



# ALGORITHM

NEWSLETTER - DEPARTMENT OF MATHEMATICS, JMC

## A TIME FOR ATONEMENT

It's that time of the year! We get to go to *Down Under*! Cousin Wally is not so happy. Even Ma says I could act a little less excited, a little more *Koala-like*, whatever that means. But I have wanted to see *Down Under* since forever and ever and ever. When Summer will come, and I will be finally allowed to go and search for the yummiest, crunchiest leaves and no one will go hungry in the winters. I would be the best leaf-finder since Great-Uncle Walter. Wally, who's been named after him, always gets scared when I say this. Of course, I am not going to run away beyond the *River That Moves* like he did. I am not stupid. Everyone knows, 'The Koala who leaped beyond The River never leaped back to The Tree'. How can I forget, when Ma has told me this everyday since I was a teensy joey barely out of her pouch.

All of us including my cousins and I will be sent on an adventure in the jungle in search of the *White Trees* having the tastiest and the greenest of leaves. This is one of the most important missions; to try each and every kind of bitter, sweet, cotton-like soft or hard leaves; to taste and try the leaves of each tree that comes our way and rank them in order of their tastiness.

All these things are done to prepare for the winters. Why, you ask? See we live in a tree for a year, eat all its leaves, play in all its branches and have fun. But the tree also needs some rest, like Ma does when she has fed us all and tucked us in with the best stories of Great-Uncle Walter (for me) and Lazy Auntie Louisa (for Wally). So, we move to other trees in the summer, so that the tree can have some rest and again grow tasty, crunchy leaves for us.

But you know the fun part? For the first time we will be allowed to go *Down Under* without adults! Play as much as we want and see new things! Now, don't get me wrong, I love the Koala way of life-sleeping, eating and repeating, as much as any Koala (maybe not Auntie Louisa though, she takes it way too seriously). But there has got to be more out there than what we see from the tops of the trees! The summer before the last, when we had made home on a really tall tree, I saw the *River That Moves* from the top. Imagine going there one day; maybe I'll even meet Great-Uncle Walter there! But this is the only rule that us Koalas have to follow. No going near The River. Ah well! I'm still going *Down Under*, so that's something.

Next morning, Ma comes to wake me and Wally up very early, the sun has not even risen. I grumble. For all my un-Koala like behaviour, getting up this early is



ILLUSTRATION BY: SHRUTI KEDIA

unfair! What's so special about today that... Oh no! Today's the day! The day because of which I was not able to sleep yesterday. With a small breakfast of two branches full of leaves, a bunch of cousins, Wally and I are bundled together to step into *Down Under*. Ma hugs me so tightly that I fear she's trying to stuff me in her pouch again. But she finally lets me go, whispering in my ear, 'The koala who leaped beyond The River never leaped back to the tree.'

So we set out, sliding down The Tree one by one, into a heap of dry leaves, the crinkling almost deafening. I look around as do my cousins. Well. Wasn't *Down Under* supposed to be, umm - greener? Grass that smelt of rain in the morning and colourful leaves - what were they called? Flopers? Flanners? Flowers! But this is a sea of brown and dull yellow, quite like the dead branches of the trees that were no good to eat. I feel the excitement draining out of me. Wally nudges me. Yes, we need to move. Find a big White Tree with green leaves. Food as always inspires me to move. We have moved quite a bit when we feel our furs growing heavy with water. But it isn't raining. In fact, it is warm. So, so warm. It is making me dizzy with sleep. No. No. I can't sleep. I need to find food and water. Lots of water. My throat is burning. I look around and see a white mist. This is all wrong!

Mist in summers? Then the smell hit me. My eyes are watering. I know this smell. Smell of heat and tall towers of red and orange. Ma always told me to steer clear of them. We need to go back, go back to The Tree! Mission abort! I look around for Wally, but all I can see is the white mist. It's in me, my nose, my ears, my eyes. I call out for Wally, my cousins, Ma, anyone, but no noise escapes my mouth. It is then that the white gives way for something more sinister. The heat hits me before the vision of red and orange does. The Towers are here and they're coming my way. I need to run. And that is exactly what I do, as fast as my stubby legs can carry me.

I did not have energy to face my fears or submit to them... all I knew was...there was no forest around, just the *River That Moves*, and an Eora that might very well kill me. As soon as the thought came into my mind, I saw a strange paw that held something, coming towards me. I was scared, but I was helpless. So I decided to embrace it. Maybe I'll finally know what happened to Great-Uncle Walter.

I stretched out my hand to touch the Eora's hand and what it clenched. And to my surprise, it poured me some water. Another one nearby had something in his hand that pointed at me, but as soon as I tasted the



ILLUSTRATIONS BY: SHRUTI KEDIA (L) AND GAYATRI CHABRA (R)

I walked on for what felt like several days, as far as my stubby legs could carry me, in search of food, shelter, water, company, anything but the mist. Everything was darker, nothing but dust all around. Despite my miserable condition, desperate for food and water, I hoped I was dreaming and that I would wake up any moment now; on The Tree, munching on my favourite leaves, in Ma's arms. I'm lost in that vision when I stumble upon a dark, hard rock. Is it a rock? Strange white marks. Then suddenly some words pop into my mind, 'The Koala who leaped beyond the River never leaped back to the Tree'. The River. This is the *River That Moves*. Everything goes black. Last I remember, I fell asleep, or fainted. One eye cracked open. To my disbelief and shock, I woke up in the arms of...an Eora? I was confused, but too tired to move.

water, I lost sense of my surroundings, I lost sense of my fear and hopelessness. For the first time in forever, my thirst was quenched. The Eora then handed me a leaf, a leaf of The Tree, which I chewed on, remembering Ma, Wally, my family, that now, I don't know the whereabouts of. This paw that caressed me felt like sunshine after a long storm. It made me feel something, taste something that had left me a long time ago. Hope.

Hope that I'll be taken care of. Hope that I'm not alone. Hope that I'll be back home, in my Tree, with my family, perhaps not the home and family that was taken away from me. But something close to it.

ARTICLE BY: ANANYA MISHRA

## 2019 AUSTRALIAN BUSHFIRES

Baked Earth, soaring temperatures, high winds hurling embers at your skin and humongous red flames ready to engulf any form of life it gets close to - this is perhaps one way to imagine the plight of Australia, which had been experiencing the real version of an ecological nightmare. If this might appear as a mere attempt at poetry, it is not. Even though bushfires are not a rare occurrence in Australia, the 2019 bushfires caught the world by surprise. A warmer than usual weather and prolonged droughts create ideal conditions for the spread of bushfires.

Scientists are stressing on the fact that global warming and climate change increase the risk of bushfires by at least 30%. Bushfires will become four times more likely if global temperatures rise by 2°C. Already, temperatures have risen by 1°C and will likely soar by an additional 4°C. These bushfires have killed at least 34 people, damaged over 6000 structures and wiped out **1.5 billion animals**. About **306 million tonnes** of carbon dioxide has been emitted. The total land affected in the country by the bushfires is about 18.6 million hectares, which is now comparable to **England's total area**. Authorities have warned people to expect more severe conditions in the future.



ARTICLE BY: NANDINI AGRAWAL | Image: www.google.co.in

# EDITOR'S MESSAGE

It was a blustery morning marked by amber colored leaves paving the footpaths and the renowned pink flowered tree of our college stood at a distance as we waited for the hard copies of the first edition of Algorithm to arrive. Within no time we were clutching on to a heavy bundle of what felt like, a new beginning to us. We rushed to our department room as anxiety, excitement and enthusiasm tickled our veins. We delicately opened the package and embraced the vision of the huge A3 sized glossy print sheets with the words ALGORITHM – newsletter of the Department of Mathematics, JMC. And basically this is how it all began....

To many, this might seem a rather exaggerated version presented by some over enthusiastic students (clearly, it is), but speaking of it very honestly even if the reality wasn't this fancy, to us it seemed nothing less than a fairy tale. We were fantasized by every tiny detail of the newsletter as it enclosed within itself an entire year's planning and brainstorming.

After we had enough inspection of the hard copies, we marched down with a few copies to the 3rd floor (which is technically the 2nd floor, as we always say). We went ahead to present a copy to our Principal Sr. Dr. Rosily and we were delighted as she welcomed us and we presented the copy of our first edition to her. She appreciated our effort and said that she'll make sure that she peruses through it, We nodded our heads and smiled in an effort to contain our excitement and exhilaration

which could have burst out any moment. Thankfully, we did not forget to request for a picture to which, despite her busy schedule, sister agreed with a smile. To this day it remains one of our favorite pictures, as time and again we reminisce the happenings of this extraordinary day. We were also applauded greatly by our H.O.D Dr. Anu Saxena and our T.I.C Dr. Indrakshi Dutta and all other professors of the department who provided us with their incessant support and guidance. Finally, we distributed the newsletters to those for whom they were made, the students. To our honor we received a very positive and motivating feedback.

This is how something that felt like just a dream a year and half ago, was weaved into a reality, nothing less than a fairy tale right? Told you!



Coming to this semester's edition, this one would be pretty different from the first. This edition discusses a serious and pressing issue and plausible cum creative solutions to the same. Sustainability is the only way through which development would lead to positive outcomes, the benefits of which can also be reaped in the future. The motivation behind this edition is the United Nations Agenda for Sustainable Development (SDG 2030).

We aim to bring a difference in the mindset of our readers as we recommend adapting to a more sustainable lifestyle. This edition is special, also because both the readers and the makers of the newsletter are locked in their homes during tough times owing to the pandemic.

As we make an effort to serve you a good read amidst these new and challenging living conditions, we hope that you will take out some time to retrospect and reconcile with all the times your unsustainable actions might have caused harm to the Earth and think about how in the post-pandemic era you can build habits that lead to mutual upliftment and progress. (We have some great sustainable lifestyle recommendations enclosed for you.)

NEHA SAM  
Editor in Chief

Before you move on to check out our recommendations here's concluding with lines from a song you might have often hummed to,

*"There are ways to get there, if you care enough for the living  
Make a little space, Make a better place  
Heal the world, Make it a better place"  
- Heal the World, Michael Jackson*

## FEED THE EARTH

Choose to Compost

Let us help wriggly worms to thrive, flowers to blossom and nutritious veggies to grow by simply composting our food waste.

All pure plant and animal products are compostable. Although, it is not recommended to compost meat, dairy or fish scraps at home, anything else, from wooden skewers, to hair in our hair brushes, are all compostable at home!



visit  
[www.trashisfortossers.com](http://www.trashisfortossers.com)  
to know more!

ILLUSTRATION BY: TANYA AGARWAL

The **CLIMATE CRISIS** has already been **SOLVED**.  
We already have the **FACTS** and **SOLUTIONS**.  
All we have to do is **WAKE UP** and **CHANGE**.

- Greta Thunberg

CARICATURE BY: TANYA AGARWAL



# ALGORITHM RECOMMENDS!

It's 2020, DITCH THE PLASTIC from your drink! Straws and stirrers are the 11th most found ocean trash.

Sustainable consumption and production aims at "Doing more and better with less". Increasing net welfare gains from economic activities by reducing resource use, degradation and pollution, while increasing the quality of life. Sustainable Development will be achieved not only by growing our economies, but minimising waste in the process of doing so.

## SHOWER POWER

On average a person spends 13 minutes in the shower, just relaxing, making up 25% per capita of water usage.

Cutting time in the shower for some extra time in bed is just as good, if not better, if you ask us!

Growth that contaminates the environment sets development back.

The United Nations

It's time to be TWO-FACED! Print double-sided, let's save a couple trees!

RECOMMENDATIONS BY: TANYA AGARWAL AND JESSINTHA MATHEW

## JMC GREENS

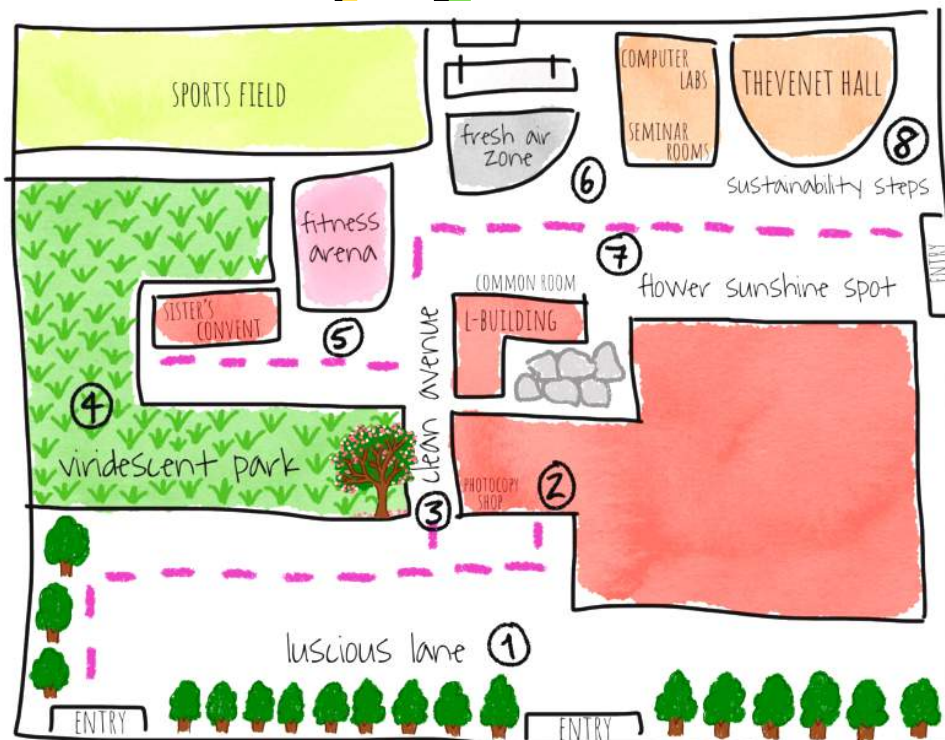
Here's something we thought we would never say, "I am missing college". In this era of virtual tours, we bring to you a visual treat tending to your college blues!



6. Where JMC celebrates its fest with zest, vigour and no pollution.

7. Just the place for a decent cup of coffee and crispy-hot samosas. We bet you can neither shake off the smile nor the sunlight of your beautiful face!

5. There's nothing like the joy of working out in nature. is there?



8. Steps to a sustainable lifestyle.

3. This immaculate avenue is outlined with myriad of flowers and bushes.

4. Blooming of this tree indicates approaching exams. Good Luck!

1. This is the street where instead of street lights you will find the most exotic species of trees.

2. This is the place where you might have to wait for a long time, so in the meantime do check the pictures of all latest events held at JMC under the umbrage of the canopy.

The inventors of bags certainly wouldn't have had any idea that an item created as just another utility would one day rise to become an indicator of personality, a fashion statement and a prominent commodity in GDP indices. A colossal variety in fabrics and designs calls for having a bag for every occasion and purpose. While this may be a symbol of high living standard, we definitely cannot deny that increased consumption of bags per household has put immense stress on an already distressed ecosystem. Driven by this concern, a group of environment enthusiasts got together and founded Eco Right, a company that caters to the ever-increasing demand of bags while ensuring sustainable use of resources.

**EcoRight was established in April 2017, in Ahmedabad, Gujarat.** The company aims at creating meaningful impact as a sustainable lifestyle brand. To achieve this goal it creates environment-friendly bags which are manufactured from biodegradable fabrics, are durable, quirky and attractive. They have a wide collection that is not only befitting for all our needs but is also environment conserving and nurturing.

EcoRight also takes custom orders. The designs are trendy and thought-provoking. The bags qualify as both environment friendly and fashionable. Not only their products, their entire manufacturing process is sustainable on multiple fronts. The durability of the bags can be inferred from the company's claim that **one EcoRight bag can replace fifty to hundred plastic bags!**

Instead of splurging on bags crafted with a certain lack of empathy, from non-biodegradable materials or animal hides, we strongly recommend you to buy an EcoRight bag which is biodegradable and sturdy and made with extreme care for our ecosystem. They have sold over two lakh bags to date. **They ship their products globally and the company is one of the highest-rated on Amazon India and USA.** Customers from all around the world testify the outstanding quality, design and concept of the bags.

Their products can be bought from Amazon as and their website. **Opting for an EcoRight bag can be the contribution you always wanted to make towards the environment.** Getting hands on EcoRight merchandise is extremely hassle free. It's perhaps one of the most convenient ways of fulfilling your social responsibility. So, the next time you plan to buy a bag for the next semester, for your best friend's birthday, for a new job or simply for carrying the groceries from the supermarket, we highly recommend investing in EcoRight!

Algorithm is proud to announce collaboration with EcoRight. We applaud their efforts and are honored to be a part of the same.

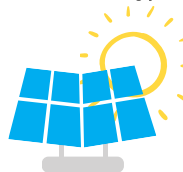
ARTICLE BY: NANDINI AGRAWAL ILLUSTRATIONS BY: RIMJHIM SINGH

### Fabric



THEY USE A VARIETY OF FABRICS- RECYCLED COTTON. A COMPOSITION OF JUTE AND COTTON AND RECYCLED PET BOTTLES

### Solar Energy



THE FACTORIES ARE SOLAR-POWERED. ENERGY-WISE ALSO THE MANUFACTURING PROCESS IS SUSTAINABLE

### Raw Materials



RAW MATERIALS ARE PROCURED ONLY FROM CERTIFIED SUPPLIERS

### In-house facilities



IN-HOUSE FACILITIES ARE ETHICALLY AND SOCIALLY AUDITED TO HAVE NO NEGATIVE IMPACT ON THE ENVIRONMENT AND ARE CERTIFIED FOR QUALITY

### Dye



THE DYE USED IN THE PRINTING CONTAINS NO ADDITIVES AND IS FREE OF HARMFUL CHEMICALS FOR PEOPLE AND ENVIRONMENT

### PRODUCTS OFFERED

- Tote bags
- Work bags
- Lunch bags
- Beach bags
- Travel bags,
- Grocery bags
- Drawstring pouches



*An EcoRight bag is a token of gratitude towards the Earth; it's a celebration of constant efforts that are put every day to save nature!*

# The Department of Mathematics

COMPILED BY: KHUSHBOO KARAMCHANDANI

2019-20 AT A GLANCE



## FRESHERS' DAY

The Department of Mathematics kick-started the new academic session by extending a warm welcome to the freshly inducted students. The theme for the day was "Things only a fashion blogger could wear" and it was indeed intriguing to see how the freshers set fashion goals for the entire college. The day began with an ice breaking session followed by a talent round and a couple of entertaining performances by the seniors who were delighted to welcome the new batch.

Ms. Twesha Dewan was declared "Miss Mathematics 2019" and Ms. Tanvi Suri bagged the title of "Miss Fashionista 2019". Moreover, Sunaina Chhabra representing the Department of Mathematics won the title of "Miss Personality JMC 2019".

## TEACHERS' DAY

The Department of Mathematics gathered together to thank the teachers for their valuable contribution and incessant dedication towards the department and its students. The students expressed their gratitude through small tokens of appreciation, recitation of poems and songs, the event concluded with the cake cutting ceremony.



## SELF DEFENCE WORKSHOP

Pioneering the vision of making women equipped with the necessary skills and techniques to defend themselves in all unprecedented circumstances, the Department of Mathematics organised a 5 day self defence workshop from 2nd September 2019 to 6th September 2019. A total of 80 students participated enthusiastically and were trained by officials from the Delhi Police.

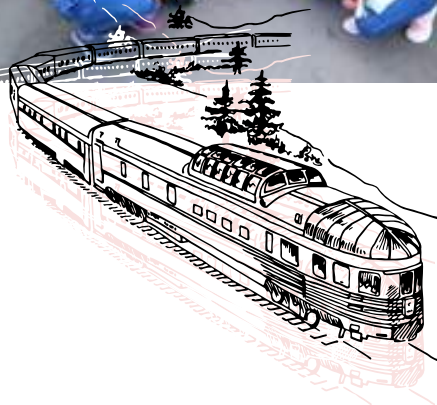
## SEMINAR ON SEXUAL HARASSMENT AT WORKPLACE

The Department of Mathematics organised a one day seminar on 'Sexual Harassment at Workplace' on 20th September 2019. The Seminar started with a debate competition on the topic "If you walk into a room and feel uncomfortable, then that is harassment", followed by a report presentation on Sexual Harassment. Both the events were witnessed by participants from various colleges. The seminar concluded with an interactive session by Advocate Zeba Khair.



## DEPARTMENT TRIP

The Department of Mathematics organised a trip to Dalhousie from October 18, 2019 to October 22, 2019. Dalhousie is a tiny tinsel town tucked away in the lap of Himachal Pradesh, it is a piece of paradise for all travellers. Students visited Panchpula, Khajjiar (known as Mini-Switzerland) and Mall Road. It was a great opportunity for students to bond with each other.



## SPORTS DAY



The Department of Mathematics actively participated in the Sports Day events held on the 6th of March 2020. The squad of mathematicians marched skillfully and amazed everyone with their well coordinated performance.

# MATHARENA' 20

Matharena, the annual fest of the Department of Mathematics was held on January 20, 2020 and students from all colleges of the Delhi University participated in large numbers making the festival a huge success.

The day commenced with the lighting of the lamp by the Chief Guest Dr. Asha Mathur, former principal of Lady Shri Ram College and our principal Sr. Dr. Rosily as well as the teachers of the department.

The main event of the day was the Paper Presentation Competition titled "Mathematics and its Applications" and indeed the audience witnessed some spectacular presentations. There were also several game stalls and the event concluded with the fun yet tricky Mathematical Tambola.



# 2019-20 AT A GLANCE

## FACULTY

Head of Department: Dr. Anu Saxena | Teacher in Charge: Dr. Indrakshi Dutta

Dr. Alka Marwaha	Dr. Ambika Bhambani	Dr. Shruti Tohan	Ms. Rama Saxena	Dr. Rashmi S. Thukral
Dr. Anu Ahuja	Ms. Sunita Narain	Dr. Monica Rani	Dr. Shikha Singh	Ms. Richa Krishna

## STUDENT COUNCIL

Ms. Teres Augustine (PRESIDENT)	Ms. Purty Kapoor (VICE PRESIDENT)	Ms. Pawni Khurana (GENERAL SECRETARY)
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## ACHIEVEMENTS

### SPORTS

**Ritika Sehrawat** : Overall champion at the Inter-College Athletics Meet.

**Preeti** : First position in the Inter-College Handball Tournament, BITS Pilani relay event, IIT Kanpur Handball Tournament.

### EXTRA CURRICULAR

**Diksha Jha** : Second position, Mathematical Relay, Shivaji College and Mathematics Quiz at Kalindi College.

**Anjali Mishra**: Second position, Mathematical Relay, Shivaji College.

**Rimjhim Singh**: Best Performer, Hansraj College; Performed and won laurels in 17 competitions as a member of Kahkasha, the Dramatics Society.

**Deepjyot Ahluwalia**: Third position, poetry competitions -'Verse-o-magique' Maitreyi College and 'pen-a-page', Cauldron JMC.

**Ishika Bhutani**: First position in Dig a Bit, PGDAV College; Second position in Mathematics Quiz, Atma Ram Sanatan College and Bharati College; Third position in Mathematical Relay and Mathematical Charades, Shivaji College, Mathematics Quiz, Motilal Nehru College and Mathematical Pictionary, Shivaji College.

**Shambhavi Maurya**: First position with Abhilasha Francis in Mathematical Relay, Matharena'20; Third position in Rangoli Making Competition, Montage'20.

**Shailza Varshney**: Second position in Jack of Trades organised, Finance and Investment Cell, Shivaji College.

**Nishka Bhushan** : First position at AIIMS ( duet Singing competition); Performed and won laurels in 19 competitions as a member of Echo, the Western Music Society.

**Sanskriti Mishra** : Got featured in the Grazia India Magazine for Wella's pride issue.



## Analysis of Fractal Patterns in the Prices of Agro-Based Commodities



NEHA SAM, IIIrd YEAR



YUKTI, IIIrd YEAR



VIDHI VASHISHTH, IIIrd YEAR

On an average, the last few years have seen fluctuations and volatilities in all sectors of the Indian Economy. For an agro-based economy like India even the slightest of changes in the agro-based commodity market can prove to be detrimental to the country's growth. Amongst all the crops grown in India, onions nevertheless have shown a high degree of instability in prices and literature proves that the prices of onions have been used as an indicator of food inflation several times in Indian history. Hence a study on onion prices in the Indian Economy might lead to a good insight on whether the market in general can be remotely predicted. Motivated by this line of thought, three students of the Department of Mathematics: Neha Sam, Vidhi Vashishth and Yukti, under the guidance of Dr. Monica Rani started researching on the same.

The paper is inspired by Fractal Market Hypothesis (FMH) which analyses the daily randomness of the market, and to understand the same, the Hurst Exponent approach has been used. The paper unfolded a suitable algorithm to find the Hurst exponent using statistical methods, specifically linear regression and time series analysis, wherein time is the independent variable and price of the commodity considered, is dependent.

Results showed that the prices exhibit fractal characteristics which implied time series of onion prices is monofractal and therefore can be predicted in the short term. This result may or may not be generalized to the other agro based commodities of the Indian Market. Lastly, this result could be of benefit to the policymakers of India while drafting policies targeted towards the agriculture sector.

**The paper was chosen to be presented at the 3rd International Conference on Modern Mathematical Methods and High Performance Computing in Science and Technology (M3HPCST-2020), Inderprastha Engineering College, Ghaziabad from 9th - 11th January 2020. The abstract of the paper was published in the proceedings of the conference and has been selected to be published in the Ramjas Economic Review 2020. The team also participated and won at paper presentation competitions across Delhi University including first position at Hindu College, Jesus and Mary College and Sri Venkateshwara College, second position at Miranda House and Annual Winter Conference 2020, Ramjas College.**



We extend our sincere gratitude to our H.O.D Dr. Anu Saxena and our T.I.C Dr. Indrakshi Dutta and all the professors of our department for providing us with this opportunity and for being a constant source of support and guidance.

# FLIP THE COIN TO SEE THE BRIGHTER SIDE

ARTICLE BY: DEEPJYOT AHLUWALIA AND HIMANI ARORA

In these unique, unprecedented times of the prevalence of Covid-19, a lot of us have been forced inside our abodes and into ourselves. This undoubtedly has increased our screen times and exposed us to the harsh reality of the pandemic. Mostly through news channels and other reputed academic (or institutional) reports, the COVID situation has been expressed in a variety of ways.

Through this article, we wish to explore the integrated world of Mathematics and Covid, aka mathematical epidemiology.

## UNDERSTANDING THE COVID MODEL

The first type of basic mathematical model that scientists and researchers use to draw and express their findings is the S-I-R model. This categorises the population into 3 categories on the basis of disease status. The categories are S-Susceptible; capable of being infected, I-Infectives; those who have contracted the disease and are capable of passing it on and R-Removed; recovered from the disease and incapable of contracting or spreading the disease.



**S - SUSCEPTIBLES**

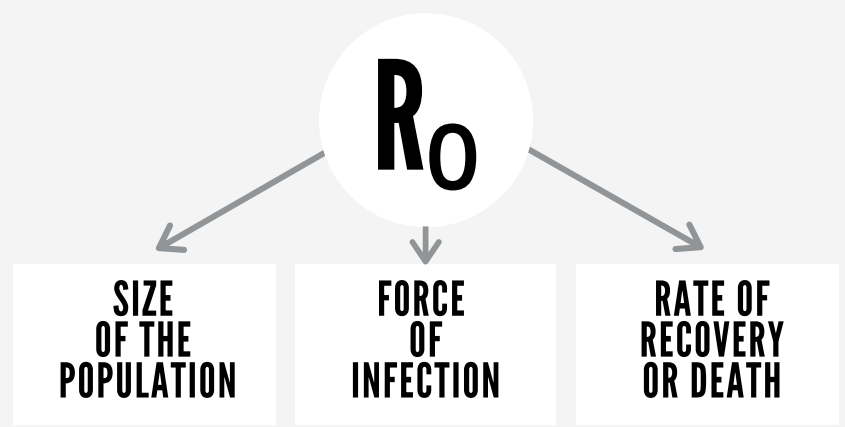
**I - INFECTIVES**

**R - REMOVED**

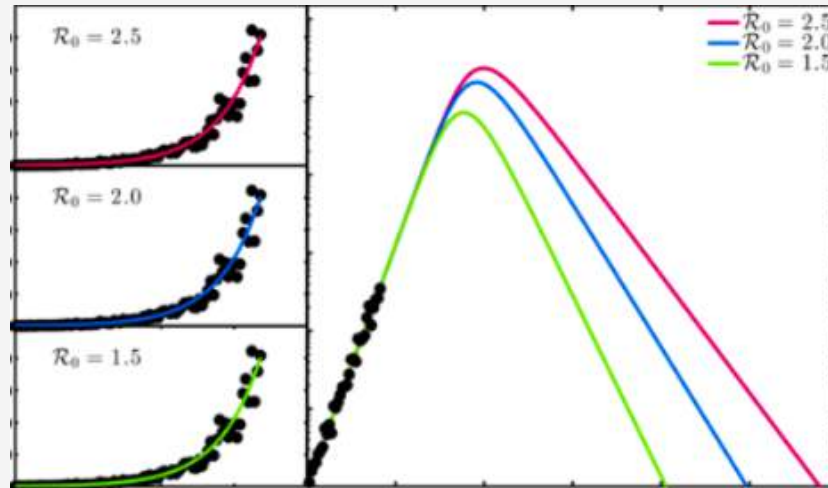
The need and idea of social distancing is highlighted throughout this model. The practice of social distancing effectively removes you from the category of Infectives or Susceptibles, and places you directly in the removed category, without even contracting the virus. This slows down the spread massively and prevents a greater outbreak.

The basic reproduction number, an important parameter in this model denoted by  $R_0$  is the average number of previously unexposed individuals, infected by a single freshly introduced disease carrier.

$R_0$  factors in three components: size of the population, rate at which susceptible become infected (often known as the force of infection), and rate of recovery or death from the disease. Increasing the first two of these factors increases  $R_0$ , while increasing the recovery rate reduces it. If the value of the basic reproduction number exceeds 1, it accounts for an exponential outbreak. The lower the reproduction number, the better.



The basic reproduction number for COVID-19 in India is 1.22 as of 22nd May 2020.



Another very important element is the case fatality rate. **Case fatality rate** is the proportion of infected people who ultimately die from a disease. The  $R_0$  factor is extremely important for understanding the spread of the virus but it does not give any information about how serious the infection can be for an infected individual. Case fatality rate depends on various factors like the immunity of the patients etc. In the case of COVID-19 it varies significantly with the age of the patient.

On the other hand a study suggests that a higher case fatality rate tends to reduce the infection spread because it kills the people who get infected with the disease and hence, the infection does not spread further.

The SIR model suggests ways of controlling the outbreak. The only way to convert susceptible to recovered is through vaccination. Herd immunity crucially means that people who are immunocompromised like the elderly or pregnant women can benefit from the protection afforded by other people's immunity. On recovering, these people will become immune to the disease and also break the chain of transmission. The number of people who should be immune to the disease will depend directly on the reproduction number  $R_0$ .

## ADAPTATIONS OF THE S-I-R MODEL

Another adaptation of the S-I-R model is the S-C-I-R model where C represents the population of carriers of the infection. The carrier class is vital for representing diseases like HIV/AIDS, which have long infectious periods with no obvious symptoms. Any infection that has carriers, which means infected people without any symptoms, pose a huge risk to the population. This is because it becomes difficult to identify all the potential carriers.

A very simple adaptation of the S-I-R model is the S-I-S model which is used for those diseases which confer no immunity to the infected people. This model indicates that the infection of the disease will never die out from the population and will keep on converting susceptible to infected and infected to susceptible again.

## THE FLIP SIDE

Although the corona virus has engulfed almost the entire world, one cannot neglect the brighter side of the story. To curb the spread of the virus governments all around the globe introduced the concept of lockdown or shutdown. Lockdown served as a remedy to our environment. Our environment, damaged over the years due to human practices and global warming required some time to replenish and recover and come back into its full bloom. Lockdown has contributed towards helping our environment gain its strength and energy again.

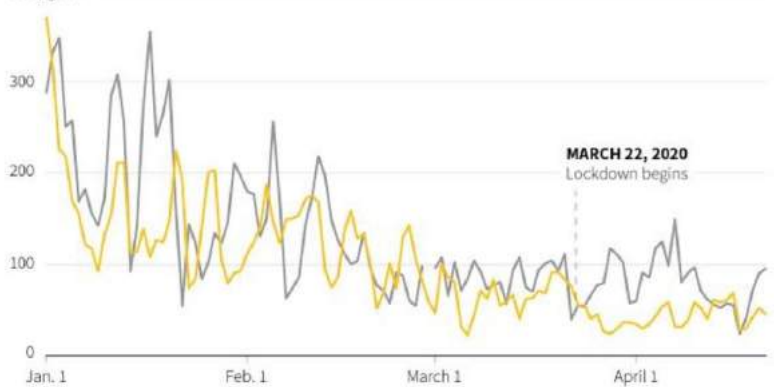
### Delhi pollution levels fall during coronavirus shutdown

Delhi's city-wide lockdown to curb the spread of the novel coronavirus began on March 22. Since then, the daily average concentration of PM2.5 has been lower than the same time period in 2019.

#### AVERAGE DAILY PM2.5 LEVEL

— 2019 — 2020

400  $\mu\text{g}/\text{m}^3$



Source: Central Pollution Control Board.

A. Bhandari, 21/04/2020

REUTERS

SOURCE: REUTERS (NEW DELHI)

**India's capital city, New Delhi was ranked, the most polluted city in the world by WHO in May 2014. Delhi skies were never the usual colour but were always grey with industrial and vehicular emissions. The AQI which used to be around 200 and sometimes jumped to 900 has settled to an all-time low of 20. Through lockdown Delhi's 11 million registered cars and factories and construction sites have stopped adding to the air pollution and the skies have blessed the residents with a piercing blue colour.**

Some extremely rare species have re-emerged such as the South Asian dolphins or Ganges Dolphins which have been spotted in the Ganga River after over 30 years; Mumbai has recorded an exceptional increase in the number of migratory flamingos.

The Uttarakhand Pollution Control Board confirmed that water from har-ki-pauri in Haridwar was tested and classified fit for drinking after chlorination.

All this indicates that though these hard times have affected the world greatly, it has also helped improve the status of the environment in most places. With hope in our hearts to surpass these times, we must move forward to a future of refined lifestyle choices to preserve Mother Nature and work cumulatively to restore our planet from the damage that had been caused over time.

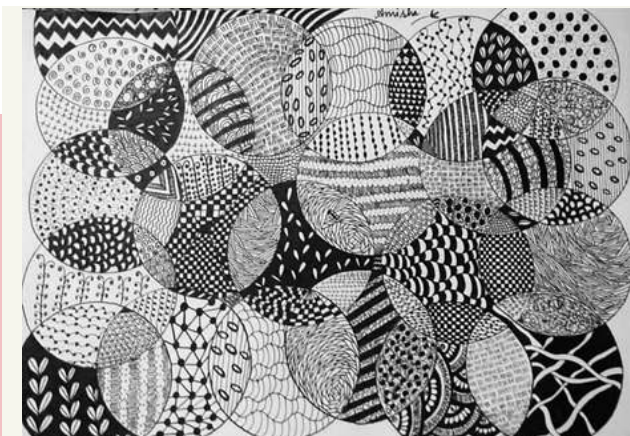
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Lat

## 562

Hi! I am number 562.  
 Other cows are like me too  
 I don't have a name  
 I was separated from my mother just when I came  
 The farmer threw me into a metal cage  
 That was the first time I saw their rage  
 The picture of a calf smiling on a grassland you see  
 Is just a dream, we live in a place full of dirt and pee  
 The place is so overcrowded that I can't even move  
 By doing this torture, I don't know what the humans  
 want to prove  
 Instead of my mother's milk, I was fed hay  
 I was getting weak, but I couldn't say  
 When I was 15 months old, they see  
 Farmers came and impregnated me  
 I was in a lot of pain, I cried and screamed my lungs  
 out  
 I begged for mercy in my shout  
 After 9 months, I was so excited to see my baby  
 Just like any other mother, I hoped to stay and  
 comfort my baby, maybe?  
 But when the time came  
 The farmer reminded me that her fate is just the  
 same  
 I couldn't handle myself, hence fell on the floor  
 He hit and kicked me, not seeing that my eyes were  
 sore  
 I was taken into the milk parlours daily  
 To take the milk which was meant for my baby  
 I suffered through this process too  
 But my emotional pain told me that it was nothing  
 new  
 Next year I gave birth to a beautiful male calf who  
 was taken away for veal  
 Any emotion besides pain I could not feel  
 Every year I gave birth and the same process  
 repeated  
 This was just not my children's fate, but every cow's  
 kid  
 When the farmers realised I was getting weak  
 I wanted to say a lot of things but could not speak  
 It was again an impossible moment to beat  
 As now I was going to be just a piece of meat.

NISHITA, IIIrd YEAR



AMISHA SINGH, IIInd YEAR



PALKIN DALAL, 1st YEAR



ABHILASHA, 1st YEAR

## • अकेला क्यों

लाखों की इस भीड़ में भी यहाँ हर शव्स है अकेला क्यों?  
रास्तों का इल्म होते हुए भी गुमराह है क्यों? भटकता है क्यों?  
बाहर हसी है पर अंदर हर बात फसी है क्यों?  
बाहर हर काम पूरा है मगर अंदर कोई भाग अधूरा है क्यों?  
हज़ारों है उसके पास फिर भी वो अकेला क्यों?  
सुनने के लिए हमेशा तैयार पर सुनाते वक़्त अकेला क्यों?  
जन्नत में तो सब है साथ पर जहनुम में अकेला क्यों?  
जीत में तो कई होते हैं साथ मगर शिकस्त के समय ही अकेला क्यों?  
हुकूमत में तो हर कोई आ जाता है पर खतम होते ही अकेला क्यों?  
कहने को तो दुनिया साथ है कहने को तो ज़माना साथ है।  
अंजाम पे तो अनगिनत चेहरे है साथ पर आगाज़ की घड़ी था अकेला क्यों?  
एक बात है जो खटकती हैं,  
आखिरकार आठ सौ करोड़ की आबादी होने के बावजूद भी इस दुनिया में अकेलापन  
बस्ता है क्यों?

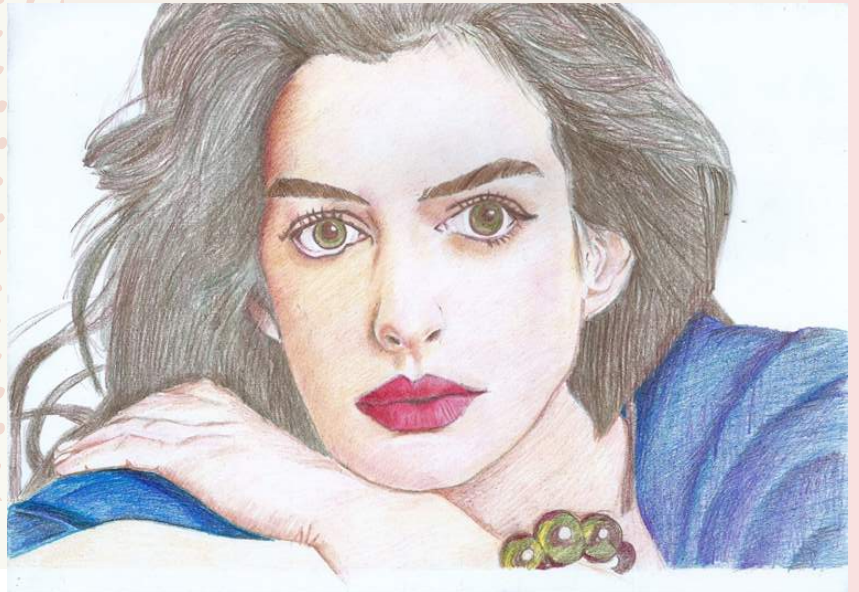
ESHA KHANNA, IIInd YEAR



ANJALI MISHRA, IIInd YEAR



PAWNI KHURANA, ISt YEAR



TANYA AGARWAL, IIIrd YEAR

## SHE

She bleeds every month  
 And at times bears pain  
 Inside and out  
 Yet she lives by  
 With the virtue of great pioussness  
 For she bleeds to create a world  
 She refuses to degrade her self-esteem  
 In an alter of myths  
 And to lose her insight  
 In a maze of taboos  
 She dares to walk headstrong in society  
 Where blood shed at border is considered chivalric  
 And the one shed in beds.... Impure  
 Because to her  
 Hygiene is a great possession  
 Contentment a treasure  
 Confidence a great friend  
 And education a power

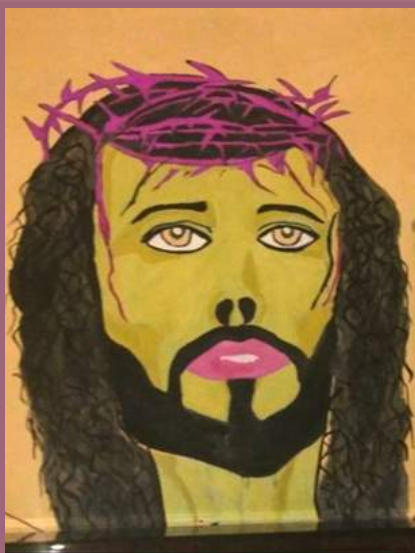
SIMRAN ARORA



SNEHA SUNNY, IIInd YEAR



PEARL GUPTA, IIIrd YEAR



ANANYA SHAJI, IIInd YEAR



DIKSHA JHA, IIInd YEAR

# Class of 2020



**ANANYA MISHRA**

<Insert a vague quote about life, optimism & Dumbledore here>



**ANGELA ARTHUR**

Want the streamers to be ready by tomorrow.



**ANJALEENA GEORGE**

Couldn't make history, but i could make a short story.



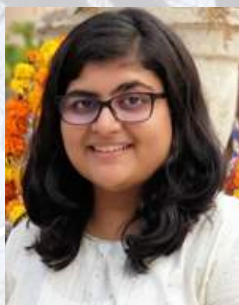
**ANU K. THOMAS**

Look somewhere else ain't no inspiration here....



**ANUSHKA MISHRA**

I have no clue who you are either!



**APOORVA**

Ever got locked up in the college building?



**CHARU BAJAJ**

I am my own problem, also my own solution.



**CHAYANIKA PANWAR**

It wasn't supposed to end like this...



**ELIZABETH K. JOY**

Controlling my laughter during lectures was tougher than mugging up proofs.



**GAURI TANDON**

God knew I'd be too powerful if I wasn't allergic to paper dust.



**JASMINE SALUJA**

Is probably at Starbucks sipping coffee alone, avoiding human interaction.



**JENIFA THOMAS**

I am not the one with a fur (jenni-fur), I am jenifa and I don't have fur!!



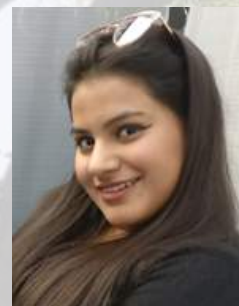
**JESSINTHA MATHEW**

I've probably clicked half of these pictures.



**KIRTI KHANNA**

Kabhi khushi kabhi gum.



**MADHURTA UPPAL**

Was never interested in demons, girls and books.



**MAHIMA MARIAM VARGHESE**

The only take-away from this course: Maths is not the joy of solving first or getting final answers.



**MANALI SETHI**

These 3 years were more life changing than I could even imagine.



**MANYA KAKKAR**

High school Math taught there's a solution for every problem, college Math taught me there's a problem with every solution.



**MEGHA KHANNA**

Let's do the simplest things, let's make the moments count.

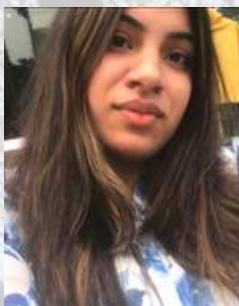


**NEHA SAM**

You've still saved my number as Neha CR.



# Class of 2020



**NIHARIKA KHURANA**

After 3 years it feels like an accomplishment, pursuing Maths Honours, a course I never imagined myself doing.



**NISHITA**

Read that again. It's \*Nishita\*, not Nishtha



**PEARL GUPTA**

Got Harvey Specter instincts and Ranveer Singh energy.



**PRANSHI SHARMA**

I am strong, I had to be.... I just graduated!



**PREETI**

Play is the highest form of research...



**RADHIKA CHANIAN**

Do you have a plan? I don't even have a pla..



**RISHIKA CHANIAN**

This is all a moo point.



**RIYA JAIN**

Don't worry about fitting in when you're custom made.



**RYNGA IRENGBAM**

I entered college as a confused teenager and now I am leaving college as a confused adult.



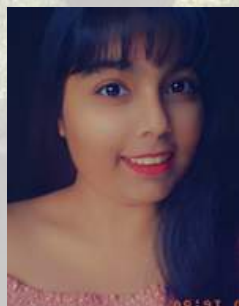
**SANSKRITI JAIN**

I'm not what my name suggests.



**SHEETAL**

I smell the books before reading them.



**SHIREEN**

I wish these 3 years wouldn't have passed so fast!



**SONI CHAUHAN**

Maths taught me to make arbitrary choices....



**SRISHTI**

What feels like the end, is often the beginning.



**TERES AUGUSTINE**

No!! It's not pronounced as terrace.



**TANYA AGARWAL**

For the umpteenth time it's Agarwal, not Rastogi.



**TANYA RASTOGI**

For the umpteenth time it's Rastogi, not Agarwal.



**VIBHU SACHDEVA**

Just bad at dividing attention



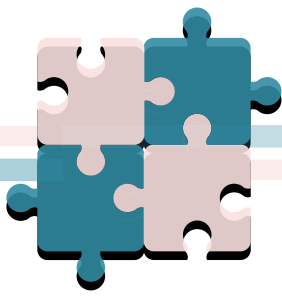
**VIDHI VASHISHTH**

Coronavirus@batch of 2020



**YUKTI**

Been last on attendance lists since '99



# The Editorial Board

Presenting to you the team that weaved these 18 pages into what you now behold as an aesthetic piece of art. Here's appreciating all the cups of coffee, all the proof reading sessions, the attention paid to the minutest of details, those some umpteen drafts created and edited and not to forget their patience as vast and seamless as an ocean!



**NEHA SAM**  
Editor in Chief



**ANANYA MISHRA**  
Content Strategist



**TANYA AGARWAL**  
Chief Illustrator



**JESSINTHA MATHEW**  
Principal Designer

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DIKSHA JHA  
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ADDITI PANDEY  
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RUCHI SINGH  
SURUCHI BECK  
NANDINI AGRAWAL  
ISHIKA BANSAL  
PURTY KAPOOR

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SHRUTI KEDIA  
GAYATRI CHABRA

## **DESIGN AND PRESENTATION**

RIMJHIM SINGH

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GAYATRI CHABRA  
PURTY KAPOOR  
RIMJHIM SINGH  
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