BITS&BYTES

9TH EDITION

COVER STORY

BLOCKCHAIN IN SUPPLY CHAIN

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In 1993, this firm started operating at a loss as it inched towards bankruptcy. Right when they thought they had no hopes of surviving, the founder returned to bring back the company from the brink of death. And he did. Now, this almost trillion dollar company is a common name in the US household.

Bits n Bytes draws inspiration from a multitude of success stories similar to this one, and after almost two years of inactivity, we are back, better than ever before. With a new set of inductees coming in with their fresh ideas for the betterment of this magazine, and the Department of Computer Science and Engineering being ever supportive in our attempts to bring technology to your doorsteps, this edition will feature articles on topics starting from Blockchain and privacy and go on to talk about startups, algorithms that you should know and cover our very own department's symposium, Vortex.

This is the last edition that the final years will be working on, and as we leave the team and the college, we are handing over our responsibilities to a very capable, young team that has made this edition possible. We hope ours will be a success story too, much like Apple's.
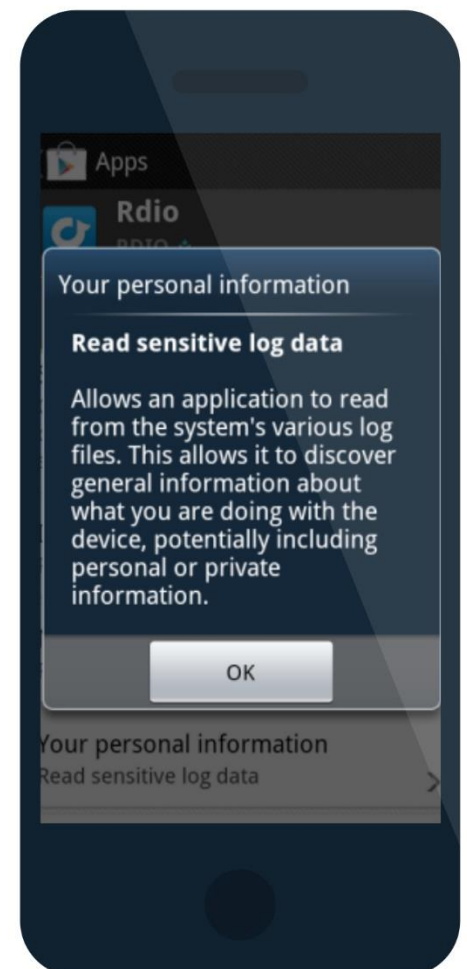
Cheers!

Anugrahaa Ramesh
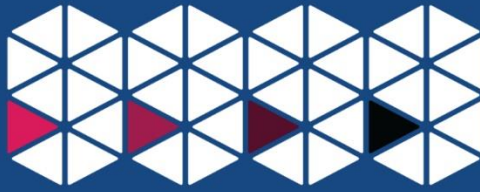*Editor*

EELO
Mobile Data Privacy

—Ram Sreevaths

#DeleteFacebook, wonder why this became the rage on twitter and other platforms? Here's the story. It starts with one **Aleksandr Kogan**, a lecturer at the University of Cambridge. He had created an app in facebook called "*Thisisyourdigitallife*". This app is a personality test app and to use it, the users have to grant access to their facebook profiles, locations, liked content and most importantly, data of their friends too. This is all fine- a psychology professor doing research using data from facebook. The problem started when Kogan gave all that data to a firm called **Cambridge Analytica**. Cambridge Analytica is a data analytics firm based in UK. The firm helps politicians reach voters online. It builds up a data set consisting of all the profiles, then uses computer programs to predict voter behaviour, and based on the analysis, sends specialized advertisements in order to influence people. This firm was associated with the 2016 US president elections and played a key role in the election. **Steve Bannon**, Trump's chief strategist is also the vice president of Cambridge Analytica's board. The company helped the campaign identify voters to target with ads, and helped with strategic communication, such as the content of speeches in various campaigns. Thus, data was used to win elections and this brings us to the next part: what can we do now that we are aware of this?

App permissions are something that we tend to overlook most of the time whilst installing a new app. It is available in the google play store page of the app itself and mentions the required permissions. App permissions involve identity, contacts, location, sms, phone, phone media, camera/microphone, wifi information, device id and other information. These "*permissions*" aren't so much requests as they are declarations. Hence, if your phone is not rooted and you feel that the app requires certain features not essential for its functioning, then the best course of action is to not install it. For example, an app used for reading books has nothing to do with your contacts. In android 6.0 (Marshmallow) and above, the settings menu has a separate section for app permissions where permissions can be given/revoked from apps; however, as mentioned earlier, complete restriction of access can only be done with a rooted phone. For rooted phones, apps like app ops and xposed module xprivacy help in keeping app permissions under check. Android's old APIs allowed for call and SMS details to be recorded if just access to contacts was given. Although these permissions are all seperate in newer APIs, developers use apps with the old APIs to collect data about phone calls and texts even if you did not grant those permissions explicitly.

Apps
Rdio

Your personal information

Read sensitive log data

Allows an application to read from the system's various log files. This allows it to discover general information about what you are doing with the device, potentially including personal or private information.

OK

Your personal information
Read sensitive log data

So, considering that most of us lose out on warranty if we root our phones, **Gael Duval**, creator of Linux distribution '*Mandrake Linux*' came up with a new OS based on Lineage OS called **Eelo**, which does not have google and its associated apps. It is, however difficult to remove Android from its dependencies on Google. First, instead of the Google Play store, Duval has used **F-Droid**, an implementation of FOSS (Free and Open Source Software) for Android applications along with Apkpure. Google play services are replaced with an open source alternative- **MicroG**, and to deal with the Google safetynet check that apps employ, **Magisk Manager** will be used. Magisk is generally used in rooted phones instead of the conventional SuperSu to give a shielding effect by hiding the fact that the phone is rooted. The word privacy is almost always followed with **Duckduckgo**, at least in the world of search. Duval offers duckduckgo as the default search engine but also allows for users to pick their own favorites. Also, in an effort to stop people over the internet from tracking you, Eelo comes with **Quad9 DNS**(9. 9. 9. 9). Quad9 DNS service is an effort by the Global Cyber Alliance to block malignant sites, phishing attacks and most of all, protect user's privacy. Eelo is currently in beta stage and will roll out shortly.

Anugrahaa Ramesh
Shilpa Sweth

Inspirational Start-up -Mu Sigma

By Shreyas Thirumalai

"Start-up" – the latest buzzword that is ringing in everyone's ears. So, trendy in fact that there are a multitude of start-ups to which almost 10Million join the group annually. The sheer competition enforces natural selection-culling all but the creative and efficient initiatives. The ones which survive leave their marks upon us. Statistics indicate that over 85% of the start-ups fail within 5 years of inception.

Mu Sigma is one of those companies that survived in business analytics and bloomed in the face of significant competition from IBM and Accenture.

So, what exactly is this company founded by Dhiraj Rajaram , whose name is derived from two overused mathematical symbols (μ and σ) all about?

• For Dhiraj, it all started because of his unending urge to learn.

• His second reason to build a start-up was to separate noise from the signals – in terms of information that comes to businesses in their day-to-day life.

• The final reason being his belief that innovation in businesses was nothing but chance. The more experimentation, the better the chance to innovate.

Mu Sigma is the realisation of the dream which became real in 2004.

What is it exactly that they do?

Mu Sigma is a firm that is involved in management consulting but the company's primary feature is to provide its clients analytic services or as they refer it decision sciences.

Consultant? Mathematician? Software Company?

Truth is, we're all the above. We are Art, plus Science, done at Scale, Implemented as One.
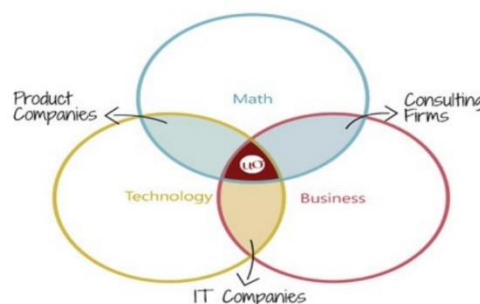
We are a Decision Sciences Company

The company's biggest challenge in its infancy was hiring people. Due to skepticism Dhiraj literally had to persuade people to join his company. He went to the extent of explaining to the mother of one of his employees as to why her son had to join his company.

He invested 80% of his personal money. He comments "When you put your own money, you have so much skin in the game. You will spend wisely and it teaches you a lot of things." He believes that by raising money, one not only loses equity but also the learning curve is not as steep as it would have been had one invested one's own money.

After surviving four years on its own, Mu Sigma raised its first round of investment worth $30 million, $25 million, in 2008 and 2011 respectively. $108 million was again raised from Sequoia and a private equity investor General Atlantic, which is the highest investment ever made in an analytics company.

Successful as it may sound, fame comes only after it tread thorns of the rose. Many companies tried to buyout Mu Sigma. His refusal to go with the offers was the fear that his brainchild might eventually die.
He believes that accepting and correcting mistakes very soon is pivotal. For instance, bad hires need to be let go off easily. It is important to rectify one's mistakes as soon as possible.

Despite the many trials and tribunals, Mu Sigma has faced its one startup that has lived on to deserve the title "Successful".

Are you inspired by Mu Sigma to build the next big thing?

Blockchain in Supply Chain

by Kshitij

Let us suppose that you order a shirt from an e-commerce site and it gets delivered to you.
How would you confirm the authenticity of the shirt?
How would you make sure that the shirt is genuine and was not made in a sweatshop?
How would you make sure that middlemen involved did not tamper with your shirt?

The shirt costed you a pretty handsome amount so you can't take any mishaps. You would probably count on the authenticity of the shirt since it was bought from a reliable source. But would you be sure? There have been reports of frauds in very reputed organisations too, so you can't be sure that your shirt is authentic.

Is there any way to sort this out?

Let's approach this by finding loopholes in the current process and try to address them.How does one get a chance to cheat you? It is possible for a person to cheat when other people don't have information about them.Consider a very simple case that your shirt is being made in a sweatshop which that website owns and then delivered to you with the help of a delivery agency (Delivery agency does do any fraud).

Here, neither you nor the delivery agency have any information about the product's genuineness. The delivery agency has nothing to do with the product as long as it is legal and hence, does not ask for any verification. This gives room for the possibility of a fraud.

Whhat would be a feasible solution?

One way would be for the delivery agency to ask for verification. However, this would hamper its business. Hence, the delivery agency does not ask for any verification as long as the product is legal.

Another way would be to have a system like Google Sheets in which the information about every process is available and universally accessible without tampering the information.

Consider a new system in which every person in the system (including those who are not involved in the transaction) has the information about the processes that your shirt has undergone. For example, when your shirt is at the delivery agency, then, you, the delivery agency, the manufacturer, the website and the other people on the system like other buyers and sellers (wondering why?), will have the information about all the processes. (You can think of this system as very secure google sheets where data is secured with the help of hashing and cryptography)

Editor   : Shivani
Designer : Gokul

WHY ARE INTERNSHIPS IMPORTANT FOR THE COLLEGE STUDENTS?

RAHUL KAR

Unraveling one's own latent potential and proclivity are one of the biggest challenges faced during one's college days, and challenges are meant to be won.

Internships lay the foundation for finding the intuitive and conscientious generation of future professionals. If you are a college student who is pondering about the next big step to take, internships are what you are looking for. Let's get to learn about how these internships leave you with the best opportunities.

WILL COLLEGE LECTURES ALONE SUFFICE?

Becoming a professional is not just about graduating from a college with reasonably good grades. Other important aspects to look into are building good relationships, experiencing the practicality of the corporate world through internships andsavoring the tastes of both success and failures to meticulously tread on the path of harsh reality.Generally, the students emphasize on earning the best grades possible thinking that's the only yardship which can quantify their capabilities. However, these students seem to struggle in a work setting because of their limited perspectives. If one wants to break out of this mediocrity, then he/she ought to engage in non-scholastics or internships to develop new perspectives about the different work styles.

GOAL SKILLS KNOWLEDGE MENTORING PRACTICE OPPORTUNITY TRAINING

9

SELECT YOUR CAREER

Internships are the imminent path ahead which lets one gain first-hand insights about the potential careers without any long-term commitments. Most fail to realise that studying a major and working as a professional are two disparate concepts which are often not equally enjoyed.Internships help in finding your desired career and in return help you set your goals proactively.
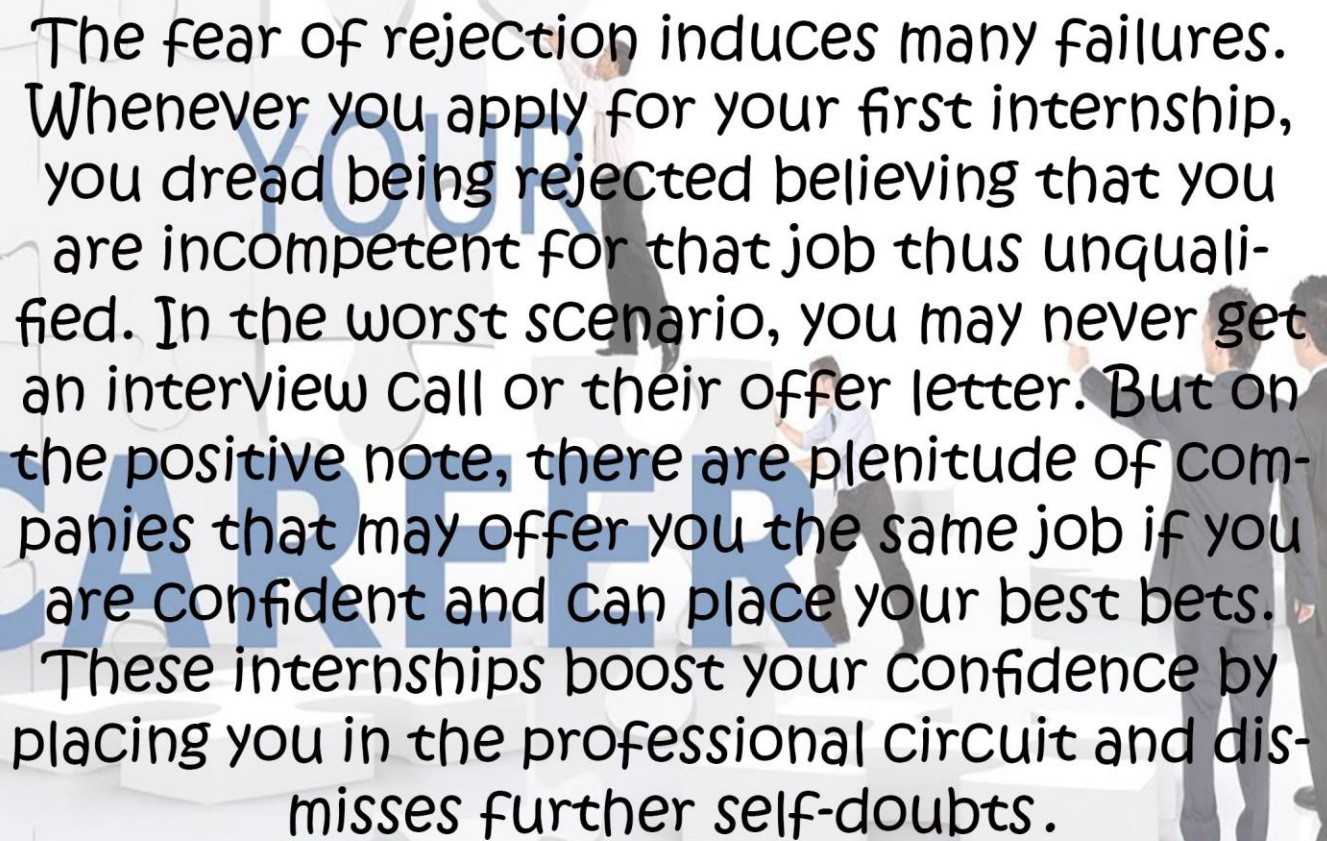
DEVELOP FLEXIBLE SKILLSET

Joining a company as an intern exposes you to the wide array of real world problems. The sooner you receive an assignment at work, the better will be your understanding about the inclination to solve the problems. When you select those problems of your choice, you can also select the industry and the work as an individual. As you get closer to achieving your career goals, you develop the skills that equip you with a competitive edge in that chosen market. Thus, the internships help you develop multitudinous skills through assignments and work projects with little effort.
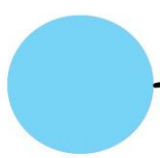
NETWORK AND COMPETE

Post graduation, it is most likely that your internship experiences and the built relationships land you a lucrative job. One needs to understand that your graduation with good grades get you a satisfactory and a well-paying job, whereas the skills you develop as an intern gets you marketable alongside building your work ethics and aptitude. Internships also connect you to the vast network of employers, mentors, industry experts, and human resource managers with whom you would travel in the loop of the professionalism.There are more chances of being paid better as a fresher with internship experience because of your ability to discern company operations faster than the inexperienced counterparts.

BOOST YOUR CONFIDENCE

The fear of rejection induces many failures. Whenever you apply for your first internship, you dread being rejected believing that you are incompetent for that job thus unqualified. In the worst scenario, you may never get an interview call or their offer letter. But on the positive note, there are plenitude of companies that may offer you the same job if you are confident and can place your best bets. These internships boost your confidence by placing you in the professional circuit and dismisses further self-doubts.

These are some reasons why you should try seriously for internships while in college. Reflecting on the importance of internships for your CV or the necessity of internship for your future, interning in an ideal environmnet will augment your skillset and lets you experience a part of the imminent future.

Editor : **Thivyavignesh**
Designer : **John Samuel**

TOPOLOGICAL
GENETIC OPTIMIZATION
ALGORITHM

by
Deepti

Remember the Mendel Law of inheritance based on the experiments done on pea plants to determine their gender in succesive generations? This is proof that given enough data, one can draw sufficient conclusions in mathematical modelling. However, the Human Genome Project, completed in 2003 had mapped around 22,300 protein-coding genes in humans. Even excluding the junk DNA that is a large dataset for a single being which leads to very expensive computation costs. This led to the creation of new genetic algorithms.

Optimization methods take an important role to help the designer to find the best solution in any scenario. These methods differentiate themselves from the design variables on which they are performed. There are three main categories of different methods.

1. The first one, called dimensional optimization, or the parametric optimization, uses design parameters to size a solution whose geometry has been pre-defined by designer.

2. The second one, called shape optimization, changes the boundary between each subdomain of material whose topology is defined by the designer.

3. Finally, the third method, called topology optimization, uses parameters describing the material distribution inside a design space.

So, what are Genetic algorithms? They are an optimization strategy where points in the design space are analogous to organisms involved in a process of natural selection. Each organism is represented by a character string analogous to a chromosome, with each character position analogous to a gene and each character value analogous to an allele. These "chromosomes," each representing a possibly-optimal design, are created in generations, with offspring designs arising from parent designs. Child designs are created when parent designs, chosen from the best designs in a generation, group in pairs to produce offspring via genetic reproduction and crossover. Sounds interesting, right?

Parents: 11111111111 00000000000
Children: 11111110000 00000001111
Crossover: 11111111 00000000 1111 0000
                    Crossover
Before 10111001011000010110100
After   10111011011000010110100
                    Mutation

Genetic algorithms are a compromise between "weak" and "strong" search methods. But what are these? Strong methods, such as numerical optimization procedures, perform search in an

informed manner using function gradients. While weak methods, such as random or exhaustive procedures, search in an uninformed manner by extensively sampling the design space. Weak methods are expensive, but more likely to find global optima; strong methods are inexpensive, but more likely to settle for local suboptimal. Genetic algorithms, in contrast to both, operate with a strong progression toward improved designs, together with the weak operations of probabilistic pairing, crossover, and mutation.

When using the genetic algorithm to perform search and optimization, several parameters must typically be specified: Probability of Crossover, Probability of Mutation, Fitness Scaling Coefficient, Population Size, Crossover Operator, Selection Scheme etc. These parameters have a great effect on search performance and efficiency.
Shape and Topology Optimization have been active research areas for some time. Some of the recent works that caught our sight are Homogenization-Based, Simulated Annealing, Genetic Algorithms, etc

Wrapping things up, the genetic algorithm returns an optimal or near optimal solutions on every run regardless of problem instance, problem size, or random number seed. As David Edward quotes, "Genetic algorithms (GAs) are defined as search procedures based on the mechanics of natural selection and genetics, and we think we know what innovation is - at least in some sort of qualitative way - but what does one have to do with the other?" Let's find out!

Editor   - Krishnakumar
Designer - Gokul

VORTEX

The CSE annual symposium

-Arjun

"TEAMWORK IS THE SECRET THAT MAKES COMMON PEOPLE ACHIEVE UNCOMMON RESULTS."

On 2nd February, the Computer Science and Engineering department's annual symposium, Vortex experienced its largest footfall in its history with over 1000 people. This unprecedented event can be owed to the blood and sweat of the members behind it.

Vortex '18 was superior in all aspects compared to its predecessors. This was primarily achieved by increasing Vortex's popularity on social media. Over 2000 people liked Vortex's Facebook page over the past 2 years and more than 75% of the colleges contacted came for Vortex. Vortex also conducted 2 outreaches, one at SONA college, Salem and the other at SRC SASTRA, Kumbakonam.

Vortex '18 had an auspicious and jovial inauguration thanks to Mr. Vijay Anand Guntur, the Corporate Vice President of HCL technologies. His guest lecture ignited Vortex '18 into the amazing event it is.

Vortex '18 had a total of 6 workshops and 12 events with more than 4000 online registrations. All's well that ends well and Vortex '18 ended well on 4th February with every participant taking back technical learning and fun.

Edited & designed by
Shivani & Sruthi

CROSSWORD

ACROSS:-

1. Global Positioning System [3]
2. A pictorial representation of the logic flow in a system [4-5]
3. A recognized and definable cross over points between two systems [9]
4. Acronym for a network that connects computer systems that are close together within a single building [3]
5. Computer that has been designated to share resources and data [6]
6. A function that takes a variable size text input and returns an irreversible fixed size string called the message digest [4]

DOWN:-

2. A system designed to prevent unauthorized access to or from a private network [8]
7. A group that defines US Standards for the information processing industry [4]
8. An acronym for recognition of printed or written text characters by a computer [3]
9. A mechanism of catching information on the web browser [7]
10. Protective software designed to defend your computer against malicious software [9]
11. A system based function that directs a call to an application to transfer the data [6]
12. A small electronic device about the size of a credit cards that electronic memory and possibly an embedded integrated circuit [5-4]
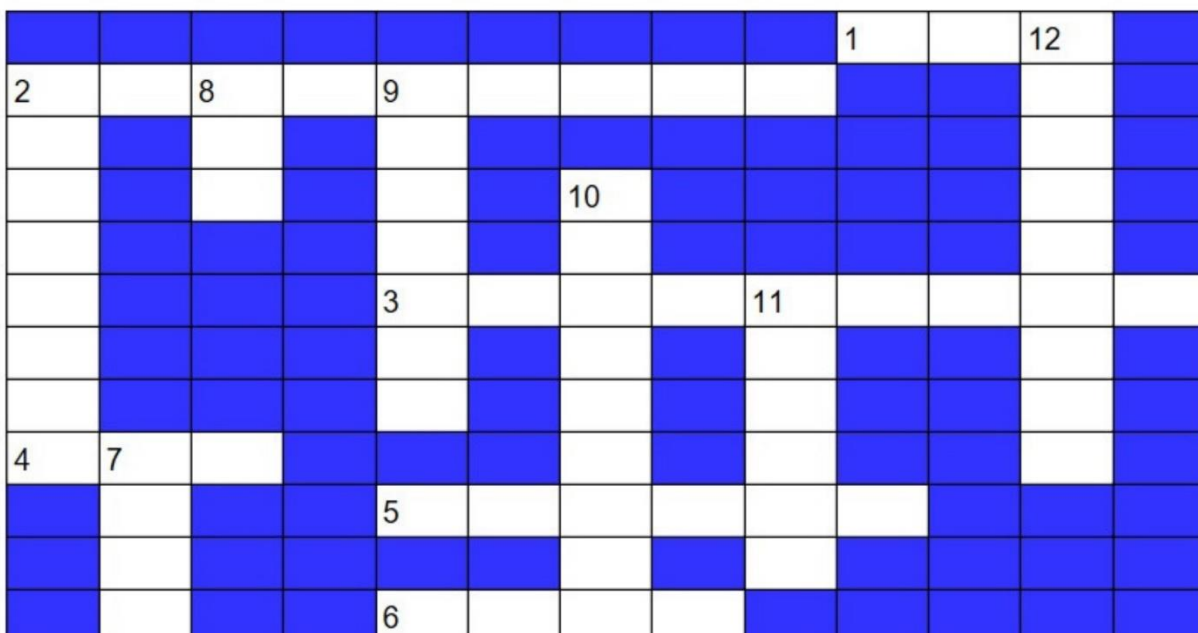
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