BRAIN STORM

18. Illusions in Art

8. CS meets biogas

TABLE OF CONTENTS

●○○ Entertaining article, no scientific content. A puzzle or a Cover related article are examples of this category.

●●○ Easily readable article on a scientific topic. Should be comprehensible, even without any prior knowledge.

●●● Scientific article that explores a certain topic in depth. Might assume the reader has taken a course that's related to the topic.

EDITORIAL

BY: Eric Jansen, chairman

We live in perpetual illusion. Not only do our brains constantly make up a fairly shaky interpretation of what enters our eyes, but the way we 'choose' to see the world, in a metaphoric sense, is usually based on false assumptions and imperfect perception, which leads to the illusion of reality. Illusions like having enough material to fill a Brainstorm or having enough time to make sure Maarten can finish the layout are not uncommon when we're working on a new edition. My most unrealistic illusion was probably thinking that I'd work as an editor for the Brainstorm for about two years before quitting. That was almost seven years ago.

Gradually, this illusion was replaced by another one: the feeling that I'd keep making Brainstorms forever. To some, my time here must have seemed like an eternity, but by the time you are reading this, forever has ended. I've worked with so many different people, I don't have enough space to thank them individually, so hereby, to everyone who's been part of the Brainstorm in the past seven years: thank you all for a great time!

I'll probably keep living in illusion for a while, believing the Brainstorm will never be the same. So to soothe that feeling a little, I hope we've made a last Brainstorm that'll serve as a good example to my successors of what is expected of them. Furthermore, the articles point out some pitfalls they might encounter: Arryon elaborates on some of the most common illusions that any student at some point has to deal with, Michael Wilkinson uses the topic of 'proof by intimidation' to show how to create the illusion of a great article or paper.

Because this is our summer edition, we've included not one, but two puzzles, for some good old-fashioned holiday puzzling fun! For people that are looking for a good read, contentwise, Wilco has written about a project on sustainable energy he's currently working on at TNO. If you're staying home this summer, but like the feeling of being away, then Jonathan's report on the Budapest trip is perfect for you. Since this edition's theme is 'Illusion', Isabela has done some research on illusions in art and shows some interesting, visually challenging paintings, explaining what is going on and why we perceive what we perceive.

So this is it. Have a great summer, hopefully this Brainstorm can contribute to that! We'll be back next year, or at least some of us. I'm out!

PHOTO: Eric Jansen

BY THE BOARD

BY: *Jelmer van der Linde*

Seeing the theme of this Brainstorm, the first thing to come to mind is to write a little piece of prose about what would have been my formula for drawing a penrose staircase, probably better known as an impossible triangle. I hacked it together once on a friday evening in JavaScript and animated it the next saturday afternoon (using requestAnimationFrame!) and it still dances around on my "new tab" page in Chrome. I thought I could simply clean it up a bit and extend it to make the number of corners variable. The `simply' in the previous sentence proved to be an illusion.

And that is kind of interesting because that actually was me having a mental illusion about a visual illusion. Both are illusions but are they comparable, or is one of them solemnly a figure of speech? Let's try. Illusions can be visual, like my staircase. They can be auditory, like hearing someone say your name while instead they are saying "Dat is jammer." You can have the illusion that your phone is vibrating in your pocket but when you check, you still have not received a response to your text.

But, you can also have the illusion that something is going to work out correctly, that something will be easy. Is that the same kind of illusion, or is this us using the same word for a similar but different concept?

What they all do have in common is that the illusions are things that do not comply with an expectation. It is a discrepancy between your inner model of the world and the world as you perceive it. Or is it? Is a penrose staircase possible in your mind but impossible to perceive? I think in this case it is the other way around: you can perfectly well perceive a penrose staircase but you cannot create a model of it using your known rules of geometry. Yet, you can, or at least Escher could think up this weird but beautifully incorrect geometric shape. But I digress.

Now that we have in some way described what an illusion is, can we think up a new one? Is there something we can perceive, yet not auditory, visually or using any other sense that would also have to comply to an expectation yielded by a mental model? Well.. how about the illusion of self-consciousness. Are you certain that you are not just watching and trying to explain your actions as conscious choices?

PHOTO: *Jelmer van der Linde*

COMIC

BY: Joke Kalter

COGNO-INTELLECTUALISM, RHETORICAL LOGIC, AND THE CRASKE-TRUMP THEOREM

by: Michael Wilkinson

This paper presents a breakthrough in rhetorical logic, a promising field of science, of great value to those writing research proposals. It provides new, and utterly convincing tools for closing embarrassing gaps in your reasoning, without resorting to brute-force methods, such as actually thinking about the problem in the first place. The Craske-Trump Theorem, along with the Trump-Craske Conjecture will allow researchers in any field to use the technique of "Proof by Intimidation" fully.

I. IMPRESSIVELY LONG PARAGRAPH

I was suitably impressed by the seminal paper by Martin Trump [2], suggesting that the name Craske-Trump Theory would be a very impressive name, and that if anyone had a theory in search of a suitably impressive name, they could use it. It is a rare and magnanimous gesture when scientists are so selflessly prepared to attach their name to other peoples' work. Indeed, the name Craske-Trump Theory has a distinguished feel about it, and this is just what the powerful, but underrated field of rhetorical logic has been looking for. Rhetorical logic is a form of logic which is used more than any other, by politicians, salesmen, and researchers writing research proposals and grant applications. It requires a particular skill in treating unknown quantities in a confident, sweeping way, which reassures or overawes the readership or listeners. In various schools of logic, things may be false, until proven true, or, alternatively, true until proven false. In rhetorical logic, unproven things are true or false as suits your need in an argument. It is therefore essential to be able to make confident assertions on any topic you were either too thick to master, or couldn't be bothered to learn. This makes it the most cogno-intellectual of all forms of logic. It calls for obscure, but learned-sounding names, theories, and other jargon. The proposed name "Craske-Trump Theory" is inspirational for this purpose. However, I propose to make a small improvement on this name, changing it to Craske-Trump Theorem. It will be defined simply as that theorem you need to prove your point, whatever your point may be. I will also add further functionality, in the form of the Trump-Craske Conjecture, and the Craske-Trump-Wilkinson Operator. Before going into these extensions of Martin Trump's work, I will describe one of the most important tools in rhetorical logic, viz. "Proof by Intimidation" [1].

II. PROOF BY INTIMIDATION

A well-known technique in mathematics is "Proof by Induction." Reasoning using induction works along the lines of: prove that some property holds for the first case of a problem prove that if the property holds for any given case, it automatically holds for the next. Hey presto, it holds in all cases. Induction is simple, and this is one of its shortcomings in everyday life. Mathematicians may be satisfied that induction works (in fact it is obvious to them that it works), but to lay people it seems unsatisfactory. Induction

looks like some sort of cheap trick, that must be wrong somewhere.

The situation is very different for "Proof by Intimidation." The aim here is to make something sound terribly difficult, using as much jargon as possible, and then ending with "so obviously X holds." Though the argument may be completely obscure, even totally incorrect, proof by intimidation is understood by everyone who is too vain to admit they don't understand you. In this context, citing the Craske-Trump Theorem in a tone implying that anyone in this field (regardless of the field) should know what it is, can go a long way towards achieving the goal of complete intimidation.

III. USE OF THE CRASKE-TRUMP THEOREM IN GRANT APPLICATIONS

Everyone who has ever written a grant application has run into at least one of two problems: (i) you need some property to hold for your argument but cannot prove it, or do not have the time before the deadline, and (ii) you have a totally new idea, which does not seem to connect too well with any of the topics in the call for proposals. In the first case, the Craske-Trump Theorem is the tool of choice, if we define the Craske-Trump Theorem as that theorem which will prove any proposition we happen to need. In this way the Craske-Trump Theorem is to logic what Skinner's Constant is to physics. Skinner's Constant is that number which your result must be added to, subtracted from, multiplied with or divided by, to get the right answer. Care must of course be taken that we do not use the Craske-Trump Theorem to prove things that are patently wrong, but only as a stop-gap measure for areas of doubt.

In the second case we may require some intimidation to suggest the new idea is in fact part of some undefined, but well respected scientific tradition. In this case the title Trump-Craske Conjecture can be applied to any new research question to give it the required dignity.

Mathematicians will of course object that this whole reasoning is not obviously correct. This, however, is important. Anything already proven by mathematicians is by their definition obvious, and therefore does not need the benefits of rhetorical logic, and the Craske-Trump Theorem. To formalize matters for mathematicians, we will introduce a logical operator, called the Craske-Trump-Wilkinson Operator, which has a symbol $Ø_{CTW}$. If P is some proposition then $Ø_{CTW}(P)$ is always true.

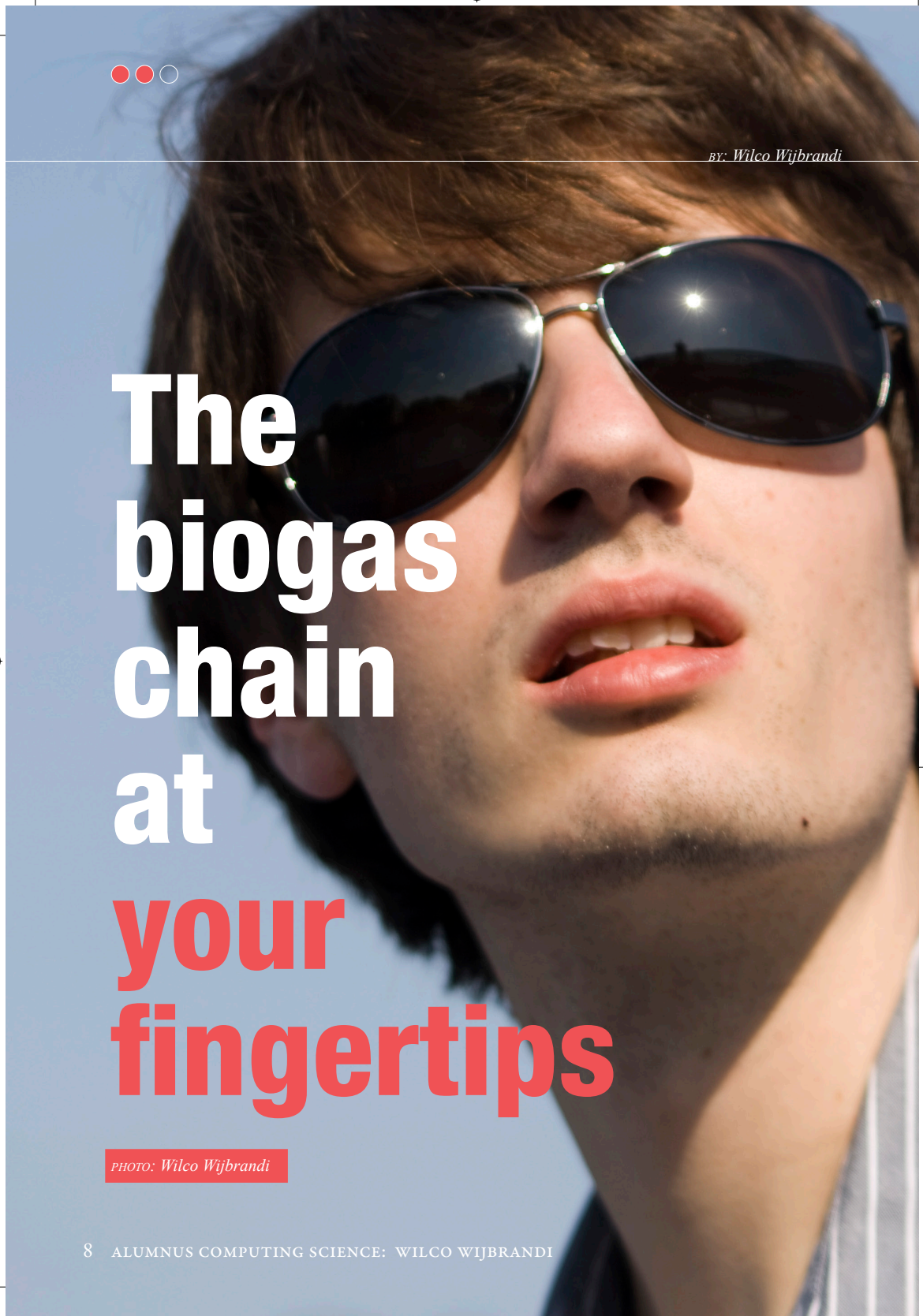
IV. CONCLUSIONS

I have shown conclusively that the Craske-Trump Theorem may work wonders in the case of grant applications. By implication, it should be workable in many other areas. In fact, the Trump-Craske Conjecture States that the number of uses for the Craske-Trump Theorem tends to infinity, as more and more people use it. Since this is only a conjecture at this point, more work is needed on the foundations of rhetorical logic. I am confident that the Craske-Trump Theorem will be instrumental in proving its own worth, and indeed, validity.

REFERENCES

[1] J. Cohen. On the nature of mathematical proof. The Worm-Runner's Digest, 3(3), 1961.

[2] M. Trump. Theoretical impressiveness. Annals of Improbable Research, 5(4):2, 1998.



BY: *Wilco Wijbrandi*

The biogas chain at your fingertips

PHOTO: *Wilco Wijbrandi*

After you graduate, you hope to find a challenging job in which you can make a difference. I succeeded at that almost two years ago by finding a job at TNO in Groningen. TNO is the Dutch organization for applied scientific research. Our goal is to bring the results of scientific research to the market.

Since I studied Computing Science, I try to do that with software. TNO is a project organization. I'm always working on several projects at the same time. I do that together with colleagues from my own department, but very often I also work with people from other TNO locations and with a different background. Also, in most projects we collaborate with companies and other research institutes. This way we have project teams with people who have a different expertise and an own point of view.

Windmills and solar panels are pretty expensive

One of the problems I'm working on is the transition we have to make to sustainable energy. I do that in different projects. When talking about sustainable energy, you are probably thinking of windmills and solar panels. Indeed, those are great techniques for generating sustainable energy, but there are also some downsides. First of all, windmills and solar panels are pretty expensive. Windmills produce quite some energy, but they are pretty annoying when you live next to them. They make a lot of noise and the shadow of the turning blades can be very frustrating when it falls on your window, but worst of all: their energy production is very unreliable. Windmills only turn when there is wind and solar panels only produce electricity when there is enough light. Another problem with electricity is that there is no efficient way of storing it. You might think of batteries, but they are very expensive compared to the amount of energy they can store. You want your devices to work whenever you need them, so at some point we're going to have a problem when we want to increase the percentage of renewable energy in the electricity grid.

So we need to come up with a solution. If we can't control the production, maybe we can influence the consumption. At TNO we're looking at technologies which make smart appliances turn on when, for example, there is a lot of solar energy available. This is one of the subjects I'm working on, but since I already talked about that during one of Cover's lunch presentations, I want to tell you about another project I'm involved in.

It turns out there is another sustainable energy source which is suitable for our little country: biogas. If we want to produce biogas we need organic material, a.k.a. biomass. For example, your body runs on biomass: stuff with lots of carbs, fats and proteins, such as bread, chips, meat or beer. Fortunately, for biogas production we don't have to be as picky as we are with our own food. We could use maize, cane or rapeseed oil, but we can for example also use waste products such as roadside grass or cow manure. Once we have the biomass, we put it in an airtight room called a digester. If we make sure no oxygen gets in, keep the biomass nicely moist and warm, and stir it a little, bacteria will digest it and start producing gases. Depending on the type of biomass, this gas consists of roughly 60% methane, 35% carbon dioxide and 5% of other gases. Wait, methane? Methane is

the main component of natural gas; the stuff you use to heat your home, heat the water for your shower, and heat your pots and pans when cooking your dinner.

So what can we do with biogas? It turns out there are quite some options. Because of the high methane percentage, biogas burns pretty well, so we can probably use it for heating. The only problem is that the heating system of your house was built to run on natural gas. The characteristics of biogas and natural gas differ so much that they require different burners. So if we want to use biogas for heating, we have to buy specialized biogas burners.

PHOTO: *User interface*

Another thing we could do is use biogas to fire up a power plant. We burn biogas in order to produce electricity. This is an interesting idea. I told you that it's very hard to store electricity. Storing gas is much easier. So if we combine a power plant with a biogas storage facility, we can use it to balance our electricity grid. We use biogas to produce electricity whenever there is no wind and solar energy available.

Gas fired power plants have an efficiency of 40% to 60% percent. That means that 40% to 60% of the energy in the gas gets converted in electricity, while the rest gets converted into waste heat. Waste? Well, we could throw it away, but we could also make use of it. For example, if we place the power plant next something that needs heat, such as a public swimming pool or greenhouses, we can reuse the heat.

In the Netherlands we are a bit spoiled by our own natural gas. Here, almost everything runs on natural gas: heating of buildings, power plants, but there are also more and more cars that run on natural gas. So it's a shame that biogas is not compatible with natural gas. Can we fix that? Yes, that's also an option. By washing the biogas we can upgrade it to have the same properties as natural gas. Basically, the percentage of methane increases. We call this product biomethane, or groen gas in Dutch. Well that's convenient! We can inject biomethane in our existing gas grid and use it to heat buildings, produce electricity, and fuel cars that also run on natural gas.

So that sounds pretty good, right? We put some (waste) biomass in a digester, heat it a bit and we get biogas: that's a sustainable energy source! As long as the sun shines, we can always produce more biomass, so we can also keep on producing biogas. But is it really that sustainable? In order to answer that question, we have to look at the big picture. I'll explain that with another biomass product: biodiesel. Did you know that most diesel engines can run on sunflower oil without any problems? Exactly, the stuff

you buy at the supermarket. When you use it to fuel your car you might end up with a car smelling like a deep fryer, but it will probably run just fine. We can always grow more sunflowers, so we can always produce more sunflower oil, so it as a sustainable fuel! Right? Well, unfortunately, no. If we want to produce sunflower oil we have to prepare the land, harvest the sunflower seeds, transport them to the factory, extract the oil, and transport the oil to the supermarket. It turns out that when you look at the complete chain, you almost need the amount of energy of one liter of regular diesel to produce one liter of sunflower oil. So when looking at the energy: what did we gain by using this biodiesel instead of regular diesel? Not that much. So calling it a sustainable energy source doesn't really seem right. And the same thing holds for biogas: We always have to look at the big picture and be careful not to consume more energy in the process than we produce.

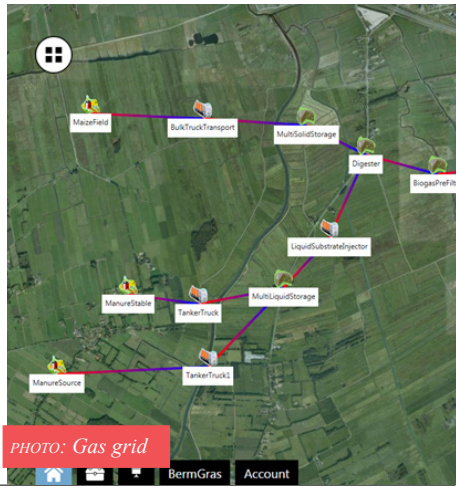


PHOTO: Gas grid

If you are still reading, you must have noticed one thing: Producing biogas is incredibly complicated! We have to harvest biomass, transport it, digest it and then there are many options for using the biogas. The availability of biomass also differs throughout the year. There are a lot of steps involved in producing biogas. Together we call this the biogas production chain. The are several types of biomass we can use, which all have different characteristics when it comes to biogas production. We can use the biogas for heating, producing electricity, both at the same time, or upgrade the biogas and inject in the natural gas grid. Are we going to build a biogas pipeline? Are we going to put it in a truck? Before we know it we have used more energy in the process than we gained and we haven't even talked about the financial aspects yet. Is the biogas chain profitable? Is it better to have one big digester and transport all the biomass to that digester or is it better to have several smaller ones and transport the biogas through a pipe?

Did you know that most diesel engines can run on sunflower oil without any problems?

When designing the biogas chain, there are a lot of choices to be made and it is incredibly hard to oversee the consequences of these choices. How do the designers of the biogas chain make such decisions? Good old Excel is usually the tool. But since Excel is inflexible, it takes a lot of effort to calculate a specific configuration. Can't we make this easier?

In the Flexigas project we're trying to make the designing of biogas chains easier. In order to do that we are developing a decision support system: the ultimate toolbox

for anyone who has to make a decision somewhere in the biogas chain.

First of all, we need to know everything there is to know about every step of the biogas chain. Since we are no biogas experts, we are working together tightly with a PhD student of the Hanze University of Applied Science who is a biogas expert. All this biogas knowledge has to be represented in the computer using the modelling language Modelica. Modelica is an object-oriented, declarative language for modeling complex systems. Modelica has commercial and open-source implementations. In Modelica you can create models of physical entities. We created models for different types of biomass sources, digesters, transportation options, storage, upgraders, injectors, etc. All these models can be configured with parameters. For example, the model of a digester has a parameter for the volume of the digester. The models contain information on energy, but also on costs and environmental impact. All these models can be connected with connectors (some kind of interface in Modelica). This means that you can connect a barn (which produces cow manure) with a manure truck, the manure truck with the manure storage, the manure storage with the digester, and the digester with the power plant. With these Modelica models, you can build the complete biogas chain on your computer and simulate it.

Unfortunately, Modelica is not very easy to understand. We don't just want experts to be able to use the models; anyone who is involved in the biogas should be able to use it. That's why we made a simple and intuitive user interface. The interface is based on Google Maps. The user can easily draw the biogas chain on top of it. This way it is immediately clear where the biomass comes from and where the digester will be. Distances can be calculated automatically. The interface can be used with a multi-touch screen. This way more people can work on the model at the same time, so we can gather all the stakeholders and let them collaborate in the design process.

Producing biogas is incredibly complicated!

Although having a flexible model and being able to simulate it is already very useful, we can take it a step further. The goal is to build an optimal biogas chain. Why should the user try out all the alternatives manually? We can create software that does that! We can automatically change alternatives and try out different combinations of parameters for the model. We can do a sensitivity analysis for the parameters or do an automated parameter optimization. But simulating one biogas chain already takes some time; trying out a lot of alternatives at the same time requires some serious computing power. Since we want to encourage an interactive process in which the user can try out different combinations, we need results quickly. That's why we built a network of machines that can execute simulations. There is one master server that coordinates all the simulation tasks. As soon as the user requests a simulation, the server splits up the task, all the worker machines execute their simulation and combine their results. The user quickly sees the results visualized in the tool and can think of the next step.

Finally, there may be different biogas experts with different views on the chain. Or maybe there are other cases in which there is some sort of chain. That's why we put all the biogas knowledge in the Modelica models, and nowhere else. All the elements in the user interface are generated based on the Modelica models only. Experts can upload their models to the server using a web interface. The server parses the models and generates the metadata the user interface needs.

Do you also want to work on something challenging, related to your field, with impact on society? Why not consider doing your internship, bachelor or master thesis at TNO? You can see some of the thesis/internship topics on werkenbijtno.nl. Sign up for the job alert, this way you can select in which fields you are interested and you will receive an e-mail when we have a new thesis/internship topic available. Or just send me an e-mail at wilco.wijbrandi@tno.nl. At TNO Groningen we can always use good students who are interested in the field of machine learning, cloud computing or software architecture.

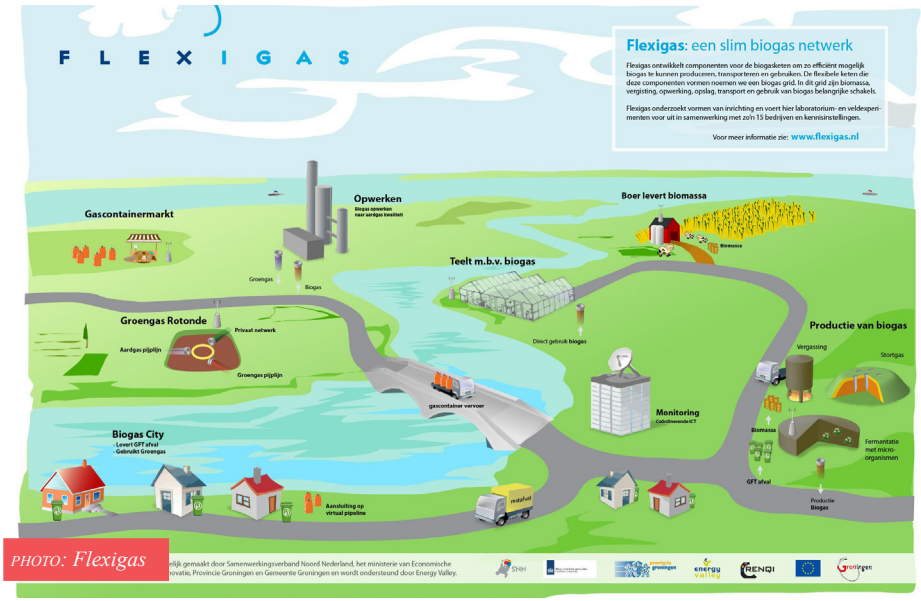


PHOTO: Flexigas

PUZZLE

BY: Eric Jansen

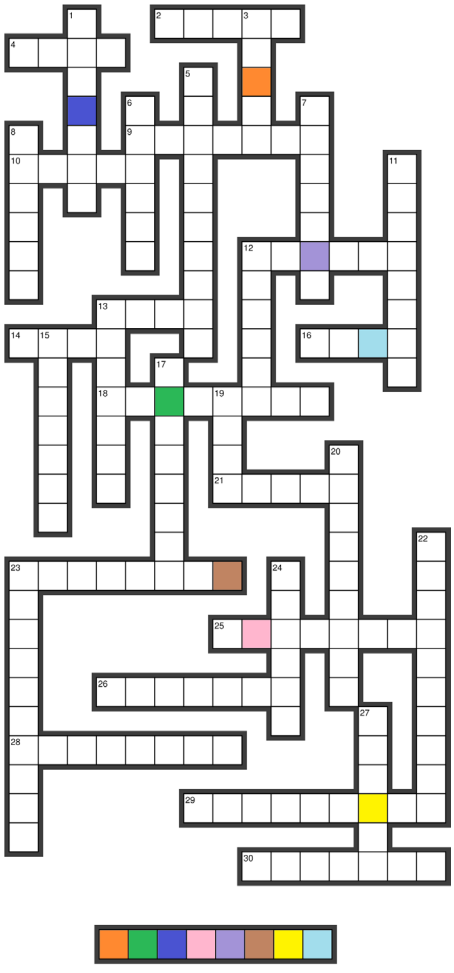
Fill the grid by finding the answers to the given clues. The colored spaces form a word. Send this word to brainstorm@svcover.nl before the 1st of October to have a chance to win our summer prize! Have fun!

Across

2. Borders on the sea (5)
4. Do this or drown (4)
9. Red wine and fruit (7)
10. The Eagles found one in California (5)
12. Romantic sight at the beach (6)
13. Result of too much alcohol or nausea (4)
14. Surrounded by water (4)
16. Students are known for large consumption of this (4)
18. RHCP advise doing this with your two favorite allies (8)
21. To dry yourself with (5)
23. Capital of Hungary (8)
25. Movie or alcohol consequence (8)
26. Everything you take on holiday (7)
28. Between 23 degrees north and 23 degrees south (8)
29. Colorful and sweet alcoholic drinks (9)
30. Holiday in a tent (7)

Down

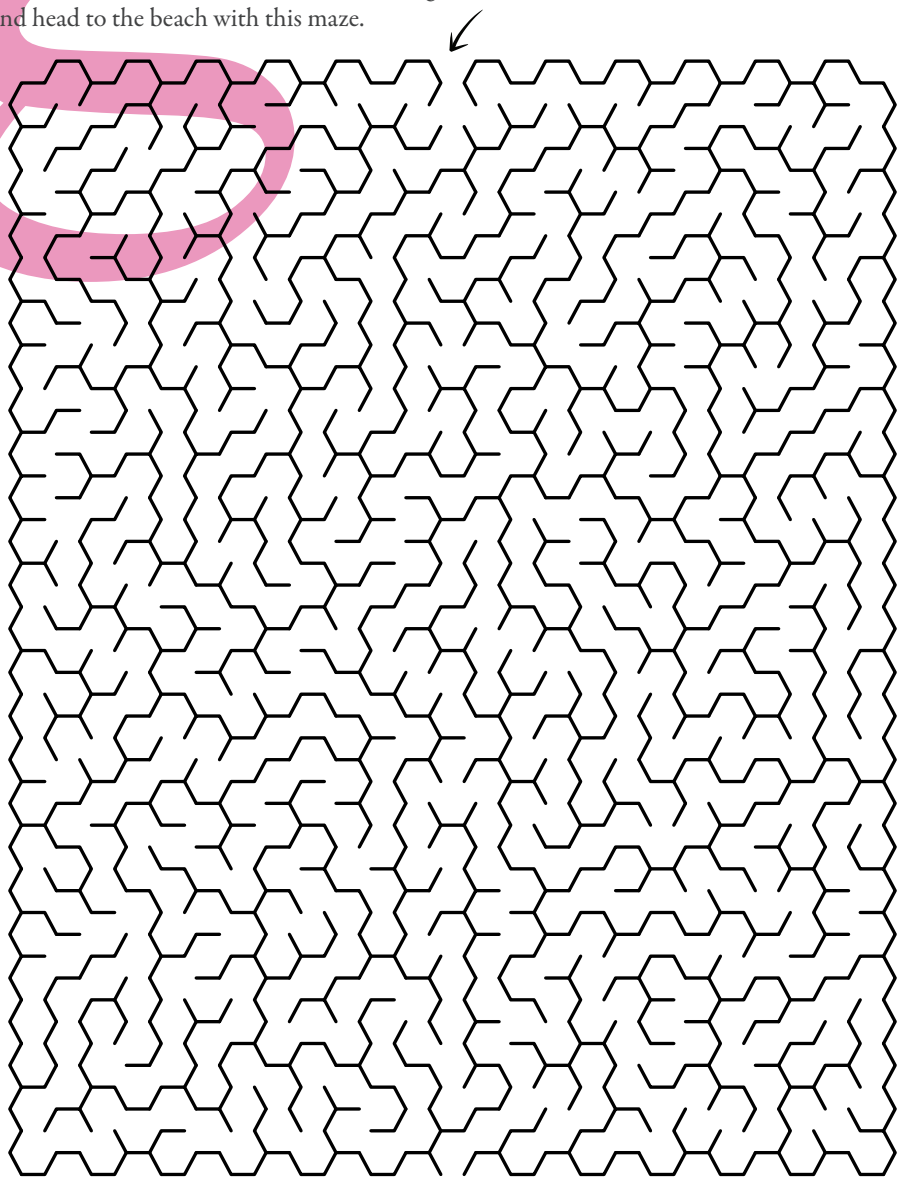
1. What you need to get into a concert or a plane (7)
3. Founded in 1993 (5)
5. Worn by Johnny Bravo (10)
6. Surrounded by water (6)
7. Disco activity (7)
8. Garment worn over the pelvic area (6)
11. Predecessor to the e-card (8)
12. Été, Verano, Estate (6)
13. Impossible triangle (7)
15. E.g. Schiphol (7)
17. Best tool for baking meat (8)
19. Shelter of fabric and poles (4)
20. Footwear, sticks between your toes (9)
22. E.g. Go, Risk (10)
23. Your favorite magazine (10)
24. What you hope to be after a sunny day (6)
27. Swimwear (6)



MAZE

BY: *Lotte Noteboom*

Go to the beach! Leave the Bernoulliborg and head to the beach with this maze.



COLUMN: ILLUSION

BY: Arryon Tijsma

Our mammalian brain sometimes has a few tricks up its sleeve to tempt you into doing things you actually don't want to do, or to act as if your senses see things that aren't actually happening. That last bit is, of course, called an illusion.

For us young adolescents, barely kicked out of our parents' nests, spreading our wings and venturing into the wide world, there often exists a discrepancy between how we perceive the world and how it actually is.

As students are a special class of people, we are said to be prone to a similar special class of illusions called student life illusions. These types of illusions are characterized by the fact that they cannot be seen through and are very persistent.

Allow me to enlighten you with a fine selection of illusions you'll encounter during your struggle for a degree. For reference, I've included an appropriate name for each.

The 'contracted month' illusion

Every once in a while, money magically rains down on us students, so we get fat wallets again and can buy Albert Heijn branded groceries instead of Euroshopper (which by the way is now also called Albert Heijn basic, so that could also be called an illusion). "Stufi in, extra win!", this is often called.

As the month progresses we make calculations in order to avoid being broke before the end of the month and the beginning of our next free money session. Since we all graduated with the requirements for doing A.I., Computing Science or something less important, this can only mean that we are capable of performing simple algebra and are thus safe from being in this woeful, penniless state. However, sometimes it just so happens that at the end of our money, there is a piece of month left.

If we are safe from making algebra errors, this can only mean that the month first presented itself as an illusion of it having less days than it actually had, which then gradually faded to reveal the month's true length. Since this illusion doesn't present itself to all students at the same time, it is wise to consult with fellow students in order to reach a consensus on the month's length and how to spend your money in it.

The 'ninja assignment' illusion

Homework assignments can contain many illusions. Sometimes teachers embed illusions into assignments on purpose, to keep students on their toes. For instance, a teacher can create an assignment that reveals itself to be two times as difficult the second time you read it. Or he or she can let the document have a hidden page at the end with five more assignments that is only revealed an hour before the deadline.

But the worst of all is the ninja assignment. This assignment does everything in its power to hide from your senses until it is utterly too late to finish it. It will hide behind other appointments in your schedule, will disguise

as a regular announcement on the course's Nestor page, and it will even trick you into thinking that the page's schedule from last year is the one you really should be looking at. Because you don't know of its existence until it is too late, this illusion is a really tricky one to see through.

The 'I-wont-get-fucked-by-one-more-drink' illusion

I find this one of the best illusions in the wondrous world of college students. By reading the title, most of you may already know what I am referring to. Let me sketch you a scenario: Two prominent members of our association might decide to join the monthly drinks activity in the Mambo Jambo. At first they are just having a good time, but peer pressure and general enjoyment forces its way into their stomachs in the form of a nice amount of beer.

After a certain point, most people that need to be somewhere the following day decide to go home. A few members who don't care about EC's or who are just in general #swagtastic, decide to go on a pub-crawl, most probably ending in Shooters or the Blauwe Engel. One of our two members wants to go home, but the other says: "Ah, come on, join us for just one more, it'll be fun and then you can go home".

It is at this point that the brain of our member undergoes a severe illusionary thought-process. We all know beforehand that if he decides to respond positively, he will end his night absolutely wasted, lying comatose in his own puke. He even realizes this himself, but his brain pulls a clever trick called yolo in which the aversive stimulus is transformed into a positive, excuse-filled happy place in which you can only think "It'll be fine".

The outcome is the same nevertheless: a few hours, 13 beer for 7,50 in Het Kasteel, three rounds of shots in Snow Valley, and a few unidentifiable drinks later you are refused by the randomness of the bouncers at Shooters and must drag your regret-filled head to your bed.

It might seem the world is full of the dangers of misinterpretation and deception. Luckily, we can cling to the consolidation that these phenomena happen to everyone. At least there is the malicious pleasure you can take from people under heavy illusionary influence. And on the bright side: "All problems are illusions of the mind." -- Eckhart Tolle (I seriously have no idea who this guy is, but his quote sounded cool)

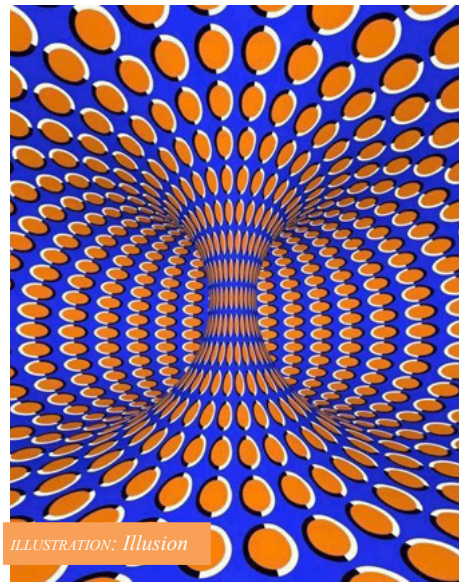


ILLUSTRATION: *Illusion*

ARTSYLLUSIONS

BY: *Isabela Constantin*

I bet Rene Magritte took a class in Psychology and then decided to troll us by breaking the rules of perception. As perceiving and interpreting visual input are cognitive processes which happen very fast and without us being aware of it, we find ourselves trapped when looking at this painting. If we take a second to analyze the principles of Gestalt regarding visual interpretation, we will discover that two principles render contradictory information in this painting: that is, closure and good continuation (or occlusion). Closure involves perceiving the image of the woman on the horse as complete and continuous, rather than taking the tree bits separately. Good continuation is, for example, seeing a tree behind the front part of the horse rather than seeing random pieces of wood. The twist is therefore created by interweaving the foreground with the background, resulting in an impossible image.

RENÉ MAGRITTE: *The Blank Signature*

SALVADOR DALÍ: *Invisible Afghan*

So what main quality does an artist and creator of double images have to have? According to the artist Salvador Dali, it is not a broad knowledge about the way perception works, but... a certain degree of paranoia. His theory, explained in one of his essays, "L' ne pourri", is that the paranoiac have an innate gift for creating illusions and perceiving objects in multiple ways according to their (unconscious) desires. As soon as the paranoiac indicates his/her different views to others, everybody else can recognize them. Speaking of which, the complete title of this painting is: "Invisible Afghan with the Apparition on the Beach of the Face of Garcia Lorca in the Form of a Fruit Dish with Three Figs".

I can see why an apple hitting your head might make you feel that gravity is not an illusion, but take a look at this lithograph and observe how the water seems to climb up two floors. If we look at the corners in the water path we can perceive it lined up, but the pillars suggest different heights.

M.C. ESCHER: *Waterfall*

This work of art, created by the famous Dutch artist M.C Escher, depicts a perpetual motion machine that can spin the wheel for an indefinite time if water was added from time to time to eliminate the loss from evaporation, as the artist recommends in his notes. This almost utopic illusion is realized by giving the water path the structure of two so-called impossible triangles. Also called the Penrose triangle, this figure was made popular by the mathematician Roger Penrose and it is an impossible object in the sense that it cannot exist in any ordinary Euclidean space.

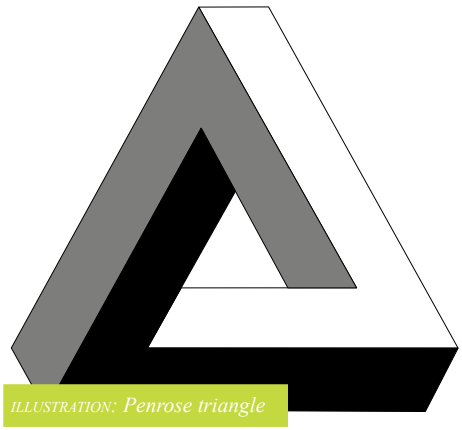


ILLUSTRATION: *Penrose triangle*

Resources and for more (about) illusions:

http://www.scottmcd.net/artanalysis/?p=115

Surrealism and the visual arts: theory and reception. Cambridge University Press, 2011.

http://www.lhup.edu/~dsimanek/3d/illus1.htm

Images:

http://www.wikiart.org/en/rene-magritte/the-blank-signature-1965

http://www.wikiart.org/en/salvador-dali/invisible-afghan-with-the-apparition-on-the-beach-of-the-face-of-garcia-lorca-in-the-form-of-a

http://www.wikiart.org/en/m-c-escher/waterfall

http://en.wikipedia.org/wiki/File:Penrose-dreieck.svg

SWITCH: SERIES 1 HANNIBAL &

BY: Lotte Noteboom & Maarten van Gijssel

Lotte:
Maarten had a large amount of series he watched and among there were a lot of series unknown by most people. A lot of them were cancelled after one or two seasons, which tells you a lot about his taste in series. For this switch Maarten gave me a series that wasn't cancelled yet: I chose Hannibal. Maarten told me that this series is kind of based on Silence of the Lambs, but because I still need to work on my general knowledge, I haven't seen that movie (I know, working on it).

The series is about a criminal profiler who helps the FBI to find the perpetrator of bizarre crimes. The criminal profiler, named Will Graham, is a psychoanalyst and has the ability to empathize with the killer. The first investigation has a lot of impact on Graham, so his supervisor (better known as Morpheus) decides to let him talk to a psychiatrist, dr. Hannibal Lecter. When you're watching the series it becomes obvious that the psychiatrist is actually a serial killer. This makes it more interesting to watch, even more so because the characters are unaware of this.

The first episode starts with a domestic crime scene. When Graham arrives, he uses his empathizing abilities to reconstruct the crime in his mind. He used this as an example for one of his lectures. Then Morpheus walked in and asked Graham to help him with a case. This case was about eight girls that went missing. I don't want to spoil too much, so I won't go into details about this case and how or even if it was solved.

The second episode starts with three boy scouts walking in the woods and finding hands that are somehow planted in the ground. Graham investigates the crime scene and a redhaired woman walks up to one of the officers to ask what that man is doing. This woman plays an important role in this episode, but again, I don't want to spoil anything, so if you want to know what happened, you should watch it yourself.

Overall I really enjoyed the first two episodes of the series. You really have to pay attention when you are watching it or else you don't know what is going on. It is not just another crime solving series. It is a little more disturbing than most series, because there is a serial killer among the main characters. Maarten told me that it was a thriller and that he had sleepless nights because of the stories in this series. That made me really curious, but after seeing the first two episodes I slept perfectly. Maybe the next episodes will be scarier and more disturbing. I am definitely going to watch the other episodes.

PHOTO: Lotte Noteboom

ORANGE IS & THE NEW BLACK

Maarten:
When I was asked to do a switch about a series I thought 'this is never going to happen' because I'm a big series fan and I've already watched a sh*t load of stuff nobody has ever seen (and for good reason). But Lotte came with a very interesting proposal: a female prison series with a lot of nude and lesbian sex. So, obviously, I was intrigued and started watching 'Orange is the New Black' immediately.

Even though the promise of lesbians getting comfortable with each other is amazing, I was hesitant because the series revolves mostly around women and, to say it decently, I'm not a big fan of something like 'Awkward' and 'Sex and the City'. But I started watching. Of course it begins with a shower scene and within a couple of seconds the first breasts were on screen, with the promise of a lot more, so my hesitations went away. The troubles of prison life are immediately clear, because the main character, a slim blonde, gets bullied out of the shower by a slightly larger, black inmate.

The series switches between the past and the present, showing the life of a couple of inmates before prison, their misdeeds, how they ended up in prison, and their current prison life. Of course it's a bit corny, a lot of the characters were normal people who made the wrong choice or met the wrong people. Not unlike the main character, Piper Chapman, who fell in love with a lesbian in college (an awesome cliché, experimenting during college) who was actually an international drug dealer. This way, Piper got caught smuggling money.

Prison life isn't all roses. Not only do the inmates rape, seduce, intimidate and harass each other, but also the guards don't make it any easier.There are different types of guards; the always cranky fat (probably divorced) woman, the shy and sweet Spanish ex military guy, the old intelligent (and only sensible) man and the sexually deranged dude, called 'Pornstache' (looks like one of the guys of the village people). Different situations arise with the different personalities, but the most extreme with Pornstache, who is also a dick.

If you're still not convinced about the quality, you will be after this: Donna of 'That '70s Show' is the girl that Piper has a relationship with before her incarceration and is also in a lot of shower scenes. The fiancée of Piper is the apple pie guy from American pie (being gay was only an experimental phase) and during the first episode you will be treated to some awesome references.

Don't worry about any spoilers, most of the things described here are explained in the first couple of minutes, and you're probably aren't going to watch it for the story anyways.

PHOTO: *Maarten van Gijssel*

BY: Jonathan Hogervorst

ExCie: Budapest

PHOTO: Jonathan Hogervorst

After exploring several forms of life on Earth, David Attenborough completes his study of nature's greatest miracles by following Earth's most fascinating species, the Student, along their epic journey to Budapest.

Saturday, April 19th, 2014. In the middle of the night, a herd of brave students had gathered in front of the Central Station of Groningen. Their goal was simple: they had to get to Budapest. There was excitement in the air while they waited for their bus to arrive. While their epic journey had not even begun yet, one member already lost the herd: Wijnand went back to the centre to put his bike on a more safe location. Fortunately he got back in time and all 26 students got on the bus heading to Eindhoven.

On the bus it became clear that there was an absolute hierarchy: six of the alpha males and females immediately took the lead. Sebastiaan, Diederik, Ben, Liese, Kim, and Tessa, who would be known as the Gamemakers, handed out envelopes to the rest of the herd, known as the Tributes. The envelopes not only contained programme booklets, but also stickers and Gotcha game cards. (The meaning of the ExCie logo on the stickers would remain a surprise for some more days.)

After arriving at Eindhoven Airport, the herd went on a hunt for food. They then had to get through security and board the airplane. This was easier said than done, as someone almost had to be left behind: Arnoud managed to lose his boarding pass. Only after a race of life and death, a new boarding pass was acquired and Arnoud again passed security. Just minutes before takeoff he got on the airplane and the herd was once more reunited.

It is still not known whether the cabin crew spoke Hungarian or English (or some other language). Fortunately the plane safely landed on Budapest Airport after a 2-hour flight. Within 2 more hours, the herd reached their hostel, accomplishing their initial goal. The hostel turned out to be a very nice accommodation, exceeding most's expectations.

After dropping off their luggage and freshening up, most of the herd went out to take a look at the city centre. As is generally known, in order to function properly, the species of students depends on the frequent intake of ethanol-containing beverages. It was therefore no surprise that some discovered local bars and beers.

The species of students depends on the frequent intake of ethanol-containing beverages

Two bars immediately stood out and would be visited more often in the following days: *T.G.I. Friday's*, directly next to the hostel, serving great cocktails and meat (with Jack Daniels sauce); and *Oké Hungária*, serving half liters for € 1.30 and shots for € 0.60, and having WiFi. (At the latter place, yours truly earned his nickname 'Shotmeister'.)

That evening the herd gathered at the hostel. This was remarkable, considering some members' condition. Together they went to a Hungarian restaurant to get a taste of the local food.

For the next day, a tour through the city was planned. The tour went along the Hungarian

State Opera House, the St. Stephen's Basilica, a park, the Parliament Building, the Great Market Hall, the Liberty Statue, and ended at the Hungarian National Gallery.

The day after that, the herd went on to discover the city even more, this time by bike. Interestingly, it seemed like cycling evoked nationalist sentiment: all kinds of statements were translated to Dutch shouted out aloud. Homeboy became 'thuisjongen' and #YOLO became '#JLMEK' (je leeft maar één keer). Unexpectedly a group suicide was attempted by crossing an eight-lane road. This did clarify why a local, who just before tried to give directions in Hungarian, tried to prevent the herd from going that direction. Fortunately, everyone survived.

After their perilous journey, the herd reached the Aquincum Museum, exhibiting the ruins of the ancient city of Aquincum. An armed guard summoned some students to return to the paths, as he considered the ruins his territory. After the short visit, the bikes had to be returned. Later that day, some of the students gave meaning to the word 'student' by making their Advanced Logic homework (while still enjoying a cocktail or two).

Homeboy became 'thuisjongen'

For Tuesday, the first serious activities were planned: two universities had to be visited. Besides watching presentations from staff, the herd also had the chance to visit some research teams. Since summarising all presentations and visits would require too many words, only a general impression will be shared: none of the university buildings featured (working) air conditioning.

Wednesday started with a visit to another university. (The general impression was still applicable.) After that, a visit to presentation software company Prezi was planned. Because they were not yet ready at the agreed time, they sent the students to the club *Instant* where they could grab a beer. An hour later the visit could actually begin. The presentation skills of the Prezi people were a bit disappointing, considering they worked at a presentation software company. However, the company seemed like a nice environment and the large office was a cool place.

On Thursday, the Széchenyi Thermal Bath was visited. Besides several indoor and outdoor pools, the complex also included saunas and steams. It was a great place to relax for a full day. Most notable were some groups of older men, sitting at tables in the pool, playing chess while enjoying a beer. That seemed like a pretty good retirement occupation.

Friday started with a rough split of the herd in order to simultaneously visit the companies Gravity R&D and Scarab Research, both developing recommendation systems. After their presentations, the people working at Scarab had arranged lunch at a nice local lunchroom. During that lunch the meaning of the symbol in the ExCie logo became clear. The symbol is nowadays often used by the radical far-right party Jobbik. (After that lunch, Gamemakers wearing committee shirts no longer took off their vests in public.) Later that day, the herd reunited to visit NNG, developer of white-label GPS navigation software. During their presentations there was room for (lengthy) discussions.

As a result of consuming alcoholic beverages and inhaling certain substances, one member of the herd was weakened. It has been said that this was 'expressed' no less than 12 times during that single day. Clearly this was a sign, as the biblical number 12 represents a "harmonious, perfect entity". It was thus confirmed from above that the herd and the city of Budapest formed a harmonious and perfect entity.

That night, King's Night had to be celebrated. Dressed in orange clothes and orange bow ties, the students first visited 'Szimpla Kert'. Situated in an abandoned industrial-ish building in Budapest's Jewish quarter, Szimpla would become the world's first ruin bar. The building and the diverse collection of second-hand tables and chairs ensured a unique atmosphere. After visiting Szimpla, the students went to Instant.

In Instant, the herd got into its first battle with locals. Alex was roughly attacked, until Diederik heroically jumped in between. On top of that, Merel got robbed from her phone and purse. Led by the Gamemakers, the herd went back to its hostel, licking their wounds. Fortunately, Merel's purse was returned, with all travel documents still inside.

Just as in The Netherlands, King's Night was followed by King's Day. After recovering from the night, a visit to Mozart's opera *Le nozze di Figaro* took place. Dressed in beautiful dresses and costumes, the herd got the attention it deserved. After their intellectual effort, most students were starving. On a hunt for food, the herd raided a local McDonald's restaurant. They might have been slightly overdressed for that occasion.

On Sunday, the Budapest Zoo & Botanical Garden were visited, being one of the world's oldest zoos. The conditions in which the animals were held were a bit disappointing after having visited Zoo Emmen before. Nevertheless it was a fun visit.

Dressed in orange clothes and orange bow ties, the students first visited 'Szimpla Kert'

The day after that, the time had come to clean up the mess. After sweeping the rooms in the hostel and removing empty beer crates from the ledge of the building, everyone went to the airport to take the flight back home. In an attempt to stay a little longer, Diederik this time lost his boarding pass. However, it was quickly found back. After the flight, the herd travelled back to Groningen by train. To everyone's regret, the epic journey had come to an end.

I would like to thank Sebastiaan, Diederik, Ben, Liese, Kim, and Tessa, on behalf of all Tributes, for organising this phenomenal journey.


HUSTLE
Oculus
STUDIO
WC
WC

STUDY ASSOCIATION Cover

COLOPHON

The Brainstorm is a magazine published by study association Cover and is distributed among its members, staff members and other interested people. The Brainstorm comes out at least three times a year in an edition of 500.

Contact
Study association Cover
attn. The Brainstorm
PO box 407
9700 AK Groningen
brainstorm@svcover.nl
www.svcover.nl