wout de Ruiter

Three months left – The disaster theme of this Supremum is a great fit with the goal of creating a radio station, basically we only had a fun idea and no clue of what we needed to do to achieve it. The only thing we knew was that we needed to play songs and talk a bit. Covered! Ok, sound over the internet, interaction with people, and some content that rises above the daily weather conversation. Cover.... oh wait... We knew that Thomas had some knowledge about sound and recording, Bram and myself knew how a computer worked, Sabine and Ingmar smiled very smiley, but this was nowhere near what was necessary. Basically we were doomed, but still, three months to get it fixed. Plenty of time left!

One month left – Every stupid idea needs to start at some point and secretly we wanted this just too much. And with only a month left we really had to start with something. And we did. We recorded a couple of fun jingles over a couple of beers. Because these are the high priority issues if you still have no clue on how to create a radio station... But the jingles were very nice!

Five days left – A lot happened in the meantime. With our big mouths we told everyone we were going to make radio, we had lined up a sponsor, had an idea about some content, spent some GEWIS money, and

we had a vague understanding of how to broadcast and what equipment we needed. So at the borrel on the last Thursday before the intro, we were pretty happy with ourselves. Besides, we still had plenty of time left to handle the remainder of the work.... oh wait, that was a lie. Content schedules, music playlists, studio equipment plan and digital plans were still in the early phases. Maybe we were procrastinating a bit too much...

Interim till Monday 8 o'clock – Ok, we needed to actually do the work, so we worked around the clock to get all equipment to GEWIS, made broadcasting plans, created a website and streaming platform, hooked up a full studio in the lounge, basically everything normal people do way in advance. And when Ingmar and I brought in the last pieces of essential equipment at 7 o'clock on Monday morning we were ready to start broadcasting at 8 o'clock. So basically we had a full hour of spare time! And people say that students cannot plan...

Now we started to do the actual broadcasting. The entire team was present in the studio, and someone spoke the magical words, I think that we are live now, and like a miracle, everything worked like a charm. We played the first couple of songs and Sabine and

Ingmar really showed their hosting skills. As the intro kids came into the auditorium rooms we saw the amount of listeners increase, and, even when they spread out over the campus, a lot of the groups were still listening to radio GEWIS.

Because of that, we felt like the centre of the intro week. Everywhere we went during the intro week people told stories which we could broadcast over the radio. We did interviews with everyone who we could get in front of a microphone, from central introduction committee members to the Rector Magnificus of the university, we got their stories and broadcasted them live on the radio. Because of these interactive components, the radio was an even bigger success than we could have imagined starting this.

With the audience, which was a lot larger than we expected we created a lot of memorable content. To name a couple of them, we learned the board that a bike can have gears, which does not necessarily mean that it is broken. We created a campus-wide search for the secretary of GEWIS when he did not call in for

more than 2 hours. We had two winners of our hourly item "Het Geluid", in which people guessed the most insane little sounds. Interviews were held with barely sober people and we even recorded some interviews just outside a pub. And at some days we had live conversations with people spreading over more than 4 foreign countries. It was a real rollercoaster.

Altogether it was a very intense week in which we had a lot of fun. It was great to see that everyone was listening and providing input for the shows that we created. Most of the time the entire studio was full of GEWIS people helping us with all kinds of things, so as we completed our radio adventure on Friday afternoon there is nothing more to do than to thank everyone that contributed in some way or another. The idea we once thought of over a couple of beers, doomed to be a disaster, turned out to be an awesome addition to the introduction week of many people.



Infimum: A strange or funny quotation from a teacher, a student or faculty member.
Here you can find infima sent to the Supremum committee via inf.gewis.nl.

Ralph terwijl hij kei dronken is: "HET IS PAS HALF 8?!"

Spoelstra: "Ja als je 100 golfballen meeneemt komen die ook terug bij jou, dan moet je dus 100 bakken trekken en bende af"

Pim dronken na de MAVO++ borrel: "ik heb mijn streepkaart doorgestreept"

Romy: "Sjaars, wait."

Kees: "Romy, ben jij een propper of een vrouw?"

Romy: "Ik ben alleen een propper met mn vuile was"

Vinz: "Alles is een bieropener, bijvoorbeeld een fles captain Morgan"

Pieter: "Of de kies van een sjaars"

Bouke: "Sander, wat voer jij nou eigenlijk uit bij GEWIS? Je doet niks voor de vereniging en verwacht wel dat we kladblokken regelen voor je"

Sander: "Hoezo gast? Ik sponsor de BAC toch"

J. van de V.: "Alle dingen gaan kapot door zuipen, behalve zuipen"

Rink: "Atlas is geen gebouw om in na te denken, daar wordt Engineering Design gedaan."

Teun: "We kunnen wel even klein kudje kijken"

Gijs: "Sanne was niet blij met de notulen"

Rink: "Hoezo? Ik heb de domme opmerkingen er uit gelaten"

Eline tegen Loek: "Trek dan; trek dan, hè!"

tEun: "Jongens, wat is nou iets unieks voor GEMOLD wat we nooit eerder hebben gedaan?"

Guido: "Zijn er al ooit doden gevallen?"

Kees: "Dierentuin in Rotterdam?"
Bouke: "Feyenoord"

Bouke: "Man wat een grote zuigzoen, die is echt net zo groot als mijn mond!"

Thijmen: "Hoeveel kost die soep?"

Lars: "45 cent"

Thijmen: "Is dat minder dan 50 cent?"

Robin A.: "Dat klinkt meer als een jij-probleem dan een ik-probleem."

Maureen: "Amber is gewoon Amber en dat is grappig soms"

Irne tegen zichzelf: "Hoe werken benen ook alweer?"

Martijn: "je maag knort"

Intro kiddo: "moet ik nu buikdansen?"

Een discussie aan De Tafel

Doortje: "Wist je dat de gemiddelde BMW bestuurder 112.000 euro per jaar verdient?"

Thijs: "Dat gaan wij allemaal ook gewoon verdienen."

Erik: "Is het niet zo dat maar 1% van de Nederlandse samenleving zoveel verdient?"

David: "Wij zijn wel minder dan 1% van de Nederlandse samenleving, dus dat moet wel lukken!"

Ralph basht op sjaars Ricks cursus.

Rick: "Mijn cursus heeft ten minste praktische toepassing. Dat kun je van jouw Getal & Ruimte deel 5 niet zeggen..."

Naomi: "Ik ben meer een kontenman dan een borstenman, maar.."

Kostek: "Je bent een vrouw though"

Romy: "Ik heb eten gestolen van de baby."

Alex vd P.: "Van een toets die kut gaat leer je meer dan van een toets die slecht gaat."

Saskia: "Deze thee stinkt"

Luuk: "Het stinkt niet, maar ik ben het wel met Saskia eens."

Arnoud B.: "Ik kan me niet voorstellen dat bladerdeeg met pesto lekker is."

Eline S.: "Bij een frikandelbroodje zit toch ook bladerdeeg?"

Arnoud B.: "Een frikandel is wel anders dan pesto."

Boudewijn van Dongen tijdens PMS instructie: "Als iedereen nou koffie gaat halen door via de docenten uitgang naar buiten te lopen, en via boven weer terug te komen, denkt het systeem dat de bezetting van de zaal meet dat er 400 studenten in mijn instructie zitten. Da's grappig."

Morris R.: "e^(-4x) gaat naar oneindig toch?"

Arend V.: "Nee het is MIN vier x"

Morris: "Oh, dus het gaat naar min nul"

Wout: "Ruben, doe jij niet mee?"

Ruben: "Ik ben een fucking tuinbroek aan het zoeken!!!"

Arend: "Als je lief opzoekt in het woordenboek dan staat er Patricia!"

Intro kiddo: "Some cheese from Brazil spontaneously combusts inside you"

Sanne: "I think this is just called lactose intolerance"

Teun v.d.: "Mijn lever is denk ik gescheurd."

Moeder van Amber M.: "Die was toch al geen flikker meer waard!"

Bas: "Hoe gaaf zou het zijn als we kunnen tijdreizen? Dan kunnen we alle algoritmes in constant time oplossen."

Ruben B.: "Ik ben tegenwoordig ervaring expert."

Amber vraagt hees: "Heb je een nieuw shirt?"

Saskia: "Ja! Heb jij een nieuwe stem?"

Iris P.: "Goed dat ik dit weekend naar huis ga, mijn pen is op"

Jet K.: "Wes weet niet eens waar Alkmaar ligt!"

Wesley verontwaardigd: "Alkmaar is toevallig de hoofdstad van Flevoland!"

Sjoerd: "Ik ga maar weer eens aan het werk"

Sjaars Rick: "Ja ik ga ook naar huis"

Filomijn: "Ik moet naar huis want mijn ouders hebben mij al 5 dagen niet gezien"

Vinz: "5 Dagen?! Das gewoon hoe een week werkt"

Bij een spelletje 30 seconds

Romy: "Rivier in Nederland"

Iedereen noemt rivieren in Nederland

Romy: "... Paard"

Max O.: "Het bier is duur dus we gaan vanavond niet vingeren."

Jet K.: "Zo! Ik heb mijn suiker voor deze week weer binnengenomen."

Niels V.: "Gelukkig is het zondag."

Iggy tijdens het kingsen: "Ik vind het vingeren nog wel moeilijk."

Sako: "Wil je nog wat vin?"

Stepha: "Nee, vin en ik hebben een haat relatie op dit moment. Vin heeft nog wat goed te maken"

Sjoerd: "We kunnen ook nederlands-kut uurtje doen."

Bouke: "Ow, ga je de Meeles-lijst opzetten?"

Luuk: "Wat is Défi?"

Luuk G.: "Zijn schoenen niet ook snaar instrumenten?"

Bas bij Maas thuis: "Heb je ook iets, van, gewoon water?"

HOW TO NOT FEEL BLUE UNDER GREY SKIES

I t's Friday night, and two hours ago my friends wanted to go dancing in a salsa club here in Madrid. But it has just started raining, and it has taken all of us less than ten minutes to decide we'd rather stay at home and watch a movie. It is just drizzling, but that's enough to stop everyone from going out.

TEXT Lucia Asencio

This makes me think of the Netherlands. More precisely, of a very special weekend I spent in Texel a few months ago, at the end of my Erasmus year at TU/e.

B.O.O.M., a fraternity of GEWIS, organizes an active weekend every year. Back then I was not close to the people joining the activity, but it seemed fun so I decided I'd go anyway! Two days of outdoor activities, sports, moving around and discovering a new place. In my mind, this was all happening next to the sea, under the deep blue sky on a sunny day. That's what islands look like, right? Even if I was going with complete strangers, I had to join.

And that's how on a Friday evening in June, I finished my lectures and hopped into a car that would take me to the camping area we had reserved on the island of Texel.

The beginning was grey: it was raining on our way, and it kept raining when we got there. Ask any Spanish person, and they would have said the weekend was over, but the Dutch can do better than that. The light, intermittent rain didn't stop us from walking eight kilometres that night, and we knew the following day was waiting for us, full of adventures: a mountain bike route around the island and a survival stormbaan had been planned.

That night, the sound of the rain hitting my tent woke me up several times. It got worse in the morning: it was pouring, the sky loomed dark above us, and a strong wind was blowing. Our mountain bike route would have been dangerous and had to be cancelled, along with the stormbaan. It was a disaster!

Back home, that situation would have made everyone stay in their tents, maybe some would've even gone back home... but that was not the case in Holland, hell no! I think I will never forget how active everyone was despite the rain and, worse yet, the wind.

“ Ask any Spanish person, and they would have said the weekend was over. ”

The organizers quickly thought of an alternative; we all went glow golfing, and as soon as the rain stopped for half an hour, people took advantage of the mountain bikes that had been hired. Maybe the initial route was too dangerous, but that didn't mean we couldn't go around and explore the island. I remember biking next to a small cliff, the 50 km/h wind gusts pushing and pulling me to the sides, making it difficult to keep my balance. I felt any minute I could fall straight into the sea, but no one seemed to be as worried as I was. These Dutchies were crazy! I had never biked in such strong

winds, with such heavy rain, and on our way back we were exhausted and soaked.

I thought we would call it a day by then, but no. Back at the camping grounds, while we were getting ready for dinner, the rain stopped for a moment. In the blink of an eye, a volleyball net was set and people were organizing teams to play... once more, the active weekend honored its name and made everyone move their asses.

Maybe this is just the usual behaviour in a country where rain comes and visits you four days a week, I don't know. But I can tell you it is not at all usual for me! The Dutch spirit, in spite of the rain, amazed me; how everyone stayed cheerful and active, how dark skies were fixed with a cold beer and how, what would've usually been a boring, stay-at-home weekend

for me, ended up being one of the best weekends I spent in the Netherlands.

I will take this opportunity to thank everyone in that trip for being so welcoming, kind and for making me have such a good time. That weekend I learnt that no grey sky, no storm and no hurricane is an excuse not to have fun and spend an unforgettable weekend outside. Or I thought I did learn, because in the end I am not dancing salsa tonight!

Writing this made me miss Eindhoven so much that I've just bought tickets to come back for a few days. See you soon!



BUILDING 5G NETWORKS FOR VERTICAL SECTORS

5 G will not only deliver more data at higher speeds to mobile customers but also provide the Digital Society with innovative value-added applications and services. To fulfil its promise of delivering these exciting innovations, the wireless industry will need to create a flexible, multipurpose, robust and scalable digital platform that delivers new applications to a wide variety of use cases. In this quest, network providers are turning to network slicing and TNO has contributed to the first 5G slicing standards and developed the first prototypes of this technology.

TEXT TNO

The present digital transformation of society and businesses is powered by mobile communication. New mobile services are introduced for consumers and companies. The most common examples are telemedicine, automated agriculture, factories of the future, autonomous driving and augmented reality/virtual reality. Network operators are gearing up to provide entire sectors with modern applications on their 5G networks from 2020 onwards.

CONNECTIVITY

Behind the scenes, however, there are still technical and commercial challenges to be resolved. The common denominator for new 5G services is obviously connectivity. But the characteristics and delivery requirements for different services in various sectors vary substantially. For example, fully autonomous self-driving cars require ultra-low latency and ultra-high reliability whereas advanced video streaming applications require high data speeds. Providing different applications or market segments with their desired service levels is a major challenge for operators. In response to this challenge, the cellular network industry is working overtime on the development of network slicing.

NETWORK SLICING

Network slices can be created by assembling required network functions to form logical or virtual networks

(software) on top of a common physical network infrastructure (hardware). This enables a mobile network operator to segment its network dedicated to individual businesses, specific market segments or specific services. A particular slice within a network can differ from other slices within that network based on latency, bandwidth, reliability, security or functionality provided. Because slices are isolated from each other, a slice appears as a completely unique network from a user perspective. Using network function virtualisation and software defined networking technologies, network slices may be created and dismantled in a flexible manner and can even be controlled by third parties through application programmable interfaces (APIs).

“ Slicing is crucial for delivering the variety of use cases promised by 5G ”

As an analogy to slicing consider a two-lane highway. Networks without slicing adopt a “one size fits all” approach in which fast-moving cars and slow-moving trucks use both lanes. With 5G slicing, the fast-moving cars and slow-moving trucks each gets a dedicated lane. Each of these “dedicated lanes” is analogous to

a slice in 5G, which uses a “fully customised” approach. Furthermore the lanes may be flexibly created and dismantled depending on the types of vehicles in the highway, analogous to network function virtualisation and software defined networking functionalities.

RELEVANCE OF SLICING

New mobile services can be brought to market far more rapidly because slicing enables providers to customize their 5G networks to address specific applications. They can also quickly and easily adapt services to changing requirements and future demands of customers in different industries. “Mobile networks are very expensive to build and operate,” says senior telecom consultant Adrian Pais from TNO. “Due to intense competition in the mobile industry, operator margins from the consumer market are declining. Therefore operators are looking to create new opportunities in vertical industries. It is not financially feasible to build a physical mobile network for each and every customer or sector. Network slicing is the answer to a viable business case for operators as it provides the flexibility to cater for several different customers, sectors and applications all within the same infrastructure. It is also the enabler for new business models in various industry sectors.”

EMERGENCY SERVICES

Emergency services are a great example of how slicing can be applied. In case of an incident, emergency services can place significant demands on mobile networks and the priority is extremely high. “A solution is to create an ‘emergency slice,’ explains Pais. “The network will be so advanced that it will automatically set up a slice for emergency services. An emergency may be detected by the network using data analytics, for example there may be an unusual peak in traffic in a certain area or IoT data from vehicles may indicate that an accident has happened. The network then sets up an emergency slice in a specific area with dedicated capacity and the required security for the needed timeframe.”

“A slice is like a virtual dedicated network for a particular service, sector, or business”



5GRONINGEN

TNO plays a leading role in the development of network slicing through its contributions to 5G industry standards and the implementation of slicing in its 5G testbed facility known as Hi5. This facility is available throughout the Netherlands including in 5Groningen, an initiative set up by the Economic Board of Groningen and major wireless industry players to deliver the country’s first 5G pilots and trials. “5Groningen is the only rural 5G testbed in Europe and it creates new, unique and important use cases for remote areas,” says Pais, TNO’s 5Groningen programme manager. “Due to its strong 5G expertise and independence, TNO is in the position to provide technical leadership in 5Groningen. Recently we reached a huge breakthrough by demonstrating how to build a live 5G network in only five minutes using general purpose hardware and a software-based cloud infrastructure. A few years ago this was completely unthinkable.”

INTEREST FROM MARKET PLAYERS

In Pais’ view, slicing is no hype; there is genuine interest from operators, businesses and other organisations. As often however, networking innovations depend on standards that ensure interoperability between the equipment supplied by different vendors. “The industry reached a major milestone earlier this year by completing the first 5G standards” says Pais. “Consensus is that support for slicing is a crucial part of these standards, and I expect that slicing will be an important part of commercial 5G networks within the next five years.”

KNOTTING

During the introduction week, people were playing the "knotting" game. It works as follows: a group of people stands in a circle with their hands out in front of them. Everyone closes their eyes and grabs two random hands. Once everyone has found two hands, they all open their eyes and the game starts. The goal of the game is to unknot the mess that has been created, by climbing over/under each other. It is paramount that linked hands do not let go of each other during the unknotting.

TEXT Gijs Bellaard & Sander Spoelstra

Two genius mathematicians happened to be spectators of such a game when, not unlike when the apple that fell upon Sir Isaac Newton's head, they were struck by a mathematical question: "what is the probability that a finished game of knotting ends up as precisely *one* big chain?" They were inspired to this question upon seeing that the people in a finished game ended up in a number of smaller chains. A large meal of brain juice, in the form of beer, guided them on the mathematical path to the solution of this question.

The game may be described in mathematical terms as follows: for a group of n people, let every person choose one person that has not yet been chosen. This way everybody uses one hand to choose and the other hand to be chosen. This lets us represent every game by a permutation. For example, suppose we play the game with four people: T-bone, Hondenhaar, Koenkie and Flügelprinses. Koenkie obviously grabs Flügelprinses, Flügelprinses grabs T-bone and T-bone grabs Koenkie. Hondenhaar grabs himself, because he likes that. This corresponds with the following permutation (in cycle notation):

(Koenkie, Flugelprinses, T-bone)(Hondenhaar)

Using this model, our original question can be rephrased as: "what is the probability that a permutation of n people consists of exactly one cycle?" Basic, obvious and trivial probability theory, that is left as an exercise to the reader, tells us that this probability is equal to

$$p = \frac{\#n\text{-permutations of exactly one cycle}}{\#n\text{-permutations}}. \quad (1)$$

We all know that the total number of n -permutations is equal to $n! = n * (n-1) * \dots * 1$. This leaves us with the question of how many of these n -permutations consist of exactly one cycle. Take any random arrangement of n people in a circle. This circle can be cut up at any of the n links between people to acquire a row of n people. Therefore, there are n distinct rows that correspond to the same circle. Moreover, there are in total $n!$ distinct rows. We can conclude that there are $n! / n = (n-1)!$ ways to arrange n people in a circle. Substituting this in (1) yields

$$p = \frac{(n-1)!}{n!} = \frac{1}{n}.$$

So, in game of knotting of n people, there is a $1/n$ probability that the game ends up as one big chain.

"Basic, obvious and trivial probability theory, that is left as an exercise to the reader ,"

However, it occurred to the prodigies that it is really boring if somebody grabs their own hands (just like Hondenhaar did in the example), which is often resolved in real life examples. Therefore, they would like to find a new probability, which excludes the

permutations where somebody grabs their own hands. Such permutations (with no fixed points) are known as *derangements*. The two top-tier intellects realized that this would change the probability significantly. After all, for all n elements in a permutation, there is a $1/n$ probability that it maps to itself. As a result, every permutation is expected to have one fixed point. Therefore, a new formula for p arose:

$$p = \frac{\#n\text{-permutations of exactly one cycle}}{\#n\text{-derangements}}. \quad (2)$$

This yields the new question: "what is the number of n -derangements?". Let a_n denote the number of derangements of n people. Suppose that there are n people numbered $1, 2, \dots, n$. Let person 1 grab the hand of any person i other than himself. There are $n-1$ possibilities for such a choice. Next, we let person i choose the next person. We distinguish two cases:

1. Person i grabs the hand of somebody other than person 1 . Then i can choose between all remaining persons except for himself, so this reduces the problem to finding a_{n-1} .
2. Person i does grab the hand of person 1 . This takes both persons out of the pool of remaining players, so this reduces the problem to finding a_{n-2} .

This yields the following recurrence relation:

$$a_n = (n-1)(a_{n-1} + a_{n-2}) \quad (3)$$

which can be rewritten as

$$a_n - na_{n-1} = -(a_{n-1} - (n-1)a_{n-2}). \quad (4)$$

Now define $f_n = a_n - n * a_{n-1}$. Then we can rewrite (4) as

$$f_n = -f_{n-1}. \quad (5)$$

Using base case $f_2 = a_2 - 2a_1 = 1$, we find $f_n = (-1)^n$. This yields the recurrence relation

$$a_n = na_{n-1} + (-1)^n. \quad (6)$$

Straightforward recursive substitution (which may be proven by induction) yields the solution

$$a_n = n! \sum_{i=0}^n \frac{(-1)^i}{i!} \quad (7)$$

Interestingly, we recognize this as $n!$ times the partial sum of the power series of e^x at $x = -1$. Due to this power series converging extremely fast we may write a_n as:

$$a_n = \left\lceil \frac{n!}{e} \right\rceil$$

This concludes the intellectual odyssey of the two virtuosi with the answer that the probability that a finished game of knotting with n people ends up as precisely one big chain is equal to

$$p = \frac{(n-1)!}{\left\lceil \frac{n!}{e} \right\rceil} \approx \frac{e}{n}.$$

□



FALLING INTO BURGERHOOD

Recently I've noticed – nay, embraced – the fact that I am becoming a bit of what you could call a "burger". I know that I am technically still a master student, however, living together for a significant period, the occasional existence of a canine third member of the household and the recent acquisition of a wind-proof jacket, should qualify me as such. You might draw the conclusion that this must imply that my life is now forfeit, that its utter happening is this week's edition of "De Kampioen" or buying billions of bogrolls in the bonus. Fortunately, you'd be wrong.

TEXT Yoram Meijgaard

I used to naively think it was just bad luck that uncomfortableness always happens to me. Nowadays, I think it is just my tendency to do stupid stuff. To pick a favourite out of numerous examples: maybe the problem of falling down a mountainside is not the falling, nor is it the slippery rocks, or the bleeding afterwards, instead it might be that you were running down that bloody mountain, chasing that other fool that you call a friend. Or maybe the real problem is that you were doing this without any medical equipment with you.

Although this has been very much a "what doesn't kill you makes you stronger" process, I recognised that I needed to get certain preparations involved to prevent that I accidentally claim the ultimate Darwin-award. Obviously preventing disasters is impossible, as the saying goes: "shit happens", but we can at least try to mitigate some of its consequences. Here is what you need to know:

1. THE RULE OF TWO (OR THREE IF WANT TO BE SUPER PARANOID)

If something is so important you cannot do without, make sure that you bring it twice. This applies almost in general, from bottles of wine when you have guests over, to medical equipment on a multiday hike (or at least bring one, I mean "come on past me, what was wrong with you?"). Do note that this rule does not extend to girlfriends, boyfriends or any other significant others.

2. WHEN ONE THING GOES WRONG, EVERYTHING GOES WRONG, SO PLAN FOR IT.

One mistake typically never makes a full disaster, but compounding mistakes always does. Consider losing your wallet, your phone or your keys. If you miss one, then you can deal with that. It is when you lose all of them at once that you are in trouble. You can no longer pay, since you don't have your cards, nor can you use your phone and that bit of physical cash that is at home is unreachable since you cannot get into the house. Therefore, you should do 'defence in depth': prepare for incidents, both minor and major, happening together.

"I think it is just my tendency to do stupid stuff."

For a final philosophical note: life is just moving from one stable position to the next. From high school to university, from living with your parents to living on your own to living with someone, relationships forming and breaking up again. Transitions are always difficult and bring troubles of their own, so make sure you have something to fall back on and someone that can support you. With that all in place, it becomes time for me to make that transition to working and to truly start my super sweet "burgerleven".

GAMEN MET CEREBRALE PARESE?

Q-LABS is een initiatief van ilionx waarbinnen zo'n 35 collega's veelal buiten werktijd met elkaar slimme en innovatieve oplossingen ontwikkelen. Als hobby dus. Naast collega's haken er ook steeds meer studenten aan, via stages of gewoon, 'omdat het kan'. Bij Q-LABS brengen we onze uiteenlopende specialisaties samen onder één dak. Door meerdere competenties te bundelen, komen we tot verrassende resultaten. Of het nu gaat om bijzondere projecten voor ilionx zelf of om het helpen van andere mensen en organisaties, Q-LABS gaat geen uitdaging uit de weg!

TEXT ilionx

Innoveren zit in ons bloed en dat is maar goed ook, want iemand met een lichamelijke handicap helpen met gamen is natuurlijk best een uitdaging. Met ons nieuwste project, dat in samenwerking met Zuyd Hogeschool is gestart, helpen we Job, die cerebrale parese heeft, met het spelen van zijn favoriete games. Cerebrale parese wil zeggen dat je hersenen niet in staat zijn om de juiste spanning aan je spieren door te geven en ze onderling op een goede manier te laten samenwerken. Deze ontwikkelingsstoornis wordt gekenmerkt door motorische stoornissen, zoals spasmes en krampachtige bewegingen.

ARTIFICIAL INTELLIGENCE EN PATROONHERKENNING

Voor dit project zetten we een Xbox Adaptive Controller in waar eigen input aan kan worden toegevoegd. Deze controller is een samengestelde hub voor apparaten die games toegankelijker maken en is met name bedoeld om te voldoen aan de behoeften van gamers met beperkte mobiliteit. Externe apparaten worden aan de controller bevestigd om een op de persoon aangepaste controller-ervaring te realiseren. We registreren deze input door een IoT-apparaat als adapter te gebruiken. Daarmee kunnen we alle input

ilionx

analyseren en in de toekomst gebruiken om zijn gameervaring te verbeteren met patroonherkenning en artificial intelligence. Hiermee willen we ervoor zorgen dat de controller spasmes herkent en hier automatisch op inspeelt. We hebben recent met een camera en machine learning software zijn bewegingen in kaart gebracht. Deze data is met behulp van studenten in een Power BI dashboard verwerkt om zijn bewegingen te visualiseren.

FYSIOTHERAPIE

Deze data wordt geanalyseerd en gedeeld met een fysiotherapeut. Deze deelt op zijn beurt met Q-LABS welke lichamelijke oefeningen vanuit een zorgperspectief goed werken, zodat we er samen voor kunnen zorgen dat het gamen ook een positieve invloed heeft op de juiste bewegingen en daarmee de gezondheid van Job. Op lange termijn willen we een eigen spel ontwikkelen dat hier perfect voor geschikt is. Misschien wel in de vorm van een stageopdracht! Met projecten zoals deze wordt van heel dichtbij duidelijk wat de impact van innovatie kan zijn en hoe wij met onze kennis het verschil kunnen maken voor onze medemens. Hoe mooi is het om met onze hobby iemand anders te helpen met het beoefenen van zijn hobby? We gaan dan ook hard aan de slag om van dit project een groot succes te maken en we houden jullie op de hoogte van de vorderingen via onze sociale media!



UNDERMINING CRIME

Last September, I finally graduated from university. After 7 years of hard work, I can call myself a "burger" now. But, becoming a burger is not the "disaster" I want to talk about. The disaster I want to talk about is hypothetical, and has to do with my thesis.

TEXT Wesley Brants

At the Career Expo of Wervingsdagen two years ago, I came across the stand of Shintō Labs. This company from Eindhoven tries to give municipalities more insight in their data by creating software that can be used to search and analyze this. Most often, this data is regarding criminal activities, more specifically a phenomenon called "undermining crime". Undermining crime is when criminals abuse governmental systems to perform criminal activities. These kinds of crimes are dangerous, because they allow criminals to commit crimes behind the scenes of a legal activity. They cost quite some money and are hard to stop because it is hard to get insights into them. This is where the software of Shintō Labs comes in, giving a helping hand.

My research was about a new way to analyze data, using graph databases and network analysis. Data given by municipalities is often in a relational database format; many long excel- or CSV-files. This tabular data shows a lot of information, but it becomes hard to find connections between the entities in the data. Municipalities have data available about persons, buildings, companies, social payments, permits, etc. Using indicators known from research and experience, one can retrieve the "suspicious" entities. However, it becomes interesting to see if any entities which are suspicious are related as well.

Criminal networks are a main part in the underworld nowadays. Crimes are no longer local or individual but are performed in global networks and communicated via many ways, such as in person, over the telephone via encrypted networks, or via the dark

web on a message board. However, if the underworld mixes with the upperworld for some undermining criminal activity, data becomes available. My research question was if I could find criminal networks within this data.

Criminal networks have a structure. Research into this structure gives indicators, and allows one to form insights in this network. We can make this structure explicit via a crime script. A crime script is a blueprint of a crime; it tells who does what at which location and how it is done. Using a methodology named the Organized Crime Lab, I have developed a methodology to create crime scripts for criminal networks from the bottom-up. So, we first think about individual roles and then build relations between them to form a network. This new variant of the crime script thus has explicit relationships and forms a template network. This crime script can be used to form queries, so we can query a graph database for criminal networks.

The data can be put in a graph database as well, which shows the entire dataset as a network. We can query this database to find criminal networks. However, current Graph Query Languages (GQLs) to query such a database are not usable. They do not allow us to look for paths explicitly, and they do not allow to use composability. Hence, in my research I used a new GQL: G-CORE. G-CORE is a new GQL developed by TU/e, which treats paths as first-class citizens, meaning we can query for paths and save them. In criminal networks, we have to deal with complicated relationships, so having paths in our arsenal is a wise step. Moreover, G-CORE allows for composability,

allowing us to query the results and build our network from the bottom up, which is what we want.

One municipality had a problem with undermining crime; people started companies of a certain branch that, according to them, formed extraordinary networks. The municipality has received complaints about mafia-practices within this branch. They do not know how these networks are formed however. Using my methodology and their expertise, we were able to write a crime script and query the data. This way, we found nine suspicious networks. They varied in size; some networks consisted of two companies, but the largest one consisted of sixteen companies having multiple people on multiple locations involved. Moreover, most companies were founded on home addresses where the owners did not live themselves, but where elderly people lived. As these companies had indicated not to want any mail from the Chamber of Commerce, this is an important indicator of abuse of these perhaps unaware people.

My research shows a new way to use municipal data, as well as provide the current state of the art with a new way of using crime scripts (a new form, even!) and is the first time G-CORE is ever used in a real-life

setting. Although G-CORE still has its flaws, the language is already very powerful and promising, not only in this domain but in many others. Moreover, I created the first prototype of a tool that can be used by criminologists to find criminal networks, but also analyze these in a quantitative and qualitative way. For this, my work was rewarded with a neat 8.

Last October I started working full-time at Shintō Labs. There, I have the role of data scientist, which means I will be making more applications for municipalities. On top of that, I will be diving in methodologies to use network analyses for municipalities. With Shintō Labs, I have the ambition to start a joint PhD. Hopefully, I can contribute to the solution of fighting criminal networks this way. Because if criminal networks cannot be stopped, that would be a true disaster, one which we hope will never come.

Title of thesis: CSI – Crime Script Investigation: Towards an efficient method of finding and analyzing criminal networks using G-CORE and graph databases

Supervisor: Nikolay Yakovets

2nd Supervisor: Jurriaan Souer

3rd Committee Member: Alexander Serebrenik

Company: Shintō Labs





TRAFFIC LIGHTS NO LONGER NEEDED: BACK TO THE FUTURE

Because cities and highways are becoming more congested year after year, traffic lights are needed more than ever. However, everyone has experienced that traffic lights cause frustration. "Why did it turn red just before I got to cross the intersection?" (No, the steering wheel can't do anything about it, even not if you hit it with your fists...) And traffic lights are never quick enough to change the light on your lane to green (the scolding does not help...) Reducing frustration caused by traffic lights is not easy, but there is hope on the horizon: traffic lights will not be needed anymore with the introduction of self-driving vehicles!

TEXT Rik Timmermans

This is one of the projects I have been and am still working on during my PhD. My PhD relates to queues in traffic and as the first self-driving vehicles are already on the road in the US, it is important to think about what can be done when the road is occupied by self-driving vehicles. What are the advantages of self-driving vehicles and how can we use those to reduce, for example, delay? So, let's have a look at how traffic lights will become obsolete once self-driving cars are around – and what will replace them.

MODELLING

Self-driving vehicles are able to communicate with others and with roadside equipment. We assume that this roadside equipment acts as some kind of virtual traffic controller. Such a virtual traffic controller can keep an overview of all vehicles driving towards the intersection, by means of communication with those vehicles. The big advantage of this is that anticipation on vehicles driving down the road is possible, reducing the delay. The virtual traffic controller communicates with the vehicles and tells them when each vehicle is allowed to cross the intersection long before the vehicles actually reach the intersection.

As soon as the vehicle knows when he is allowed to

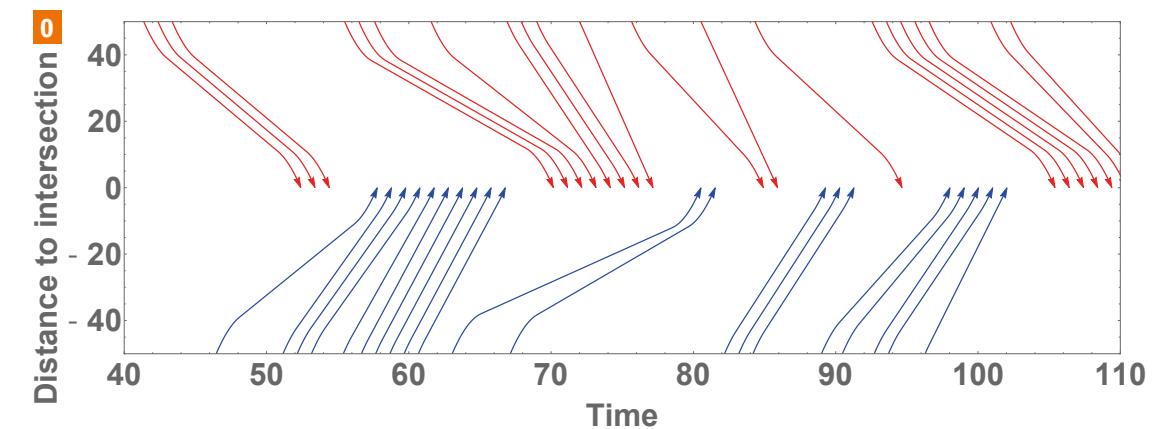
cross the intersection (told to him by the virtual traffic controller), it can decide how to drive towards the intersection. It namely knows where it is driving now, and when it has to cross the intersection. So, it can for example make sure that it is driving at full speed when it is crossing the intersection. This is a big benefit, because occupying the intersection for a shorter amount of time increases the capacity of the intersection, which in turn reduces the delay. Moreover, the vehicle can minimize the amount of acceleration that is applied. This also reduces pollution, killing two birds with one stone!

A BRIGHTER FUTURE

Let's see how this would work in Figure 1. We see two streams of vehicles (represented by the red and blue arrows) driving towards an intersection. The intersection is at the middle of the figure. The arrows represent individual vehicles. We see that there are no collisions, as none of the arrows cross each other, which is a good thing to start with! The steepness of an arrow corresponds to how quickly a vehicle drives, so we can see the deceleration and acceleration that each vehicle performs. For example, the first red vehicle on the left, starts decelerating when it is fifty

meters away from the intersection, then cruises at a constant speed for some time and then accelerates at a ten meters distance from the intersection. We see that none of the vehicles has to stop, which is good if we want to reduce pollution!

is a very bright sketch of the future. What if the number of vehicles doubles when those self-driving vehicles are introduced? Then the reduction in the delay will not be there anymore, simply because there are too many vehicles present. So, the future might be a little less bright than sketched by us.



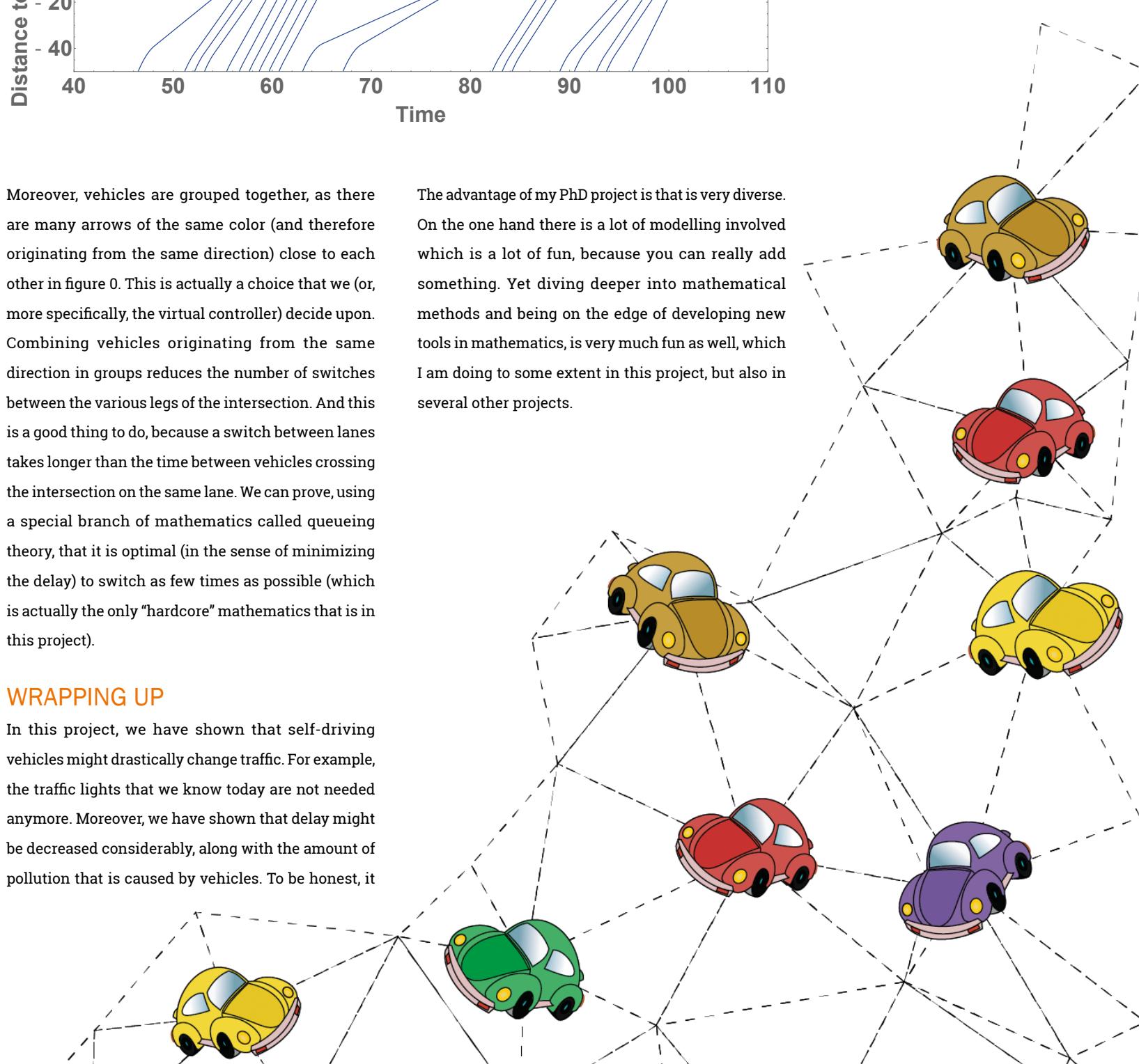
Moreover, vehicles are grouped together, as there are many arrows of the same color (and therefore originating from the same direction) close to each other in figure 0. This is actually a choice that we (or, more specifically, the virtual controller) decide upon. Combining vehicles originating from the same direction in groups reduces the number of switches between the various legs of the intersection. And this is a good thing to do, because a switch between lanes takes longer than the time between vehicles crossing the intersection on the same lane. We can prove, using a special branch of mathematics called queueing theory, that it is optimal (in the sense of minimizing the delay) to switch as few times as possible (which is actually the only "hardcore" mathematics that is in this project).

WRAPPING UP

In this project, we have shown that self-driving vehicles might drastically change traffic. For example, the traffic lights that we know today are not needed anymore. Moreover, we have shown that delay might be decreased considerably, along with the amount of pollution that is caused by vehicles. To be honest, it

0

Several vehicles from two legs of an intersection driving to the intersection. Each arrow represents an individual vehicle.







THE AMAZON IN BRAZIL IS ON FIRE

While preparing for the Study Tour by the Brazilian Academical Cultural And Noteworthy Activities (BACANA) Committee, we regularly learn more about the Brazilian culture, customs, and nature. We would like to share our findings with all the members of GEWIS in the Supremum editions up until we embark on the Study Tour to Brazil in 2020.

TEXT Renée Theunissen &
Janneke van Oosterhout

PROBLEM

This year, there have already been more than 44,000 fires in the largest rainforest in the world: the Amazon. This number is the highest since 2010 and is considered worldwide to be a disaster. There has been an increase of 264 percent since 2018, and the fires can even be seen from space. Not only are the fires disastrous for the environment, but they are also a threat to the three million animals and plants and the one million people that live there.

CAUSE

Sixty percent of the rainforest is located in Brazil. Many critics believe that it is no coincidence that the number of fires has increased under the government of Bolsonaro, who became president of Brazil in 2018. His skepticism towards climate change has resulted in a loose environmental policy, which would allow forest fires to expand more easily. Not only the number of fires has increased, but also the intensity of the fires. These wildfires are not natural events. They are a combination of droughts and human activities to obtain more fertile soil. The rainforest is too moist to burn by itself.

CONCLUSION

August of this year was by far the worst month for the Amazon. Never before had there been so many fires with such intensity. In September, there was a decrease in the number of fires. This was not only due to the international attention that the fires gained, but also the societal pressure that was put on Bolsonaro, and the amount of rain that fell that month. Bolsonaro eventually sent the army to put out the fires and increased the fine for deliberately setting the rainforest on fire. These wildfires go hand in hand with deforestation. If this is not addressed, it will continue until the whole Amazon is gone.

HELP

The moment the rest of the world got to know about the fires, the G7-top, consisting of the USA, Japan, Germany, France, Italy, the UK, and Canada, decided to offer the Brazilian government 18 million euros to combat the Amazon fires. However, Bolsonaro rejected the money from the G7-top, because he did not feel like it was their right to interfere without consulting him. A few days later, Bolsonaro eventually decided to accept the money under the condition that Brazil could decide what to do with the money.





DISASTER CAKE

Sometimes an idea comes to mind that involves many different ingredients, many steps and some loose ends. It really takes a lot of effort then to make sure it's not going to be a disaster! This is what we faced a few weeks ago when we had to make a cake for the general members meeting.

TEXT Dionne Heuvelman & Mattijs van den Berkmortel

INGREDIENTS

CAKE

- » 750 g butter
- » 750 g sugar
- » 750 g self raising flower
- » 15 eggs
- » 3 teaspoon vanilla extract
- » Extras of choice, e.g. we used pepernoten in one layer and 50 g cacao in another

FROSTING

- » 600 g Cream cheese
- » 750 g Powdered sugar
- » 150 g Butter
- » 2 teaspoons vanilla extract

TOPPINGS OF CHOICE, OUR CHOICES

- » Pepernoten
- » Oreo's
- » Chocolate pepernoten
- » Mini stroopwafels
- » Smarties
- » Bonbons
- » Coconut macaroons

What cake do you make when you have in mind that the cake must consist out of multiple layers, that you want to use different sorts of toppings, that the cake must look beautiful, that you have to stay within budget and that the cake doesn't taste like a disaster. In this article we present the recipe we came up with. We also included some pictures of intermediate steps. And of course, a picture of the final result is included!

To start, preheat the oven to 160 degrees Celsius. Pick three 24 inch spring forms, put parchment paper on the bottom and grease the sides.

In a large bowl, combine 250g of melted butter, 250g of sugar, some vanilla extract and 5 large eggs. Beat the mixture a couple of minutes to make sure enough air is in it. Then add 250g of flour and stir until you get an even batter. Pour the batter into a spring form and bake it until you can stick a toothpick in the middle and it comes out clean(approximately 60 minutes).

Redo the previous step 2 times until you have three cakes. When you include the flour you can also put some extra ingredients into the cakes. We used cacao for the second cake and pepernoten for the third cake. But here you can do some experimenting. Please don't use smarties, because this can end in a disaster! Let the cakes cool completely to room temperature until you go to the next step.

Next the frosting needs to be prepared. For this combine 600g of cream cheese, 750g of powdered sugar, 150g of butter(at room temperature) and some vanilla extract. Beat this mixture until all lumps have disappeared. Afterwards, keep the frosting cool by placing it in the fridge until you need it again.

When the cakes have cooled down completely, it's time to use the knife. Cut off the top part of each cake to flatten them. This makes it more easy to stash the cakes later, otherwise the layers will fall and you end up with a real disaster.

For some extra effects, you can cut each cake into three rings. To make sure the rings are of equal size, use a plate or a cup to help you. Next you can switch

the rings from cake to cake to make a nice pattern for the inside of the cake.

Now it is time to stash the different layers. Start by placing one layer of cake on a display tray. Put some frosting over this layer and add some topping into the frosting. Make sure the toppings are covered with frosting all over again. Now add the second layer of cake and again put some frosting and toppings on this layer. Again, make sure that the toppings are covered by the frosting completely. Lastly place the last layer of cake on top of the other two. Put all frosting you have left over the cake and make sure that the top and the sides are covered with the frosting.

Now the most fun part starts and how you do this is totally up to you. The cake needs some decoration and for this a lot of different toppings can be used. We used some bonbons, smarties, mini stroopwafels, oreo's, (chocolate)pepernoten and coconut macaroons. Be creative in this last step and make sure your cakes looks beautiful afterwards. Don't hesitate to put everything you have bought on top!

Lastly, we advise to keep the cake into the fridge until you are going to eat it. It's not really a problem if the cake stays outside the fridge for about 1 hour, but keeping it out more than that will probably end in a disaster.

Have a lot of fun by creating this cake and of course by including your own personal touch!



Infimum: A strange or funny quotation from a teacher, a student or faculty member.
Here you can find infima sent to the Supremum committee via inf.gewis.nl.

Romy: "Ik heb oprecht een goede onderkin."

Benne: "humans count base 10 because they have ten fingers, well bits have two fingers "

Ruben is aan het uitzoeken wat hij vanavond gaat eten.

Ruben: "Ik heb zin in wat snels en gemakkelijks."

Bouke: "Nou, here I am!"

Bouke: "Hou je niet van gingers?"

Wesley: "Nee."

Ruben: "Lullig!"

Wesley: "Wat? Ik prefereer gewoon zielen."

Illona probeert intro kids enthousiast te maken voor haar praatje: "Woooow, I am SO enjoying my morning right now!"

Moeder van Vinz: "Ik heb hier kotsemmers"

4 emmers komen naar beneden

Teun: "Oh, maar vorige keer was dat niet genoeg"

Moeder van Vinz: "Dan heb ik er hier nog meer"

Er staat hardstyle op in de GEWIS ruimte

Romy: "Ik wil een dutje doen."

Bouke tegen Bas: "Shit we mogen natuurlijk niet drinken, we zijn beginnend bestuurders."

Stiefvader van Vinz: "Wat is dat toch met die toeters?"

Tim H.: "Ik heb gewoon een keer een Trojan Whore gehad."

Sjaars: "Kijk eens naar zijn zak."

Random sjaars: "Is hij groter?"

Andere sjaars: "Nee, hij is langer."

Sanne De W. "Niets is te groot als je dronken bent."

Jeroen N.: "Motivatie, kun je dat eten?"

Danny: "Als je genoeg moeite ervoor dat waarschijnlijk wel, ja!"

Tessa: "Dus dan heb je motivatie om te eten!"

Op weg naar Brunssum, Leon zit tegen de rijrichting in in de kofferbak van de auto: "Robin, waarom rijden we Brunssum uit als je in Brunssum woont?"

Patricia: "Niels, waarom heb je één schoen uit?"

Niels: "Ik heb jeuk aan mijn schoen."

Sjoerd vertelt over zijn scharrel.

Eline: "Heb je haar al bestuift???"

Martijn K op de vierde verdieping van Atlas: "Je hebt hier wel een beter uitzicht dan in de kelder!"

Bouke: "Wat zijn kringgesprekken in het Nederlands?"

Bouke: "Ik was vanochtend nog steeds zat, ik ben zelfs nog van mijn fiets gevallen."

Mart: "Ohja, bestuur: in het weekend van de EAPC doet een van de printers het niet"

Op de terrorflup 3.5 staat er klassieke muziek op

Spouwsjaars: "Hey! Ik probeer hier in de bus te zitten"

Bouke: "Dus zo heb ik iemand gefixt via de mail."

Leroy: "Wat ben jij toch een goeie secretaris!"

Bouke: "Ik heb dit net naar albestuur@hotmail.com gestuurd"

Bas van Doren: "Jongens hoe kunnen jullie op de maandagochtend al zó niet-productief zijn?"

Mattijs in het busje: "Oh dat was, die hadden we kunnen aanrijden!"

Are you good at

-  Designing?
-  Mailing?
-  Writing?
-  Spellchecking?

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The Supremum committee is looking for new members, if you are interested please contact us at: supremum@gewis.nl

MATHEMATICS TO PROTECT US FROM DISASTER

Of the ten deadliest natural disasters in recorded history, four involved earthquakes, and six involved floods.¹ The deadliest natural disaster by far was the floods in China in the spring of 1931, where an estimated one to four million people died as the result of severe flooding caused by heavy rains and melting snow.

TEXT dr. Tim Hulshof

In the Netherlands, which is effectively one big river delta, almost all deadly natural disasters have involved water. On February 1, 1953, a heavy storm coincided with a spring tide. Dikes breached in 67 places all over the southwest province of Zeeland, rapidly flooding 1300 square kilometers of low-lying lands on the other side. There was nowhere to escape. 1836 people died in a matter of hours, as did 30,000 animals, 70,000 people were evacuated, and 60,000 buildings badly damaged or destroyed. The total economic damage was about one billion Guilders.² It was the deadliest, most damaging flood in the Netherlands in almost four hundred years.³ Three weeks later, the government instituted the Delta Committee, who were given a clear objective: raising our defenses so that we could resist the worst storm of the next ten thousand years. The committee quickly identified two possible ways to increase the defenses: raising the dikes, and closing the estuaries. But raising which dikes, and by how much? And closing which estuaries, and where exactly? And all this was to be done under a very constrained, post-WWII restoration era budget. The task was enormous.

Take a moment to consider for yourself how you would predict the size of a ten-thousand year storm. The weather is much too complex and chaotic to predict more than a few days in advance, even with the best supercomputers of today, so that's not an option. You would have to extrapolate your prediction from real measurement data. But we only have about one century of accurate weather data available (in 1953, they had

only about 50 years). You might look at that data and say: in the past century the largest storm in the Netherlands had winds reaching speeds of 162 km/h, so in the next century that should also be true, and in the century after that, and so on. But even ignoring climate change (they did not know about this in 1953), this approach would be very naive. There is no reason to believe that 162 km/h is an upper limit, just because that is the strongest it has been. Instead, you would have to model the storm's magnitudes with random variables. But immediately a new question arises: what type of random variables should we use? One hundred years of data would not be enough to tell. Predicting the ten-thousand year storm with such limited data seemed like a hopeless task.

Fortunately, there was one person who saw it differently: mathematics professor David van Dantzig. Van Dantzig was one of the last true mathematical omnivores. He had started out in topological algebra, moved on to mathematical physics, but finally settled down in probability and statistics.⁴ In each field he made numerous important contributions.

Van Dantzig investigated all three of the major mathematical problems: (1) the underwater currents in the North Sea, (2) the economic costs of raising the dikes, and (3) predicting the magnitude of the ten-thousand year storm. Solving any one of these problems would be a serious challenge for any scientist or engineer. Van Dantzig solved all three.

Van Dantzig was able to predict the ten-thousand year storm, using 50 years of data, because he knew a remarkable fact, that had just recently been discovered: it turns out, that it doesn't really matter which random variable you choose to model the storms. All you need to do is make sure that the random variable you choose has the same average as the measurements, and that it matches the data in another computable property, the extreme value index ξ .

Thus, the results will always be the same: the probability of seeing a large storm can be approximated by a simple formula: the Generalized Extreme Value distribution of index ξ .⁵ The index ξ is easily estimated from a few Q-Q plots. And it gets even better, because the approximation turns out to be incredibly accurate. Already for the maximum of just five exponential random variables, the approximation is accurate to within one percent! 50 years of data was plenty for Van Dantzig.

Van Dantzig set to work: He computed the mean and the extreme value index of the data. He used these to compute the strength of the likely ten-thousand year storm, using simple exponential random variables. He used that result, in combination with his underwater current models, and computed how high the waves would get. He then computed how tall the dikes should be, and what that would cost. His conclusion, unfortunately, was that the required dikes would be unaffordably expensive.⁶ He recommended instead to weaken the objective, and defend ourselves against a thousand-year storm. And that is what happened. The dikes were raised, the estuaries closed, and in the 60 years since, no storm has been able to breach our defenses. The minimum height of dikes that Van Dantzig computed have been enshrined in Dutch law, and the Delta Works are now considered one of the seven wonders of the modern world.⁷ David van Dantzig, unfortunately, was not around to see most of this. He died in 1959, long before the Delta Works had been completed.

¹ This is not counting famines. If we count famines, then the top ten is ten famines.

² About 40 billion Euros in today's money.

³ Since the All Saints flood of 1570, when an estimated 3000 people died.

⁴ Born in 1900, he published his first maths paper in 1914. He studied mathematics on his own, at home, because he couldn't afford the tuition, enrolling only for the final exams (which he passed cum laude). He obtained a PhD under the supervision of one of Netherland's most famous mathematicians, prof. Bart van der Waerden (who was 23 at the time, three years younger than Van Dantzig!). Van Dantzig became a professor in Delft in the 1930's, but was fired in 1941, because he was Jewish. After the war ended he became a professor at the University of Amsterdam. He was one of the founders of the Dutch Center for Mathematics and Informatics (CWI).

⁵ This is due to a famous theorem by Fisher and Tippett, which tells us that if X_1, \dots, X_n are independent identical continuous random variables with extreme value index ξ in R , then for some well-defined linear transformation of the data X_1, \dots, X_n

$$\mathbb{P}(\max\{X'_1, \dots, X'_n\} \geq x) \approx \begin{cases} \exp(-(1+\xi x)^{-1/\xi}) & \text{if } \xi \neq 0, \\ \exp(-\exp(-x)) & \text{if } \xi = 0. \end{cases}$$

⁶ This history focusses on the role of Van Dantzig. Note that as always, the full story is much more complex, and involves important contributions of many, many other people.

⁷ According to the American Society of Civil Engineers.

(October 13, 2019)

STRAWPOLL.COM/ZX843RWP

VRUCHTENHAGEL

Originally created on February 27, 2018, we are only days away from reaching the second birthday of the famous strawpoll that set out to once and for all answer the very important question: Which of the following options would you consider to most closely resemble chocoladehagel: chocoladevlokken or vruchtenhagel?

TEXT Erik Takke

Having received around 2600 votes to date, the strawpoll has provided us with a clear picture of the public opinion on this matter. I am sad to report that the view of the majority is clearly not aligned with my own. Being among the first to support my camp, I have hereby taken it upon myself to right this wrong and explain to you why there is only one correct answer to this question: it is vruchtenhagel that most closely resembles chocoladehagel.

For those not familiar with the Dutch cuisine, a short explanation on what we are talking about. Many of us Dutch start our day with a breakfast that consists of lovely slices of bread covered with spreads and sprinkles. Three types of sprinkles stand out: chocolate sprinkles (chocoladehagel), chocolate flakes (chocoladevlokken) and fruit sprinkles (vruchtenhagel). To give you a sense of what they each look like, you can find pictures of all three scattered around this and the neighbouring article.

Being at the forefront of this war for two years now, life has been tough yet very rewarding. Over these years I have been suppressed and belittled for my cause. However, I have also seen others stand up and support each other in battle. They were not afraid to pick arguments with the other side and show them why they were wrong. Despite these efforts, we have not yet convinced them of their wrongs. Today we set this straight.

This debate is not on which of the two you like or eat the most. This debate is on the principle of what

exactly the word 'resemblance' means. The website Wordnik defines this verb as "to be like to; have similarity to, in form, figure, or qualities." To me, this clearly shows why vruchtenhagel is the right fit. Not only are the 'form' and 'figure' similar, vruchtenhagel also has physical properties nearly identical to chocoladehagel. Moreover, both are part of the family of sprinkles, whereas chocoladevlokken is just flaky.

Now, I could go on for quite some time on why vruchtenhagel is the way to go, and if you want me to, make sure to ask me! Truthfully though, I don't want to force my opinion on the matter onto you. You are completely independent and completely capable of making your own decisions. I would even encourage you to read the article from my opponent on the right and get an even clearer picture of the important matter we are discussing here. The only thing that I would like to ask you is that you do make a decision on the matter and fill in the strawpoll yourself. I would rather see the whole world be against me than for people to live in ignorance.

So thank you for making a decision and raising awareness. Without you, this would not have been possible. I will leave you with these final words: Whatever you choose, know you are always welcome to join team vruchtenhagel.

Disclaimer: the words used in this article are very much an exaggeration. This is all just friendly banter.

STRAWPOLL.COM/ZX843RWP

CHOCOLADEVLOKKEN

Somewhat less than two years ago, the famous strawpoll about one of the most important questions was created. Having received around 2600 votes to date, it has given us some insight in what should be the answer to the following question: "Which of the following options would you consider to most closely resemble chocoladehagel: chocoladevlokken or vruchtenhagel?"

TEXT Ruben Verhaegh

Your initial reaction to first reading this question may be to think that the answer is extremely obvious and I would agree with you. Although a vast majority of the votes on the strawpoll is favouring chocoladevlokken to most closely resemble chocoladehagel, you might be surprised that there are still hundreds of votes for vruchtenhagel. Let's take a closer look at why these people are completely, utterly wrong.

There are of course numerous similarities between all three toppings: chocoladehagel, chocoladevlokken, and vruchtenhagel are all food items, are all typically eaten on bread, are all packaged similarly and are all not leaders of political parties (yet). The similarities far outnumber the differences, yet the latter are of course what interest us when deciding which items most closely resemble one another. I think it's fair to say that the four most important properties in which they differ from one another are flavour, shape, colour and texture.

Note that the texture of both chocoladevlokken and vruchtenhagel differ from that of chocoladehagel. Chocoladehagel is typically smooth, whereas chocoladevlokken and vruchtenhagel both are somewhat more rough. Hence, we will have to base our decision on the other three properties.

We can all easily agree that chocoladevlokken are most similar to chocoladehagel when it comes to flavour and colour and that the same holds for vruchtenhagel when it comes to shape. There is little

room for discussion on that front, so it boils down to the prioritization of the three properties. I would like to think that flavour is by far the most important property of these items, due to the simple fact that they are food. The sole purpose of their existence is to be eaten, making flavour and possibly texture the most important properties.

"The sole purpose of their existence is to be eaten... "

Moreover, I would argue that the shape of these sweet goods is the least important property of the three we are considering. Sure, this can be important when comparing individual sprinkles and flakes to one another, but that would be an uncommon situation. In their natural habitat, these tasty items are all found in closely packed groups. It would be easier to quickly distinguish a slice of bread filled with chocoladehagel from one filled with vruchtenhagel than to distinguish it from one filled with chocoladevlokken. In this most plausible scenario to encounter any of the foods, their shape no longer appears to be the most important factor to tell one from another, but rather their colour.

But that is just my take on this question. You might not even agree with me, which is okay and also means

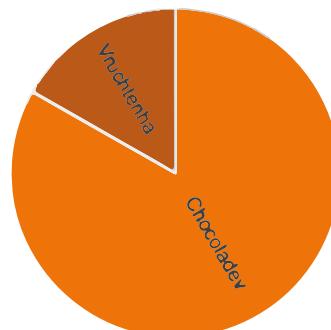
that you are wrong. Either way, I honestly encourage you to voice your opinion via the strawpoll to help the world make up its mind on this important dilemma. Feel free to read the article from Erik on the left to find out why anyone would possibly be on team vruchtenhagel. Be careful however when eating breakfast at Erik's. If you ask for chocolate sprinkles when he doesn't have them, he might just give you sprinkles made of concrete, because he thinks those

are more similar to the chocolate sprinkles you asked for than chocoladevlokken are due to their shape. (That is obviously what is implied in his article).

Disclaimer: the words used in this article are very much an exaggeration. Despite his poor judgement on such an important matter, I still love Erik and other vruchtenhagelaars alike.

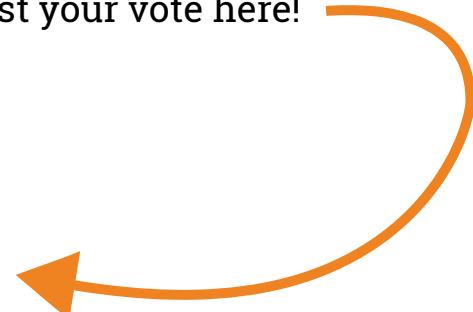
Van welke van de volgende opties zou je zeggen dat deze het meeste op chocolade hagelstag lijkt?

This is the result after 2659 people voted



Don't agree with the outcomes?

Cast your vote here!



SCHEEPSRECHT/CHARM

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333400004525121534
513434203344405120
334355344201520540
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38: IS GEWIS DOOMED?

On the first of July, seven members with fresh spirit became the new board of GEWIS. Unfortunately for this association, those seven members were us. Our predecessors have taught us a lot during the period in which we were 'kandi's', but of course there is a lot left to figure out on our own during the beginning of the year. Are we able to let GEWIS continue on the right track, or will we completely bugger it up? Is there, and more importantly, are we a disaster waiting to happen? Only time will tell, I guess.

TEXT Board 38

At the beginning of our board year, we started off quite relaxed and calm. Most of us could use the summer vacation as a quiet period in which we could get to know our role and take our place in the association in exactly the way we liked. However, for Susan things were different. Where the other board members could come to the university at 10 o'clock, Susan had to be on the train early in the morning to visit several companies almost every day. She did not even get some free time after graduating for her Bachelor degree! What a train wreck!

While Susan was busy, the rest of us were drinking lots and lots of coffee at Wervingsdagen, working on connections inside the university. In these sessions, we got to know a lot of different associations a bit better and started to get quite a bond with all of our nieces. Because we had such a good bond, most of us tried to go to as many of the parties that were hosted by our nieces at the beginning of the year. Sometimes these parties were after not one, not two, but three constitutional drinks, meaning the morning after would be a complete catastrophe (not looking at you, Ronnie)!

Next to the parties of our nieces, we also have a very strong bond with a lot of our cute sisters, the WISO associations. On one of the constitutional drinks, the drink in which the inauguration of the new board is celebrated, three of our heroes (Bas, Ruben and Bouke) decided that it would be a good idea to 'bras' the guest

book of the hosting organization. So when the order committee wasn't watching, the hatched plan was set to action. Surprisingly easy, the book was taken outside, where we immediately wrote our 'bras' letter in the book. Unfortunately, we did not think this through, since it was raining cats and dogs outside. And to make it even worse, the page on which we had written our letter got torn out of the book very carelessly. A massive calamity once again!

" And this happy energy translates to GEWIS as well... "

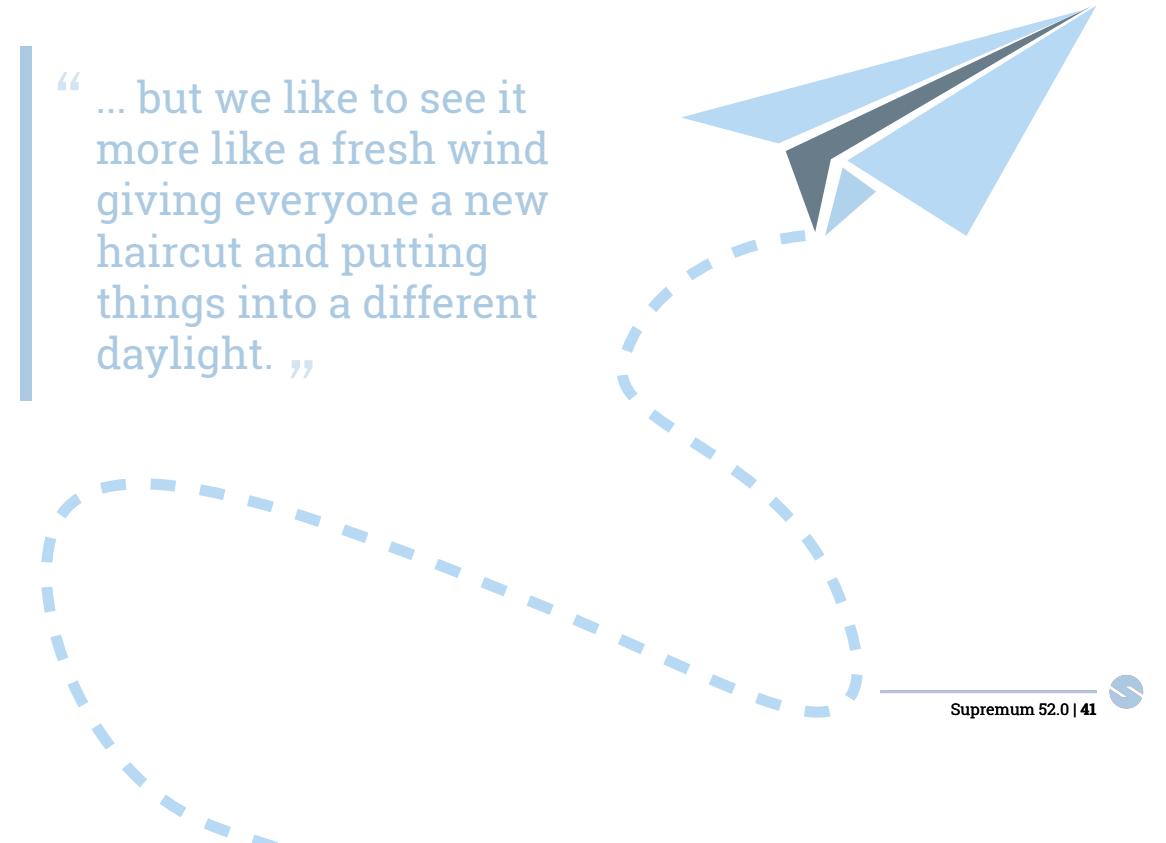
On another trip in Utrecht after another party, two of the crew were on their way to some friends of Anne, because they were nice enough to offer us a sleeping place, so we could go to a meeting the next morning. After exiting the bus, it was necessary to walk a bit further to the end location. During this short walk, something mysterious was lying on the pavement. After further inspection, the mysterious object turned out to be a scooter ('step' in Dutch) without a back wheel. "You know what would be a great idea? To take this scooter with us as a present on the next constitutional drink!" was exclaimed. And said so, made so: Anne needed to explain to her friends from home why we were carrying a pink scooter without a back wheel with us. What a demise!



And to top it all off, these clowns are lead and restrained by the biggest clown of all, our chairman Kees. Additionally, Kees' job is not made easier by the rest of us. Everytime he has to give a talk to another board, our beloved chair receives 3 different, seemingly random words from us to keep him extra on edge and prove that he can talk like a real leader. This results in some quite amusing stories, and means that Kees tells some boards that he has ridden some crayfish in the Sahara in the past. How miserable!

" ... but we like to see it more like a fresh wind giving everyone a new haircut and putting things into a different daylight. "

So yes. Definitely yes. We are, piece by piece, disasters. But let's be honest, have you ever seen a bunch of disasters being so happy together? And this happy energy translates to GEWIS as well (at least, that is what we like to think). Sometimes our actions may seem like a hurricane, but we like to see it more like a fresh wind giving everyone a new haircut and putting things into a different daylight. And therefore, we are sure that we are exactly what GEWIS needs!



INTRODUCTION WEEK & FLUP

"The introduction week was a really cool week. It was a good way to get an introduction to both the student life, and your co-students. If that wasn't enough already, I was invited for the Follow UP weekend. The FLUP sounded just as fun as the intro-week, so I immediately bought I ticked for it, and I've got to say, it was more than worth it!" - Nick

TEXT Nick Broeks & Daan Verkade

INTRO

Nick: The introduction week was very formal in the beginning. You just had to listen to what you were told. As soon as we met our parents, I knew it was going to be a fun week. My parents were Chiel van Horssen and Stefan Hoekstra, and I've got to say, they were the best. To get an idea of what intro-parents do, here's a list of task they had:

- » Make sure university doesn't get into trouble.
- » Make sure GEWIS doesn't get into trouble.
- » Make sure their kiddo's have fun

I have to admit, my parents did exactly as desired. They taught us games to play in a group, how a student house works, and they showed us where we could go out. They also learned some standard "habits" of students, like the "golfbal" and "twee in de hand".

The other things we learned during the introduction week were the important stuff. Things like "orga sucks" except for the intro-committee of GEWIS. They really made a good schedule, and I had a lot of fun following the program and if I look back on it now I'm glad I joined the intro. The intro-week showed me every student and sport association I could join, but most importantly, it showed me GEWIS. They made a really beautiful, story about GEWIS, how there's always someone at GEWIS, and how it's always fun there. I was skeptical, but I found out it was true what they said. Now I'm there all the time and all thanks to the intro-committee! The best part about the introduction week, was the party at Friday. You just talk a lot with

people, drink a beer and just enjoy the weather. For sure one of the best experiences I had!

Daan: There aren't a lot of moments that I've felt homesick after a fun weekend. However, the intro-week and the FLUP both gave me a feeling of wanting to spend more time in Eindhoven. Before the intro, I had only been in Eindhoven two times and it was therefore all the more funny to feel homesick after just a week of spending time in Eindhoven.

When I arrived in Eindhoven, walking down the Limbopad, I felt overwhelmed by all the people handing out flyers and goody bags. Thinking back to that day, the Limbopad looked a lot longer than it actually is. That day it took me 20 minutes to get to the Auditorium while it normally should take around 5 minutes. However I'm happy that it took a bit longer. Walking down that path was the first step to feel more at home by getting to know what one could do in Eindhoven, besides studying.

Even though walking down the Limbopad was my first



step in getting to feel more at home, it was not the most important one. Meeting my intro-family had the biggest impact on why I felt so homesick after the intro. Although it's always exciting and scary to meet new people, it's even more exciting and scary when doing it in a city I didn't know. Luckily for me, I had nothing to worry about as it turned out later. All of us got along great with each other and, in a week time, it felt like a real family. Even so much that we all came together after our first day of lectures and cooked dinner for each other. It's mainly because of this family that Eindhoven started to feel like a place I could call home.

The intro was, of course, about more than just getting to feel at home, however this is what made the intro so memorable for me. Getting to know Eindhoven and getting to know the amazing students that live there is why the intro was so special to me and why it made me feel homesick about a city I had only visited twice before.

FLUP

Nick: The FLUP, where do I begin. It started in the first week of lectures, when we were making sure we had a tent to sleep in. We were already hyped for it, but as

soon as we started, it was one of the most fun evenings I had. I had my first pub-crawl, with a group which was way too big, thanks to Leon Vreling. That was the moment I got to learn a lot of people at once. We just had some music on and drank beer all night. Until we began to feel the alcohol. That was the moment we started a dropping. We just walked and laughed with the group, and it was a really fun experience. As soon as we arrived at the location, we found out we missed a stop and had to walk further.

The next day, we started with breakfast. Just make some food, grab some coffee, but wait, there was no coffee machine!!! After it was solved with some makeshift coffee iron, we all had some coffee. After 12 pm we started drinking beer again. It was just a really relaxed weekend, we just sat in the sun, did some beer pong and eventually did some really funny games. I've had a lot of camps already, but I can assure this was already the best one so far. The best part, the cantus, didn't even begin yet. Just as a cantus should be, lots of singing, lots of drinking and a lot of joy.

The last day was the best, just do what you want to do, relax and sit in the sun. We stayed with some other first years and just enjoyed the freedom. Eventually



we cycled back to Eindhoven, to have one more drink to end the FLUP.

Daan: When the intro was over and my homesickness slowly got less, I could start getting excited for the FLUP that would take place two weeks later. The FLUP gave me another chance to get to know even more people to hang out with and to participate in all sorts of activities. Instead of getting to know Eindhoven, I got to know GEWIS and the people that make GEWIS so great a lot better during that weekend.

The FLUP was all about getting a bond with fellow students. The FLUP let to me meeting the one and only KoffieIJzer, also known as Nick, and Rick, about who I had, until then, only heard from via the stories my mom told me about him. Next to meeting them, I also bonded with a lot of other people while doing beer pong in the morning and doing activities together like the cantus and finger painting on each other.

The FLUP didn't come without memoryless. I have almost no memory of the pub crawl and in a way, I'm happy about this as I did a lot of stupid things that night like almost landing on my face after my attempt of doing a judo roll on the street. That weekend it didn't matter if you did something stupid because everyone did something stupid and that's what made it so fun. Going to the FLUP was a terrific amount of fun and I'm

CONCLUSION

Nick: In general, it's safe to say I enjoyed the FLUP and intro-week way more than expected. I've made a lot of friends, became really active in GEWIS and most important. I got my title Koffieijzer, which I will carry with a lot of pride!

Daan: Both the intro and the FLUP made me realise how much fun GEWIS actually is and both made me miss Eindhoven when the week was over and I had to go home. Getting to know so many new people was quite overwhelming but at the same time a lot of fun!



glad that I went to it. The journey to the camp made me bond with the rest of the group that I was with and was an enormous amount of fun. I got to meet a lot of great people and because of all this bonding made me realise even more how much fun GEWIS can be.

The theme of this Supremeum is Disaster, but the only "disaster" that I can think of is that I have to leave Australia within three months again and that there is just too much that I still want to do. Of course I also miss my family and my friends from GEWIS, but fortunately, you'll learn how to make friends in another country fast enough. If you ever doubt about going abroad, then go! All those stories about it being a unique life-time experience are true. Yes, it might be really expensive and you'll have to leave your friends and family behind, but it will all be worth it!

When I'm back in the Netherlands, Before I fly back to our cold country (yes, it is already around 30 degrees here), I have about four weeks left to travel around. This is the part that I'm most looking forward to. In the first two weeks, I have planned a road trip from Brisbane to Sydney along the coast. After that, I fly to Tasmania and join an organized tour for a week. During Christmas, I'm probably sunbathing on the beaches of Melbourne, as I will spend the last week of my journey here.

best part of Australia is by far the wildlife. Everywhere you'll find animals that you won't find in the Netherlands or even in the whole of Europe. In the evening, you can see possums and bats with ease. While walking on the beach, whales and dolphins can be spotted regularly. And if you are as lucky as I was, you'll spot wild koalas and kangaroos. No snakes or spiders yet, although I probably shouldn't say that too loud. The activities are also awesome. I've been on a whale watching cruise, went sandboarding in the desert and took a scuba diving and surfing lesson.

For the ones who don't know me, I'm a sixth-year student and just started the third year of the master Industrial and Applied Mathematics. It is almost a year ago that all stories about studying abroad being a life-time experience were filling my mind, so I scheduled my first meeting to see what was possible. And here I am, writing this story for Supremum from my room in Brisbane, in the Land Down Under, also known as Australia. On weekdays I'm working on graduating at the University of Queensland and with two amazing supervisors. During the weekends, I enjoy the city, wildlife, beaches, and all of the other amazing stuff that Australia has to offer.

STUDYING ABROAD GRADUATION DOWN UNDER

TEXT Femke van der Sch

THE DISASTER OF TOO MUCH CHOICE

Suppose you are around 18 years old. You almost finished your high school and now you are going to take the next step: university. Unfortunately, you did not put a lot of time in visiting different universities over the past few years, in order to make a good choice of the study you want to do. You take your laptop and you fill in some of those questionnaires that should tell you what you want to become. However, the conclusion of the tests all say something different: artist, medicine, baker, technical sciences, etc. Without further thinking, you just apply for some random studies: applied mathematics, because you are slightly good at math; computer science, because you want to become rich and data science, because all companies use data science, right?

TEXT Mattijs van den Berkmortel & Laura Kuntze

Soon you discover that the programs you applied for may not be what you expected. You don't know much about them, what if one of them is not the right choice?! Your friends all know what they want and they won't stop talking about their bright futures. Your parents try to be motivated by telling you that it does not matter and that you can do whatever you want. And on top of that, you keep receiving emails from your school that they want to know what choice you made. What a disaster. How can you possibly know what is going to make you happy in the future?

Naturally, not all high school students struggle that much with choosing a study, but for those who fear the disaster of choosing wrong, the university organizes lots of different activities. During these events, several students try their utmost to inform potential future TU/e students, and of course all other visitors of the information days.

Together with a very motivated student promotional team we are prepared to answer all different sorts of questions. Really, questions that arise can be from all different kinds. Examples are what courses you have to take and how it is to live in a city far away from your parents home. But also questions like "Are there any

girls that follow your program?" or "Are there also people who like to socialize at your program?". Then it is up to the students of the promotional team to stay professional and to answer these questions in a serious way.

However, besides these strange questions, the work we do is very valuable. We see all those struggling students and help them to make the best choice. Even when we realize that one of our studies is not the right choice for a visitor, we are able to help. We just direct them to one of the other studies of our university or even to studies at other universities, because the motto is: every student in the right place! With this motto we help prevent that high school students make a choice that would be a disaster for the rest of their lives.



Infimum: A strange or funny quotation from a teacher, a student or faculty member.
Here you can find infima sent to the Supremum committee via inf.gewis.nl.

Ralf over de zon: "Wow, dat ding is fel joh."

Tijdens een borrel op zomerreces

Iggy van H: "oef, ik ben echt toe aan vakantie.."

Arjen S: "*snurkgeluid* inderdaad zeg, ik ook..

Morgen weer!"

Vinz: "Salmonella is gewoon een mening"

Lucas: "I have never seen a triangular vagina"

Sanne tegen sjaars met bloedneus op flup: "heb je meegedaan met Limburgse leeuwen?"

Kiddo: "Nee met vingerverven"

Tijdens de w.v.t.t.k. (wat verder ter tafel komt) van een supremumvergadering

Anne N.: "Is er nog anders iets op tafel gekomen dan eten?"

Ilse: "Hoezo is dit nu in een keer mijn wachtwoord?"

Kas: "Liever eenhoorns want hoe kan je ooit een zeemeermin neuken?!"

Romy: "Bij bowlen denk ik altijd aan bitterballen."

Arend V.: "Ik studeer wiskunde, geen kabel"

Erik de Vink tijdens college over CFG's: "I don't expect you to swallow this all in one blow"

Arend: "Twee woorden, dertien letters, twee puntjes!"

Maureen: "Kerst?"

Henk over carnaval: "Ik snap niet waarom dat nuttig is"

Anderen in de ruimte: "Is het ook niet, maar wel leuk"

Tim: "Alex, jij was wel echt aan t glibberen"

Alex: "ja maar ik ben toch ook een paling!"

Dylan: "Ja, maar soms moet je gewoon een verwonding oplopen."

Bouke: "Voor ik zo naar huis ga moeten jullie mij even helpen herinneren dat ik nog ga kakken, want het wc-papier thuis is op."

In een klein, geel wagentje op weg naar Leiden.

Kees, kijkend naar rechts: "We rijden een Porsche voorbij."

Wordt links ingehaald door een Porsche.

Arjen: "Kijk, jij noemt het een kater, ik noem het nagenieten!"

Ralph's ochtends na een bruiloft: "Ik wil geen open deuren in trappen, maar alcohol is niet goed voor je."

Sjoerd is Pom-bar aan het eten

Bouke: "Sjoerd, je klinkt als een koe"

Diederik: "Is de aas een 2?"

Bestuur heeft chocoladeletters gekregen van een anonieme Sinterklaas.

Sjoerd: "Misschien heb ik ze wel gegeven?"

Kees: "Dat kan niet, jij koopt geen zeven chocoladeletters om ze weg te geven."

Anne: "Ik weet wel wat kaas is."

Romy: "Als ik maar geen griep krijg, daar heb ik geen tijd voor."

Niels: "Dat is wel een beetje zielig voor de griep."

Romy: "Dan had hij maar een datumprikker moeten sturen."

Bouke: "Jij moet echt stoppen met kerstkleren shoppen."

TRAINING-ON-PAPER: MINIMALISM

Do you ever think that your room is a disaster? With clothes everywhere on the ground and your desk a mess, so people might think that a bomb has gone off? If that is the case, minimalism might be something for you. In this article I will tell you more about how literally cleaning up your physical space can figuratively create space as well. I'm talking about space in your mind.

TEXT Arend Verbeek - TRAIN

Minimalism is all about the art of less. It's a way of life where you try to be conscious about what you own and specifically what stuff makes you happy and what doesn't. Minimalism is a trend set in motion by Joshua Fields Millburn and Ryan Nicodemus, also known as 'the Minimalists'. Their movement gained traction after their TED-talk, which can easily be found on YouTube and is definitely worth a watch. In that talk they explain how they realized that the stuff they owned didn't bring them happiness like they had expected. Recently minimalism was also put in the spotlight again by the clean-up show of Marie Kondo that can be found on Netflix.

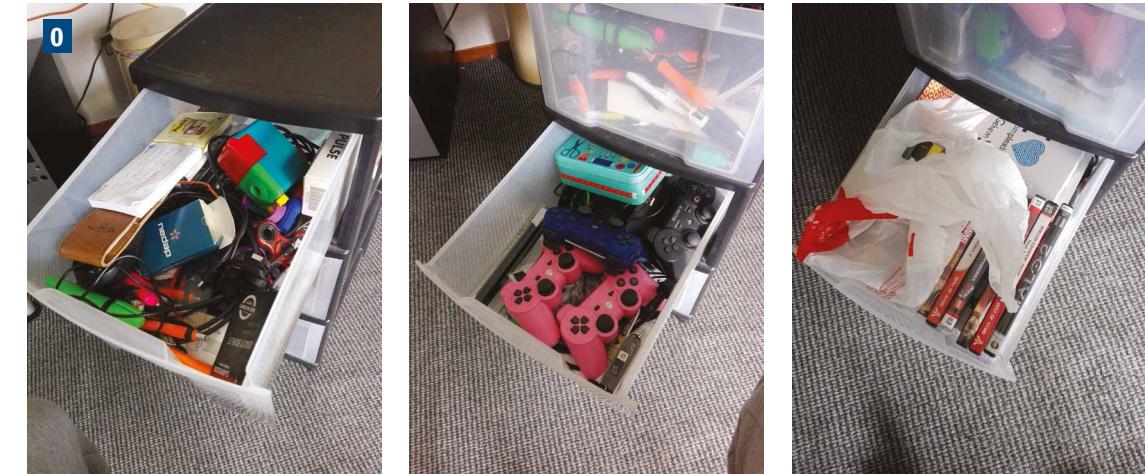
Last year, TRAIN asked Anja of the blog Minimalist Dutchie to give a lunch lecture about her experiences as a minimalist. It was really nice to hear someone speak about their own personal experiences. I was most touched by her story about an ugly lamp she owned in the shape of a monkey. It made her happy every time she looked at it and it was also functional, because it was a lamp. When she got rid of most of her stuff she kept the lamp. She gave us a lot of great tips, but she also admitted that she wasn't perfect herself.

When TRAIN organizes an event, we try to research the theme of our event ourselves. For the training on effective meetings we tried to make the TRAIN meetings more efficient and for the lecture about mindfulness some of us downloaded the meditation app Headspace. As a preparation for the lecture about

minimalism I cleaned up my wardrobe. I donated two garbage bags of clothes and I refolded everything that was left. It was probably also meant as a way of S.A.B. (study avoiding behavior), but I was proud of the result and it felt enervating to have done something that had been on my to-do list for ages.

While researching for this article I realized that I had still a lot to clean in my room next to my closet. I have multiple drawers I avoid opening because of the amount of trash in it and I have more shoes than I care to admit. The other day I took a day off from studying to clean this and I'm quite proud of the result. I assume everybody has boxes or drawers in their home with junk in it. Stuff that is not really trash, but so useless you never touch it. For example: I realized I owned four different decks of playing cards I had never touched and three pairs of sunglasses I never wore. This stuff accumulated in my room after three years of getting free promotional material from tech companies. In my junk cabinet I also kept a lot of broken electronic devices, because I was too lazy to either fix them or recycle them properly.

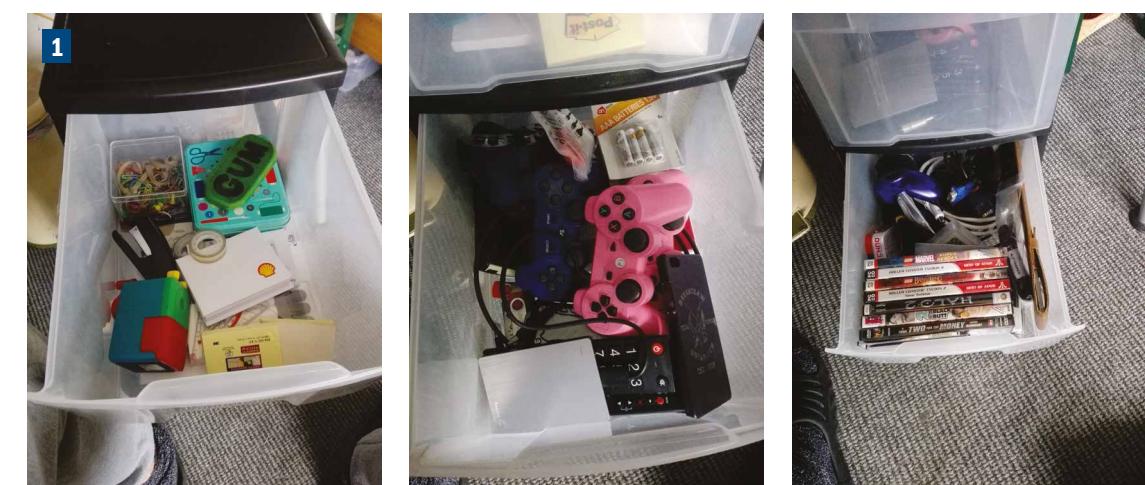
Throwing out the trash, junk and broken stuff was not hard for me. What I found the the most difficult thing of this project was deciding what to do with the stuff I was emotionally attached to. I'm someone who likes to gather weird and interesting things that remind me of some kind of story. I own an old lava lamp and although it has been broken for years I can't really



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The drawers of my junk cabinet. From left to right: 'office supplies and junk', 'a collection of broken and not-so-broken electronic devices' and 'a heap of DVDs and games'. Note: my DVD player broke two years ago.

part with it because I burned my hands on that very lamp the first time I was drunk. This is also why I found Anja's story about her monkey lamp so relatable. This topic was actually discussed during the lecture as well. I mentioned that my mother asked me to clean up my old room because she was unable to throw out any of my old things herself. Stuff I thought to be trash reminded my mother of a time when I was still her little boy. Anja's advice was to think about what stuff would really make my mother happy and keep that. For example: drawings I made as a child are a good idea to keep, but the toys I used to play with didn't have the same emotional value.

In the end I ended up with one garbage bag, one bag I was going to bring to the thrift shop, four pairs of shoes for the Salvation Army and a few electronic devices I'm going to recycle. It was a lot of work and I hope that the effort will pay off. In conclusion: I don't really



1
I cleaned out the drawers and I'm quite fond of the result. There's still quite some stuff in there, but atleast most of it is useful now

COMMITTEES & FRATERNITIES

GEWIS is built on top of committees. Besides, Study Association GEWIS has several fraternities which contribute to the atmosphere and organize activities. Find out more at: www.gewis.nl/association.

FRATERNITIES

ATHENA



ATHENA

B.O.O.M.



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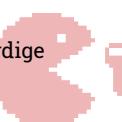
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Excentrieke Kups

GEDWAAL

GEWIS'sers Dwalen Waar

Anderen Anders Lopen

GEFLITST

GEWIS Fotografeert Leden In

Toffe Situaties, Toch?

GEHACK

GEWIS Ervaart Het

Algoritmisch Code Kloppen

GEILER

GEWIS Eet Ijsjes Lekker

En Regelmatig

GELIFT

GEWIS'sers Liften

Ieder Fantastisch Traject

GEMOLD

GEWIS'ers moeten

overal leugens doorzien

GETAART

GEWISSers Eten TAART

GEZWEM

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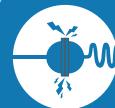
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