

TAYLOR VISION

*Release Your
Constraints*

May 2023



About us



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BOARD

Chair

Secretary

Treasurer

Internal Affairs

External Affairs

LOCATION

HISTORY

Taylor is the study association related to the department Precision and Microsystems Engineering of Delft University of Technology. The association was founded in 1988 to enhance the study experience of the students. The Taylor Foundation, in its legal form, was subsequently founded in 1992, making it an official organ in the TU Delft. During this time, the department changed its name from "Production Engineering" to the PME you are all familiar with. In contrast to what many people think, Taylor is not named after the famous mathematician known for the Taylor expansion. It is named after the mechanical engineer Frederick Winslow Taylor, who was active in production engineering and industrial efficiency. The logo of Taylor was inspired by the tip of an Atomic Force Microscope, an instrument that requires technology from all the divisions of the department. Taylor aims to enhance the study experience of the students by: trying to improve the relation between the students and the department staff, bringing the students in contact with the industry, providing the department with student feedback about courses and, last but not least, organizing recreational events to de-stress from the hard working life as a HTE student.

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From the board

Dear HTE'ers,

The final quarter of the year has begun, signaling the need to contemplate future plans for the next year. Should you take extra courses, pursue an internship, or embark on your graduation project? With so many options, it's natural to have many questions. Fortunately, this period is packed with events that will make these decisions easier for you. The thesis market showcased the fascinating topics offered by our incredible department, and the connect event, which we will organize this quarter, will give you a taste of the internships, graduation projects, and jobs available to you from various companies!

We also enjoyed seeing so many of you take a coffee break with us at the Taylor office. Sometimes, there isn't even enough space for everyone, and that has of course nothing to do with Jelle's

belongings scattered throughout our office ;).

As summer approaches, we hope to have the next Taylor drinks outside again. There is nothing better than enjoying the sun with a drink and a bite while chatting with friends about high or low tech stuff.

So all in all we are excited about the upcoming period, which promises to be both thrilling and inspiring.

On behalf of the Taylor board,

Mark Baken (Taylor 22/23)



Recent graduates

19-1-2023	Max van der Vis	Designing a suspended silicon nitride GHz acoustic beam splitter
19-1-2023	Rens de Rooij	Indirect sensing method for contact location and force in a compliant finger
20-1-2023	Endre Ronaes	Tunable magnet actuators: magnetisation state and position control of a hybrid tunable magnet actuator.
25-1-2023	Shiema Elhassan	Temperature control system for Organ-on-a-Chip applications
25-1-2023	Jelle Kortman	Design optimization for a kinematic coupling for use in vacuum with restrictive particle generation
7-2-2023	Niels Bouman	Tuning graphene dynamics by mechanical strain
10-2-2023	Shunyu Yao	An improved chip design for nanomotion detection
20-2-2023	Sjoerd Zillen	Stage inaccuracy compensation on sub-micrometer flatness measurement
23-2-2023	Robert Krol	Improving the accuracy of the topology optimization of turbulent flows.
24-2-2023	Luuk Withagen	Design of 3 DoF and 6 DoF force and moment balanced manipulators based on the spatial pantograph linkage
27-2-2023	Thomas Michalica	Two-photon polymerization-based 3D-multi-electrode arrays for electrical monitoring of neuronal cells
3-3-2023	Luuk Samuels	Parametric study of an elastic singularity -based frequency doubler for concatenation
22-3-2023	Tobias Neeft	Development and prototype of a textured nanoimprinted air bearing system

30-3-2303	Marek Slebioda	Fatigue based topology optimization of an offshore wind turbine drivetrain.
31-3-2023	Cas van Ruiten	Air loading on ultrathin graphene membranes for microphone application
5-4-2023	Victor Jaarsma	Efficient manufacturing of P (VDF-TrFE-CTFE) actuators for a robotic fish
12-4-2023	Chihao Kuo	Fabrication methods of a novel 3D hybrid stiffness scaffold for neuro mechano-sensing
19-4-2023	Wieland Juch	Development of a suspension system for a hydrostatic bearing operating on an undulating surface
21-4-2023	Tieme Moens	Design and testing of a suspension system for a hydrostatic bearing operating on an undulating surface
25-4-2023	Flip Colin	Variable thickness and initially curved flexures for improved flexure mechanisms
25-4-2023	Dennis van de Ketterij	Noise robustness improvement of reset control systems using measurement line filtering
26-4-2023	Yu-Xuan Chuang	Shape correction for 3D laser marking



Congratulations!

Upcoming activities

09/05 |

Connect Event



25/05 |

JPE Lunch Lecture



31/05 |

Prodrive Excursion



TBA |

Taylor Drinks



01/06 |

Pre-activity TT



TBA |

Lunch Lecture



TBA |

Cycling activity



PM Lunch Lecture

On a lovely Friday, the 13th of January, Johan and Darwin from the company PM, Precisie Metaal, (or Precision Metal in English) came all the way from Dedemsvaart to Delft.

PM is a world-class producer of extremely precise bearings and mechatronic systems with applications across many high-tech sectors, from medical to semiconductors. Darwin took us through the design process of a new type of bearing that no one in the world can make. The presenters even brought some of their products so we could feel the smoothness of the very tiny bearings. They didn't bring



the tiniest though, because it always gets lost. With the innovative work at PM, there is plenty of opportunity for interesting jobs.



TAYLOR

Drinks

Pizza and drinks galore at PME Square!

Some Ph.D. candidates were asking the Taylor Board week in, week out when the special Taylor Drinks including pizza were going to be held at PME square. On the 21st of February, pizzas were arranged, resulting in Taylor Drinks with over 100 people!



ACE Lunch Lecture

Right at the start of Q3 ACE kicked off with a lunch lecture in week 2.

ACE is an engineering firm that mainly does projects for other companies. During the lunch lecture we were given an overview of the company itself and the kind of work they do. Fun fact: they do not only have an office in Eindhoven but also in Delft (!) and two in Belgium. They have quite a wide variety of areas they operate in, like automation, automotive, construction, product development and of course the high tech sector. The fact that they work different projects for lots of



different client companies means that as an engineer at ACE you get the chance to work on a wide variety of different projects.



Meet The

Are you excited for the Taylor Trip?! This year's trip to Japan is organised by our special Taylor Trip Committee (TTC). Get to know the enthusiastic HTE'ers who are working hard to make sure we go to the coolest nature, cultural sites, companies and cities in Japan.

Tom

Hello everyone! My name is Tom and I am a first year High Tech Engineering student. I finished my Mechanical Engineering bachelor in 2021 after which I joined the Forze Hydrogen Racing student team as full time Chief Mechanical Engineer for a year to promote the use of Hydrogen and to get experience in a race team. Next to my studies I enjoy watching Formula 1, go to the gym, play the drums and delve into the watchmaking industry.

For the Taylor Trip Committee, I took up the role as chair which means that I have to take care of the smooth operation of planning the trip and preparing meetings. I look forward to travelling to Japan and experiencing their culture, nature and cuisine. We are trying to arrange some visits to amazing companies for which I am very interested to see the Japanese work ethic.



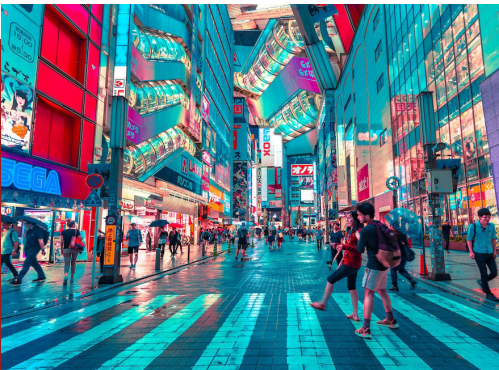
Camila

Hello, my name is Camila, I'm 24 years old from Floridablanca, Colombia, I am the secretary for the Taylor Trip Committee 2023. I did my Bachelor's in Mechanical Engineering in Colombia, and now I'm living in The Netherlands, pursuing my Master's at TU Delft, in the HTE Track. Aside from Mechanical Engineering, I like to play volleyball and listen to Taylor Swift. I really like Japanese culture and I have been learning Japanese for more than a year now. I am very excited to be going to Japan and helping organize the trip has been super fun. My favorite Ghibli movie is Howl's Moving Castle and I'll be buying all the merch.

Tetsuo

Hey everyone, I'm Tetsuo, I'm 23 years old and the treasurer of this year's Taylor Trip Committee. I finished my bachelor in mechanical engineering at TU Delft in 2021 after which I took on a full-time position at AeroDelft last year. In my free-time I enjoy playing rugby and watching sports/movies or listening to a podcast.

As my name may suggest, I'm not fully Dutch. I have a Dutch dad and a Japanese mom and I also grew up speaking Japanese.



Taylor Trip Comittee



I've been to Japan a few times before to visit family so I hope to bring a little bit of experience when organising the Taylor Trip to help everyone enjoy Japan to the fullest. I've not seen any of the business side of Japan so I'm especially excited to visit some very interesting companies there with you!

Niels

Hi, I'm Niels and I'm 23 years old. I started the HTE Master's degree in September, after completing my Mechanical Engineering Bachelor's degree in Delft and working with AeroDelft on a hydrogen-powered airplane. During my Bachelor's program, I had the opportunity to go on an exchange program to Denmark.

Next to my studies I enjoy playing football at Ariston and like to go cycling with WTOS (and hopefully Taylor when the weather gets better). In my free time, I like to play the piano and really enjoy cooking. I'm very excited to visit Japan and explore their amazing cuisine. I'm sure that it's going to be an unforgettable trip.

Fabian

Hello there, I am Fabian, a 25 year old mechanical engineering student in my master at TU Delft. I grew up in Germany close to Mannheim and got my bachelor in mechanical engineering at the University of applied science Kaiserslautern. After which I moved together with my girlfriend to Leiden and started to study in DELFT. My passion lies in the basics of mechanical

engineering. I am fascinated by complex mechanisms and love to come up with solutions for problems and bring those to life.

When moving here I promised myself to learn proper kitesurfing, however I have yet to start practicing :D. In my free time I like to go to the



beach, go bouldering or meet with friends on a beer (I hope to add Kitesurfing to that list during summer).

I joined this year's Taylor committee to get the opportunity to shape this Taylor Trip and give it my personal note. Together with Tetsuo I am responsible for the organization of company visits, which are a fundamental part of this trip. We try to get into contact with companies from different fields in the high-tech sector of which there are a lot in Japan. I am really excited about this trip as I have never been to Japan but the research that we have done so far promises that this Trip will become an awesome one!

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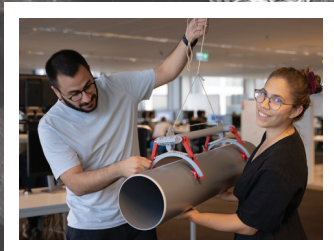
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ENGINEER YOUR FUTURE



TWD Network Drinks

Networking VrijMiBo at PSOR with TWD

On Friday 10th of March, network drinks with TWD were arranged at PSOR cafe, due to 't Lagerhuysch (temporarily) not being allowed to sell alcoholic drinks.

Luckily, PSOR Cafe came out to be a nice backup option with a nice atmosphere and even an 8-ball pool table! TWD started off with a short presentation about their company and afterward, time for chitchatting was possible. All in all an entertaining VrijMiBo(FriAftDri)!



Settels

Lunch Lecture

Settels Savijne is a group of companies that fits perfectly with the high-tech engineering education.

Jaap Oudes (principal engineer) and Niels van Giessen (design engineer) from Settels in Eindhoven came to Delft to give a lunch lecture to the students. Settels invents, designs, and manufactures high-tech equipment. The equipment is used in medical treatments, display manufacturing, semiconductor industry and more. With accuracies of picometers, we were impressed by the performance of Settels' machines. We were glad to see some familiar design concepts from the course precision mechanism design being used in real-life. Jaap stressed that the most important thing is to enjoy your job and that you should find out what is a fulfilling way to spend your time.



Interview

WITH

Murali K. Ghatkesar

Let us start from the beginning, how was your youth?

I was born in a place called Hyderabad which is in the southern part of India. Until my Master's degree, I lived in the same place where I was born. I went to the University of Hyderabad located in that same city and studied Master of Science in a Physics Department with a specialization in Electronics. After my Master's degree, I went to another city called Bangalore in India, again in the south of India, and did a Master's in Engineering, which was in instrumentation.

Then I worked for one year in a company, going back home to Hyderabad. And then I went to Switzerland for my Ph.D. and Postdoc in the US and then I came to the Netherlands. That was my educational journey. With youth you mean: when I was even younger?

Yeah, around 10-18 years old

Yes, so in India, what is emphasized by parents is that education is the only way to a good life in the future. It's in the culture. So a lot of kids are told to study well, you have to get good grades. Otherwise, you have to do some mean jobs, where you might not get enough money and you're going to struggle in life. So, education is a way for you to do well in life, right? As there are very limited universities for everyone to get admission to, there is competition. For every type of education that

you want to do, there is an entrance exam where only top rankers will get admission. Until school days it was a more fun time, but from there all the stress starts for young people. Until 15 years it's okay, there is less stress, I would say. You can still have fun. But after that, it is all about choosing your career and then preparing for competitive exams.

And how did you cope with that? With the stress that was put on you?

Yeah, it was quite stressful, because it was always a comparison with successful kids. The most popular career choice in India, at least at my time, is either engineering or medicine. People used to consider only these two career options where you can have a good life. So, a lot of stress to get into one of those professions. I was more interested in math and physics. All activities are cut, usually. No play, no fun stuff, just read read read, prepare, many many hours. Write the entrance examinations ...

Besides the tough study, which hobbies did you have? Or which hobbies do you have now?

In India, everybody plays cricket, haha. Here everybody plays soccer, but in India literally everyone, all kids know how to play cricket. Things are changing now, but when I was a child, it was always cricket. Everywhere, kids played cricket. I was no different, I also



Murali Ghatkesar with his wife Reshmi Mukherjee in traditional Bengali attire attending a wedding at Bakuliagram, West Bengal, India.

played a lot of cricket. That came with me all the way to Switzerland, where I was playing professional cricket. Cricket is an expensive game because the gear that you buy -- the bat, the helmet, pads, gloves, all those things

cost money. But still, everybody in India plays cricket, not because they can afford it, but because they play without any protection. Also, to not hurt yourself, there are different types of balls, like rubber balls, or tennis balls, but they don't hurt that much. But actual cricket is played with a hard balls. If you don't wear protection, you will seriously get hurt if the ball hits you. But kids in the street play with rubber or tennis ball, which is much safer. When I came to Switzerland, I got a chance to play professional cricket for the first time wearing all the protective gear and playing with a hard ball.

Later I also developed badminton as my hobby, I played a lot of badminton during the late part of my Ph.D., which became my main hobby in terms of sports. But being in Switzerland, and having Swiss friends, I also learned to ski. I wouldn't have done when I was in India, because in the place where I'm from, there's no snow.

And then, another hobby that always stayed with me is collecting poetry in Hindi and Telugu (my mother tongue). My latest hobby for me is reading philosophy. This developed a few years ago. I'm really trying to understand different philosophies that developed around the world over many years. Two important philosophical lessons I have learned so far are, 1) the universe we live in is a high-precision place, and 2) balancing is the secret to a healthy and happy life.

Do you often talk or go back to your family?

Yes, every year I have to go back, otherwise, I cannot focus. Every trip to India is like charging my battery. If I don't go I somehow feel disconnected. So that's why I go every year and spend time with my family, and friends, and travel a bit. There is still a lot to

explore in India for me. So, yes every year during Christmas vacation I go to India for four weeks.

Ah just like this year. And what is the funniest thing that has happened at TU Delft since you've been here?

I knew that I was coming to a land of tall people. You know that I'm short, haha. So I was like 'Okay, tall is how tall?' In the first year, I had a master's student who was really tall, even by Dutch standards. It was funny, I took



Murali Ghatkesar with his wife Reshmi Mukherjee at the 13th International Workshop on Nanomechanical Sensing (NMC) held in Delft where Murali was a co-chair of the conference.

a picture with him where I was standing next to him, with both my hands raised and I was still shorter than him. He was really really tall. People around us always used to make fun of both of us, wanting to see next to each other.

It was really funny. I was like a hobbit before him. Ha ha...

What Indian food would you suggest to everyone reading this interview in the Vision? Is there one Indian meal that comes to mind directly?

I am a foodie. One of the things that I miss in the Netherlands is good food. Because Indian food has so many varieties, it's so diverse, it's so amazing, I just love it. And I'm vegetarian, so there are so many vegetarian varieties in India which I miss here. Even in the restaurants here, there are very few options for vegetarians. There are many dishes to suggest, and it is difficult to choose. For non-vegetarians, I would say try Tandoori Chicken. And for vegetarians, I suggest something from south India, it's called Idli. It is a steamed rice-lentil cake and is usually eaten by dipping it in peanut-coconut soup. For north-Indian food, I recommend Maharaja Restaurant, Nieuwe Langendijk 59, 2611 VJ Delft, where they also serve non-vegetarian food. For south-Indian food, I recommend, Saravanna Bhavan, Noordeinde 123, 2514 GG Den Haag, where only vegetarian food is served but there are so many varieties to choose from.

So you have worked in the industry for one year, you told me. When or how did you decide to get back into academia?

Basically, before joining that industry, I was doing my second Masters at an institution that is called the Indian Institute of Science. This is one of the top institutes in India. Then, for the first time, I was exposed to research, before I didn't know what research was. And that gave me a taste because that is when I saw Ph.D. students and professors and conferences and all these things. The kind of things that they were talking about was fascinating to me, especially, MEMS-devices.

Anyway, I graduated, I wanted to do a Ph.D. but it didn't materialize at that moment so I took a job in the industry. I was hired to optimize assembly code for VOIP codecs on digital signal processing (DSP) processors. I was at this company for 1 year. And then 9/11 happened in the US. The entire industry got hit and they just started firing people. I was one of the victims and lost my job. But that was also a blessing in disguise because it was an opportunity for me to go back to research. I started applying for Ph.D. positions and eventually got into the University of Basel, Switzerland. That's how I switched to doing research. And I'm glad that I'm doing research. I thoroughly enjoy what I am doing.

So you're an assistant professor, are you planning to go higher level?

Yes, this year I have an interview with the career committee for promotion, so yes, let's see what happens, haha.

Author: Jelle Smit

Lunch Lecture Demcon

On the Thursday of week 7, we welcomed Eva and Tim from Demcon to come to tell us about their company during lunch.

Demcon is a company active in many different sectors. Among those is the High-Tech mechatronics sector. Starting with some general information about Demcon, Eva quickly grabbed our attention by having an office in Delft! Next Tim prepared a presentation about one of the projects he has been involved with. This was a project about vacuum, a subject that is very relevant in the high-tech industry but something that does not receive a lot of attention during our master's program. After learning about the basics and the challenges of engineering with and in a vacuum, Tim described the



project. Afterward, we could see and play with various parts from the project they had brought before we were all kicked out of the lecture hall by the next lecture.

Flexologic Excursion

In the fourth week of the third quarter, we went to Alphen a/d Rijn. Alphen? That is not near Eindhoven I hear you think.

True, but Alphen is where the company Flexologic is located. Right in the middle of South-Holland, in an unsuspecting industrial area, the plate mounting technology market leader has their headquarters. Their slogan is “we innovate” and we learned that that is no exaggeration during the afternoon we spent at their facility. First, we got a short introduction to the field they operate in, which is the mounting of flexo plates onto



rollers which are used for printing. This mounting has to be done with micrometer precision, in order to print with high resolution. Flexologic offers solutions that can do this mounting fully automatically. After this short introduction, we received a tour showing the machines in action in order to better understand the challenges involved in the mounting process. Next, we received more general information about the company and the type of jobs they offer, and we got the chance to ask



more questions. Then, we were shown the next generation of machines they are working on, including a fully automated robotic cell that does the taping of rolls onto which the plates are attached. This is normally a very tough job as these rollers are very heavy. This robot could do all kinds of different sizes of rollers fully automatically. We finished the day with some drinks.

PaASML-TAYLOR

Drinks

After SinterklaASML and KaASML comes.... PaASML!

The drinks on Tuesday 28 March had two awesome themes: Easter / Pasen and ASML! The one and only PaASML Taylor drinks. Everyone got to the PME square after their last lecture of the day. Sara Buurman and her colleague from ASML arranged a quiz on the intricacies of ASML's machines. The expertise of the high-tech students was challenged, but they did very well. Everyone was awarded an ASML-mug filled with easter eggs. The



(ASML-thesis) winners of the quiz had a head start but nevertheless deserved the grand prize of a wireless phone charger! After the quiz we enjoyed a cold beer, nice snacks and the chocolate eggs :D



Taylor Girls Night

On 2nd March the ladies of high tech came together for a girls activity!

We started the evening with home made pizzas. A few of us already had some experience with baking pizzas, however it was still challenging to get an undamaged pizza including all the toppings out of the oven. It was entertaining to watch! After a lot of girls talk, we ended the evening in the night bar 'de Kurk'.

Please contact Paulien if you want to join the activities! :))



Recipe

Sweet potato hotchpotch

Winter is over but in the Netherlands it's never too late for stamppot (hotchpotch). Stamppot comes in a lot of varieties with many different ingredients. Here we've put an easy-to-make, modern stamppot. It's one of my favourites. Credits to Appie.

Cooking instructions

- 1. Clean the sprouts and cut them in half. Peel the sweet potatoes and cut them into equal pieces, cook them in water for 15 minutes. Add the sprouts after 7 minutes to let them cook with the potatoes for the last 8 minutes.*
- 2. In the meantime, put some water with a stock cube in a 'hapjespan' and wait until it's boiling. Then add the meatballs and let it simmer for 15 minutes. When halfway, turn the meatballs.*
- 3. Drain the water from the potatoes and sprouts, put them back in the pan, add 100 mL of the water from the meatballs and mash it into a puree.*
- 4. Cut the sun-dried tomatoes in little strips and mix them with the puree.*
- 5. Add some pepper (and salt if you want)*
- 6. Serve with the meatballs.*



Ingredients:

For 4 people

Sweet potato - 1 kg

Brussels sprouts - 500 g

Sun-dried tomatoes - 200 g

Vegetable stock cube - 1

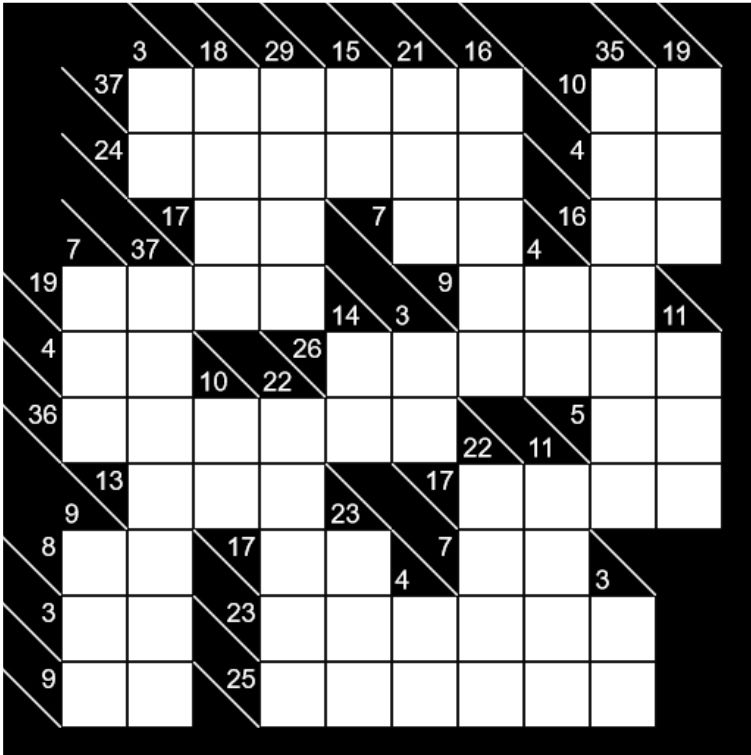
Meatballs (vegetarian or not) - 4 big ones

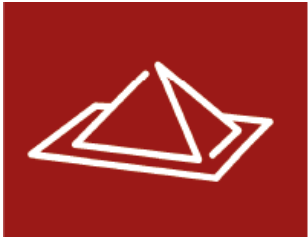
Puzzle

Kakuro

The goal of kakuro puzzles is to fill in all the blank squares using numbers 1 to 9. The sum of a row of numbers should add up to the number on the left of the row. Similarly, the sum of numbers in a column should add up to the number at the top of that column. A row or column consists of uninterrupted white squares. It is not allowed to use the same number twice in a row or column.

Send an email to taylor-3me@tudelft.nl with your solution and you might be the lucky winner!





Taylor

