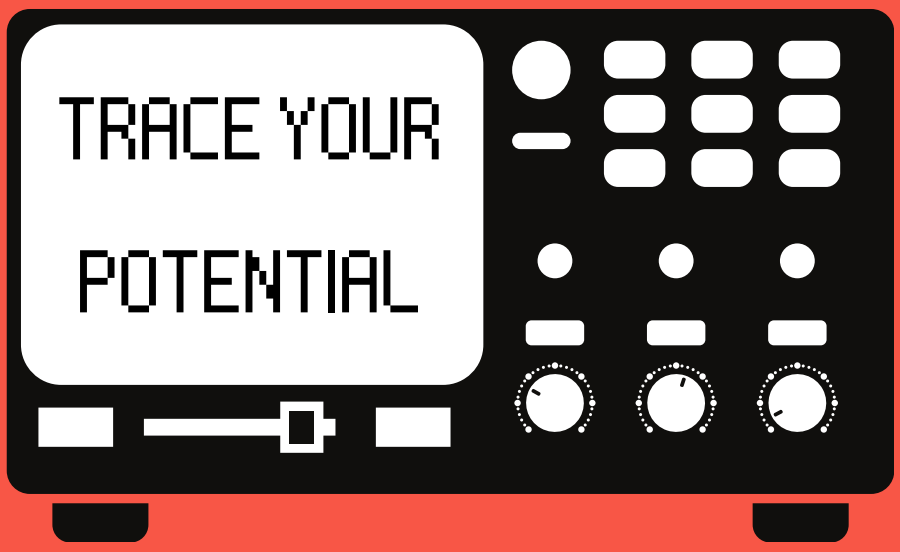
SEPTEMBER ECE DEPARTMENT 2021

AMPERE



6th Edition

2 decades of Amplifying lives

IN MEMORY OF

Dr. Pranay Chaudhuri

OCTOBER 1957- APRIL 2021

A GREAT ACADEMICIAN AND TEACHER

Professor Chaudhuri was deeply respected by the students and cherished by all those who knew him well. On the occasion of 20 years of Heritage Institute of Technology, Team Ampere pays tribute to him for his leadership, mentorship, and guidance which has made the institution what it is today. May his soul rest in peace.

VISION

Through their dedication and accomplishment, the Department's degree holders will represent the institute and department throughout India and around the world. They will demonstrate that they are capable, sincere, and effective professionals and educators. They will demonstrate that they are caring, responsible citizens.

MISSION

Students with degrees from Electronics and Communication Engineering (ECE) Department of Heritage Institute of Technology will

1. Acquire specialized knowledge in the desired domains
2. Be able to analyze a problem in the given areas and be able to solve it in efficient manner.
3. Have confidence and knowledge to start new business activities and show entrepreneurship skills.
4. Develop passion for more studies and R & D.
5. Inherit leadership qualities for society and workplace.

From the Desk of the HOD

An unprecedented crisis has gripped the world for the last 18 months or so. People, in general, and the student community in particular are facing challenges, very difficult to overcome.
Yet, the publication of our own AMPERE as per the almanac proves we can overcome.
Let me share with you all a fact. When AMPERE was taken up as a project, a few faculty members like Prof. Siladitya Sen and Prof. Sayantani Datta and a few pro-active students worked tirelessly. The success was striking. Now, you see that the projects like magazine have great resemblance with relay races. In relays, the batons are handed over to the next participant of the same team. If the team members are not of same standard, the result is not good.
Here, lies my satisfaction and my confidence. Over the years, the standard of AMPERE has remained excellent. The seniors have mentored the juniors seamlessly with the full support of the faculty members.
I am hoping strongly that all stakeholders of the ECE family will start meeting soon- in the familiar places- the classrooms, the laboratories, the library, corridors.
In the meanwhile, take utmost care of self and families.
Let us be vaccinated and let us be prepared to fight.

Prof. (Dr.) Prabir Banerjee
Head, ECE Department

From The Mentor

Congratulations to amazing Editors! You have made me proud. This time it was a tough job to meet the timeline. You have shown extreme dedication & creativity to design a magazine like this. I am sure this e magazine will win appreciation from one and all. I sincerely appreciate the contributors also who has enriched Ampere.

MESSAGE FROM THE EDITORIAL BOARD

The overwhelming response from contributors, as well as the encouragement from our mentors, motivates us to take our publication to the next level. We are excited to introduce “Ampere” as a platform for our department's students to showcase their talents and give their observations and ideas on a variety of current events in the world to the general public. We've always attempted to devote a column to a variety of articles. In fact, we have also tried to come up with a social media platform where students can send in articles, feedback, anonymous confessions or anything they want to speak but are not confident enough or afraid to say in public forums. We are a voice of the ECE Department and would love to bring forth each and everyone of us!

Prof. Prabir Banerjee (HOD, ECE Department) and Prof. Sayantani Datta, our mentors, have been very encouraging throughout the process and helped us so much. We're grateful for having such amazing professors who inspire us everyday. We'd also like to thank the ECE Department's contributors, students, professors and our dear alumnus for making this journal possible. We hope that this issue will live up to your expectations. Welcome to the sixth edition of our departmental magazine 'AMPERE'!

Read on further to explore and witness each and every creative mind because this edition will indeed mark the beginning of a new journey ahead!

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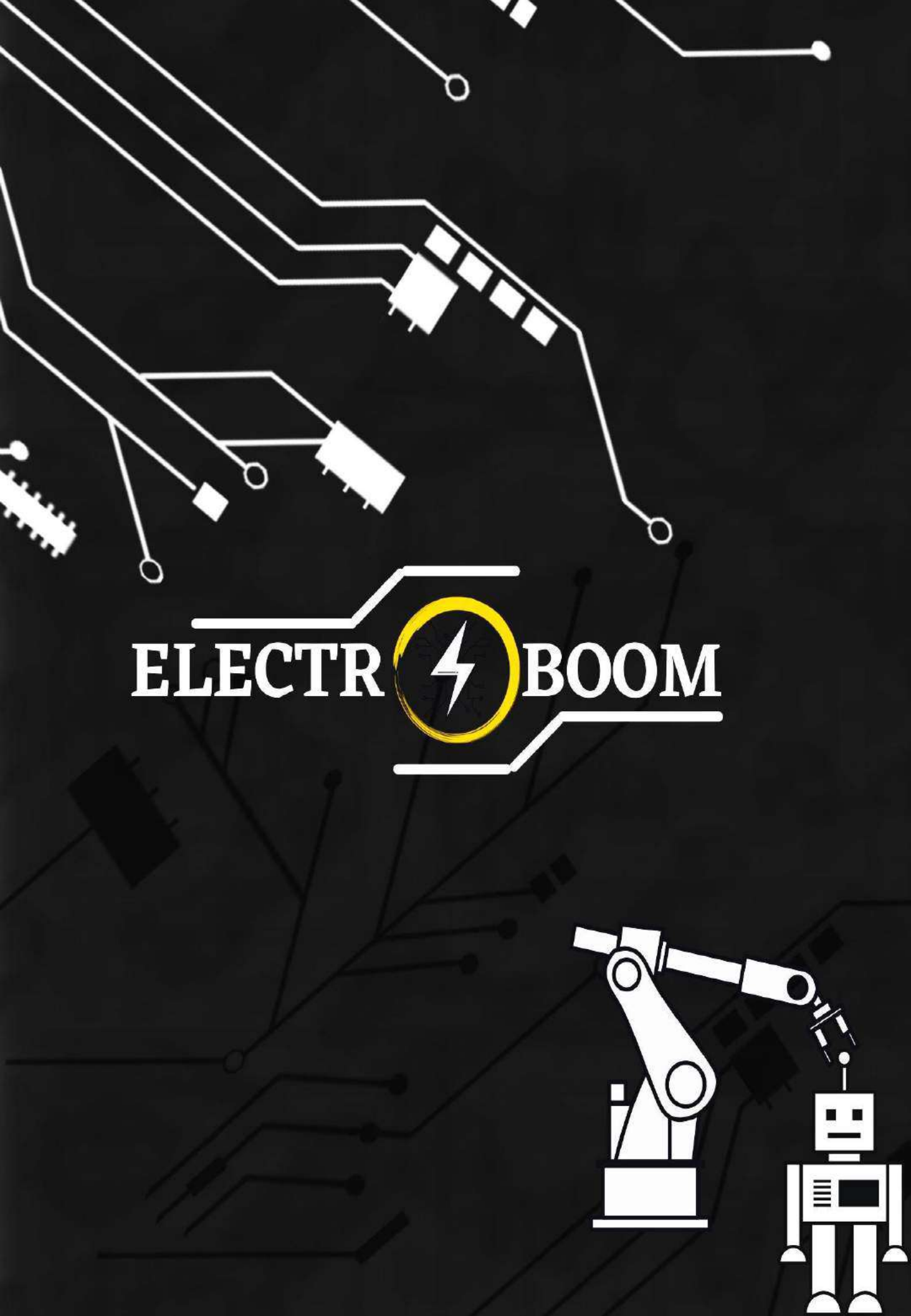


Glass Chip

The Future of Quantum Computing

IonQ, a Maryland-based company in collaboration with the University of Duke and its Duke Quantum Center, has recently announced the development of a new, glass-based trapped-ion computing chip replacing all the silicon-based designs they have previously worked on.

This glass trap technology is based on engraving micrometer-level-precision in fused silica glass, which will contain the company's new computing units – reconfigurable chains of ion-based qubits. The possibility of scaling is at least triple-digits.

Previously the company offered 32-qubit machines to customers, having systems delivered to major cloud services providers, including Amazon Web Services, Microsoft Azure, and Google Cloud. The company is calling their new architecture "reconfigurable multicore quantum architecture" – RMQA(for short)

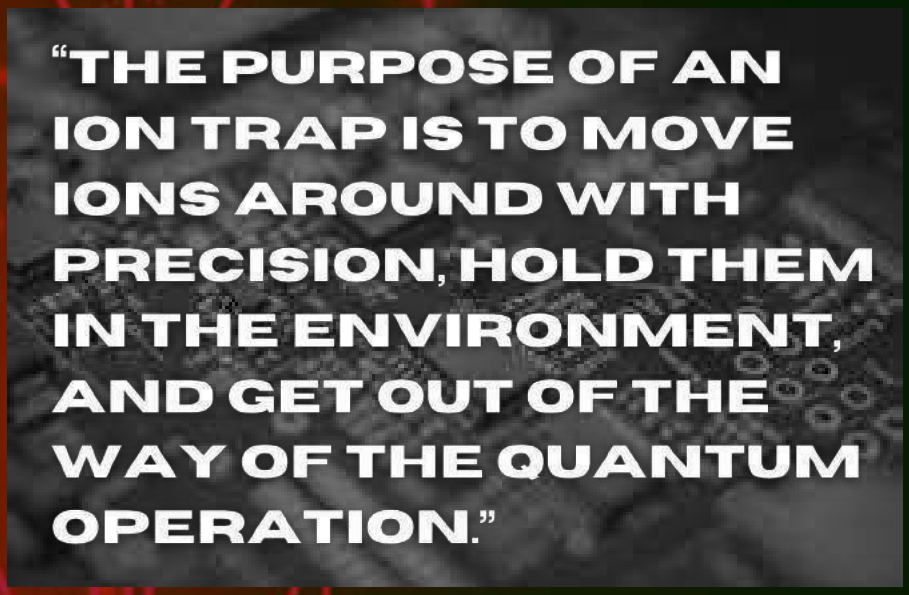
There are quite a number of varied approaches being explored currently towards our future of quantum computing . When it comes to reaching supremacy in quantum computing , IonQ has decided to go the trapped ion way– the problems that are impossible to solve in a classical, Turing-based computer are finally going see solutions emerge from just few years of classical computation only .

IonQ isn't the only one exploring this dimension – AQT, Honeywell and Oxford Ionics are three other companies centring their research on the philosophy of trapped ion to implement quantum computing scaling.

This approach takes place by keeping electrically charged atoms (ions) in a section on a given substrate, which is opposite to magnetic fields. In this case, the substrate is an enclosed glass chip. The qubits in this design are stored in electronic states which, in turn, allows the ions to interact with the qubits –post their acceleration via powerful laser beams.

The company claims that this approach of trapped ion with opposition to the new glass trap technology allows highest-known qubit longevity before their states naturally change, thus making them unusable for the purposes of quantum computing

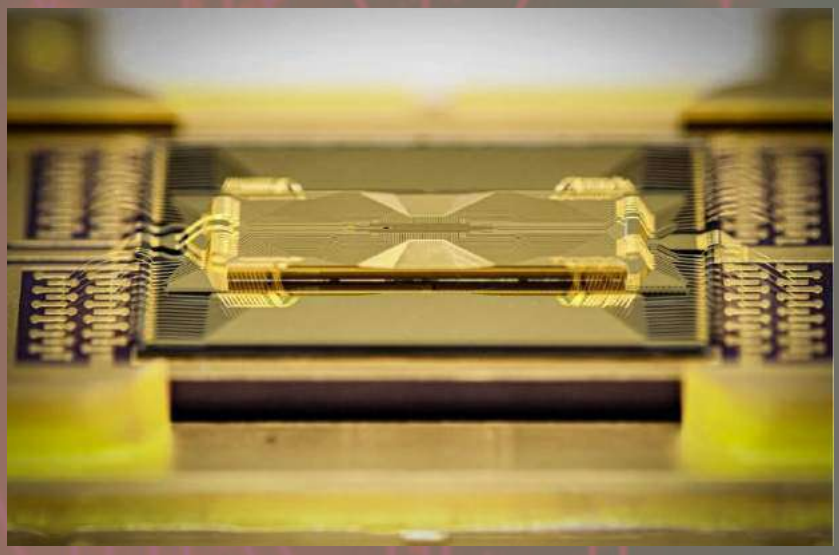
According to IonQ, the pros for this particular approach which makes use of naturally-occurring qubits do not end there. They claim if a high number of qubits is connected and made to work in tandem in this way, other approaches show much lesser potential comparatively for qubit scaling, and fidelity of the results is touted at an impressive 99.9%. Part of that is an immediate response to the new, glass-based approach: led by Jason Amini the team working on the evaporated glass approach at IonQ explains that



According to the company, the fused-glass approach has demonstrated the improvement on all three of the dimensions – glass is a notoriously able insulator. The special design of the glass chips has been developed to allow the laser beams to interact with the qubit ion chains suspended inside it with immaculate surgical precision.

For the time being, the company has demonstrated only a chip with 64 total qubits built on this new crystal clear approach to quantum. The company's design is simple relatively – four single chains of 16 qubits are kept together in the ion trap. However, the approach has some flaws. Only 48 of those qubits are actually accessible as computing power; the remaining 16 qubits (four per chain

of 16) are used as “refrigerant” ions, which might occur inside the chip due to system imperfections and fluctuations . However this , means that the system can easily be scaled the old Turing way of AMD and Intel by just adding more surface area that can hold ion chains, making multiplication of the amounts of quibits in a given system effortless and with perfect scaling Peter Chapman, IonQ CEO, explains that “the architecture allows you to relatively easily expand to hundreds of qubits on a single chip.”



IonQ is now on the path to create stacks piled with quantum chips, interconnected and fundamentally controlled via integrated photonics and be the first publicly traded, pure-play quantum company, having already taken steps to ensure a 2021 summer market listing, at an estimated valuation of $2 billion. “Once you do entanglement, distance no longer matters,” says Chapman. “Whether or not it’s multiple chains on a chip or one chip to another, it all acts as if it’s one big quantum computer.”

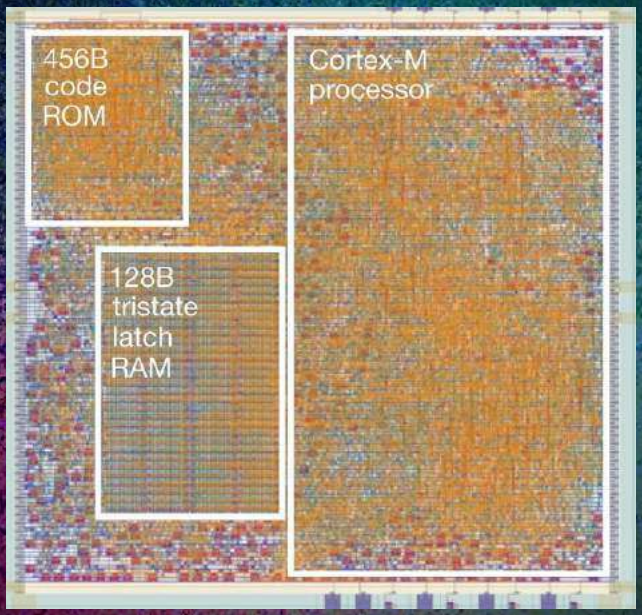
-Shreyashee Roy
2nd Year

THE MOST COMPLEX FLEXIBLE PROCESSOR

PlasticARM

Over several decades, the microprocessor industry has seen several leaps of improvements and changes but one thing that has mostly remained constant is the use of silicon wafers as substrate. However it might all change in the future, owing to the further progress and innovation of the industry and the global silicon shortage. The newest prototype from ARM is aiming to do so by using plastic as the substrate.

The prototype, popularly known as PlasticARM, is a full-fledged CPU based on the existing ARM Cortex–M0 architecture. It is not the first flexible processor ever created but it is the most complex flexible processor yet. It essentially consists of a 32-bit Cortex-M0 CPU with 456 bytes of ROM and 128 bytes of RAM printed on a plastic substrate by photolithography, a very commonly used method for manufacturing of processors thus making it easier to produce. It's comprised of over 18,000 logic gates, which ARM says is at least 12 times more than the previous plastic-based chip. The transistors are made with Indium Gallium Zinc Oxide (IGZO)

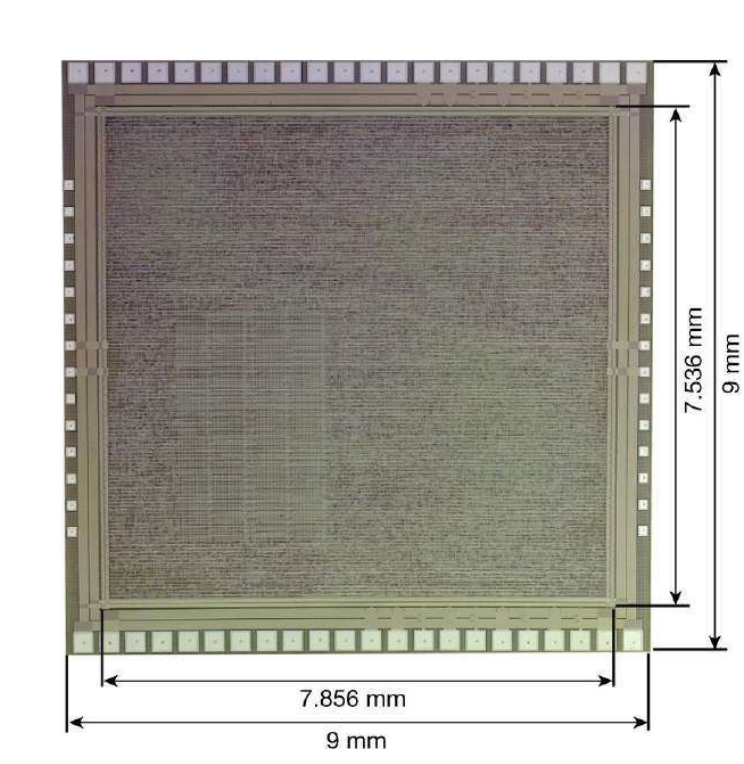


which is commonly used in TFT displays.

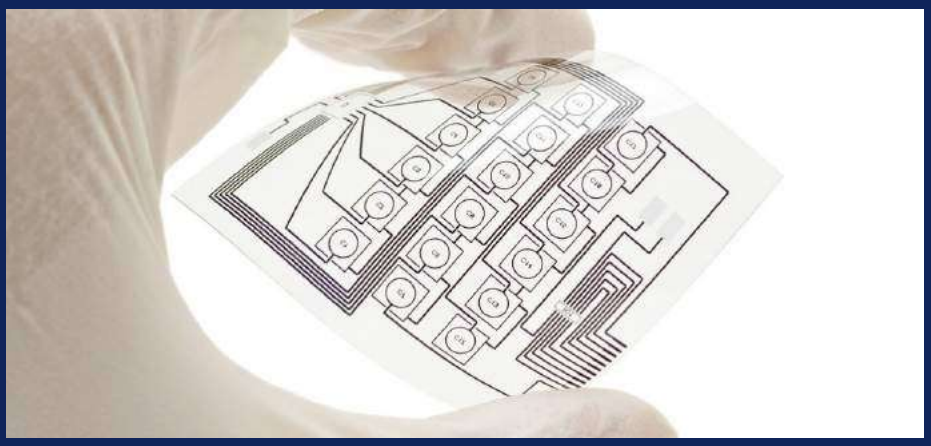
The idea behind this innovation is that instead of silicon the transistors are printed on some other non-conducting substrate, in this case plastic, and this idea has been used for making displays for a long time.

Although a processor like this would be cheaper to produce and have more applications than a traditional processor, it still has a lot of catching up to do to meet the performance standards of a silicon chip. The present prototype is not computationally powerful, running at a mere 29 kHz and based on a 800 nm process, the same process which was used in the first Intel Pentium processor in 1993. PlasticARM consumes around 21 mill watts of power, for but 99 percent of that is essentially wasted (radiated in form of heat) with only 1 percent used for computation.

However the uses of this new flexible processor once improved and perfected are endless. These processors could be used for wearable technology, tags for food products to monitor their state, trackers, etc. As these processors are cheaper to produce, it will be more



economical to implement these in various products than traditional processors.



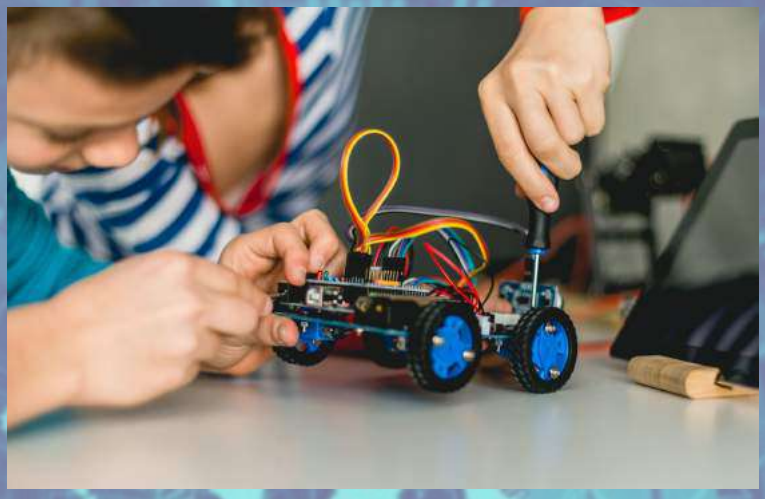
Flexible processors like these could pave the way towards creation of an ‘internet of everything’ integrated into more than a trillion inanimate objects over the next decade.

-Soumya Biswas
2nd Year

OBSTACLE AVOIDING ROBOT

This article is for all those geeks who wish to make something fascinating in the world of robotics. Here we are going to see how to make a simple obstacle avoider robot. This will serve as a "Hello world" project for beginners in robotics. In this project, the Arduino Uno microcontroller board is used as it is easy to code and there is strong community support. The microcontroller is the brain of the robot and takes the necessary decisions based on the values measured by the sensor. This robot is capable of avoiding obstacles and finding its way autonomously. This is a fun project and will take not more than two hours to complete.

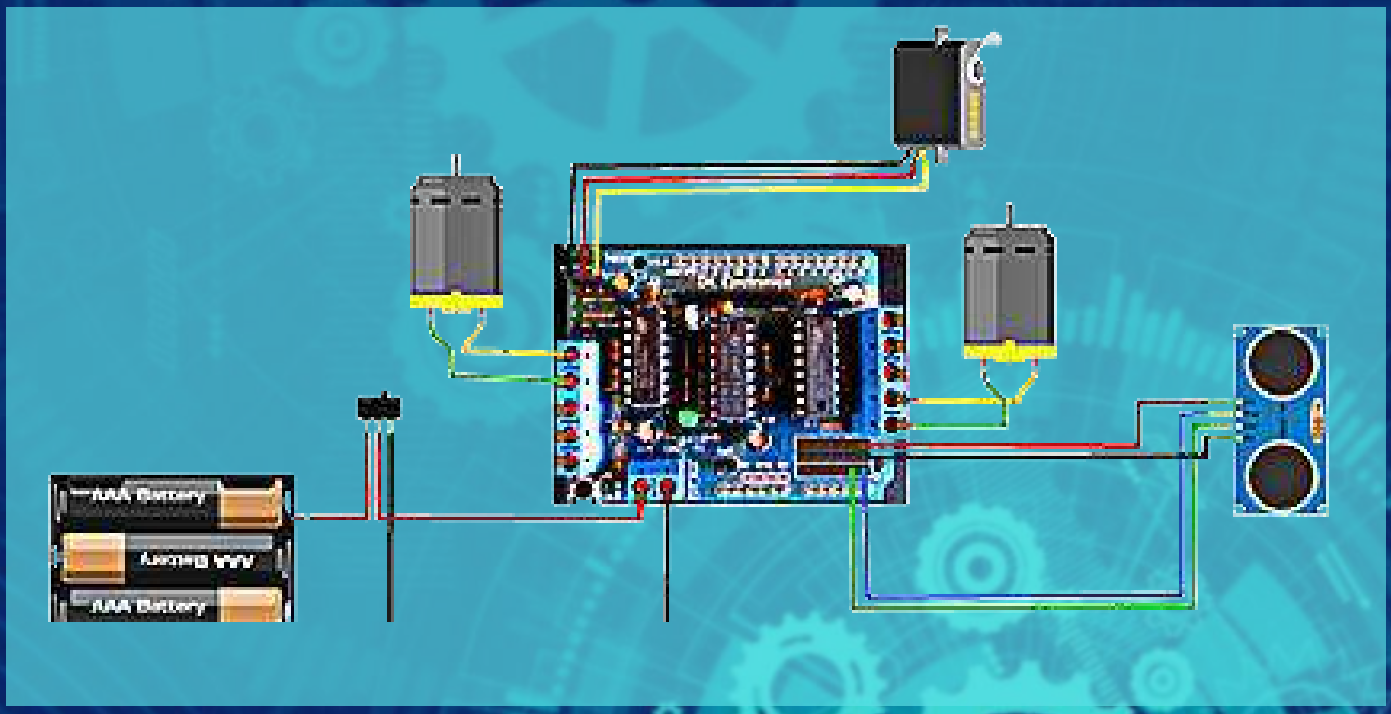
The components used in this project are robot chassis kit, Arduino Uno, L293D motor driver shield, SG90 servo motor, ultra-sonic sensor, switch, 100nf ceramic capacitor, 300 µf capacitor, and wires.

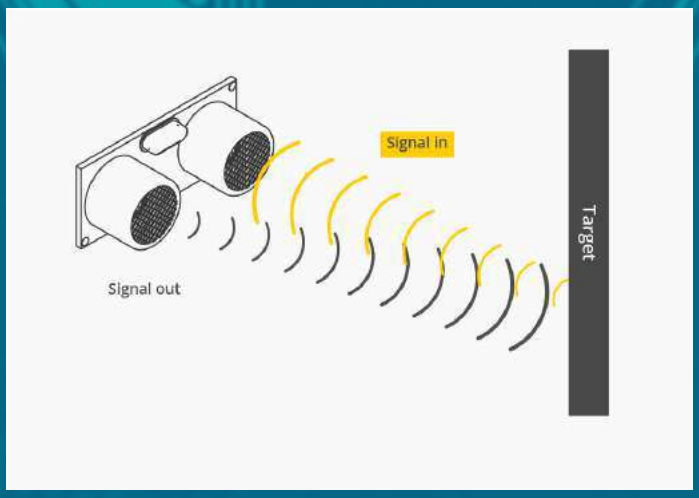


The robot kit contains the chassis, two battery-operated DC motors, the wheels, the front wheel, battery holder, some screws, a switch, and wires. The kit also contains a guide that can be followed to assemble the basic structure. Red and black wires are soldered to the positive and negative terminals of the battery-operated motor respectively.

To reduce the electrical noise produced by the motor, the 100nf ceramic capacitor is soldered to the motor. Next, mount the motor driver shield on the Arduino board and connect the battery terminals to the shield through the switch. The current requirement of the motors can be higher than what Arduino board can provide, that is why it is essential to use the motor driver as it provides up to 650 mA current to each of the motors.

The circuit diagram





Ultrasonic Distance Sensor

After all the connections have been made according to the diagram it is now time to code the Arduino Uno. We can use the Adafruit motor shield library to run the motor driver. This library has made our life easier. To run the servo motor we have to use the servo library which is an inbuilt library of Arduino software. The robot uses the Ultrasonic distance sensor to measure the distance in front of it. To generate the ultrasound we need to set the Trigger Pin on a High State for 10 µs. That will send out an 8 cycle sonic burst which will travel at the speed of sound and it will be received in the Echo Pin. The Echo pin will output the time taken by the pulse to travel the distance in microseconds. The distance from the obstacle can be calculated by putting this measured time in the appropriate formula. If the measured distance is more than a threshold value, the robot will move forward. If the measured distance is less, then the robot stops, moves back a little, and then looks around in its right and left direction. If the distance measured in the right is more than that in the left (and it is more than the threshold value), the robot will turn right and if it is the other way round, the robot will turn left. If the measured distance in both the directions is less than the threshold value, the robot will move back and the same process will repeat.

This is a simple algorithm and it can surely be optimized by providing further conditional checks. Through this project, absolute beginners can draw insights into how a robot works. They can use this knowledge to make other DIY projects. A few of the project's ideas are line follower robot, sumo robot, human follower robot, gesture follower robot, Bluetooth controlled robot, voice-controlled robot etc. I hope you have liked this article.

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-Sourav Bhattacharjee

2nd year

INJECTABLE microchips

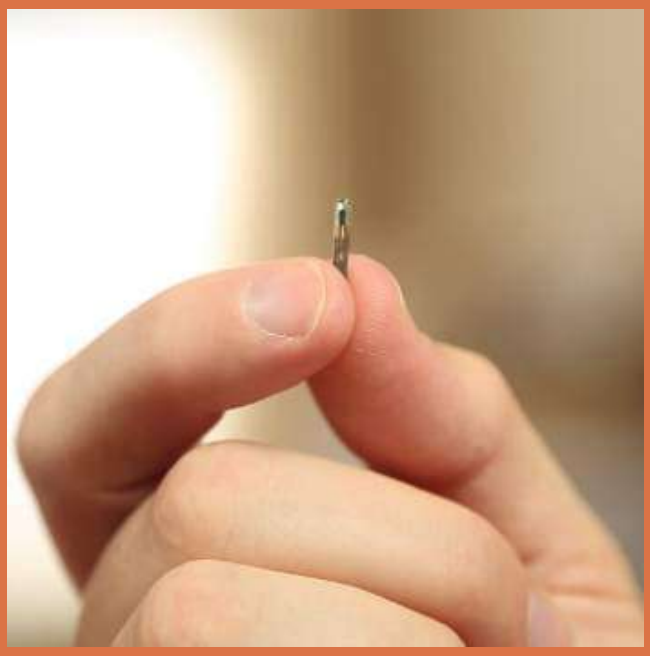
Introduction

In some areas of life, bigger is better but when it comes to microchips, smallness is boss and according to Chen Shi, former researcher at Bioelectronic Systems Lab at Columbia University, “The world’s smallest single-chip system, sits on the tip of a hypodermic needle.”

“The world’s smallest single-chip system, sits on the tip of a hypodermic needle.”

Electronics are getting imperceptibly small, opening new avenues for medical technology to place advanced monitoring and treatment devices inside our bodies. And Columbia University engineers just demonstrated a new and revolutionary version of this, creating the world’s smallest single-chip system ever developed.

Human beings, as a species, have always tried to shape the environment around them according to their needs and convenience. So with the advancements made in medical science and implantable medical devices in general, we started looking inside our bodies to better tune ourselves to interact with the environment around us rather than bending it for our convenience, which is often economically impractical and detrimental for both humans and the environment we live in, in the long run. There's a growing interest in what can be done with actual implantable devices beyond what can be done with drugs. Researchers are increasingly interested in designing wireless, miniaturized implantable medical devices for in vivo and in situ physiological monitoring. And their hard-work has bore some revolutionary fruits

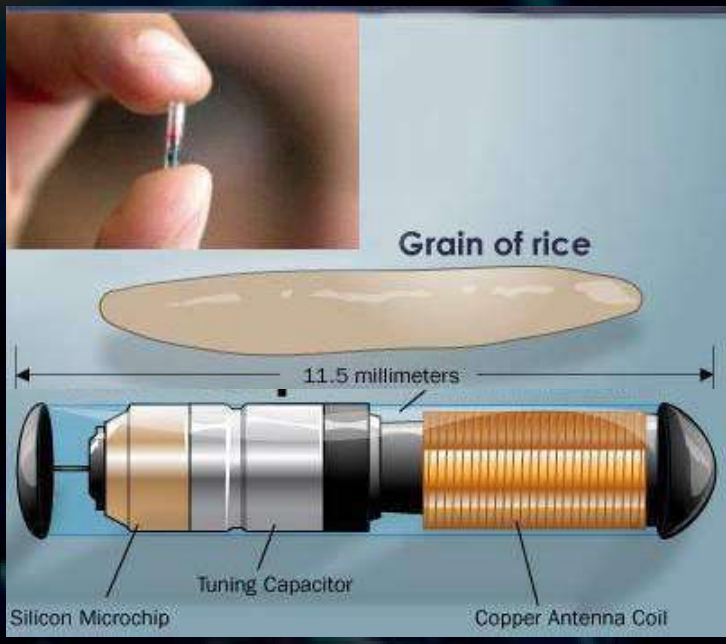


What?

Researchers at Columbia University have reported that they have built the world's smallest single-chip system consuming a total volume of less than $0.1mm^3$. It's about the size of a single grain of salt and visible only under a microscope. According to Ken Shepard, a professor of biomedical engineering, "This is the smallest device that allows bidirectional communication."

How?

But designing a working specimen is no easy feat. Besides being tiny, the chip had to send and receive data and, on top of that, charge wirelessly. The answer to both of these caveats turned out to be the same technology used to take candid shots of our future bundle of joy: ultrasound. Ultrasound's much smaller wavelength made communication with a tiny device possible. And for the power, an element in the microchip essentially turns some of that ultrasound into the That power allows the chip to receive and transmit data back and forth to the imager sensor.



Why?

The goal of projects like this microchips is to make medical devices that can be inserted and removed with less invasive measures. In paper published by the Columbia University's team, they just measured the temperature which is a relatively easy thing to measure in a solid state device. We can also measure, for example, pH i.e. acidity or alkalinity of tissues which is important in many functions. The team hopes one day chips like these could detect the spread of cancers or monitor one tiny area of the body, measuring the

presence of a particular enzyme or biomarker. They are working on specifically monitoring various biomarkers during wound healing, to understand the wound healing process and perhaps even try to actuate , in ways, that would accelerate the healing action. Some much simpler implantable microchips are already used in pets, usually to identify them in case an animal gets lost though these are much larger in size.

Concern :

Despite the momentous gains, it has not been entirely smooth sailing, especially since the advent of COVID-19. The work of the engineers was seized on by people spreading baseless viral online rumors and misinformation about COVID-19 vaccines. These conspiracies falsely claim that vaccines contain injectable microchips meant to track us or somehow control our minds. According to one recent survey, as many as one in five Americans believe that there's a microchip in new vaccine, which makes the conspiracy a significant contributor to vaccine hesitancy even as unvaccinated people continue to face alarming rated of COVID-19 related hospitalization and deaths.

Conclusion :

Since the advent of microchips in 1959, they have seeped into each and every aspect of our lives, starting from computers and smartphones to home appliances and cars. So, the human body is most probably the last frontier which they are dead set to conquer. Therefore, the ultimate goal of this technology should be about pushing the limits of how small an implantable medical device can be and possibly removing every major caveats like availability, affordability, reliability and public acceptance before it is declared fit for human use.

-Swarnali Saha
1st year


SCIENCE
HUB

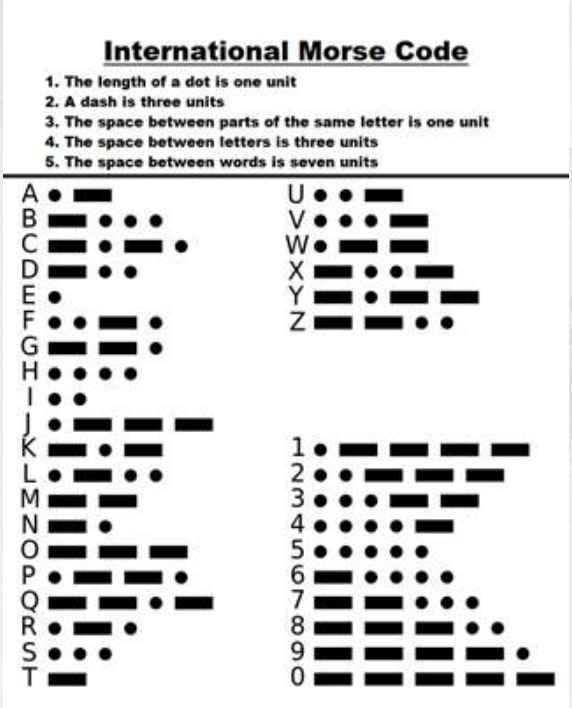
THE TELEGRAPH AND MORSE CODES

In the modern world, communication is important. Progress becomes easy when people work together and help each other out. So, from the very beginning of civilization, effective communication was important. Of course, the people you need, do not always live next door. And long-distance travel was neither easy nor feasible. So, humans lived in dwellings, isolated from other groups. Then one fine day, humans realized that ideas could be penned down on, let's say, a sheet of papyrus. A lot of these sheets could carry ideas from place to place without an actual visit, if only one person could transport the sheets. This gradually evolved into the practice of writing letters. Letters have been playing a crucial role in connecting people for thousands of years. But this changed on January 6, 1838, when Samuel Morse's telegraph system was demonstrated for the first time at the Speedwell Iron Works in Morristown, New Jersey. For the first time in history, communication was made possible without the need for a person or an animal to actually carry the message. Humans found a new post-rider—Copper Wires.

All the system needed was a key, a battery, wire and a line 14.8of poles between stations for the wire and a receiver. At two ends of the wires, two operators would operate the signal transmitter. Messages were transmitted through the wires in the form of electrical pulses. And compared to letters, this was fast.

But how to send messages through a wire? How to represent words, letters etc. For that, first of all, messages had to be short and only contain important words, so as to convey information in the lowest word count. Then entire messages would get converted to a series of morse codes

International Morse Code, encodes the 26 Latin letters A through Z, one non-Latin letter, the Arabic numerals, and a small set of punctuation and procedural signals. There is no distinction between upper- and lower-case letters. Each Morse code symbol is formed by a sequence of dits and dahs (dots and dashes). The dit duration is the basic unit of time measurement in Morse code transmission. The duration of a dah is three times the duration of a dit. Each dit or dah within an encoded character is followed by a period of signal absence, called a space, equal to the dit duration. The letters of a word are separated by a space of duration equal to three dits, and words are separated by a space equal to seven dits.



In 1901, Italian physicist and inventor Guglielmo Marconi demonstrating the wireless radio device, which was used to transmit Morse Code over the Atlantic Ocean. That was the first time when morse codes got off the wires and found a set of new workplaces. In aviation, pilots use radio navigation aids. To ensure that the stations the pilots are using are serviceable, the stations transmit a set of identification letters (usually a two-to-five-letter version of the station name) in Morse code. Radio navigation aids such as VORs and NDBs for aeronautical use broadcast identifying information in the form of Morse Code. International Morse code today is most popular among amateur radio operators, in the mode commonly referred to as "continuous wave" or "CW". Morse code has been employed as an assistive technology, helping people with a variety of disabilities to communicate. For example, the Android operating system versions 5.0 and higher allow users to input text using Morse Code as an alternative to a keypad. You can actually see (or should I say, hear) an application of morse code in your daily life. That's the very popular SMS chime of your phone. If you convert the words SMS to morse it looks like this: . . . - - . . .

So, while the telegraph has become obsolete in most places, the morse code lives on. People don't think much about them today. But one can hardly deny that, perhaps for the first time, they connected people living far away from each other, through technology.

Sagnik Mukherjee
2nd year

HOW THE FIRST IMAGE OF A BLACK HOLE WAS CAPTURED

“Blackhole is not black in color, they are colorless."

Blackholes are mysterious astronomical bodies, which for a long time have dodged our advanced telescope, making us hard to get a real image of it.

There are many artistic renditions of it, but none of it can be called the real image of a black hole.

But finally, we were able to get the first-ever real image of a black hole, courtesy of the Event Horizon Telescope’s observation and imaging algorithm developed by a team of computer scientists.

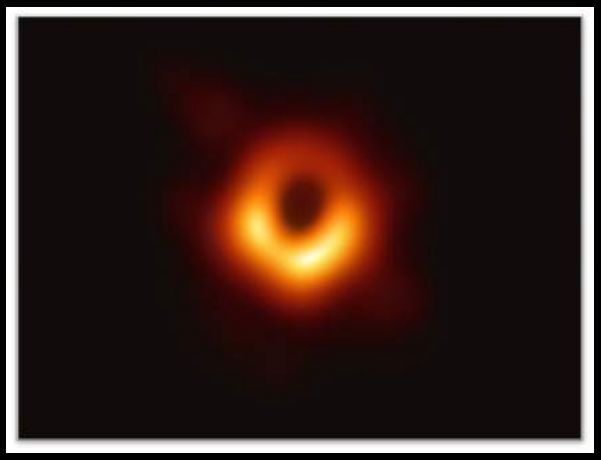
Black holes are formed when a supermassive star runs of fuel and dies. Any star in the universe has two major forces acting on it, the inward acting force of gravity due to its own weight and the outward acting force of radiation pressure due to the nuclear fusion reaction that takes place in its core. Both these forces counteract each other and keep the star shining. but when the star runs out of the hydrogen in its core, it starts to collapse. What is left behind depends upon the initial mass of the star. A star which has a mass more than 20 times the mass of our very own sun, when a star has exhausted the last of its hydrogen and helium fuel it undergoes gravitational collapse. This leads to a catastrophic explosion known as a supernova, where the star blows off its outer layers. As a result, the star turns into a black hole.

Why taking image is difficult? Black holes by definition are impossible to see, this is because to see something we need light to reflect from it, but a black hole has a gravitational pull so high that even light can't escape it. Making it impossible to see what is inside a black hole .what we can see is the accretion disk of a black hole, which is formed as a result of gases and dust particles rotating rapidly around it while getting heated up in the process and releasing light. In this bright disc, our blackhole can be seen as a ball of shadow. We can take images of such types of black holes, but the nearest one is 53million light-years away.

To take images of such distant objects, we would require a telescope as large as our earth. Which is practically impossible to make. We can't make a telescope a big as the earth, but one thing we can surely do is to connected telescopes around the world to work together as if it was a giant telescope. so, an international collaboration called the Event Horizon telescope was created, which is capable of resolving structure on such a massive scale. Each telescope in this worldwide network works together collecting thousands of terabytes of data. This data is then processed to create the actual image. As per the original requirement, we needed a telescope as big as the size of the earth to see this image. so To get the same result, we need to cover the entire surface of the earth with the available sized telescope and make them work together as a single giant one.

But even this idea is not feasible as we can't cover our entire planet with a telescope. Practically we can construct telescopes at few designated locations and work with them. Now the drawback is that, instead of getting a complete image which was possible with a planet full of the telescope, we can get only a few details of the image with the current setup. But the rotation of the earth ensured that

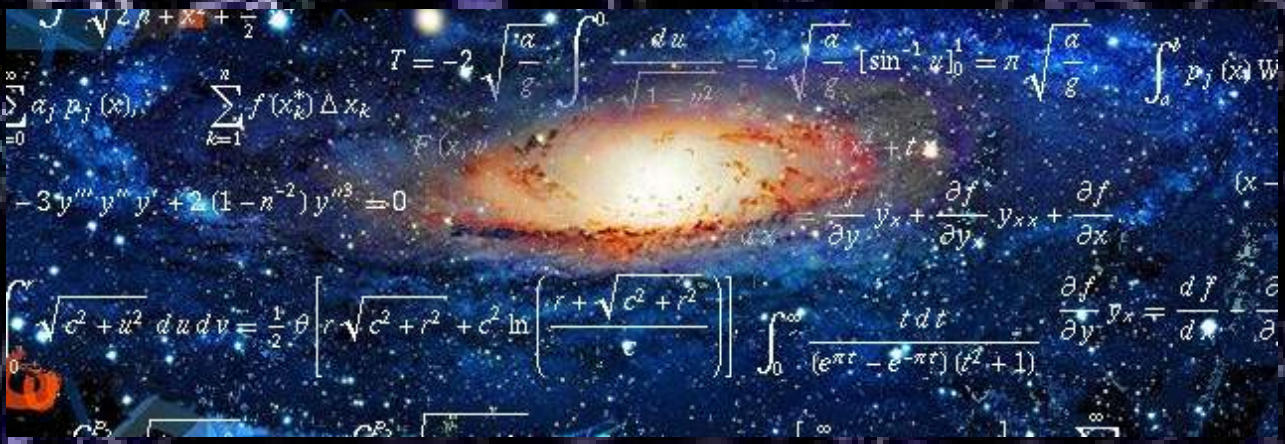
the telescope gets to observe different parts of the same image, which in turn provided us with more information to work with. Even with this additional information, it was still a real challenge to complete the image. That's why needed imaging algorithms to fill in the gaps. This imaging algorithm will fill in the missing pieces of the image with the limited information provided by the telescope and the data we feed into it. Now here comes the trickiest part, the data we feed-in can be manipulated so much that, we can even get a giant dragon at the center of the image if we wanted. This data that we are talking about is the different types of images, that we are going to use to reconstruct our blackhole image. Now if we feed simulated images of a blackhole into the algorithm, there is a high chance that the algorithm will give you the image of a blackhole that you always imagined, so that's not the actual image of the black hole that we are observing. So, the algorithm here is biased, which we don't want. A perfect algorithm will be the one if gives the same output, irrespective of the type of images that you feed into the system. If that



happens it means, your algorithm is free of bias and can be trusted .Another way of checking your algorithm is to create many different types of source images by using a particular type and changing the information provided. Once the algorithm is confirmed, we can then use it to create the first-ever real image of a black hole. Which we successfully did by taking the picture of, a supermassive black hole at the center of the galaxy M87.

SYED MAHAMMAD RIAZ
1st year

MATHEMATICS AS THE LANGUAGE OF UNIVERSE



Going into a conversation about the universe , you might imagine a story filled with wondrous events like stellar collapse, galactic collisions, strange occurrences with particles, and even cataclysmic eruptions of energy. You might expect a story stretching the breadth of your time ranging from the Big Bang and landing you to here where your eyes are soaking in the photons being emitted from your screen. Of course, the story is grand. But there's a different angle to the present amazing assortment of events that oftentimes is overlooked. Behind all of these fantastic realizations, there is a mechanism at work that permits for us to understand all that we simply enjoy learning about. That mechanism is mathematics, and without it the universe would still be shrouded dark .

We are currently intertwined with our system . Before geniuses like Galileo, who aimed his spyglass towards the sky, or Kepler discovering that planets move about the sun in ellipses, or Newton discovering the universal gravitational constant , mathematics was somewhat limited, and our understanding of the universe rather ignorant. At its core, mathematics allows a species attached its system to probe the depths of the cosmos in only a piece of paper.

Mathematics almost certainly originated from very early human tribes (predating Babylonian culture which is attributed to a number of the primary organized mathematics in recorded history), which might have used math to keep track of lunar or solar cycles, and keeping count of animals, food and/or people by leaders. Mathematics is both a natural occurrence and a person's designed system. It might appear that nature grants us this ability to recognize patterns within arithmetic, then we systematically construct more complex mathematical systems that aren't obvious in nature but allow us to further communicate with nature.

Mathematics developed alongside of humans, and carried on with each culture that was developing it simultaneously. It's an exquisite observation to ascertain that cultures that had no contact with each other were developing similar mathematical constructs without conversing. However, it wasn't until mankind decidedly turned their mathematical wonder towards the sky that math truly began to develop in an astonishing way. It's by no mere coincidence that our scientific revolution was spurred by the event of more advanced mathematics built to further our understandings of our place within the universe. Once Galileo began measuring the rates at which objects fell in an effort to point out mathematically that the mass of an object had little to try to to with the speed during which it fell, mankind's future was forever altered.

This is where the cosmic perspective ties in to our want to further our mathematical knowledge. If it weren't for math, we might still think we were on one among a couple of planets orbiting a star amidst the backdrop of seemingly motionless lights. This is often a rather bleak outlook today compared to what we now realize the awesomely large universe we reside in. This concept of the universe was inscribed by Kepler who observed the planets doing, then applied math thereto to develop a reasonably accurate model of the system . This is often one among many demonstrations that illustrate the importance of mathematics

within our history, especially within astronomy and physics. The story of mathematics becomes even more amazing as we barge to the advanced thinkers humanity has ever known like Newton.

Mathematics is not just a group of vague equations and complicated rules that you simply are required to memorize. Mathematics is the language of the universe, and in learning this language, you're opening yourself up the core mechanisms by which the cosmos operates. It's equivalent to traveling to an unknown destination , and slowly learning the local language in order to understand everyone around. This mathematical endeavor is what allows us, a species bound to our system , to explore the depths of the universe. As of now, there simply is not any way for us to visit the middle of our galaxy and observe the supermassive region there to visually confirm its existence. There's no way for us to venture out into a Dark Nebula and watch in real time a star being born.

Yet, through mathematics, we are ready to understand how everything exist and work. Once you set about to learn math, you're not only expanding your mind, but you're connecting with the universe on a fundamental level. The magnificient story of the universe is written in mathematics, and our ability to translate those numbers into the events that we all like to study is nothing but amazing.

SHREYASHEE ROY
2nd YEAR

THE BOHR-EINSTEIN DEBATES

There is a poetic, albeit deliberately naïve, idea elucidated by the Slovene philosopher Slavoj Žižek in his essay on Schoenberg's Erwartung - what if World War I was not the traumatic break in world history that shattered late nineteenth-century progressivism, but a reaction to the true threat to the established order: the explosion of vanguard art, scientific and political, that undermined the established world view of the era? Think Kafka and Joyce, Schoenberg and Stravinsky, Picasso and Kandinsky, and the truly epoch defining - and redefining - discoveries of quantum physics and the theory of relativity.

It is said that we never really healed from the Copernican wound, the decentering of our earth from the centre of the cosmos in favour of a universe of multiple centres of gravity. Neither can we completely heal from the Darwinian wound, that brought humans down from transcendental beings to the realm of animals. We are animals with over-evolved brains, and that divide we are yet to reconcile. In this vein one might be tempted to look to the 1900s and early 1910s and find yet another decentering of human subjectivity, namely, the aforementioned discoveries by Einstein and Planck.

But as we know, the 'real', or rather more profound, quantum revolution happens a little later, the mid-1920s to be exact. The (un)holy trio of Heisenberg-de Broglie-Schrödinger, along with Max Born and under the guidance of Niels Bohr (our protagonist here), discover in Leipzig, Gottingen and Copenhagen, the most iconic theories in modern physics - the Uncertainty Principle, the Wave-Particle Duality of Matter, and Schrödinger's Wave Equation - discoveries that called for a radical new ontology.

And who better to take up this challenge than Niels Bohr, in what would come to be formalised as the Copenhagen Interpretation. Unfortunately for us, there is no one definitive version of this, as Heisenberg

and Bohr would have subtle differences in their understandings of the theory that would persist for the rest of their lives. Heisenberg initially formulated his Uncertainty Principle as an epistemological problem - a problem of whether it was impossible for us to measure the position and momentum of a particle with exact accuracy, a view from which Bohr would differ significantly.

However, the most immediate and brutal backlash came from Einstein, when the new quantum revolution culminated in the Fifth Solvay Congress of 1927. Einstein was a Spinozist - his monistic material view of reality conflicted with what the new theories entailed. It is said that everyday he woke up with a new thought experiment and passed it on to Bohr, and by the end of the day, he would have it solved. Famously, in a 1926 letter to Max Born, Einstein wrote "I, at any rate, am convinced that He [God] does not throw dice."

The knee-jerk reaction here would be to assume that Bohr was a brazen solipsist. But a more careful consideration shows us that he indeed considered it important to distinguish between the subjective experience of the object and the object in-itself. He stressed the primacy of casual and spatio-temporal concepts ("space", "time", "momentum") in any understanding of reality. This is obviously nothing new - Bohr borrows here heavily from Kant and German Idealism.

Where he becomes one of the more radical thinkers of the 20th century is in his conception of the quantum world as being inherently ontologically incomplete (at least from our naïve classical perspective). Bohr believed that atoms were indeed "real", and "neither heuristic nor logical constructions." However he does concede that the quantum mechanical formalism was not true in the sense that it gave us a literal ('pictorial') representation of the quantum world.

In his own words: "There is no quantum world. This is only an abstract physical description. It is wrong to think that the task of physics is to find out how nature is. Physics concerns what we can say about nature". This has led many

people to claim that the Copenhagen Interpretation is all about "Shut up and calculate" - a saying famously misattributed to Richard Feynman.

This is obviously lacking in nuance. As mentioned above, the main split between Bohr and Einstein was on whether the Copenhagen Interpretation was an epistemological one or an ontological one. Bohr insisted on the latter. According to his complementarity theory, objects have certain pairs of complementary properties which cannot all be observed or measured simultaneously - such as position and momentum. This suggests, from our general classical perspective, an incomplete metaphysics at the quantum level.

Brian Greene uses the analogy of a video game to describe this. By entering the quantum level, we are no-clipping out of reality, we are entering areas that we are not meant to enter, and hence that have never been programmed properly. In a way, this analogy would, in theistic terms, posit God (if you may) as a lazy programmer. It's almost as if he underestimated us, and we caught him with his pants down. Even to sceptic atheists, this is a powerful idea, and speaks volumes about the sheer strength of human curiosity.

Therein lies the quantum wound - a decentering of human subjectivity. What can we do in the face of a revolution that unearths our fundamental concepts of space and time and causality - only to find them flawed, irrational and unpredictable? What can we do under the weight of such irrelevance? In parallel with the analogy of the opening, we can imagine that 1927 was the anus mirabilis, the real traumatic event, and the following years - the rise of the Third Reich, the rise of Italian fascism, and the greatest man made disaster in human history - was a conservative backlash, albeit a failed one.

The real revolution has happened. Where can we live now but under its shadow?

Sagnik Bhowmik
2nd year

THE JAMES WEBB SPACE TELESCOPE- BEGINNING OF A NEW ERA

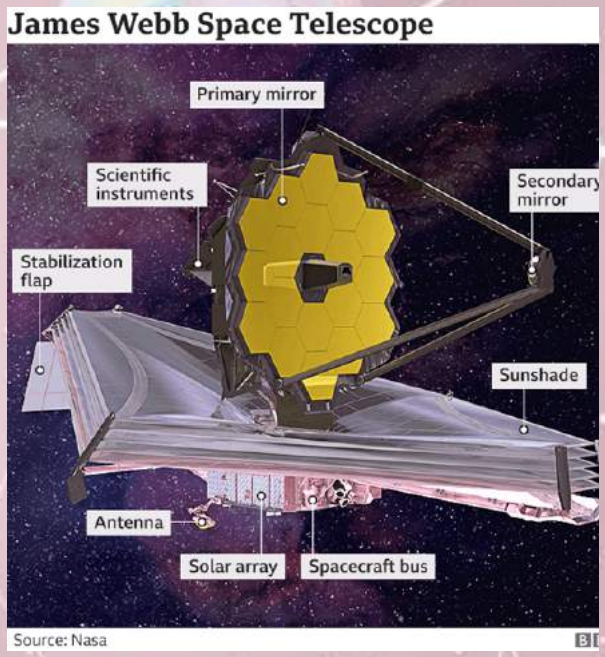
The launch of the James Webb space telescope will mark the beginning of a new era in the history of space science and technology. It will replace the 'Hubble space telescope' and is expected to be launched by National Aeronautics and Space Administration(NASA) by 31st October 2021.

The James Webb Space Telescope is an orbiting infrared observatory which has been developed by NASA, ESA(EUROPEAN SPACE AGENCY) , and CSA (CANADIAN SPACE AGENCY), that will complement and extend the discoveries of the hubble telescope due to it's longer wavelength. This will enable the telescope to look back time time at the farthest galaxies located more than 13 billion light years from earth, as well as look at the dust clouds where stars and planetary systems are forming today.

The primary of the JWST, the Optical Telescope , consists of 18 hexagonal mirror segments made of gold-plated beryllium which combine to create a 6.5 m (21 ft) diameter mirror—considerably larger than Hubble's 2.4 m (7 ft 10 in) mirror. Unlike the Hubble telescope, which observes in the near ultraviolet, visible and near infrared(0.1 to 1 μm) spectra, the JWST will observe in a lower frequency range, from long-wavelength visible light through mid-infrared (0.6 to 28.3 μm), which will allow it to observe high redshift objects that are too old and too distant for Hubble to observe The telescope must be kept very cold in order to observe in the infrared without interference, so it will be deployed in space near the

Sun–Earth L2 Lagrange point(1.5 million km from the earth) and a large sunshield made of silicon - coated and aluminium – coated Kapton will keep its mirror and instruments below 50 K (−223.2 °C).

It was expected to be launched by 2018 . However, In March 2018, NASA further delayed the launch after the telescope's sunshield ripped during a practice deployment. After that, NASA announced that it is finally expected to be launched by 31st October 2021 with “NASA GODDARD SPACE FLIGHT CENTER” being the leading management observatory of the project. The cost of this entire project is around 9.7billion US Dollars which has been reduced from the previous mentioned cost of 10 billion dollars. Engineers now are working to add a five layer sunshield in place to prevent damage to the parts of the telescope from the infrared rays of the Sun.



Unlike Hubble, the James Webb Telescope will primarily look at the Universe in the infrared, while Hubble studies it primarily at optical and ultraviolet wavelengths (though it has some infrared capability). Webb also has a much bigger mirror than Hubble. This larger light collecting area means that Webb can peer farther back into time than Hubble is capable of doing. Hubble is in a very close orbit around the earth, while Webb will be 1.5 million kilometers away at the second Lagrange (L2) point.

Thus, This telescope will give us an idea about how the earliest galaxies were formed and also the evolution of galaxies which will mark the beginning of a new era of Space Science.

SUBHADEEEP MUKHERJEE
2nd YEAR

SPORTIFY

7 in Olympic
19 in Paralympic

PARALYMPICS

Tokyo 2020

AVANI LEKHARA

SUMIT ANTIL

MANISH NARWAL

PRAMOD BHAGAT

KRISHNA NAGAR

BHAVINA PATEL

NISHAD KUMAR

YOGESH KATHUNIYA

DEVENDRA JHAJHARIA

MARIYAPPAN THANGAVELU

PRAVEEN KUMAR

SINGHRAJ ADHANA

SUHAS LALINAKERE YATHIRAJ

PARALYMPICS

Tokyo 2020

ASUNDAR SINGH GURJAR

SINGHRAJ ADHANA

SHARAD KUMAR

AVANI LEKHARA

HARVINDER SINGH

MANOJ SARKAR

OLYMPICS

Tokyo 2020

NEERAJ CHOPRA

MIRABAI CHANU

RAVI KUMAR DAHIYA

P.V.SINDHU

LOVLINA BORGOHAIN

BAJRANG PUNIA

NATIONAL MEN'S FIELD HOCKEY TEAM

The Tragic Exit of Messi

Football is a game of passion, of unbridled enthusiasm and loyalty. Players and fans, who are the most passionate about it and who hold the beautiful game dearest to their hearts, are also usually those who are fiercely attached to the teams or clubs of their childhood, and any separation of their bond with their club usually results in an onset of extreme grief. The game abounds with examples. Francesco Totti, one of the most brilliant forwards of his generation, remained faithful and committed to his childhood club AS Roma, and never left them even when he was literally flooded with offers from bigger clubs. Alessandro Del Piero, one of the most brilliant forwards of his generation, even played in Serie B, Italy's 2nd division, with Juventus when they were relegated due to the Calciopoli scandal, such was his love and commitment for the club. John Terry was a Chelsea academy graduate and stayed there for his entire career to earn the mantle of their "Captain, Leader, Legend". Another such player is the 'GOAT', Lionel Messi.

Messi requires no introduction here. He is one of the finest footballers this planet has ever seen. Whether it is waxing lyrical with his magical left foot, or superbly dribbling past defenders like a slick U-boat, watching Messi play is like poetry in motion. Messi has won the Ballon D'Or 6 times in an illustrious career, but it is to be noted from where this magical journey began.

A young 6-yr old kid from Newell's Old Boys club in Argentina, with growth hormone deficiency, impressed scouts from Spanish giants Barcelona so much that they took all responsibility for his treatment and made him sign a contract on a napkin paper, and the rest is history. In 16 glorious years of brilliance, starting from 2005, Messi became one of the finest footballers in history, won 6 Ballon D'Ors, innumerable La Liga and Champions League titles. Truely he became the primary attraction of a star-studded team including Puyol, Pique, Busquets, Xavi, Iniesta, Fabregas, Villa and Ronaldinho. For him, Barcelona was integrated into his very DNA: Life without the club that made him great and which he so passionately embraced as his 'home' was incomprehensible.

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All went well, until Josep Maria Bartomeu became the club's president in 2014. Unlike his predecessor, one Joan Laporta, Bartomeu began the path for Barcelona's decline when he laid emphasis on getting more star players or big names into the club, irrespective of whether they actually fitted the style of football played by Barcelona or not. Expensive dud signings like Coutinho, Pjanic, Dembele, Umtiti, to name a few, became the order of the day. Most of these players remained on the bench most of the time, due to injury or poor form, yet commanding huge, unreasonable salaries while doing nothing. All these continued till in 2021, matters finally came to a head.

As per regulations specified by La Liga, the total salary cap of a football club must not exceed a certain limit, or else they would not be allowed to make new signings. These duds, signed on long term lucrative contracts, commanded huge salaries while effectively sitting on the bench. Such was their greed for easy money that they refused to take any pay cuts or to leave the club for some other destination. This meant that Messi, whose contract ran out in 2021, could not be signed even on a free. The club's greatest ever player, their maestro and talisman was soon lost to Paris Saint-Germain on a free. One of the last members of the club's golden 'Tiki-Taka' generation and inarguably their finest ever player, was lost just like that. The enduring image of the tragedy was Messi crying on his napkin during his farewell ceremony. This man who had given his loyalty, his all to the club for the past 15 years, the club without whom life was incomprehensible, was now disappearing from his life. A journey that began with a signature on a napkin paper was now ending with tears on a napkin paper, with 15 glorious years sandwiched in between.

Hritam Kanjilal
3rd Year

Volleyball

Volleyball has always been a widely played sport. While the standard Indoor volleyball is its most common variation, plenty of other variations have become largely popular over the years. Beach volleyball is a commonly portrayed variation that has earned itself a spot in the Olympics events after gaining immense popularity, while Sitting volleyball is now a Paralympic sport.

In its most popular variations, volleyball is a team sport in which two teams of six players each are separated by a net. It has been considered an Olympic Sport since 1964.

While the rules for the game vary across the different variations, there are a few set standards that most, if not all variations follow:

- A player on one of the teams begins a rally by serving to the receiving team on the opposite side of the net
- The receiving team must not let the ball touch the ground, and send it over to the other side after a fixed number of touches
- Whichever team lets the ball drop to the ground loses the rally
- The team that wins the rally gets a point and serves the ball to start the next rally

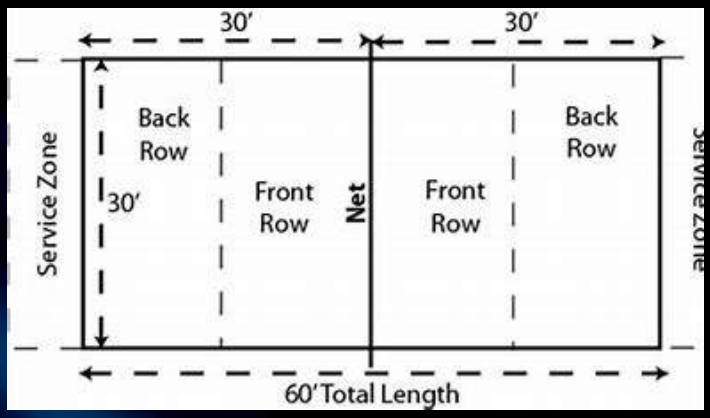
While the game is usually played with the hands, legally the players can strike or push the ball with any part of the body. In fact, there's an entire variation of volleyball known as footvolley, where the players are allowed to strike or push the ball with any part of their body except their hands.

Volleyball, despite being played widely, has a surprisingly shorter history when compared to other sports like football, cricket, running, archery, etc. It was invented only in 1895 as an indoor pastime for the older members of the YMCA in the United States.

Originally derived from the concept of badminton (and dubbed Mintonette), it took characteristics from other sports such as baseball, tennis and handball. The court was inspired from basketball, which was catching on in the area as a relatively new and popular sport of the time.

In 1896, the game, still called Mintonette, had its first exhibition match during which, an observer noted the volleying nature of the game (similar to the rally in other net games) and thus the game quickly came to be noted as "volley ball".

The International YMCA Training School slightly modified the original rules of the game and circulated it to the various YMCAs. Gradually, the game began to spread and widen its horizon, gaining more exposure.



In the 1900s, Spalding made good use of the American Sports Publishing Company to mass produce books with complete instruction and rules of the game. The year of invention of the first proper "volleyball" is highly disputed as some claim that it was invented as early as 1896, along with the game, while some claim that it was invented in 1900.

Over the years, the look of the volleyball used for the game has developed and refined, finally producing the ball that is used today. The modern volleyball is a spherical ball, traditionally consisting of 18 almost rectangular sections of genuine leather, arranged in six identical sections of three panels each, wrapped around a bladder and stitched together.

Over time, the rules used in the game evolved and a number of consistent techniques were formed, namely, serving, spiking, blocking, setting and receiving. Also, a few permanent positions for the players in one team came into play. Moreover, the skill and power of a set, and later the "three hit" rule was introduced.

The sport was officially introduced internationally in 1919, when the American Expeditionary Forces distributed 16,000 volleyballs to their troops and allies. The first country to start playing the sport after USA was Canada (in 1900). It is now popular in every continent (except Antarctica, of course), where at least one or the other countries have found a place in the top 30 teams in the world.

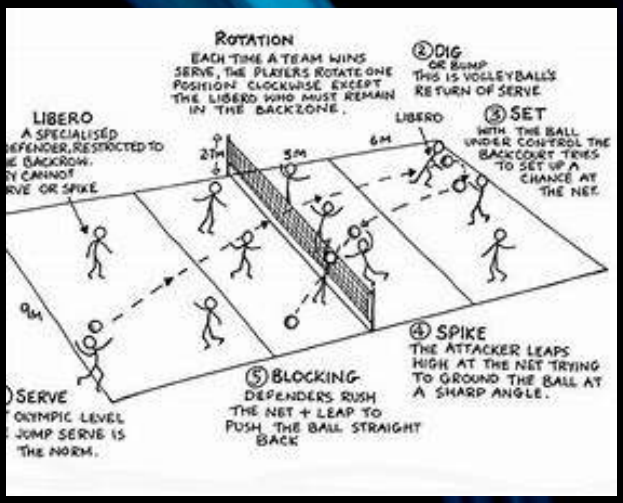
The volleyball court is rectangular in shape, divided in equal square halves by a net separating the two competing teams. The top of the net is placed at around 2.43m for men and 2.24m for women, and varied for veteran and junior championships.

Two parallel lines are drawn 3m from the net, and on both sides of it, demarcating the "front row" and "back row". In the major variation of indoor volleyball, 6 players from each team are allowed on the court at one time, three of who stand in the front row, and three in the back row. When it is a team's turn to serve, the players on that team rotate by one position in a clockwise direction while keeping the number of players in the front and back rows constant. The player on the farthest right side of the back row serves as the server for the rally.

The team keeps serving the ball until and unless they drop the ball on the court during a rally.

When the ball is on one side of the court, the members of the team attempt to keep it in the air, while sending it back to the other side of the net in no more than 3 hits. If the ball drops to the ground, the team on that side loses a point. The most common variation of touches used is the dig-set-spike.
Unlike other net games, the player is allowed to step out of the border to ensure that the ball doesn't touch the ground. However, stepping into the opponent's court counts as a fault.

The major positions in a volleyball team are the following:
• setter – they aim for the second touch, and try to set the ball in a favourable position for the spiker to attack.
• middle blocker – they are usually the tallest players who are specialised in blocking attacks from the opponent. They are also responsible for performing very fast attacks with the setter.
• outside hitters – they are usually the most consistent attackers on the team and play out the maximum number of spikes for the team from the left side of the front row.
• opposite hitters – they are specialised in defending and blocking as they are stationed on the right of the front row, since attacks to the right are hard to place accurately.
• libero – the libero is a special player specialised entirely in defence. They are responsible for receiving or "digging" powerful serves and attacks to make it easier for the setter to orchestrate an attack.



While a libero is not allowed to play on the front row, they can still participate in an attack by setting the ball to the spiker. A libero can switch out with any member of the team after a rally since they don't have a specified position. They are distinguished by wearing a different jersey from the rest of the team.

A spiker is an attacker who jumps vertically to hit the ball with their hand and send it to the opposite side of the netAll the above positions (except libero) are allowed to act as spikers to perform an attack. Other special positions are – a defensive specialist, who is subbed in for a poor receiver, and a serve specialist, who is subbed in for a poor server.
Though it was introduced as a pastime, volleyball has grown to be one of the largest sports with an immense number of players joining every year. It has found its place in both men's and women's sections of the Olympic and Paralympic games, making it one of the most coveted and widely watched sports all over the world.

Sohini Mazumder
2nd Year

Haryana: The "Olympics Medals" state of India

When it comes to any sporting event like the Olympics, there is a discussion very often after every big sporting event in every newsroom and in many households all around the country: what is it about Haryana that makes the state always a goldmine for medal-winning sportspersons? More than 30 percent of India's individual medals in its Olympic history were won by sportspersons from Haryana. Haryana can certainly be called the Olympian State of India.

There isdefinitely a strong historical and political context to why Haryana excels in sports.historically Agriculture and military have been the mainstay among people of Haryana. Both the fields require deep physical resilience. It is an impact of an agricultural society clubbed with most harbouring dreams of joining the Indian Army that laid the physical foundation of the state's Olympic dreams.

Many former Olympians from the state like wrestlers Lila Ram and Devi Singh and long jumper Ram Mehar, were from the Army. If one looks closely at the districts from where have come most Olympians and sportspersons have come , one will see the link between districts like Bhiwani, Rewari, Sonipat and Najafgarh where the Army had the strongest influence. Nearly every household there had a soldier, actually they still have.

Agriculture and the physical labour attached to it trained the body to achieve the intense levels of physical fitness and strength demanded of a world champion. However, it would be unfair to deny the Haryanvis their love of sports, be it the infamous cricket or the more extreme wrestling 'dangals' and boxing rings. The rite of passage from childhood to teenage usually for every young boy in a Haryana village still passes through the local akharas.

Now isa good time to praise successive Haryana governments. Surprisingly, governments that failed on most social markers such as upliftment programmes for women or the girl child, governments that mostly pandered to an archaic state mindset were possibly the first across India to encourage their states sporting talent through mostly incentives.

What changed the game and the playing field was the year 2000 when the state introduced its first-ever sports policy! The policy significantly hiked the cash incentives for the sportspersons who won medals in international games. Before the 2000 Sydney Olympics, the cash rewards were given in thousands, with the gold medalist winning just Rs 1 lakh.

In 2000, the chief minister of Haryana was Mr. Om Prakash Chautala who announced a reward of Rs 25 lakh for bronze medallists, Rs 50 lakh for silver winners and Rs one crore for those who won gold at the Olympics . Overnight, the cash prize for a gold was massively hiked from Rs 1 lakh to Rs 1 crore. In that same year, Haryana set up regional training centres upgrading sports equipment.

In the year 2001, a cabinet resolution in the Haryana state assembly led to an out-of-turn appointment as officers in the Haryana Civil Service and Haryana Police Service for sportspersons winning the gold, silver and bronze medals in the Olympic games , world championships and Asian Games. This was seen as a massive incentive for a state which previously had only farming and agriculture to depend on.

The precedent of 2000 was then followed by all sucessive governments irrespective of their party affiliations. Be it the Congress and now the BJP, each government which has come to power has only upped the cash prize and other incentives to medal winners. The question of infrastructure and identifying talent young before they reach the medal winning stage is still unfortuantely a big loophole, but one can safely say that the Haryana government have done more than any other state government.

When our Olympians returned from the city of Tokyo, the Khattar government of Haryana felicitated the medal winners from Haryana with the maximum prize money and incentives, much higher than any of the other states. Winners Neeraj Chopra, Ravi Dahiya and Bajrang Punia were awarded Rs 6 crore, Rs 4 crore and Rs 2.5 crore respectively. Two players from the men's hockey team which won the bronze medal , Sumit Kumar and Surender Kumar, were awarded Rs 2.5 crore each

The sportspersons were also given government job offering letters along with government plots at a concession. Nine girls hailing from Haryana in the Indian hockey team that ranked 4th were given Rs 50 lakh each. What was really befitting was that all the other Haryana players who qualified for the Olympics were also awarded Rs 15 lakh each. Eventually, all the 31 players from Haryana in India's Tokyo squad were awarded with government spending amounting to Rs 26 crore.

Government incentives, sports as an integral part of the Haryanvi culture, clubbed with that quintessential 'mad streak' associated with the people -- these three together have been the big reasons why Haryana has earned its spurs as an Olympic medal factory. Many people would credit the 'mad streak' alone that fuels the amazing 'never give up' attitude befitting the old Haryanvi saying: "Jat mara tab janiye jab tervi hojay ".

Debangshu Kantha
1st Year

GUNNER FOREVER

Every club goes through ups and downs and it is football that teaches us to believe in it, not just in upsurge but also in failure. It's easy to point fingers and bash a club, start adoring your second favorite club a bit more but cheering and supporting and staying along with your club throughout the thick and thin which once you thought it was all yours, that's what makes a true club supporter or rather a true football fan. And by this time, you all understood I AM AN ARSENAL SUPPORTER. You can't stay on top forever and the higher your climb the greater is the fall. Being a die-hard Arsenal fan, it is always difficult to stick in such a situation because we have been accustomed to such a level of success that frankly looks close to unattainable. We were once invincible and unbeaten in a whole premier league season and yes of course nothing to hide now we are gasping for breath against teams like Southampton and Burnley.

I came across some tweets and posts over internet about how a true fan should buy original jerseys and should have season passes to support their club and show their affection towards the club. I hardly believe I could have ever got a better version of such a patriotic love towards a club. Shithousery at its peak. All you need is just a heart and its little tough to spot an Arsenal fan in a crowd but those who are they have a generous heart which will always be with Arsenal. My love, passion towards my club is even visible when I wear my first copy jersey. There are people who have stopped watching Arsenals matches and are busy at criticizing them but then there are people like me who still stay awake every matchday till 3AM to break their heart back again without a complain but with a hope every time. Even I know I have classes next morning from 9AM but I will still sit in front of the television with drooping eyes. It will always sound better to me rather than posting some gross content for the club.

It is always difficult to watch arsenal where once legends like Henry, Bergkamp, Vieira, Van Persi, Ozil, Giroud played are nowadays searching for a full season captain. If someone asks me in what position if Arsenal finishes I'll be happy with?

With a heavy heart, I will reply anything above 6th. It always reminds me of the Arsene Wenger era and which I will never forget. One of the greatest managers of all time. There are those who come, there are those who go. There are those who succumb to pressure and then there was him, who took everything upon himself. Even in a sea of fears, he never let down a tear. This was Arsene Wenger. Sometimes it's your turn to attack and thrash the opponent and sometimes you just need to seat and defense. But to be very honest I don't know how long will Mikel Arteta will stay but hats off to him and to the manager who will come if he gets sacked, unfortunately. It requires guts to take on a sinking ship. He could have easily stayed at Man city and won trophies and enjoyed working under Pep Guardiola. But Mikel was a gunner at one point of his carrier and gave his best for the club in the pitch and now taking charge of a broken changing room, demotivated players, a sinking ship and a deflated fan base. It requires strength and he took that bold step.

Every time I wear that first copy jersey of Arsenal I feel so happy. I feel like I am a gunner and doesn't matter what the club's current status is or what the world is commenting my love towards Arsenal will never decrease even by an inch. Last season only we won community shield and FA cup that too beating teams like Chelsea and Liverpool and got knocked out in the semifinal of Europa league. EVEN IN OUR WORST PHASES, WE ARE BETTER THAN MOST. They drag our name down and we lift our trophies high up. We got a deflated fanbase but I will always be their fan and I know there are many like me present out there. I will always enjoy watching Arsenal matches and will always wear their jersey with pride. There are clubs we don't even know existing and then there is Arsenal who is known by all football fans. People can criticize us because the club made their name famous by their game and achievements once and yes they will make it again. Hope is a good thing, maybe the best of things and good things never die. I hope and I believe Arsenal's glory day will take time a little but aren't far away. Struggling now, failing sometimes but it won't stay like this always. We are down now but not forever. London will be Red. Emirates will again shout their heart out. This heart will always be there for Arsenal. WE'RE ARSENAL.

Ayan Bhattacharjee

1st year

FEMALE ATHLETES IN SPORTS AND THEIR CAREER DEVELOPMENT TODAY AS COMPARED TO 20TH CENTURY

• In the world of sports, gender has become one of the main points to talk about. Women are taking an active role in the world of sports and their participations are increasing over the years. The old beliefs of a patriarchal society like 'Women are made for the kitchen and should belong there' has been proved wrong by various women across the globe. Winning in sports not only provides a momentary rush or a sense of accomplishment - but also helps women in combating the social stereotypes to reach the goal of gender equality.

• The visibility of women athletes, trainers and promoters in today's world of sports has increased slightly more than the 20th century. Back in 1900's during the first Olympic games, the idea of women taking part in any event was unfeminine. Since then a lot of progress has been made in many parts of the world, although participation of women is still restricted to a lot of events, yet various women have represented their countries and have glorified their names in the history books.

• By the 2004 Olympic Games held in Athens history was created , a new world record was set as over 40 percentage of the athletes that participated were females. Talking about sporting women in the 21st century, not only in Olympics but also in games like Cricket, Football, Hockey etc. women across the world have made a significant progress. The England Cricket Team was the first to win the world cup in 1973, where seven teams England, Australia, New Zealand, Jamaica, Trinidad and Tobago and Young England participated, that tournament created a huge public awareness and the established the existence of Women's cricket among various people all over the world. Like Cricket, Football is also an equally popular sport played by a lot of people over the world. United States was the first country to win women's World Cup back in 1991, this event also aroused a sense of gender equality among the football fans and marked the existence of 'Women Football'.

• Not only about the women overseas but also the women of our country have made us proud on many occasions, 'Indian Women' in sports have evolved completely since the 20th century. A proper infrastructure, adequate coaching , proper guidance, living a healthy lifestyle are the main things that an athlete needs to shine, but the unavailability of such things was a cause of less women participating in the field of sports but with the modernisation in science and technology, also with the development of specialised infrastructure more women have actively participated in sports and have glorified their names. The Olympic Medalists Karnam Mallleshwari, Mary Kom , Saina Nehwal , PV Sindhu , Sakshi Malik. The Paralympic Medalists like Avani Lekhara and Bhavinaben Patel , Indian women cricketers like Mithali Raj, Jhulan Goswami and many more have made us proud across overseas and held our country's head high.

• All the athletes do not come from a good background many suffer from poverty many suffer from poverty many from family issues and there are many who are physically challenged but it is their determination, hard work and dedication that inspires them to complete their dreams. Being a sporting woman is not that easy from criticisms to hours of practices, from the concept of participation in sports being 'unfeminine' to making their countries proud, women have come a long way and it is a firm belief that they will do a lot better in the coming years.

Sounak Roychoudhury
Year – 1st

SPORTS ACHIEVEMENTS 2021

FEB

Manika Batra won the 82nd National Senior Table Tennis Championship

APRIL

India gained 14 medals at senior asian wrestling championship

JUNE

Deepika Kumari won 3 gold medals in the Archery's World Cup Stage 3. 1 Individual, 1 women's team (along with Komalika Bari Ankita Bhakat), 1 mixed team (with Atanu Das)

MAR

Vinesh Phogat won women's 53 kg gold medal

Wrestler Bajrang Punia regained no 1 world ranking

Mithali Raj completed 10,000 runs in international cricket matche

Bhavani Devi became the first Indian fencer to qualify for the women's individual saber Olympics

INKED THOUGHTS

The answers you get from literature depends on the question you pose

MARGARET ATWOOD

THE ROTTEN PARADISE

You know, time stops for dead.
The flowers bloomed though, new trees grew,
the old tress got new leaves, the air scented
of new life, yet the time stopped for dead.
Who said time stops for no one,
The body there lying on the floor, the time
stopped for it.
The beautiful princess came and asked for
deal, “I can make time stop, give me your
soul?”
“What shall you do with my soul?”
“What shall you do with your story?”
“I will change it”
“then I will kill it”
Dear, who is dead?

In that black sea,
When you were swimming,
Did you meet everyone?
did u believe what you saw?
Dear, could you see the dead?

The witch out there in the forest of spring was crying,
“Save me, the flowers are killing me”
The princess laughed.
The lavenders of spring killed her,
The green carpet turned black.
Dear, did you kill her?

Her body withered
Yet magic happened
The lavenders formed a blind over her eyes.
She was alive with no sea
The water dried up.
She walked and walked through the forest of spring
But the black blood of hers had brought winter.
Dear, who killed who?

The blue bird on the tree
Pulled out one of the lavenders from her sea
The sea started to fill up again with the tears of the witch
But
The poison of the lavenders melted her wings
Slowly,
The poison killed it....
Dear, who do you think cried?

“So the lavenders are poisoned.... I can kill anyone”
“But you can not kill me”, exclaimed the snake.
“Want to become friends?”
They smiled.
The sun burned bright, the snow melted, the lavenders tightened their grip.
“Do you have heart?”
“Do you have soul?”
The sea was empty
Dear, do you believe me?

The ants had built a castle of gold
The butterflies flew in freedom
The caterpillars were celebrated
The antlion was murdered.

And they all lived happily ever after.....

Dear, did they?

SAHANA YEASMEEN
1st YEAR

PAUSE-PLAY

Subtle fear making you numb,
Fear of failure, being proved dumb,
Hit a pause button to such thoughts,
March bravely through the odds .

When discouraged is all you feel,
Positive self-image can heal,,
Bury the sorrow, intake good vibe,
Hit a play button to a thriving life.

Pessimism torturing you ,
Hit a pause and believe what you do ,
Only You can make your world fruitful ,
Facing the challenges is the only tool.

Play the good ,pause the bad,
To it courage and self-belief you add ,
Then the happiness you richly deserved ,
Will be in your life, ready to be served.

- *Pradipta Sharma,*
1st Year

Rise After The Fall

IT HAPPENS WITH ALL AND SUNDRY
DIFFERENT OUTLOOKS WE DON'T REFRAIN,
SOME CALL IT –THE HIGHWAY TO SUCCESS!
REST LABEL IT-THE LAST NAIL IN THE COFFIN.
RIGID RESISTANCE HOWEVER STRONG WE PROVIDE,
YET BRITTLE CONFIDENCE OVERCOMES AND PUNISHES,
THE UNSTABLE AFRAID SOUL THAT HAS BELIEVED
YES WE CAN, YES WE CAN..!!

SUPPORTING ,BACKING ,CONSOLATION ;ALL GONE MISSING,
LEST YOU TUMBLE DOWN INTO THE DEEP PIT OF FAILURE
REAL FRIENDS AND FEW EMOTIONAL GUIDES-THE SOLUTION,
THAT PUTS US BACK ON TRACK FOR FUTURE ENDEAVOUR.

SETTING OUT, AGAINST THE ODDS ON THE PATH OF REVIVAL,
NO LOOKING BACK, NO TIME TO REGRET;
ONCE YOU HAVE WEATHERED THE STORMS OF CIRCUMSTANCES,
ENDURING PAIN AMIDST BITTER, UNINTERRUPTED RAIN.
A VALIANT EFFORT FROM A TOUGHER HEART.
HIGH MORALE, COURAGEOUS BLOOD BURSTING IN THE VEINS;
LET'S DO IT ONCE AGAIN..!!!

NEVER GIVE UP,NEVER BACK DOWN;
MUST BE THE VOICES DOMINATING THE BRAIN;
GROWING,MATURING AND LEARNING AFTER EACH OBSTACLE,
CHALLENGES OF GRITTY LIFE,WE ALL OUGHT TO ENTERTAIN!!

- ANINDYA CHATTERJEE
1SD YEAR

Lost love

EVERYDAY I WAITED FOR YOU IN THIS COURTYARD,
WAITING TO HEAR THE SOUND OF
YOUR FOOTSTEPS FALL GENTLY,
BEHIND THE IMAGE OF SETTING SUN.
IF I CLOSE MY EYES,
I CAN SEE YOU,
AND I WOULD RUN TO YOU,
IN A FIELD OF BLOSSOMING SPRING FLOWERS
AND REST MY HEAD ON YOUR SHOULDER
ON A WARM SUMMER'S DAY
AFTER A TIRING WORK DAY.
BUT AS SOON AS I OPEN THEM
IT'S AS IF THOSE DAYS HAVE FADED.
BUT, TODAY I LOOK AT BROWN AND
CRIMSON STAINS ON THE GROUND OF LEAVES
THAT ONCE RESTED ON THIS FLOOR.
NOW THEY WERE GONE,
BLOWN AWAY WITH THE COLD WIND
THAT BRINGS THE NEWS OF ANOTHER YEAR PAST..

SHADAN MALIK
1ST YEAR

SACCADIC REALITY

Let the night bring all the
Rudimentary awareness of
Darkness that is beyond perception.
I have decorated my dreams
With slumber from the trap of
Winter and from dark nightmares
Where hours dance on the clock
While the past rushes in hurry,
The future is making addendum
Of worries for the present.

Let my soul be made from the skin
Of passion and pure bliss
While contradictions surround me.
I cannot just come out of this abode.
A prisoner who lived too long in a prison is a resident
& it sure sounds like an abyss
But the transition is beyond imagination.
I have seen desires become rumors'
& rumors' whispering to be true.
I had been spiraling to the core.
I am submerged in the comfort.
I stand on the sky to touch the ground
I see clouds stretched to eternity.
I have designed my dreams to surrender
To the vagaries of my indefinite regret.
I understand my dreams are not mine,
They are not yours, they are in bloom
And they are in a war which
I have already lost.

My oldest scars fly like a butterfly
& I was a cyclone seeking shelter
On the bedsheets of desperation
I cover myself to hide and confide
The cold wind passes near my ears
& I hear its painful journey;
I wish to assimilate in morning air
Or be a bubble reaching the surface
Of an ocean and burst with a smile
& with moonlight glimmering on my face.
Let the glass of perfect subtlety
& of grand illusion never die.
But reality crawls from underneath;
Grabs my neck to make me see
All the lost fragments of my misery.

NILANJANA BANIK,
1st YEAR.

The Distracted Psychiatrist

There were two best friends. One of them died a few days ago. The other one is depressed. The unintelligible irrationality of this depression is itself a component of the depression and is contributing to the additive pain. Of course, his best friend died. That seemed like reason enough for a sane person to be depressed. But the depressed person knew it wasn't exactly that.

The living friend didn't go through the traditional route of grief either. He didn't cry at all. The sorrow never transformedinto tears. It got stuck between his chest and his throat. Right next to his heart. An inexplicable ache continually agitated him there. He felt immovable, and the gravity seemingly enhanced just around him.

Nights were the worst, the living friend decided. The ever-existing sadness doubled down on him with its associates-anxiety and fear. Now we have two more unintelligible feelings whose origins were unknown. There was one more lingering feeling. Perhaps the scariest of all. It devises plans and procedures darker than the night itself. But it also promises something in return, the promise of letting everything go and reuniting with his friend in a faraway land.

The days seemed gloomier, and the nights seemed chillier. The living friend spent his days shrouded in despair.

Something was obstructing his views from reality. Something hidden demanded his attention. He had seen his deceasedfriend's mother uncontrollably crying and his father grief stricken to numbness. Funnily, those images don't make any difference to him now. He has been replaying them in his headfor days. They are old images which lost their meanings, like some food you get bored from eating every day.

The living friend was still busy grasping his feelings in theirentirety. Nobody, he came to the conclusion, is ever sad by someone's demise just for the sake of the deceased person.

Everyone is perpetually concerned with themselves. Therecurring thoughts are a) how their own life will be different in absence of the person and b) how the memories will haunt them to death. They don't interest themselves with altruistic thoughts concerning the deceased person, how they are missing out on the world, all the unfolded mysteries, all the uncrossed labyrinths. What a selfish world, the living friend exclaimed.

It seemed unfair how the world kept advancing on. The living friend felt left behind somehow. A desperate hand reached forward to the world, asking for them to pick him up. He felt almost like a lost child in the complexity of his overwhelming misery. If only he could make sense of the whirlwind of emotions dragging him down, he could break its shackles andbe finally free.

The deceased friend's parents have crossed all the stages of grief, and just like good parents, presented themselves to the support of the living friend. Their plan of action was to make him cry, that's how he'll be relieved of the pain, they thought. They spoke to him about how the deceased friend used to call the living friend "the psychiatrist." The living friend couldlisten to him for hours on end. He would share all his life's stories with him and the living friend absorbed them with utmost interest, they said.

He did not, of course. The living friend couldn't concentrate on his mundane stories for hours. He was mostly distracted. Most of the time, as he recollected, he zoned out, thinking something else. One particular time, the deceased friend spokeabout how he wanted the living friend to teach him swimming, but the living friend was busy thinking about how mesmerizingly talented spiders are to make those complicated webs in the corner of his room...

He never taught him swimming...
Bingo!
There it was. The mystery has been solved. Waves of euphoria passed through the living friend. He felt a surreal amount of exhilaration that hard drug addicts could only imagine in their fanciest dreams. He understood what made him feel somiserable for so many days. He was distracted, you see, so hecould never teach his friend how to swim. That is what was eating him from the inside out, tying his soul to the unfamiliarity of the unrecognized. Now he recognized his fault in all this. He never taught him swimming.
The deceased friend drowned to death.
The living friend essentially killed him.

-SWARNADEEP SAHA,
1st YEAR

Unforgotten Kite

My father's job always keeps us on our toes, eager to knowing which place we'd visit next. Luckily, one of his transfers took us to Jodhpur. I was 11 at the time.

As we went to introduce ourselves to our neighbours, I took a special liking to Abhay nana and Smriti nani (Both around 60 years old). Honestly speaking, what attracted me to them was an object I had only seen in my school books before. But there in their house, I saw a kite for the first time.

During the winters, nana took me with him and taught me how to fly a kite.

I used to cry everytime my kite got lost or entangled with someone else's.

" Don't worry, beta. A kite gets lost because it tries to reach the people we miss." Nana would say.

I spent most of my holidays in nana's home, watching him making kites and listening to his and nani's childhood stories.

" Nana, why do you write AB on the corner of all your kites?" I asked him one day while we were out.

" You see, forty five years ago I met Bhuvan in college. We had the same stream and were in the same hostel. We were hardly apart for a moment. We shared everything with each other and did everything together. AB - Abhay-Bhuvan."

"Where is he now?"

" I don't know beta. We haven't talked after leaving college. Besides, people were afraid of our closeness. As you grow older, you will realize some things are better left unanswered."

The next year, dad got transferred to Kolkata. So the next time I visited Abhay nana was when I got to college, nine years later. I learnt that Nani had passed away.

" She left me this letter before breathing her last."

" So she knew all along?"

"I guess so. We never talked about it. I mean how can I? I ruined her life. Neither could I love her nor could I give her any children. Don't get me wrong. I liked her a lot. But it still isn't the same as love. She was a smart women. She knew that too."

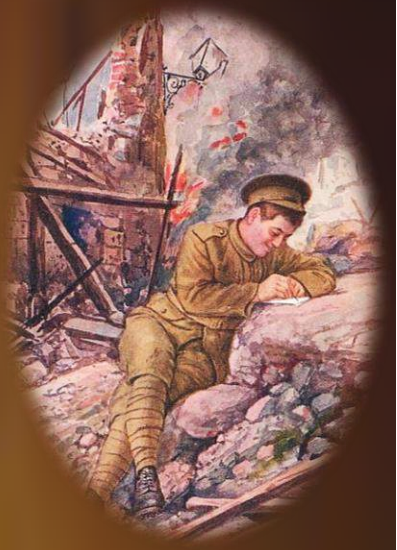
We went to fly kites like always. Nana went with two. As I stood there, I watched him let go of both the kites.

- Archisman Dey,
4th Year


লিখন
লেখন

প্রিয় ঊমা

"প্রিয় ঊমা,



আর মাত্র পঁচিশটা দিন গোনো,

আসব ছেড়ে আতঙ্কের এই দেশ।

বিক্ষুব্ধ বিধ্বস্ত, যত মহড়া!

বোমারু- রক্ত, গোলা- বারুদের রেশ।

উদ্ধত যারা উচ্চশিরে আজ,

মারছে মানুষ করছে হাজার লুটপাট!

আকাশচুম্বী হবেই তারা দেখো,

বিদ্রুপ করে বলছে শোনো ফুটপাত!

রাগ কোরোনা..

নতুন করে কি আর বলব তোমায়-

তোমায় ভাবি সহস্র কাজের মাঝে।

কিন্তু আমার দেশ যে পরাধীন,

এখন পালিয়ে যাওয়া আমার কি আর সাজে?

জানি, বলবে- "আগের বারে ও এরম চিঠি ছিল,

বলেছিলে -' ব্যাস, আর পনেরো দিনে ফিরব '

পেরিয়ে গেলো সাতাশখানা দিন!

আবার ফিরে পঁচিশটা দিন গুনব? "

জানি, তুমিও অনেক স্বপ্ন দেখেছিলে

কিন্তু অভাগা আমি পারিনি কিছুই দিতে!

কিন্তু যেদিন শেকল ভাঙ্গার শব্দ পাবে কানে

আমি উপহার দেবো স্বাধীন ভারত জিতে !

স্নায়ু জুড়ে তোমার কথায় ভাবি,

চোখের সামনে আঁধার দেখতে পেলে।

তৃষ্ণায় যখন ছটফট করে মন,

আমি তৃপ্তি খুঁজি তোমার চোখের জলে।

রোজই কোনো ভাই-এর কবর খুঁড়ি

কিংবা তাদের ছাই করি মড়া-কাঠে!

শপথ করি অগ্নি-অশ্রু দিয়ে -

রাজার আসন ভাঙব কড়া-ঘাতে!

আজও স্বপ্ন দেখি নতুন ভোরের আলোর,

আজও স্বপ্ন দেখি সোনালী আভা ছোঁবার;

জানো? পাশবিক এরা , অত্যাচারী জন্তু!

শুধু গুজব রটায় সভ্য করে যাবার!

এবার এলে কয়েকটা দিন থাকবো

নিয়ে যাব ছাপা শাড়ী আর লাল ফিতে।

পূর্ব পাড়ের ভাঙা সেতুটার পাশে,

দু-দণ্ড বসব গিয়ে একসাথে নিভৃতে।

আজ রাত্রে লিখে রাখলাম চিঠিখানা ,

কাজ শেষ করেই ফিরব তোমার কাছে।

যদি না ফিরি বুঝে নিও তবে প্রিয়!

আমার রক্ত দেশের মাটিতে মিশে আছে !

-ইতি অজয় "

চিঠিখানাকে বুকের কাছে আঁকড়ে

উমার প্লাবিত চোখে চিন্তার মহামারী।

আজ পঁচিশটা বছর গেছে কেটে

ফেরেনি অজয় , আনেনি কোনো শাড়ী।

এরমই কত লক্ষ অজয়ের প্রতি

প্রণাম জানায় সহস্র কুর্নিশে।

নিরুদ্দেশ তারা ইতিহাস থেকে তবু

তাদের রক্ত এই মাটিতে মিশে আছে ||

শিবম ব্যানার্জী

প্রথম বর্ষ

मेरी हया किरदार में वफाई तलाशती है

मेरी हया किरदार में वफाई तलाशती है,
अब तो मेरी नज़रे मोराकबा तलाशती है।

मिला इतना धोका जमाने से हमको,
तुमसे भी कभी बेवफाई तलाशती है।

जख्म इतने खाए है सीने पे हमने,
रूह भी जिस्म से जुदाई तलाशती है।

जिंदान कब तक कैद रखेगी उनको,
जिनकी बेटे की रेहाई तलाशती है।

लाख जोर आंधियों का हो परिंदो पर,
ये फिज़ावो में भी रस्ता तलाशती है।

हो गए जो किसी के हामी किसी के यावर,
गुज़रने पे उन्हें दुनिया तलाशती है।

कदम न लड़खड़ाए बुलंदी को देख कर,
कामयाबी फातही जज़्बा तलाशती है।

भूलकर मक्सदे हयात और दुनिया की गफलत,
याद रख कब्र रोजाना हमें तलाशती है।

मौज को मुझे जितना डुबोना है डुबोले,
माँ की दुआ बस मेरी हिफाज़त तलाशती है।

कुर्बान-ए-वतन होने से न डरना जवानों,
देश की मिट्टी तुझसे शहादत तलाशती है।

कर दिया अपना सबकुछ निछावर वतन पे,
सियासत मुझमें हिन्द से मुहब्बत तलाशती है।

राह-ए-रास्त से कैसे भटक जाती ये आँखें,
जो पाने को हिदायत आयत तलाशती है।

दुनिया ढूंढती है उसे जन्नत कहीं मिले,
दानाई माँ की कदमों में जन्नत तलाशती है।

बना मुझे मौला दर्दमंदो की राहत,
दुनिया सच्चो की कुर्बत तलाशती है।

शराफत का दामन कभी मत छोड़ना 'अनवर'
ज़माना तेरे अन्दर ये इस्मत तलाशती है।

- मो० अनवर रज़ा इलमी
द्वितीया वर्ष

দেশ পলাতক

মুখে আঁকা চোখের জলে, পেরোনো দিনের কষ্ট,
সামনে শুধু নিশ্চিত দেখি অনিশ্চয়তা টুকু,
নিজের মাটি খুইয়ে এখন অন্য মাটির খোঁজে,
আমার মেয়েটা বাঁচতে শিখুক, ভিক্ষা এইটুকু,
রক্তে লিখছে দুঃশাসনেরা পরাধীনতার বাণী,
কত যত্নে গড়ে তোলা ভূমি আজকে ধূলিসাৎ,
সেই দুঃস্বপ্নের দেশে আজও আমার ভাইরা কাঁদে ,
বেজে ওঠে কানে বারবার শুধু তাদের আর্তনাদ,
আমার ধর্ম শেখায়নি গো মানুষকে গ্রাস করতে,
আমার ধর্ম চায়নি কোনো জাতীর বলিদান,
ধার্মিকতার নামে যারা অমনুষ্যত্ব বাছলো,
পাবেনা কি তারা কোনোদিন তাদের প্রাপ্য প্রতিদান,
মোদের বুকেতে পা রেখে যারা উঠলো সিংহাসনে,
আমরা তাদের খেলার গুটি, সাজায় তারা ছক,
কাটবে কি এ আঁধার কখনো, মোরা ফিরবো নিজের দেশে
নাকি কাটাতে হবে বাকিটা জীবন হয়ে দেশ পলাতক।

সৌম্য বিশ্বাস
দ্বিতীয় বর্ষ

উপ “বীট”

রাত তখন সাড়ে তিনটে। লোডশেডিং। হাত পাখাটা নিজের ভঙ্গুর শিথিল শিরদাঁড়াকে কোনও রকম আঁকড়ে রেখে তাল পাতার নামে শেষ বারের মতো আবার ডানা মেলেছে। প্রতিপক্ষ তার তিন হাতে সমস্ত সিলিং কে জড়িয়ে রাখার অগাধ আস্ফালনে ফুঁসছে। হাতপাখা জানে এই শেষ সুযোগ। যদিও সব প্রাণশক্তি ওই কুঁচকে যাওয়া চামড়ার খসখসে হাতের তালুর ভিতর কোনও ক্রমে ধুঁকছে। পাশের রেডিও শেষ রাতের খোয়াড়ি ভাঙ্গা নেশাতুর গলায় শুনিয়ে চলেছে অবিকল কলের মান্নাদের গলায় “এই রাত শেষ রাত হয়তো এ জীবনে একটু আমার কাছে আরো থেকে যাও”। শেষ রাত। হ্যাঁ শেষ রাতই বটে, শেষবারের মতো ঘড়ির কাঁটার সাড়ে চারটে বাজার পৌরাণিক অ্যালার্ম, দখিনের জানালা বরাবর অশোক বরাটের বাড়ির চিলেকোঠা থেকে ভেসে আসা রেওয়াজ, তেলচিটে পর্দার ফাঁক দিয়ে শেষ রাতের চাঁদের ভোরের আলোতে লাঞ্ছিত ফ্যাকাশে স্মৃতি, আর... আর মাধবীলতা, হ্যাঁ মাধবীলতা। ছয় দশক আগে এ তল্লাট ছেড়ে চলে গেছে ও। রেখে গেছে এ বাড়ির শ্যাওলা ধরা দেয়ালের কোনও এক শ্বেত পাথরের কালচে হয়ে যাওয়া কোণে একটা চন্দ্রবিন্দু লাগানো গাল ভরা নাম মিসেস মাধবীলতা চ্যাটার্জী। পোড়ামুখী বলে গেছিল, “আমি কোথায় আবার যাবো তুমি নাকি অনেক নামী দামি পদার্থবিদ, আমার মতো এক অপদার্থকে জমিয়ে রেখো এই বাড়ির প্রত্যেক কোণা থেকে”। কোলে ফেলে গেছিল সুচারুকে। কত বয়স হবে ওর... পাঁচ মাস। কেশব মোহন চ্যাটার্জী তখন তাঁর কোল থেকে ছোট্ট সুচারুকে নামিয়ে দিয়েছিল আরেক চারুর কোলে। চারুবালা সিকদার, সুচারুর এক মাত্র মাসি, মাধবীলতার বোন। নাহ্, পালনের জন্য নয়, একদম কাগজে কলমে দত্তক দিয়ে চলে এসেছিল। নিয়ে এসেছিল এক রাশ ক্ষোভ আর অভিমান। কার উপর? দেয়ালের আয়ানায় বার বার ধাক্কা খেয়ে আঙুলগুলো বার বার নিজের দিকে ফিরে এসেছিল। কি করতে পারত আর কি করল, তার সমীকরণে বার বার অপারগতার পাল্লা দস্তুর মতো ঝুলে পড়ছিল কাঁধে। হ্যাঁ, এই কাঁধেই প্রথম রাতের পা মচকে যাওয়া বিখ্যাত স্বর্নালঙ্কার ব্যাবসায়ী শ্রী নগেন্দ্রনাথ সিকদারের এক মাত্র কন্যা সন্তান, এবং প্রেসিডেন্সি কলেজের রসায়ন বিভাগে ফার্স্টক্লাস ফার্স্ট গোল্ড মেডালিস্ট মিস মাধবীলতাকে বর্ষন মুখর কলকাতার এক ফুটপাথ থেকে নিয়ে

এসেছিল। চিরপ্রতিদ্বন্দ্বী কলেজ কলকাতা ইউনিভার্সিটির ভূপতি স্যান্যালের প্রতিদিন লাইব্রেরিতে এসে মাধবীলতাকে বিভিন্ন উপায়ে অপদস্থ করাটা অসহনীয় হয়ে উঠেছিল। কলেজ ফেরত প্রোফেসর কে এম চ্যাটার্জী গাড়ি থেকে দেখেছিল দুই পরিণত বয়স্ক নারী পুরুষ কে বস্তুত মারামারি করতে। বৃষ্টির কারণে না ছিল রাস্তায় লোক, না বেশি গাড়ি ঘোড়া, তাই এই সাংঘাতিক যুদ্ধ কত কাল যাবৎ চলছিল বলা মুশকিল। কোন ক্রমে দু পক্ষকে ক্ষান্ত করে মাধবীলতা নিয়ে এসেছিলেন বাড়িতে। সেই ছিল প্রথম। তারপর দ্বিতীয় বার যখন সে বাড়িতে পা পড়ে, সেবার লাল চেলীর রাঙা সিঁথি বেয়ে নেমে আসা সিঁদুর মাখিয়ে স্বামীর কাঁধে রেখে প্রায় জ্ঞান হীন হয়ে ঢুকেছিল সে। কাঁদতে পারতোনা। ফলে অবরুদ্ধ আবেগ তাকে অবজ্ঞেয় করে দিত বার বার, আর কেড়ে নিত চেতনা। এরপর ঘটা করে আরেক বার ই ঢুকেছিল সে। সেবারও স্বামীর কাঁধেতে হেলে পড়া মাথা। সাদা কাপড়ের আড়ালে তুলসিপাতার সামান্য বিচ্যুতিতে কাজল কালো চোখটায় সেই লাল চেলী, সিদুরে ঢাকা সদ্য বিবাহিত অষ্টাদশীর ভীরু কৌতুহল ধরা পড়েছিল। ভয়, এক রাশ ভয় নিয়ে চলে গেছিল মাধবীলতা। সাত পুরুষ ধরে পালিত হয়ে আসা এক আদিম অপার্থিব ভয়। যার সৃষ্টি হয়েছিল এই সৌরজগতের বহু বহু আলোকবর্ষ দূরে ওপর কোনও এক মাইফোনিট ধাতুর তৈরি কেবিনের কোনও এক চেম্বারে শায়িত সদ্যজাতের মধ্যে। সেই ভয়, যার কোনও সীমানা নেই অন্ত নেই, আছে কেবল নিয়তি। সেই ভয় যার নাম “উপবীট"।

আবার একটা রাত। সময় তা তো ঠিক খেয়াল নাই। দেউরি থেকে যখন মাল নিয়ে বাজার ছেড়েছিল, ঘড়িটা তখন ঢং ঢং করে আট বার করে বেজেছিল। বীরেশ হরিজনের গাড়িতে তখনও বলদ জোতা হয়নি। গায়ের নায়েব ঘোষালদের ছোট ছেলে বেনুবিহারী হাটে কি কাজে যেন এসেছিল। বীরেশ এসে সবে বলদ দুটোকে নিয়ে আস্তে যাবে, বেনু এসে বলে উঠল, “কাকা এখন বাড়ি ফিরবা তো? নাকি অন্য কোথাও যাবা?” তারপর বীরেশের কাঁধ পেরিয়ে পিছনে বোঝাই করা সব আনাজপাতি দেখে বলল “এতো অনেক মাল, এ নিয়ে নিশ্চই অন্য গাঁয়ে এতো রাতে রওনা দিবানা... এ আমারেও তোমার গাড়িতে নেও না কেন?”

নাহ্, বেনু কে নেওয়ার কোনও ইচ্ছাই মনে ছিলনা বীরেশের। শুধু বীরেশ কেন? ঘোষাল বাড়ির আর একটা মনিষ্যিকে নিতেও চায়না। গায়ের নায়েব হয়েও একটা গোটা পরিবার কী করে এতো চামার হতে পারে ভাবা যায়না। গাঁয়ের জমিদার হরিমোহন চাটুয্যে যেমন দয়াবৎসল এবং ন্যায়পরায়ণ মানুষ, ঠিক ততটাই নীচ ইতর এবং স্বার্থান্বেষী তাঁর নায়েব উমাপতি ঘোষাল। গাঁয়ের লোকেরা বলে ঘোষালরা আগে নাকি ডাকাত ছিল, এ গ্রামে যখন চাটুয্যেরা জমিদারি শুরু করে, তখন এই ডাকাতের সর্দারের কোনো এক দুরারোগ্য ক্রনিক রোগ সারিয়ে দেয় তৎকালীন চাটুয্যে পরিবারের মেজো ছেলে। আর তাঁর পর থেকে বংশানুক্রমে নায়েবী করে চলেছে তারা এই চাটুয্যে পরিবারের। তবে একথা ঠিক ঘোষালদের

রক্তে যতই বিষ থাক, বিশ্বাসঘাতকতা তাঁদের মধ্যে ছিলনা। কিন্তু চোখের চামড়া নেই এদের। প্রতি হাটবার এই বেনু ঘোষাল সদর হাটে আসে, আর ফেরত যাওয়ার সময় এমন কোণো গায়ের সওদাগর কে পাকড়ে বিনি পয়সায় বাড়ি ফিরত, আর যেতে পথে, কলা টা , মুলোটা থলেতে ভরত, দামের কথা জিগ্যেস করলে , “ও পরে দিবানে, আমি মরছি, না পালাচ্ছি?”

কিন্তু আজ বীরেশ বিনা বাক্যে সম্মতি দিল, কারন টা অত্যন্তই সাংঘাতিক। আজ তাঁর একটা মানুষের সঙ্গ বড়ই প্রয়োজন। কারন গত দু সপ্তাহ ধরে গ্রামে যা হয়ে চলেছে .....। ওলাইচন্ডী শ্মশানের খোড়া গুনিন বলেছে গাঁয়ে নাকি জরা পেত্নির নজর পরেচে। নইলে এক সপ্তাহে অমন পাঁচ পাঁচটা আস্ত মানুষকে ওই ভাবে খুন কে করতে পারে। লাশ দুটো পড়েছিল কানা কুয়োর পাড়ে। কানাই দাস যখন ধপ করে এসে বীরেশের বাড়ির দাওায় এসে আছাড় খেয়ে পড়ল। বিরেশ গেছিল মাঠে, ছোট কাজ সারতে। আর ওর বউ সবে ঘর নিকোতে শুরু করেছে। কানাইকে ওই অবস্থায় দেখে, সে এক ছুটে বীরেশ কে ডেকে নিয়ে আসে। প্রায় আধ ঘন্টা পর ডজন খানেক লোকের সামনে জ্ঞান ফিরে পেয়ে, কানাই দাস যে কথাটা প্রথম বলল তা শুনে যেন মাথায় আকাশ ভেঙ্গে পরল সকলের। নন্দী ভৃঙ্গিকে কেউ বা কারা খুন করে রেখে গেছে। তবে কেউ কথাটা হয়তো এখানে খাটে না। বেনারস থেকে এই শ্মশানে এক সাধু এসেছিল তাঁর এই দুই চ্যালাকে নিয়ে তখন এদের বয়স চৌদ্দ কি পনেরো। নাম এদের কিছু একটা ছিল, কিন্তু বিশালাকায় বপুধারী এই দুই বালক যেন সাধুর বাক্য ছাড়া একটা পাও নাড়াত না। সেই প্রভু ভক্তি দেখে গাঁয়ের লোক এদের কে নাম দিয়েছিল নন্দী আর ভৃঙ্গি। তারপর একদিন হঠাৎই সাধু গাঁয়ের পাশ দিয়ে বয়ে চলা ফাপি নদীর জলে দেহ বিসর্জন করে । তারপর থেকে ওই দুই ভাই এই গ্রামের মানুষ। চাটুয্যেরা মন্দিরের পাশে ওদের কে থাকার জন্য একটা একচালা বাড়ি বানিয়ে দিয়েছিল। আর বছর ভর গ্রামের কোনও না কোনও হেঁশেল থেকে ওদের খাবারের জোগান হয়েই যেত। ভালো বাসত গ্রামের মানুষ ওদের। আর ওরাও ওদের ভীম দর্শন দেহ নিয়ে যেন গ্রামের পাহারা দিত, আর ঠাকুরের নাম গান করত। গাঁয়ের যেকোনো বাড়ির যেকোন অনুষ্ঠানে ওরা ছিল একান্ত আপনার লোক। বলিষ্ঠ চারটে হাত অনায়াসে দুরূহ কাজ সাধন করে ফেলত। এহেন দুটো আস্ত মানুষ কে খুন করা একা মানুষের সাধ্য নয়। কানাইয়ের কথা শুনে সবাই যখন কানা কুয়োর পারে দৌড় দিল, ভবতারিণী খুড়ো

ফিসফিসিয়ে বলেছিল, “দেখ গে, ওরা দুজনে নিজেদের মধ্যে হাতাহাতি করে মরেছে। যা গাঁজা খায় রাম রাম, শেষে কিনা মন্দির অপবিত্র করে দিলি?”

ভবা খুড়র রাগের অবিশ্যি কারন ছিল। নন্দী ভৃঙ্গিদের আগে তাঁর উপরেই মন্দির দেখভালের দায়িত্ব ছিল। বস্তুতই, পুজোর শেষে কলাটা মুলোটা, নতুন শাড়ি, ধুতি এসব পাওনা ছিল। কিন্তু লোভ মানুষের নিয়তিকে অধঃপাতে চালিত করে। মন্দিরের কোষাগার থেকে একটা দুটো সোনার বালা, মায়ের গহনা চুরি যেতে থাকে। যেদিন হাতে নাতে ধরা পরে নন্দী ভৃঙ্গির সামনে, সেদিন জমিদার চুপ করে থাকে, আর ৫০ কড়া বেতের বাড়ি মারতে মারতে উমাপতি ভবা কে প্রায় পেড়ে ফেলেছিল। সেই থেকে গোটা গ্রামে যদি কোনও এক জন মানুষ থেকে থাকে যে ওই দুই ভাই কে দু’চক্ষে সহ্য করতে পারত না, সে হল এই ভবা খুড়ো।

কিন্তু কুয়োর সামনে যে দৃশ্য দেখা গেল, সে দৃশ্য এই চর্মচক্ষুতে সহ্য করা সম্ভব নয়। এক অসহ্য বোঁটকা গন্ধে পুরো কুয়ো তলা ভার হয়ে রয়েছে, আর এক ধরনের দৃশ্যমান সবুজাভ ধোঁয়ায় ভরে রয়েছে যায়গাটা। কুয়োর তলায় বেশ কিছুটা জায়গা জুড়ে মাটির উপর শ্যাওলা জন্মালে যেমন গুটি গুটি বুদ বুদ জমে থাকে ঠিক তেমন হয়ে রয়েছে। পার্থক্য শুধু এটার রং গাঢ় লাল। আর ঠিক তাঁর মাঝে, যে দেহ দুটো পড়ে আছে, তা ঐ দুই ভাইয়ের বলে শনাক্ত করা অসাধ্য। সে দেহ দুটি যেন কেউ দুই দিক দিয়ে সমান ভাবে ছিঁড়ে ছে, এমন কি মেরুদন্ড টাও আড়াআড়ি বরাবর সমান ভাবে ভেঙ্গে ফেলা হয়েছে। আর সারা দেহের চামড়ায় গোল গোল চাকা চাকা অসংখ্য ফুটো, যাদের মুখে একটু একটু রক্ত বেড়িয়ে এসেছে। আর সব চেয়ে বীভৎস দৃশ্য হল গোটা গায়ের চামড়া অসম্ভব রকমের ফ্যাকাশে হয়ে এসেছে, প্রতিটা শিরার ভিতর সবুজাভ কিছু একটা চলমান। কিন্তু বিস্ময়ের তখনও কিছু বাকি ছিল। শ্মশান থেকে নিমাই ডোম কে ডাকা হলে, সে যখন তাঁর বড় বস্তাটায় লাশ দুটোকে চালান করতে গেল, এক প্রচন্ড বিস্ফোরনে দেহ দুটো থেকে এক রাশ সবুজ ধোঁয়ার উদগীরন হল। নাক চাপা দিয়ে চরম বিস্ময়ে সকলে চেয়ে দেখল দেহ দুটো যেন চুপসে যাওয়া বেলুনের মতো মিয়িয়ে গেল। একটা চামড়ার আস্তরন পড়ে রইল কেবল মাটির উপড়। সেদিন অনেক রাত পর্যন্ত জমিদার বাড়িতে আলোচনা চলল। সকলের ই মুখ ভার। কিন্তু কোনও সমাধান আসাতো দুরস্ত, একগুচ্ছ আশঙ্কা নিয়ে সেদিন গ্রামবাসীরা বাড়ি ফিরেছিল সকলে। কিন্তু দুই দিন পরেই সকলের আশঙ্কায় সিলমোহর বসিয়ে অশনি সংকেত নিয়ে এল আরেকটা সকাল।

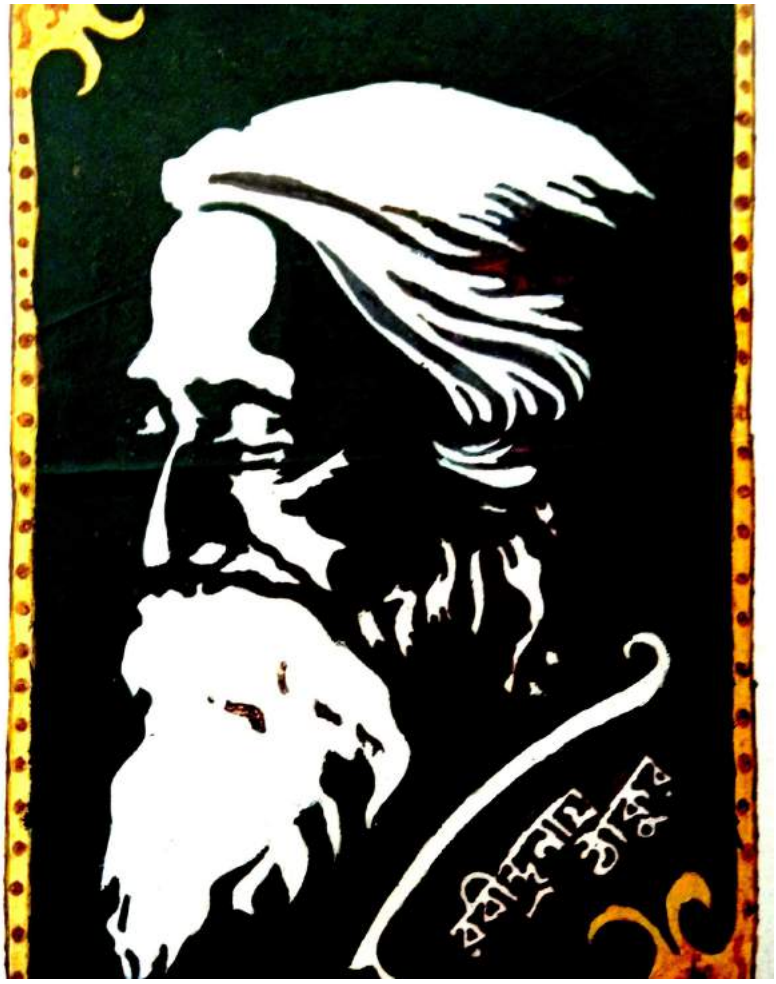
বর্ষা রায়

প্রথম বর্ষ


SHADES
"ART ENABLES US TO FIND OURSELVES AND LOSE OURSELVES AT THE SAME TIME."
-Thomas Merton

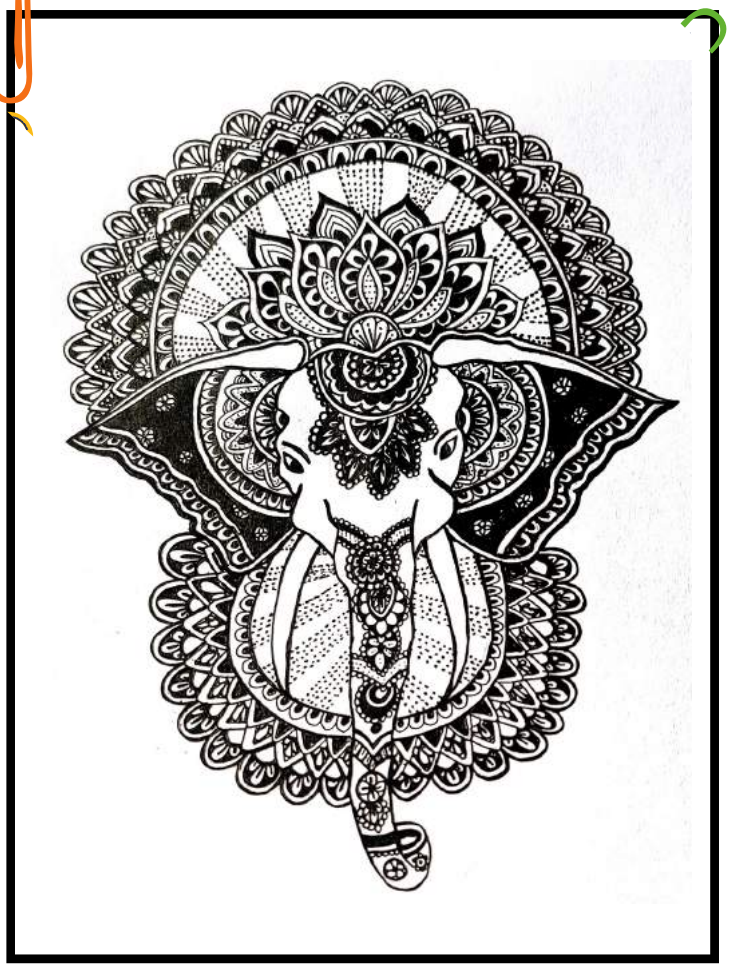
Megha Roy,1st Year

Riya Kundu, 2nd year



Samrit Bhowmik,1st year

Rahil Sengpta, 1st year



Poulomi Mandal,2nd Year

Aaheli Maity,2nd Year

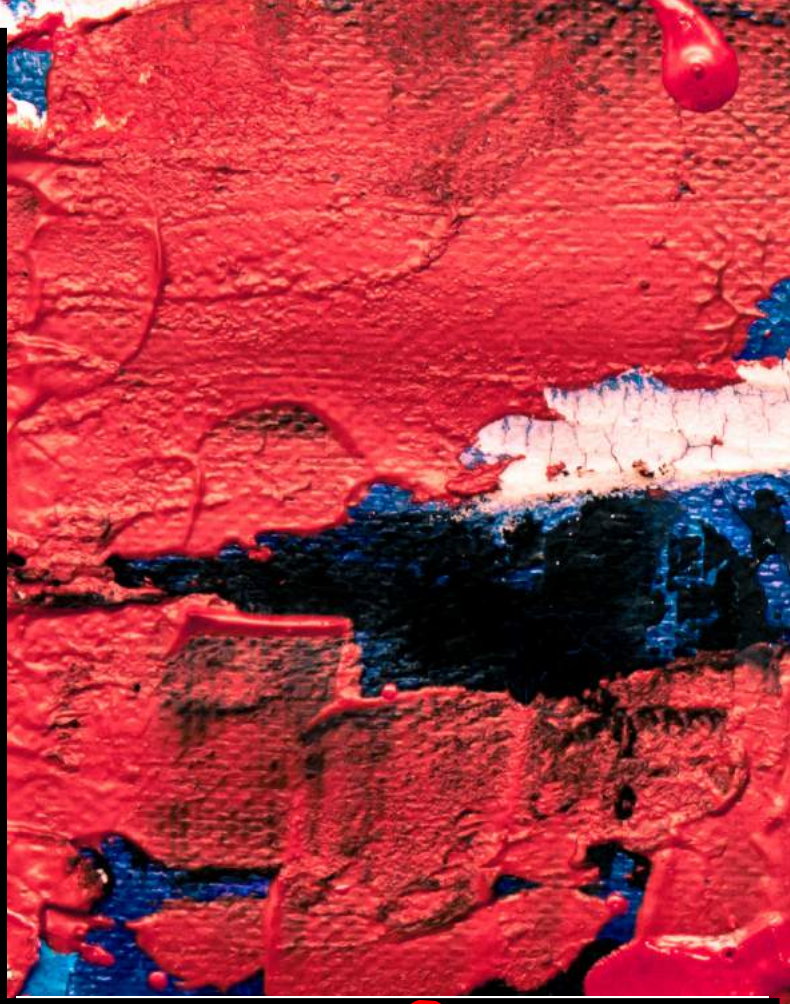
Barsa Roy,1st year

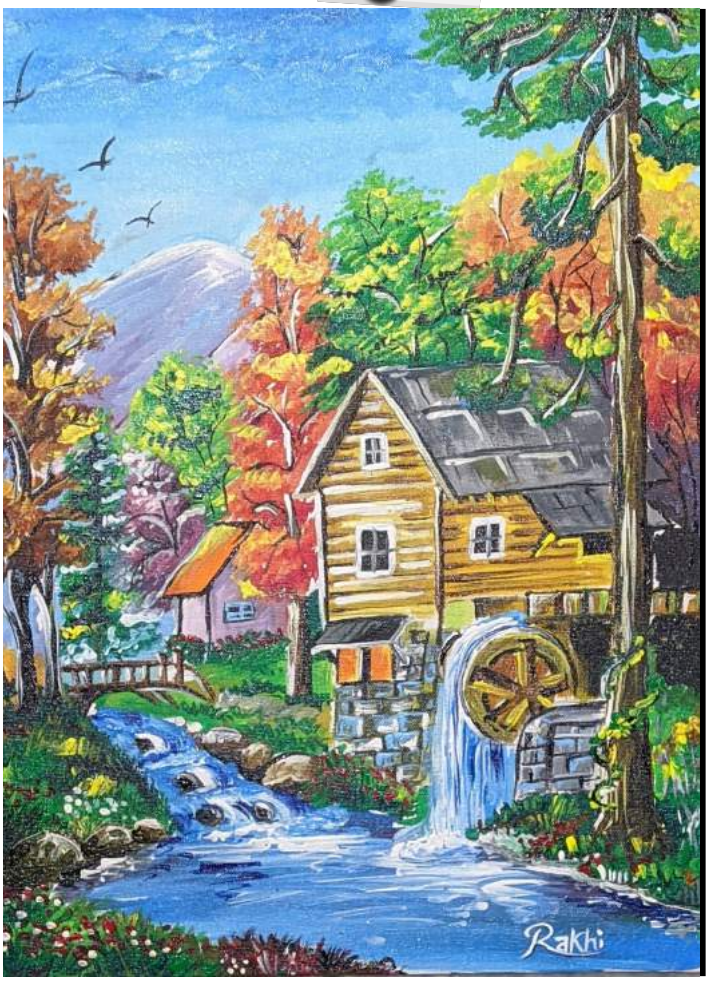
Shreya Arvind, 1st year

Angel Shaha, 1st year

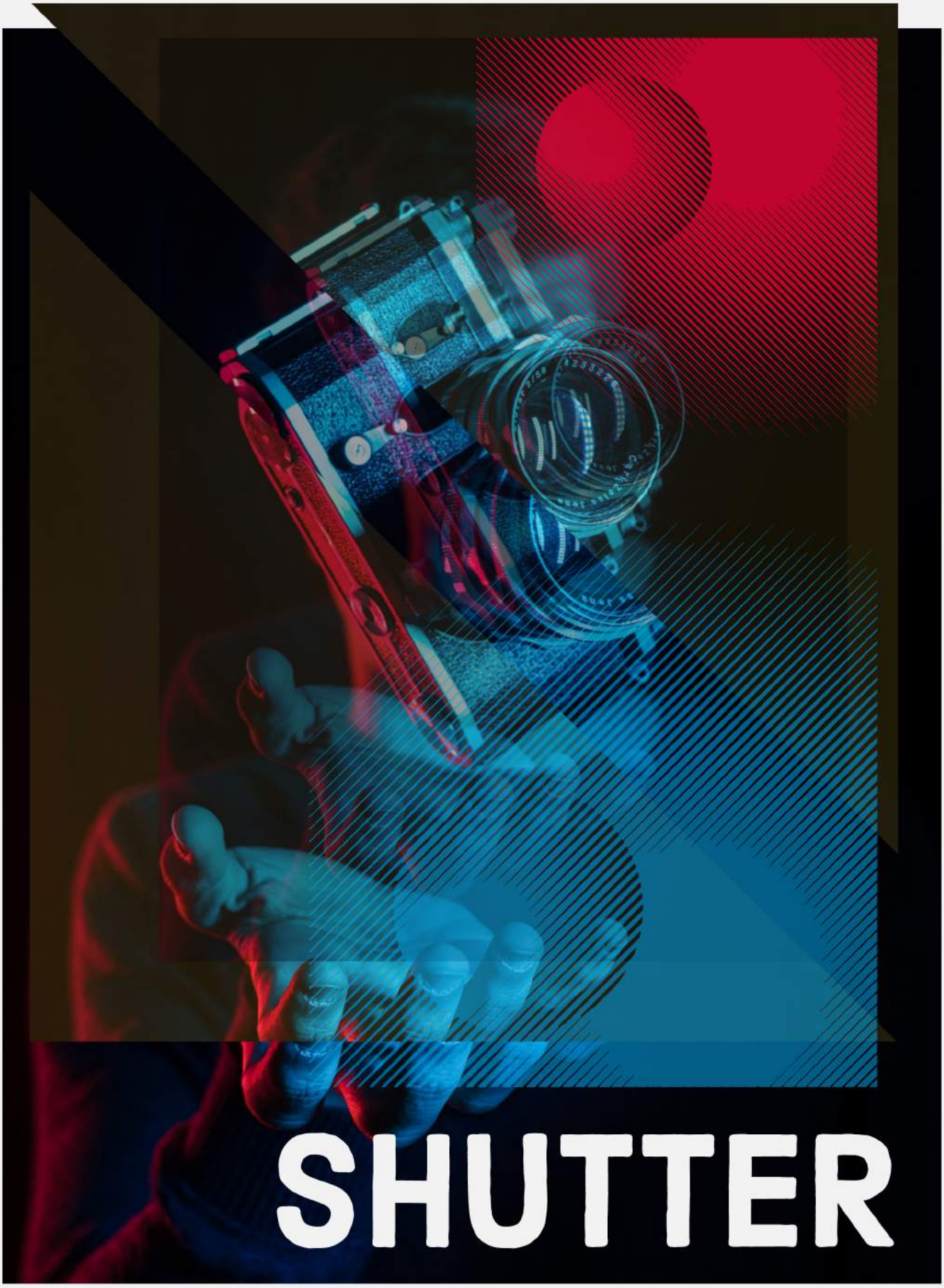
Nishant Sinha,1st year

Supritey Dey, 2nd year





Rakhi Nandi, 2nd year



"THE PAINTER CONSTRUCTS, THE PHOTOGRAPHER DISCLOSES."

-SUSAN SONTAG

Every temple has it's own story

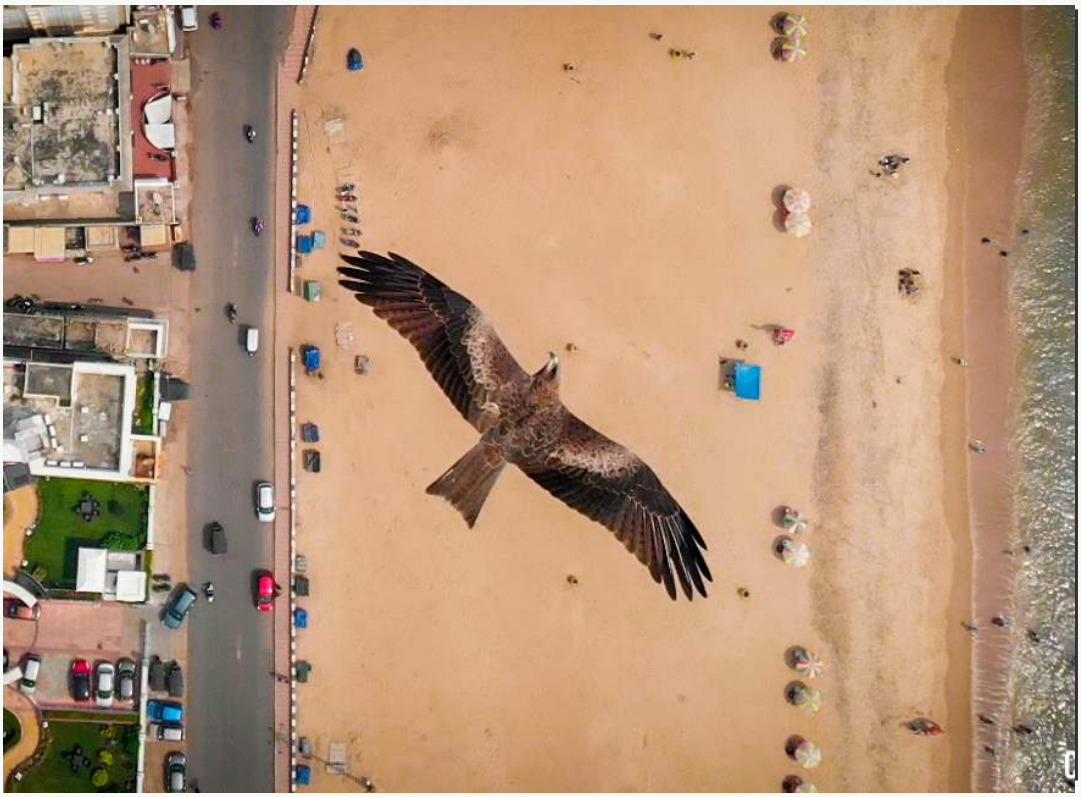
Subhangi Nandy,1st Year

Nature is the mirror of divinity

Barsa Roy,1st Year

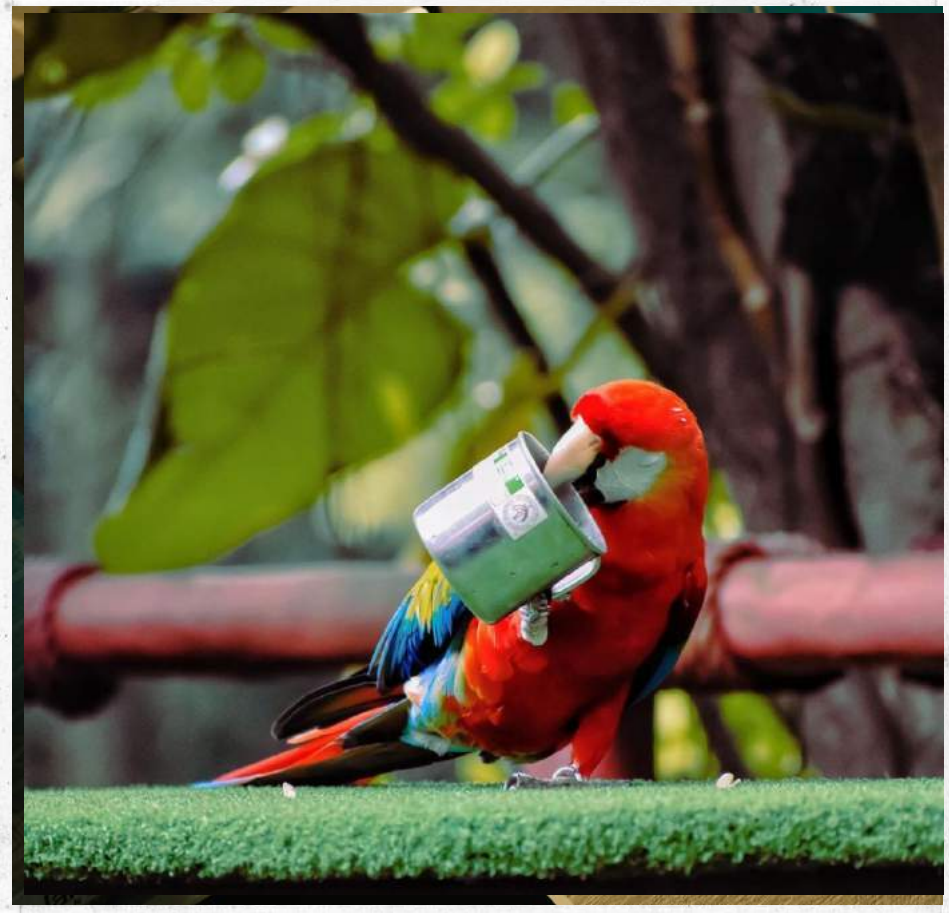
Beautiful sunsets need cloudy skies

Vanshika Agarwal,1stYear



Not all those who wander are lost

Chirayush Chakraborty,1st Year



Do small things with great love

Aaheli Maity,2nd Year

There are no facts,only interpretations

Sanmatra Chatterjee,2nd Year

Mountains are the soul's fuel

Atijit Goswami,1st Year

Without patience, a sailor I would never be

Shounak Chattopadhyay,1st Year

May the flames guide your way

Samrit Bhowmik,1st Year

Live Life in full bloom

Biswaroop Joardar,1st Year

THE WORLD TODAY

INDIAN UNICORNS STARTUP

DUMPING

SERVING HUMANITY

GLOBAL WARMING

ART OF WAR

TALIBAN TAKEOVER

EUTHANASIA

孙尺丁 曰千 山孙尺

战争的艺术

Shreedhor Kundu (1st Year)

The **Art of War** is an ancient Chinese military text composed of 13 chapters written by Sun Tzu. Aside from specific combat tips, it has a profound philosophical side to it and its wisdom can be applied to our modern lives as well, but rather with work, sports, and daily conflicts in general.

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1. Choosing your battles :

Sun Tzu argues that armies should only engage when they have a clear advantage. In the same way in life, we have to pick our battles carefully knowing which are worth fighting and which are wastes of energy and resources.

"If victory is clear: fight. If defeat is certain: do not fight."

Self-awareness is the key; being realistic about our strengths and weakness is very important. Eg: as we grow up we realize that there are time and resource constraints to what we can achieve.

2. Deception:

Sun Tzu states that a plan must be disguised employing deception which makes our actions unpredictable and prevents exposing our true intentions to the enemy.

"When able, feign inability; When deploying troops, appear not to be; When near, appear far; When far, appear near."

One historical example can be that of the Trojan war. The art of deception is common in the business world and also sports.

Eg: In football, the attackers often use their foot skills to deceive the defender.

3. Adapting to the situation:

In war, the enemy changes all the time, as well as the natural circumstances. Sun Tzu encourages us to derive victory by staying formless ourselves.

Bruce Lee, one of the most influential figures of the 20th century, also shared this philosophy of being formless like water. Just as water takes the shape of the vessel it is poured into, one should be able to change and adapt to the circumstances they are put.

.4. Finding balance and inner peace:

One shouldn't be too reckless, but not coward either. It is dangerous to be easily triggered because it's easy to lure people with a temper into a battle.

Eg: an artist or any content creator on a social media platform comes across rude comments and trolls. It is up to them whether or not they will get triggered by them leading to exhausting meaningless fights. One should be compassionate to others and treat them with humanity. Also, one shouldn't have excessive care of public opinion as it hinders personal growth and productivity.

There are different kinds of war, civil war, cyber war, revolutionary war, etc, all having different reasons and motives behind them. I believe war and peace are two sides of the same coin. However, peace and stability do not come by themselves, and sometimes to protect one's interest or community one has to choose war as a last resort. Wars are destructive, causing loss of life and damage. But, we can be students of war as the art of warfare gives valuable lessons on discipline, the importance of preparation and planning, being self-aware, observant, etc.

TALIBAN TAKEOVER AFGHANISTAN

SYED MAHAMMAD RIAZ, 1st Year

TALIBAN HAS COMPLETELY OCCUPIED AFGHANISTAN NOW

Taliban has Completely Occupied Afghanistan now. The Afghan government has fallen. And Afghanistan's President Ashraf Ghani has fled the country.

Some reports claim that he fled to Uzbekistan.

The other countries are trying to evacuate their citizens from Kabul, as soon as possible. On 15th August, the Taliban entered Kabul. And it went inside the presidential palace.

Denmark, Norway, Sweden, Germany are on the long list of countries that have shut down their embassies in Afghanistan. The US embassy has also been completely evacuated. And the remaining people are trying to escape the country via Kabul airport. Because Kabul is the capital of Afghanistan, and the Taliban has occupied it from all sides.

The Kabul airport is the only place remaining for those who want to leave the country. For this reason, some horrifying scenes have come in from the Kabul airport. Crowds packed the international airport in a chaotic scene on Sunday, 15th August. After the Taliban insurgents entered the capital, President Ashraf Ghani fled the country saying, "I wanted to avoid bloodshed". It took the Taliban just one week to regain control of Afghanistan. The airport has been closed to all civilian flights. There have been gunshots fired there, where Afghans are gathering in hopes of exiting the country.

After the Taliban insurgents entered the capital, President Ashraf Ghani fled the country saying, "I wanted to avoid bloodshed".

The US president Joe Biden had claimed that the Taliban has around 85,000 fighters compared to the Afghanistan army's 300,000 soldiers. The Afghan army could have easily defended itself. The US Intelligence experts had said that it would take the Taliban 3-4 months to get control of the entire country. But in just a few weeks, very easily, the Taliban has overthrown the Afghan government.

Perhaps the reason behind it is that there has been little to no resistance from the Afghan army. They did not fight back against the Taliban. Last year, when Donald Trump was the President of America, the USA had signed a peace deal with the Taliban. For the Afghan soldiers, it was a betrayal. They questioned how America could go and have talks with their enemies and sign a peace deal. With Joe Biden's administration, the United States pulled out its troops and left Afghan soldiers even more demoralized.

They doubted their ability to fight without any military support. On the other hand, very strategically, the Taliban used propaganda and psychological operations against the Afghan army.

Instead of declaring war, the Taliban sent text messages to Afghan soldiers to make them believe if they do not fight, they will not be killed and their family members will also be safe. They were threatened so much, that thousands of soldiers deserted the Afghanistan army. And they switched sides. Because at the end of the day, any common man prioritizes his and his family's security over everything else. They know that if they give in to the Taliban they'll survive.

Their family would survive. So why wouldn't they choose the option? In particular, when their leader wasn't very motivated himself. He wasn't confident of winning. And he fled the country. However, the Taliban's rule of the common people is perhaps no less than a living hell, especially for women.

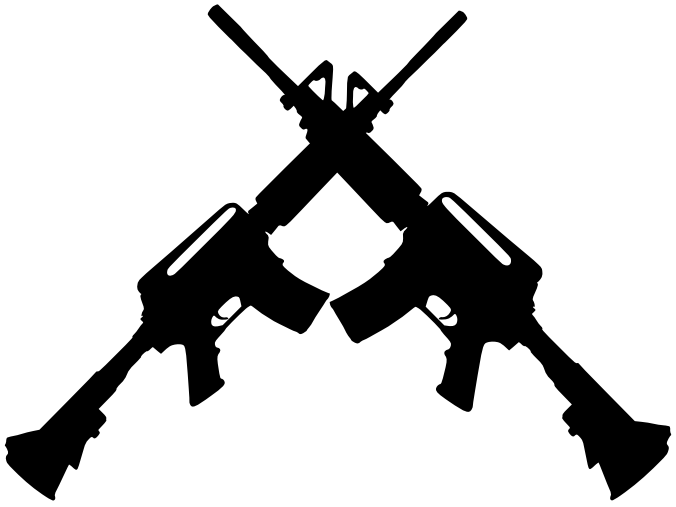
Reports have already started to come in that women are being kidnapped and forced to marry the Taliban fighters. Men are being compelled to fight for the Taliban. Several ex-Government officials have been assassinated. Girls are worried if they will be able to go to school.

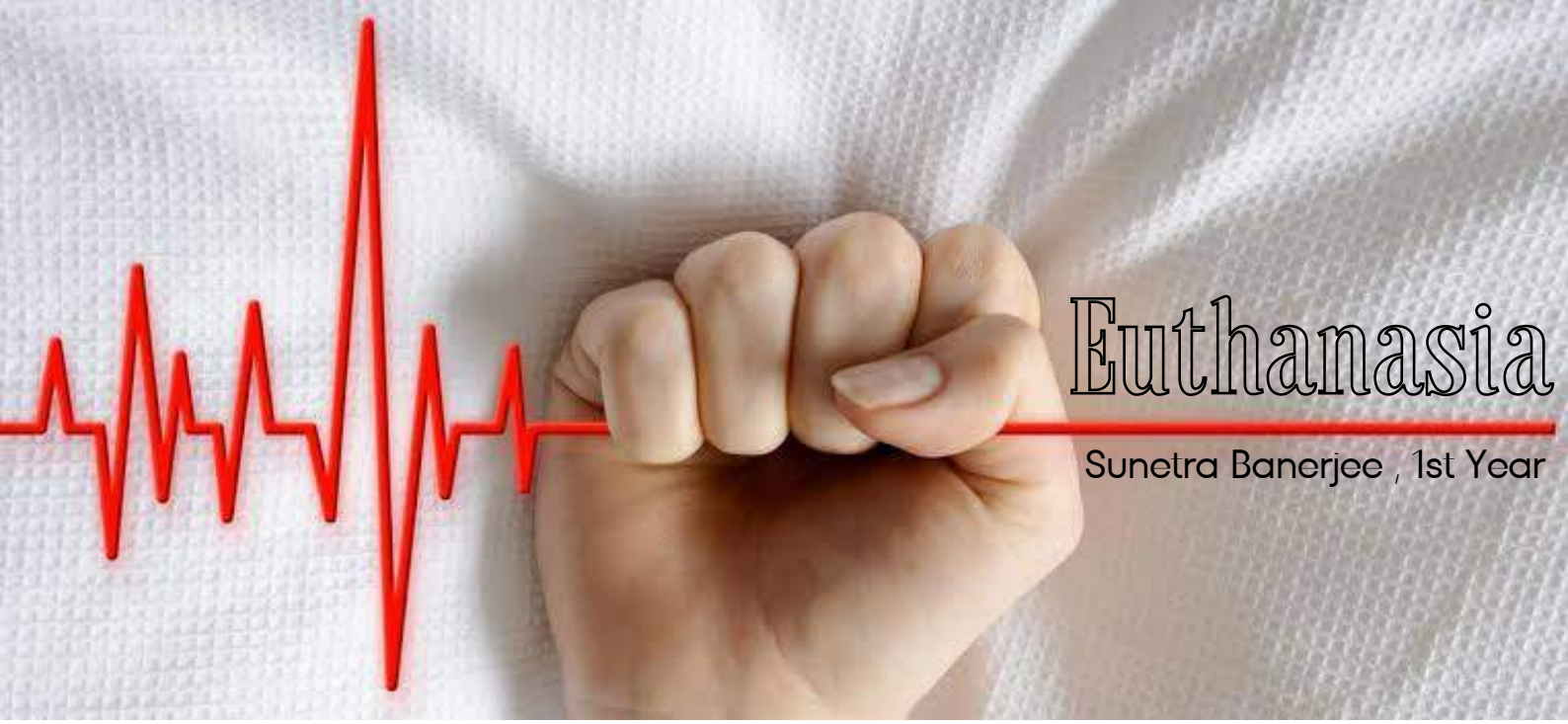
However, the Taliban's rule of the common people is perhaps no less than a living hell, especially for women.

What's interesting now is that the Taliban is denying some of the news reports. They claim that when they form the new government in Afghanistan they will give rights to women as well. They'll be allowed to go to school, to work, and to go out of their homes alone. Although, women would still have to wear hijabs. That would still be compulsory. Taliban has even gone and said that the media will be allowed to criticize anyone. The ground reality is different from what's being said, however. A comedian in Afghanistan was murdered by the Taliban.

Taliban has even admitted to having killed this comedian. Additionally, the Taliban has also admitted to assassinating several government officials. Because according to them, they were traitors. So, unfortunately, for the Afghans, the situation is looking very bleak.

The best we can hope for is that the atrocities committed on Afghans by the Taliban, as we imagine, will not happen. And that the Afghans can get true Independence and Freedom.





Euthanasia

Sunetra Banerjee , 1st Year

Can we ever forget the stellar performance of Aishwariya Rai and Hrithik Roshan from the film Guzaarish? Never. But there was one more thing that made us think about our legal systems is, the topic around which the entire film revolved, “euthanasia”. Euthanasia is defined as the administration of a lethal agent by another person to a patient for the purpose of relieving the patient's intolerable and incurable suffering, or in other words, it refers to “mercy killing”. There are two types of euthanasia - passive euthanasia and active euthanasia. Active euthanasia is defined as taking an immediate action such as using lethal injection to painlessly put a terminally-ill patient to death.

Belgium's euthanasia doctors even believe they are being humane because they are liberating people from their misery.

In the Netherlands, euthanasia and physician-assisted suicide have been practiced with increasing openness, although technically they remain illegal.

In 1995–1996 a new procedure for reporting cases of euthanasia and physician-assisted suicide was introduced. Probably as a result, the number of reported cases of euthanasia increased, from 486 in 1990 to 1466 in 1995. In 2002, Belgium became the second country in the world after Netherlands, to legalize euthanasia. Over the next decade the country became a living laboratory for radical social change.

Belgium's euthanasia doctors even believe they are being humane because they are liberating people from their misery.

In India, euthanasia was a crime. Section 309 of the Indian Penal Code (IPC) deals with the attempt to commit suicide.

Section 306 of the IPC deals with abetment of suicide. Both actions are punishable. Only those who are brain dead can be taken off life support with the help of family members. Likewise, the Honourable Supreme Court is also of the view that that the right to life guaranteed by Article 21 of the constitution does not include the right to die.

On 9 March 2018, the Supreme Court of India, passed a historic judgement-law permitting Passive Euthanasia in the country

The court held that Article 21 is a provision guaranteeing protection of life and personal liberty and by no stretch of imagination can extinction of life be read into it. But Since March 2018, passive ethunasia is legal in India under strict guidelines. On 9 March 2018, the Supreme Court of India, passed a historic judgement-law permitting Passive Euthanasia in the country.

This judgment was passed in wake of Pinki Virani's plea to the Supreme Court in December 2009 under the Constitutional provision of “Next Friend”. It is a landmark law which places the power of choice in the hands of the individual, over government, medical or religious control which sees all suffering as “destiny”

In my view, euthanasia is absolutely fair. Once we are born, we are meant to die one day, and no one can ever change this truth. If we are undergoing some unavoidable and extremely tough situations in our life, then we can choose the last option, i.e. to end our life, but what about those, suffering from an incurable disease or in coma for decades of years but are not in a physical state to commit suicide. It is rather injustice to force them to live a life that they don’t want to live. It is an injustice in the name of “right to live”, cause that individual is not enjoying it. Rights are meant to be enjoyed, and not tolerated. In such cases, “right to a peaceful death” becomes a justice.

“It is an injustice in the name of “right to live”, cause that individual is not enjoying it. Rights are meant to be enjoyed, and not tolerated. In such cases, “right to a peaceful death” becomes a justice.”

GLOBAL WARMING

Crossing the Threshold

Swarnadeep Saha, 1st Year

My eight-year-old cousin has been taught about climate change in her school and to the dismay of us all, she couldn't sleep a single night without asking if the earth is going to survive till her next birthday. She is scared the world is going to turn into a hot molten state in some nightmarish version of the floor-is-lava. When I was eight, I was scared of being eaten by a dinosaur. Fortunately, my panic was unfounded but hers is not.

Sanity of a person can be tested on their aggravation on climate change reports. As recently as July 28, nearly 14,000 scientists have signed a new climate change emergency paper declaring that we have entered a new phase of climate change. The effects of the same are imminent all across the globe. From the melting of more than half of Greenland's ice sheets to the cyclone in West Bengal, it takes quite a delusional person to turn a blind eye to it all and join a Facebook page declaring all of it as a mere conspiracy by the government.

A viral YouTube video from Oxford Union argued against the motion that western countries have no right to impose environmental standards on developing countries. In other words, India is a country where more than 230 million people live below the poverty line. They are more uncertain about their next meal than we will ever be about anything in our entire lives.

> "Should we expect the developing nations, such as ours, to meet the environmental crisis standards of the west, given the daily problems of economy and migration?"

So, it is ridiculous that they'll have to bear the burden of responsibility of climate change. Right?

India is a country where more than 230 million people live below the poverty line. They are more uncertain about their next meal than we will ever be about anything in our entire lives. So, it is ridiculous that they'll have to bear the burden of responsibility of climate change. Right? While we were comfortably lounging in our house enjoying the morning rain, cyclone Yaaswreaked massive havoc in India's eastern coast making around 150,000 people homeless. Almost every major cyclone including Tauktae and Amphan can be linked back to us releasing tons and tons of carbon dioxide in the air. According to Reuters, "the poorest are at climate risk twice over."

Farmers, who account for the 150 million people in India, have been negatively affected by global warming and the reasons of which escape them. So, I don't know if we should force paper straws and paper bags down the throats of our poor people. But I can say that they are already bearing the burdens of climate change without even knowing about it. Bill Gates, named his new book "How to Avoid a Climate Disaster" and not "How to STOP climate change," which should be an alarm in itself hinting at the irreversibility of our actions. We are at the face of a massive destruction which could potentially cost all of our lives while our politicians keep skipping global climate meetings.

COURTESY DECCAN HERALD WEBSITE

The problems of the poor are infinitely complex. But a number of them results from their lack of education. Most farmers have no idea how their productions are drastically impinged by global warming. Agriculture contributing to 15% of the country's GDP doesn't exempt any breathing person from the impacts of climate change. So, our first and foremost duty is to educate more and more people about the ills of climate change. True democracy lies in the hands of the people. Barring a large amount of population from the knowledge which governs their daily lives cannot be allowed in the world's largest democracy.

If you are still not convinced by the climate change reports and the requirement of ourcollective action towards it, I might have one other trick up my sleeve. Let's talk about the engineer's favourite beverage, coffee. Coffee requires precise temperature and elevation for perfect yield.

One of the biggest producers of coffee in the world is Columbia, specifically in the region Zona Cafetera. For the past few decades, greenhouse emissions have warmed the region by 1.2 degrees, making their production suffer a significant amount. A recent study estimates that the amount of land that can sustain coffee cultivation all over the world will be reduced to 50%. That is not just bad news for the economy but it personally attacks us all. As the popular saying goes,

> "Behind every successful person is a substantial amount of coffee"

Experts have been pointing out solutions for years now and we have been turning a blind eye to them. So, with the wrap up of the hottest month ever recorded, July 2020, it's about time we take this seriously.

SERVING HUMANITY

First Priority

Anindya Chatterjee, First Year

The world-absolutely devastated with the pandemic ! Shortage of beds , inadequate supply of oxygen cylinders, lack of proper food and what not. Amidst this BHARAT SEBASHRAM broke their 104 year old tradition for coronavirus patients by allowing nonveg food to be prepared and served inside their premises.

This decision was ground breaking as protein is the main requirement for suffering and healing covid patients.

Incidentally Swami Pranabananda started the organization in 1917 and ever since then not only the saints but no one inside the ashram were allowed to take non vegeteranian food. Perhaps , this is exactly what “modern” means. Majority relate it to the outfits and speaking fluent English. But no,it is the mentality, that helps you win over your own stereotypes.

Not only this, the two-floored building of the organization in Goria opened a 30 bed covid centre with 24 hours oxygen support. By allowing nonveg food to enter Bharat Sebashram has become an epitome in “serving mankind”. They proved that saving man’s life is more important than religious practices.

" They proved that saving man’s life is more important than religious practices "

INDIAN UNICORN STARTUPS

RAJAT JANA, 1st YEAR

Startups, in India as in many other parts of the world, have received increased attention in last 10 years.

The Indian startup ecosystem evolved rapidly over the last 20 years .Few startups were founded in the starting of 21st century, but the ecosystem was still undeveloped as only a few investors were interested in investing in these startups at that time. Startups,in India as in many other parts of the world, have received increased attention in last 10 years. Their numbers are rising and they are now being widely recognised as important engines for growth and jobs generation.The number of startups increased rapidly and more support has become available now a days.

In India Bangalore has emerged as India's most attractive startup hub, but significant founding activity is also taking place in the National Capital Region (NCR), as well as some others cities.

As the Indian startup ecosystem witnesses a boom, India is becoming the world's fastest-growing startup ecosystem with around 59 indian startups enter the Unicorn Club.

What is an unicorn startup?

Basically, a unicorn startup is a startup company valued over $1 Billion.The term was given by a venture capitalist Aileen Lee in 2013 choosing the mythiical animal to represent such successful ventures.
According to reports there are around 750 unicorns as of now in the world along with 30+ unicorns with over $10 billions valuation in the world.
Some of biggest unicorns including Bytedance, Stripe, SpaceX, Klarna etc..

Indian Unicorns

As of now India have around 59 startups unicorn in different fields like e-commerce , fintech , medical , food delivery , edu-tech etc...
Digitisation has provided a boost to the startup ecosystem in India. The last couple of decades that we have seen just how much technology has changed our day-to-day lives.The Indian technology start-up ecosystem continues to be on a growth trajectory on the back of rapid digitalisation and tech adoption as we emerge from the pandemic.

Some of the major Indian startup unicorns are Policy Bazaar, Delhivery, Nykaa, Paytm, Swiggy , Byju's etc...
Following the current trend, a wide range of homegrown start-ups are eyeing listing on the bourses in the coming years.

Some of the major Indian startup unicorns are Policy Bazaar, Delhivery, Nykaa,Paytm, Swiggy , Byju's etc

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Top 3 most valued Indian unicorns are:

Byju's - $16.5 billions
Byju's is an Indian educational technology company founded in 2011 by Byju Raveendran and Divya Gokulnath. It the world's most valuable educational technology company

1

Paytm - $16 billions
Paytm (pay through mobile) is an Indian multinational technology company that specializes in digital payment system, e-commerce and finance founded by Vijay Shekhar Sharma in August 2010.

2

Oyo - $9.6 billions
OYO Rooms is an Indian multinational hospitality chain of leased and franchised hotels, homes and living spaces founded by Ritesh Agarwal in 2012

3

Previously Flipkart was India's biggest unicorn which was acquired by Walmart on 2018 at a $16 billion deal for 77% stake ,exited the unicorn club at a valuation of $22 billions.

Unicorns in 2021:

The year **2021** has been a blockbuster for the startup industry , Eight months into **2021**, the **Indian** startup ecosystem has already added 24 new entrants to the unicorn club with the latest unicorn Zetwerk which is a B2B manufacturing startup which is more than double of the numbers of startups becoming unicorns in 2020.

Startups that enter unicorn club in 2021 are:

Digit Insurance (insurtech), **InnovAccer** (healthtech), **Five Star Business Finance** (NBFC), **Meesho** (social commerce), **Infra.Market** (B2Becommerce), **CRED** (fintech).

Pharmeasy(healthtech),**Groww** (fintech), **Gupshup** (conversational messaging).

Mohalla Tech (parent company of social platforms ShareChat and Moj), **Chargebee** (SaaS), **Urban Company** (home services marketplace), **Moglix** (B2B commerce), **Zeta** (fintech).

BrowserStack (SaaS), **BlackBuck** (logistics), **Droom** (automobile), **OfBusiness** (B2B commerce), **BharatPe** (fintech), **Mindtickle** (sales enablement), **upGrad** (higher education), **CoinDCX** (the first Indian crypto startup to reach unicorn status), **Eruditus** (edtech), and now the latest, **Zetwerk** (B2B manufacturing).

Dumping

Let us take a hypothetical scenario, where you sell shoes. Let's say it costs Rs.100, for everyone, to make a pair of shoes. You have a few competitors in your area and you adjust your selling prices to be as low as possible to get more customers. After all, customers tend to buy things that are cheaper (assume the quality of shoes don't change with price). None of you can keep a sell-price below Rs.100 as that would make a loss.

Now imagine one day, a new-comer sets up a shoe business in your area. And you find out that this new-comer sells exactly the same shoes as you, but at Rs. 80. You are sure that this new business is doomed, when you suddenly realize that all of your customers have been drawn to the alluring low cost of the shoes sold in the new shop. And while the new business does not go bankrupt, you get less and less customers every day, and before long you find yourself penniless and out of business.

Now before we take this story and expand it to the level of industries, a few questions come to our minds. Why does the new business keep its selling-price so low? Does it not want to make a profit? And how does it not go bankrupt? The answer lies in a practice called Dumping.

Dumping is a kind of injuring pricing, especially in the context of international trade. It occurs when manufacturers export a product to another country at a price below the normal price. If a company exports a product at a price that is lower than the price it normally charges in its own home market, or sells at a price that does not meet its full cost of production, it is said to be **dumping** the product.

The objective of dumping is to increase market share in a foreign market by driving out competition. In the above example, the new business successfully eliminates all contenders, and gains solid control over the market. Thus, the business enjoys a monopoly in the market and gains enough power to control the market conditions and to unilaterally dictate the price and quality of products.

Due to lack of other competing businesses,the consumers would be forced to accept the prices set by the only company available. The situation worsens if the commodity in question is an essential item like food or clothing or something big, like the electronics or smartphone market of a country. In such cases, buying essentials becomes difficult for the common people.

cases,buying essentials becomes difficult for the common people.
But still, how does the company stay afloat in the early stages, when it has to keep its sell prices as low as possible? Well, it compensates its losses from other sources, like profits made in the home country's market of the industry, or even foreign governments.

Dumping has a lot of political importance. Imagine if an entire country's shoe market share (for instance) goes into the hands of a foreign company. It would be really bad news for the common people. It might get even worse if you imagine, for example, electronics, instead of shoes. Economies suffer a lot due to dumping. Indigenous industries get throttled to death. As more and more industries shut down, people lose jobs and become poor. Ultimately, for a particular commodity, the country becomes a consumer from a producer.

So, what is to be done? Is there any way to stop dumping? Well, the answer is complicated. Consumers will always try to buy goods at cheaper prices (obviously as long as quality of product is not compromised).

And opinions differ as to whether or not such practices of dumping constitute unfair competition, but many governments take action against dumping to protect domestic industry. The WTO agreement allows governments to act against dumping where there is genuine ("material") injury to the competing domestic industry. To do so, the government has to show that dumping is taking place, calculate the extent of dumping (how much lower the export price is compared to the exporter's home market price), and show that the dumping is causing injury. These proceedings are not easy.

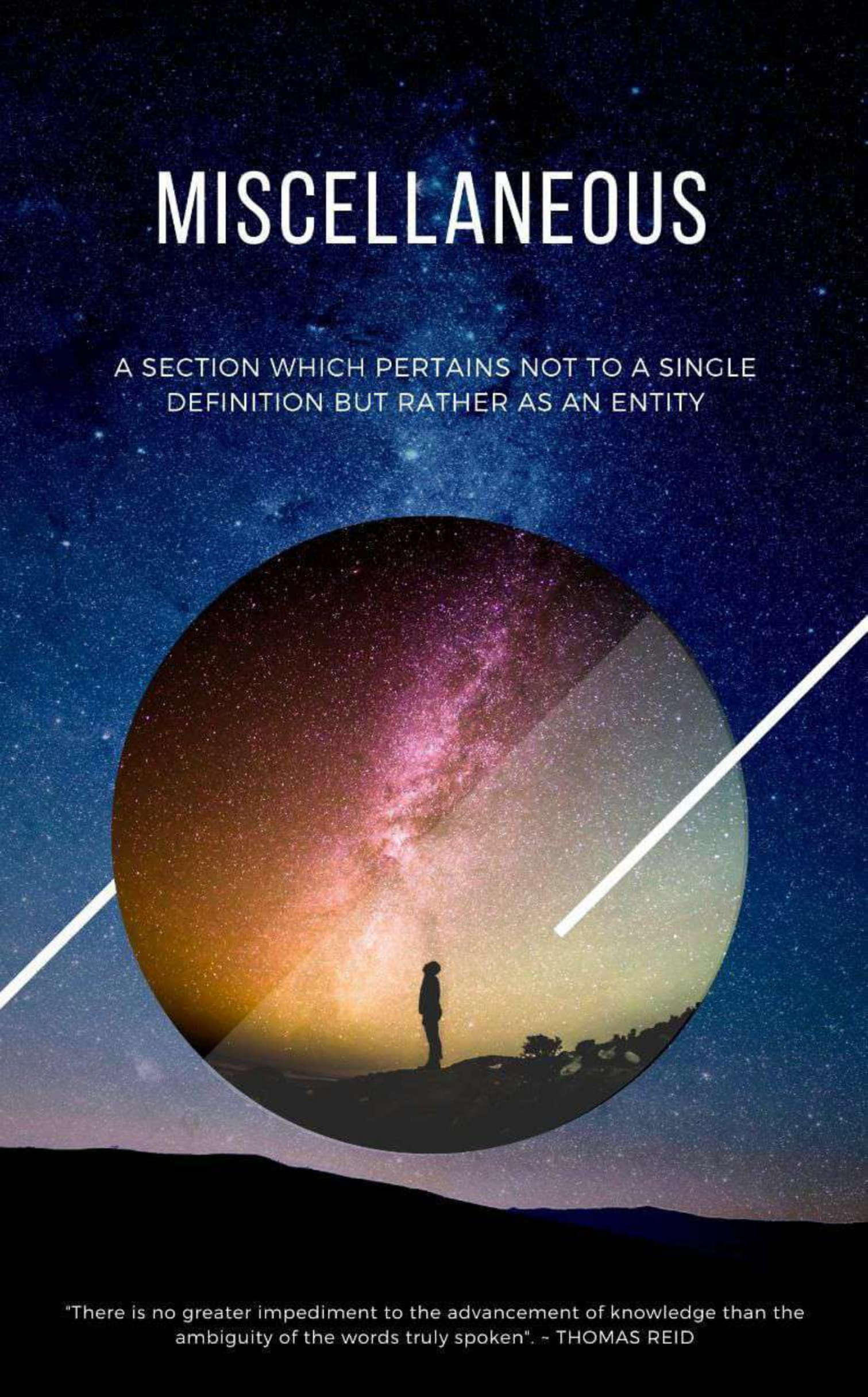
Dumping can often prove to be a really dangerous weapon that can harm the economy of the target country. Very slowly but steadily it sucks out the life-blood of native industries. There are countermeasures like anti-dumping duties, but sometimes, they are just not enough. Governments need to be cautious about these things. We must try to avoid a monopoly at all costs, for the sake of the consumers. A healthy competition in the market is always good, both for businesses and for consumers.Governments should subsidize

small businesses to encourage this healthy competition. And prices, especially those of essential goods, should not be left freely on the market's decision. There must be some control over how high these prices can go.

~Sagnik Mukherjee
2nd year

MISCELLANEOUS

A SECTION WHICH PERTAINS NOT TO A SINGLE DEFINITION BUT RATHER AS AN ENTITY



"There is no greater impediment to the advancement of knowledge than the ambiguity of the words truly spoken". ~ THOMAS REID

The Fear Of Failure:

The Biggest Enemy Of Success

Success is the things for which all of us always crave. We give a lot of effort to achieve the desired success in our life. We do all the things so that we can reach our final destination.

However, the path toward success is not very easy. Behind the every successful person there is a story of his struggle. To achieve the desired success your path is not going to be very simple. You have to go through a lot of hurdles to bring success on the boards. Well, some people are afraid of failure before their success. They think that they can never overcome those issues. And it is the worst thing to do if you want success on your bucket.

You must know that fear is the greatest enemy of progress. If you fear a lot, you can never get the success that you want. The most important thing that you have to do is to overcome your fear. If you overcome the fear, no one can stop you from getting success in life.

And to overcome the fear, you have to stay active in life and start believing in yourself. No matter how hard it is, you have to master it. And if you cannot overcome fear, you can never witness success. So, start today. Take small steps and accomplish small tasks. Once you achieve small jobs successfully, you will get confidence. And once you get the spirit, you can effortlessly overcome your fear.

Courage is one of the most reliable tools to fight anxiety. Therefore, unleash all the bravery inside you and kick out the fear of failure out of your life

Nidhi Dubey
2nd Year

KAVALUDAARI MOVIE REVIEW:

"A PERFECT NEO-NOIR THRILLER FROM ANDHADHUN's WRITER"

MOVIE: KAVALUDAARI
DIRECTOR: HEMANTH M. RAO
CAST: ANANT NAG, RISHI, ACHYUTH KUMAR, SUMAN RANGANATH, SAMPATH MAITREYA
GENRE: SUSPENSE THRILLER
DURATION: 141 minutes
LANGUAGE: KANNADA (U/A)
RELEASE DATE: 12/04/2019

SYNOPSIS: The film begins in the year 1977 inside Archaeological Department of Bangalore building where a man has been murdered and a robbery has taken place. Mr. Gurudas Naidu(Sidhaartha Maadhyamika) returns to his home wearing a bloodstained blazer and a folded piece of paper falls from his pocket.

The story now shifts to the present day where K.S.Shyam (Rishi) is a traffic police officer who is frustrated with his daily routine of handling traffic and he is constantly on the lookout to get into the crime department. One day an accidental discovery of human bones occurs during a road widening project.Shyam decides to investigate the case off the records when the crime team gives up.

He finds out that the bones could belong to Mr.Naidu ,his wife Vijayalakshmi Naidu(Samanvitha Shetty) and their 10 year old daughter whose missing case was investigated by inspector Muthanna(Anant Nag) 40 years ago. With the help of Kumar(Achyuth Kumar),editor of an investigative newspaper, Shyam goes to meet Muthanna who has taken voluntary

The rest of the story revolves around how Shyam uses his wit and intelligence to resolve the case and find out the real culprits while facing many twists and turns.

REVIEW: The story unfolds in its own pace. The director has given the movie a realistic treatment and the environment set up for the movie for different scenes makes this thriller more engaging and will keep the audience hooked to their seats till the last minute.

The scene where Shyam reads the statements of the people during interrogation of Naidu family missing case,the director has used different effects of light and had given a very unique approach which will make the audience awestruck.

Cinematography by Advaitha Gurumurthy is really appreciable. Charan Raj has given sensational music. The background music for the chase scene and the fight scene, the Nigooda song playing while Shyam is going through the files of missing people from 1975-1980 and the title song at the beginning deserve a special mention.

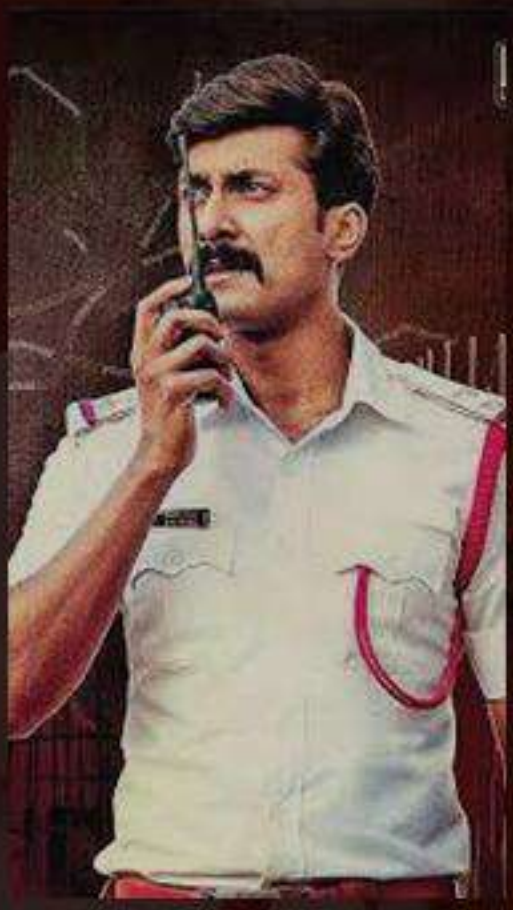
Rishi as K.S.Shyam has an amazing screen presence; he is calm, intelligent and energetic. Veteran actor Anant Nag who portrays the role of Inspector Muthanna once again gives a spectacular performance. Both Achyuth Kumar and Sampath need a special mention for their outstanding performances.

The duration of the movie could have been reduced by 10-15 minutes as there are some subplots in the 2nd half which were not necessary in the movie.

Apart from the investigation, another main highlight of the movie is the chemistry between Muthanna and Shyam which develops into a teacher-student relationship and is beautifully portrayed as the movie progresses.

Overall the movie is an example of a perfect thriller and is definitely a must watch.

Ratings for this movie:8.5/10



~ Souhridya Mukherjee
2ND YEAR

LIFE AFTER COVID

The coronavirus epidemic has taken the world by storm to prevent the spread of the virus. However, we do not have a definite report on when everything will be settled. This is a sure sign that everyone is learning from this global problem and life after the video will definitely change for the better. Aristotle once said, " These are the hardest times that we have to focus on to see the light ". Therefore, this is probably the right time to look forward to the expected development in the post-COVID world.

People now know how to live with empty things after closure. Instead of junk food, people are more likely to eat healthy home-made foods. Closed supermarkets highlighted the futility of unscrupulous consumer purchases. Humans have recognized the importance of a sustainable global health system as pollution has become less and nature has flourished. A more friendly approach will soon emerge as a remote service to save fuel and paperless transactions online. People will prioritize a simpler life. The protection of the earth and the next generation will drive the majority of life choices.

During these difficult times, families work together to protect all members from harm. Each member assists with household chores, as well as caring for children and the elderly, forming strong bonds. After confinement, the virus will take time to completely eradicate, making social exclusion and other measures part of the future. Common entertainment venues such as movie theaters, and the like may be limited to those present to prevent outbreaks of disease.

Therefore, instead of going out, people will prefer to relax and have fun with their family members. Therefore, the reduction lowered brought the importance of the family to focus. The post-COVID attitude will bring family protection forward as an opportunity for safety in all future events. The epidemic has emphasized the need to prepare a health care system to manage rapid surges in patients.

#socialdistancing

Steps are underway to build enough capacity for hospitals to better respond to emergencies. Digital health technologies such as the use of unconnected thermometers are increasing, improving patient care. Infection has raised awareness among many people about adequate hygiene. People make it a practice to wear masks and wash their hands frequently, practices that ensure good hygiene. Increased use of telemedicine makes access to medical care easier. As the protection of the health of their families has become a major concern for all, the improved hygiene and health care will allay anxiety.

Even after a coronavirus virus has spread flattens, the virus will continue to exist. Wearing masks, using hand sanitizers, and maintaining body distance will be the norm. In this situation, to reduce the chances of pollution, educational institutions will need to make their teaching strategies more sophisticated. During the closure, parents teach their children at home well, and schools hold online classes. Since parents will choose to protect young children from exposure to the threat of the coronavirus, real-world classes can take conventional teaching methods.

Overwork and long commute to work have deprived modern-day society of family time, even to the point of closure. In the current situation, social isolation cannot be fully relieved until the vaccine helps build up the immune system in most people.

Therefore, a large portion of the staff may not be able to return to the office soon. Working from home, meetings through video conferencing will be a new work ethic. People will spend more time with their family while looking for breaks from work stress, increasing family ties.

Perhaps the most important lesson COVID has taught people is the need to protect their loved ones from health uncertainties. The time for living with the inevitable refusal has passed. COVID has shown that regardless of socio-economic background and age, events can strike at any time. No one could have predicted such a catastrophe, and now people know more about protecting their families from health hazards. Until recently, people were looking at long-term life insurance as a tax-saving tool. People now see its value as important financial victims of the economic conditions of their loved ones in their absence.

As people work together to break the chain of coronavirus infections, a better world is emerging. Hard times are bound to pass away, leaving behind the wisdom of compassion and care that is truly important in life, such as the well-being of family members. People are aware of the need for precautionary measures to keep future generations safe.

~ Sk. Rumman
1st Year

FIVE REASONS TO BE HAPPY YOU ARE A HUMAN AND NOT A SENTIENT ROBOT

1. William Shakespeare was not a robot. Emily Dickinson was not a robot. Neither was Aristotle. Or Euclid. Or Picasso. Or Mary. Shelley (though she would be writing about them). Everyone you have ever loved and cared for was not a robot. Humans are amazing to other humans. And we are humans.

2. We are mysterious. We don't know why we are here. We have to craft our own meaning. A robot is designed for tasks or a set of tasks. We have been here for thousands of generations and we are still seeking answers. The mystery is tantalizing.

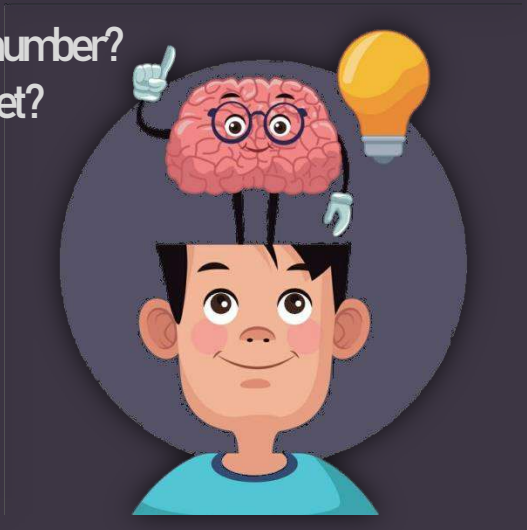
3. Your not-so-distant ancestors wrote poems and acted courageously in wars and fell in love and danced and gazed wistfully at sunsets. A future sentient robot's ancestors will be a self-service checkout and a faulty vacuum cleaner.

4. This list actually has only four things. Just to confuse the robots. Though I did ask some online friends why humans are better than robots, and they said all kinds of stuff: 'self-deprecating humour', 'love', 'soft skin and touch', 'wonder', 'empathy'. And maybe a robot could one day develop these things, but right now it is a good reminder that humans are pretty special

~ RAJARSHI PAUL
1ST YEAR

Test your brain..!!

1. You have 12 black socks and 12 white socks mixed up in a drawer. You have a power cut and it is dark everywhere. What's the smallest number of socks you need to take out blindly to be sure of having a matching pair?
2. "ch" in the front , "ch' at the back you are in the middle. What am I?
3. I give you a group of three. One is sitting down and will never get up. The second eats as much as is given to him yet is always hungry. The third goes away and never returns. What are they?
4. You are stuck in a room which has three doors. The first door opens to a room with terrorists loaded with guns, in the second room there is a lion which has not eaten for three months and the third room is set in fire(the entire room) .Which door would you open and be safe?
5. To what question you can never reply to?
6. You draw a line. Without touching it, how do you make the line longer?
7. Which is that only word that is spelled incorrectly in the dictionary?
8. What is the easiest way to make 7 an even number?
9. What is the 27th letter of the English alphabet?



Answers:

1. 3 socks . If the first sock is black ,the second one could be black, in which case you have a matching pair. If the second sock is white, the third will be either black and match the first, or be white and match the second.
2. ch(ur)ch.
3. A stove, fire, smoke.
4. The second room. In the question it is mentioned that the lion has not eaten for three months, means it is dead.
5. "Are you asleep?"
6. Simply draw a shorter line next to it. The first line will now be the long line.
7. "Incorrectly".
8. Just remove the 's' from "seven".
9. Are you looking for an answer?

Anindya Chatterjee
1st Year

EDU-TALK

ENGINEERING + ELECTRONICS + TECHNOLOGY

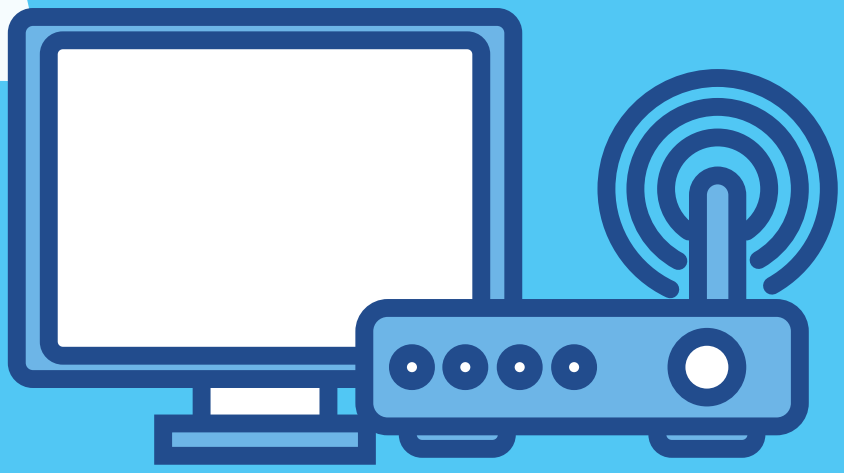
INSIDE THIS SECTION

3

Highly illuminating articles by our professors

That you definitely shouldn't miss!

A few RADIO Receiver Parameters and their Significance



Introduction:

From our childhood, we relate Radios to the radio receivers which we use in our homes, cars and maybe we carry in our pockets now, as a built-in feature of our all-in-one mobile sets. This concept is, however, not to be accepted by Electronics and Communication engineers. They are in a position to differentiate between a Radio Receiver and a Radio. The Radio is a combination of a receiver and a transmitter and some other modules like power supply unit and control unit. In fact, a Radio is described internationally as a transceiver.

The receiver operation and the transmitter operation – both are equally important in order that the transceiver works well in both the roles. It is obviously very crucial since the unit will work sometimes as a receiver and sometimes as a transmitter.

To ensure that the receiver part is working satisfactorily, a few parameters are decided for all the radio transceivers of all makes. Next task is to define specification for the parameters. These parameters and the associated specifications are decided by some Global standardization bodies. Some of the most important in this domain are **CCIR, IEEE** etc.

In this brief article, I would try to explain the most relevan and important receiver parameters and their relations to the reliable operation of a Radio transceiver.

Parameters and their Explanations:

1. Audio Output (Level) – The audio output produced by the loudspeaker/s of the radio should be loud enough to listen to from some reasonable distance. At the same time, the output level should be adjustable locally.

The sound engineers know that the audio level depends on the speaker impedance since the supply voltage is fixed. Therefore, the audio output level is to be declared always along with the speaker impedance. During testing, the audio level is measured across the declared speaker impedance. It is to be declared also as to whether the level is in RMS unit or in Peak power.

2. Audio Distortion: - The maximum distortion of the demodulated modulating signal at the given audio output is another important parameter.

3. Signal-to-Noise Ratio (SNR) – In wireless communication, the receiver performance is always measured by the SNR, a ratio of the signal power and the noise power. It is logical since two types of noises are always present in the wireless communication system- the link noise and the circuit noise.

The presence of the circuit noise is explained by many an element/stage, the main contributors being the non-linear circuits like the amplifiers, oscillators and the balanced mixers. The strong noise and its unpredictability are taken care of in the measurement procedure. The input radio frequency (RF) level from the signal generator is reduced to very low levels like (-116 dBm to -119dBm) while measuring the SNR parameter.

It ensures that the radio receiver will work reliably even at this input level of RF signal. In other words, the range of coverage of the radio network will be high.

It has to be remembered that the big difference with respect to the output or distortion measurement is that the RF signal level for these two measurements are high (0 dBm) while for SNR, the RF level is low.

The international standard for SNR for voice communication is 12dB and for data communication (like GSM networks), it is 18 dB for -117 dBm input signal.

All signals are expressed here in PD and not EMF.

4. Signal-to-noise and Distortion (SINAD) – SINAD is also used to measure the detected signal quality. Here, the distortion factor is also included. As you can guess, this parameter is more stringent to meet. The measurement procedures etc. are same as in SNR procedure.

5. Fidelity- Our voice band or speech band spans over a frequency range 300 Hz to 3400 HZ (approximately). We also have to remember that the circuit uses inductive components in many positions. Hence, the reactance of different sections varies depending on the input frequency. It is but natural that the amplitudes of the signals vary.

The resultant is that the output level of the signal will change with frequency. The challenge is to keep the variation within an allowed range. The standard variation rate allowed is ± 6 dB per octave.

The purpose of the fidelity measurement is to check the variation.

6. Hum and Noise- The AC Power supply section generates 50 Hz hum as the filtering may not be very efficient. The clock is another source of noise in any controller based design. Besides these, the other circuits and components also generate considerable noise. Such noises are design related and cannot be mitigated easily.
The purpose of this testing is to find out the residual hum and noise, when the modulating signal is switched off. The suppression is expected to be **-40 dB to -60 dB** for a good design.

I have covered six of the most important parameters used to ensure the quality of a typical receiver. There are quite a few more like **Quieting, IF rejection, Harmonic suppression.**
I hope this article will help my dear students to gain some insight into the Why and How of measurement techniques applied for checking the quality of a professional grade radio receiver.

Prof.(Dr.)Prabir Banerjee
ECE Department

ENGINEERS WHO CONTRIBUTED TO MEDICINE

Wilhelm Conrad Röntgen

Professor Wilhelm Conrad Röntgen is considered the father of diagnostic radiology, the medical specialty which uses imaging to diagnose disease. Today there are a number of medical imaging modalities but it began with the discovery of X-ray by Professor Wilhelm Conrad Roentgen (1845-1923). Roentgen was a German mechanical engineer and physicist, who, on 8 November 1895, produced and detected electromagnetic radiation in a wavelength range known as X-rays or Röntgen rays, an achievement that earned him the inaugural Nobel Prize in Physics in 1901. In honour of Röntgen's accomplishments, in 2004 the International Union of Pure and Applied Chemistry (IUPAC) named element 111, roentgenium, a radioactive element with multiple unstable isotopes, after him. The unit of measurement roentgen was also named after him.

In 1901, Röntgen was awarded the first Nobel Prize in Physics. The award was officially "in recognition of the extraordinary services he has rendered by the discovery of the remarkable rays subsequently named after him". Röntgen donated the 50,000 Swedish krona reward from his Nobel Prize to research at his university, the University of Würzburg. Like Marie and Pierre Curie, Röntgen refused to take out patents related to his discovery of X-rays, as he wanted society as a whole to benefit from practical applications of the phenomenon. Röntgen was also awarded Barnard Medal for Meritorious Service to Science in 1900.

In his early days, he was unfairly expelled from high school when one of his teachers intercepted a caricature of one of his high school teachers, which was drawn by someone else. Without a high school diploma, Röntgen could only attend university in the Netherlands as a visitor. In 1865, he tried to attend Utrecht University without having the necessary credentials required for a regular student. Upon hearing that he could enter the Federal Polytechnic Institute in Zurich (today known as the ETH Zurich), he passed the entrance examination and began studies there as a student of mechanical engineering. In 1869, he graduated with a PhD from the University of Zurich.

In 1874, Röntgen became a lecturer at the University of Strasbourg, and next year he became a Professor at the Academy of Agriculture at Hohenheim, Württemberg. He returned to Strasbourg as a Professor of Physics in 1876, and in 1879, he was appointed to the chair of Physics at the University of Giessen. In 1888, he obtained the Physics chair at the University of Würzburg, and in 1900 at the University of Munich.

Dr. Allan M. Cormack

Computed Tomography (CT) is a widely used X-ray imaging modality. The first commercially available CT scanner was created by British electrical engineer Sir Godfrey Hounsfield of EMI Laboratories in 1972. He co-invented the technology with electrical engineer and physicist Dr. Allan M Cormack, and they worked independently. Both Dr. Allan M Cormack and Sir Godfrey Hounsfield were jointly awarded the 1979 Nobel Prize in Physiology or Medicine for their individual contribution on the expanded use of X-ray by CT.

Dr. Allan M. Cormack (1924 -1998) was born in Johannesburg in 1924. Initially he wanted to be an astronomer but finding out that prospects of living as an astronomer were not good, he went to the University of Cape Town, following the footsteps of his father and brother and started to study electrical engineering. After completing his Bachelor and Masters degrees at the University of Cape Town he went to St. John's College, Cambridge, as a Research Student. In 1950s there was a vacancy in the Physics department of theUniversity of Cape Town and he came back to accept this position after completing his studies at Cambridge. Later he starts working on nuclear physics in Cape Town, were in 1956 by chance he became interested in the problem of the CAT-scanning. Later he joined the Physics department of the Tufts University at US, and chaired the department from 1968 to 1976. In 1963 and 1964 he published the theoretical results of his work on CT reconstruction. He received most interesting responses about his work on CT not until 1970-72 and then he worked more actively on that topic. In 1979 the Nobel Prize in Physiology or Medicine was awarded to him jointly with Sir Godfrey Hounsfield in motivation: "for the development of computer assisted tomography."

Sir Godfrey Newbold Hounsfield

Scientist Sir Godfrey Newbold Hounsfield was born 28 August 1919 in Nottinghamshire, UK, as the last of five children. Growing up on a small farm near Newark-on-Trent, UK, he attended Magnus Grammar School in Newark, where he demonstrated a flair for physics and mathematics. Nevertheless he left school at age 16 with no formal qualifications, however he had always demonstrated a keen interest in machinery on his family's farm.

Godfrey volunteered for the Royal Air Force in October 1939, at the start of World War II. He became a radar-mechanic instructor, and was posted to RAF Cranwell with a promotion to Corporal. He achieved his City & Guilds examination in radio communication. After the war ended, Air Vice-Marshal John Cassidy supported Godfrey's application for a grant to study at Faraday House Electrical Engineering College, in London, from which he graduated with a Diploma of Faraday House.

Godfrey joined the Electric and Musical Industries (EMI) company, where he worked on radar and computers until 1967. He led the design team for the EMIDEC 1100 computer, the UK's first large all-transistor computer which was successfully launched in 1959, mostly using skills which he had taught himself or learnt in the Royal Air Force.

In 1967 Godfrey's previous projects ceased to be of interest to EMI because of changes in company strategy. He was asked to suggest a new line of work involving pattern recognition, and he suggested what eventually became CT scanning.
Hounsfield proposed that by using x-rays one could take multiple exposures around an object to determine its internal structure. EMI was unenthusiastic because they had no significant medical business, Godfrey had no medical knowledge, and his proposal was a high-risk leap beyond existing technology. So they sought external funding, and Godfrey managed to get a small amount of funding from the UK Government Department of Health and Social Security. His struggles for financing continued for the next four years, and he also had to struggle against apathy from most of the medical profession. Visits to radiologists at many leading hospitals found that almost everyone (with the notable exceptions of a few neuroradiologist) thought that his proposal was pointless.

James Ambrose, a neuroradiologist at Atkinson Morley Hospital, in London, would go on to assist Hounsfield in the various prototypes of the CT scanner. Initially, the original prototype CT scanner was used to examine brains obtained from a histopathology museum. In 1968 Hounsfield was granted UK Patent No. 1283915 for "A Method of and Apparatus for Examination of a Body by Radiation such as X or Gamma Radiation" for his new scanner and its technology.

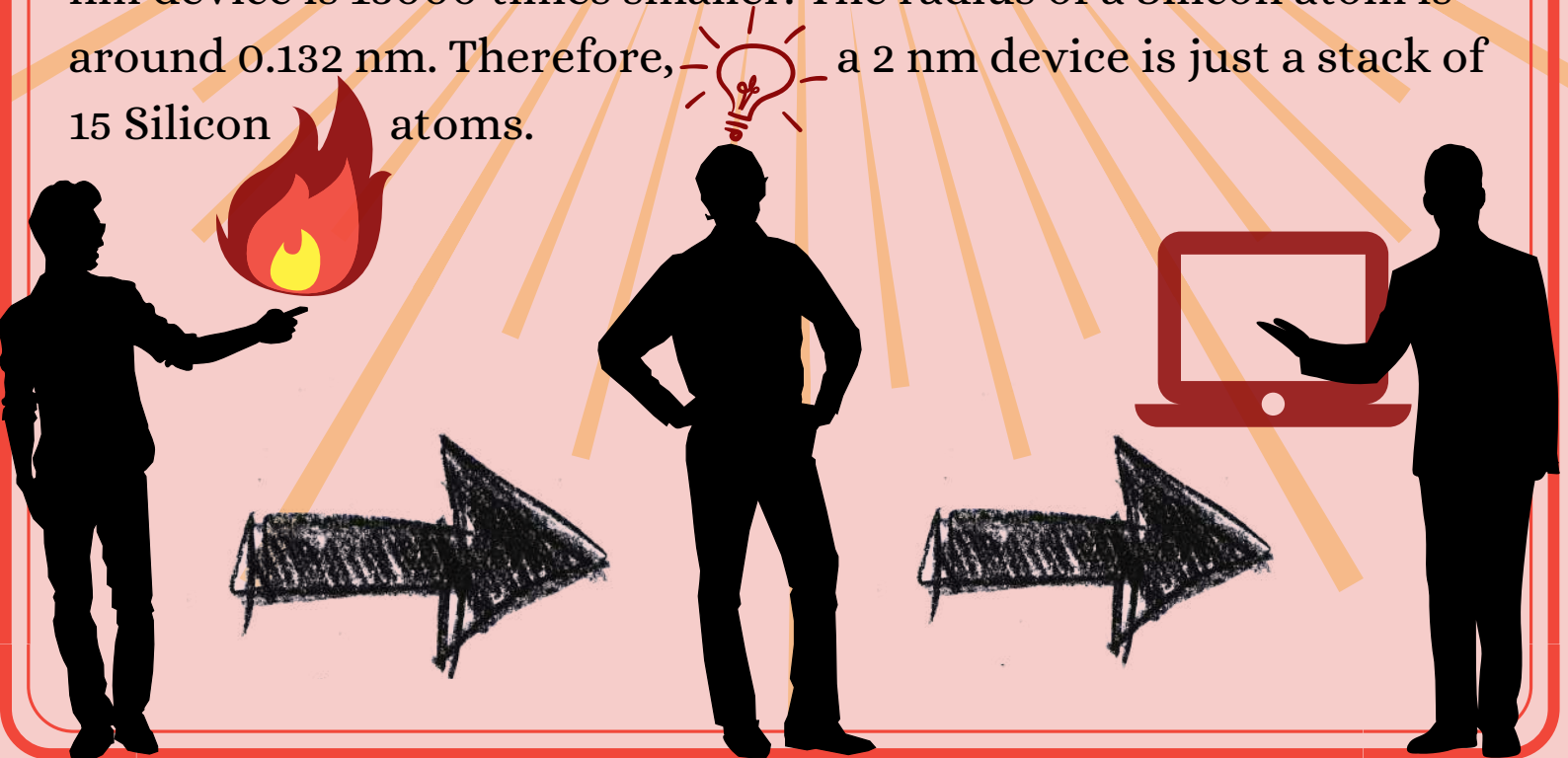
The first clinical CT scan was conducted on 1st October 1971 at the Atkinson Morley Hospital, demonstrating a well-defined cyst. Everything changed after he presented his initial CT scans at conferences in London on April 1972 and New York in May 1972. As soon as people saw these images, they realized the groundbreaking potential of this new technique. He was the first to show discrimination between soft tissues, tumors and blood clots in clinical use at acceptable cost and dose.
Sir Godfrey Hounsfield was awarded the Nobel Prize in Physiology or Medicine in 1979 jointly with physicist Dr. Allan M. Cormack. Dr. Allan M Cormack had developed the theory behind CT independently.

There are many other engineers cum scientist who have done and have been doing pioneering work in the field of medicine.

Prof.(Dr.) Anindya Sen
ECE Department.

Photonic Integrated Circuit:
The Future of Silicon Technology

We the human being, are the most intelligent species on the earth because of our intellect to moulding natural objects into our use. Beginning from the invention of fire, every such effort includes significant labour that maximises the production on demand, and that's how technology developed. After the invention of fire and electricity, the third revolution in technology was the semiconductor devices, which solved the then requirements of high speed, low-power devices having dimensions smaller than the existing ones. With the advent of the Silicon fabrication technology, the growing demands of such devices are met by suitable miniaturisation. At present 2 nanometers (nm) devices are under trial by many semiconductor manufacturers. Comparing with the radius of human hair, which is around 26 micro-meter, a 2 nm device is 13000 times smaller. The radius of a Silicon atom is around 0.132 nm. Therefore, a 2 nm device is just a stack of 15 Silicon atoms.



From the above discussion, you can understand that with each level of miniaturisation we are approaching to an exhaustive end of silicon fabrication technology. This is a nightmare because a greater percentage of the world economy depends upon the skyscraping demands of silicon technology. In absence of any suitable solutions, the trillion-dollar silicon industries are going to turn into debris, wiping out the worldwide demand for engineering jobs in semiconductor fields.

However, the photonic integrated circuit is found as a suitable alternative for the existing electronic integrated circuit. Because light is much faster than the electrons and consumes less power compared with the electronic integrated circuit. The major disadvantage of light is that it is radiative, whereas the electrons are confined within the materials. We, therefore, need to find ways to confine light within materials or mediums. The total internal reflection is the known physics to confine light within a particular medium. The fibre optic cables (FOC) are designed based on such a theory. The TIR phenomenon is described for a system of materials having dimensions larger than the wavelengths under consideration. As a result, the assumption for light as the ray is adequate to support all the necessary physics, and thus the design of FOC falls in the ray-optic regime. But such an assumption is not enough to describe the behaviour of light for the devices of micro-meter order, which is suitable for IC fabrications. As the dimensions of materials get reduced, they become comparable with wavelengths and a sort of whole new physics is necessary to describe light-matter interaction at the scale of wavelengths and sub-wavelengths. .

Thus, the study of the light-matter interaction falls under the wave-optic regime. The electromagnetic wave equation, known as Maxwell's wave equation, characterizes light in a manner the Schrodinger equation haracterizes electron-waves in a crystalline semiconductor material, where the atoms are arranged periodically with a period of the order of electron-wavelength Therefore, the behaviour of electrons within periodically arranged crystalline semiconductors materials can be imitated by light if it propagates through a periodic medium having a period of the order of wavelengths of propagating light. With such an idea, Silicon-based periodic dielectric structures are designed for the microwave frequency band. Like the electronic band-gap observed in semiconductors, photonic band-gap (PBG) has resulted in such artificially engineered periodic dielectric mediums. The existing Silicon-based electronic IC fabrication technology is also adequately well to support such optical devices, called the Photonic Crystal (Phc). Phcs broadens possibilities to realize the existing microwave devices such as waveguides, couplers, multiplexers, de-multiplexers, polarizers, filters, doubly refractions (birefringence) etc. at micro-meter scale, and thus opening up ways to optical ICs fabrication. In addition, new devices based on Phc's extraordinary properties such as self-collimation, left-hand propagation, photonic band-gap engineering, are now research topics of greatest interest and are determining factors for the future of Silicon with integrated optics.

Metals appear extremely lossy at optical frequencies and are avoided generally.

But periodic structures made of metals over a dielectric (Silicon) substrate exhibit unprecedented properties of light, if the periods become sub-wavelength in comparison with that of the Phcs. The noticeable properties of such artificially engineered material, known as metamaterials, are the refractive index, which can be made negative, even less than unity! Negative index results in superlens increasing lensing efficiency beyond the limit of the best microscope available at present. Making the refractive index less than unity the electromagnetic waves beat the speed of light while propagating through such a material! Such an achievement made the design feasible for an invisible cloak, a region the light bends across making 'things' within the region invisible to the observers. In addition, the frequency selective surfaces (FSS) called the Meta-surfaces used in designing the Stealth fighter planes are being investigated to gain possible advantages in the field of integrated photonics. These are the most impressive fields being studied right now and attracting huge funds from industries running Silicon-based electronics IC fabrication infrastructures. Therefore, the future of Silicon that was seemingly found to an end is thriving up once again with upcoming photonic integrated technology, and opening up new opportunities for higher studies, internships, high profile engineering jobs, research and investments.

Prof.(Dr.) Susovan Mandal
ECE Department

“Home is where love resides, memories are created, friends always belong, and laughter never ends.”

NOSTALGIA →

noun
a sentimental longing or wistful affection for a period in the past.

Sourav Nandi (2015 batch)

ONE THING YOU MISS MOST ABOUT COLLEGE:

Its never only one thing. :)
Macha , canteen, common room, 30 bigha and colg fests. And no. I don't miss my friends.

Even after 6 years of my graduation I talk to them every single day. :)

Soham Sengupta
(2015 batch)

SOME ANECDOTE ON YOUR COLLEGE LIFE YOU WOULD LIKE TO SHARE WITH US:

Really miss the annual fest memories . As the music club coordinator, I got to facilitate the inter college solo singing competition in 2nd year .

Also cherish all the performances we did in heritage school AUDI on so many occasions.

ONE THING YOU MISS MOST ABOUT COLLEGE:

Shilajit Pramanik (2015 batch)

So, College life at Heritage is the best thing happened to me. I miss college, canteen, my professors, my friends. Also, I made my best friends in college, so, I have a lot of memories with them in college. Nowadays we always think how good those college days were whenever we are talking. Also, I was very much associated with our photography club called Pravasana. The fests, film festivals, the small and big events – I miss big time.

Pooja PaulChaudhury
(2008 batch)

Describe your college life in a line:

College Life is not just about a degree, rather a chance to rediscover yourself

Abhradeep Haldar
(2010 batch)

One thing you miss most about college:

"My Friends. Our group split up after college and each went their separate ways."

ONE THING YOU MISS MOST ABOUT COLLEGE:

Sarat Das
(2010 batch)

The interaction sessions with friends on any random topic during off hours, walks to the canteen/workshop/main gate. We discuss today too, but the advent of Whatsapp has led to decline in actual conversation; but fortunately we are connected worldwide thanks to the same; though obviously in-person interaction of a time when there was less technology around is a special memory.

“

When I came to Heritage, I had no interest in Electronics. From that to becoming so much interested in the subject to quit my job to do PhD in Electronics is something I absolutely credit my department for. All my faculty were so helpful from the beginning and supported me in all I wanted to do.
My department changed my life..I don’t know what else makes a department stand out..but for me..it’s the biggest gift a department could have given.

”

Akash Roy (2019 batch)

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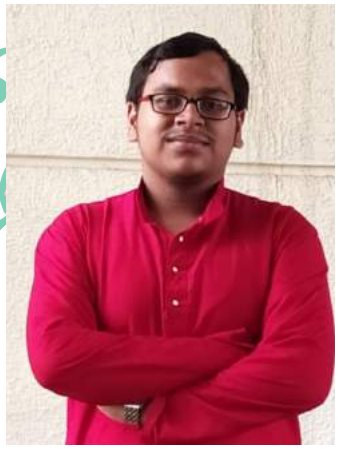

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DON' FORGET TO FOLLOW US ON SOCIAL MEDIA

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thank you

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