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EDITORIAL BOARD

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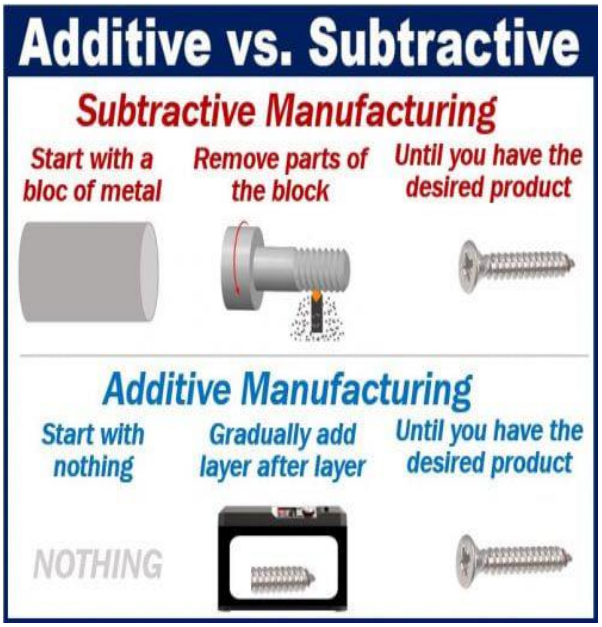
TECHNICAL ARTICLES

1. ADDITIVE MANUFACTURING

M. R. Siva 23155-M-008

It is the process of joining materials to make objects from 3D model data, usually layer upon layer, as opposed to subtractive manufacturing methodologies.



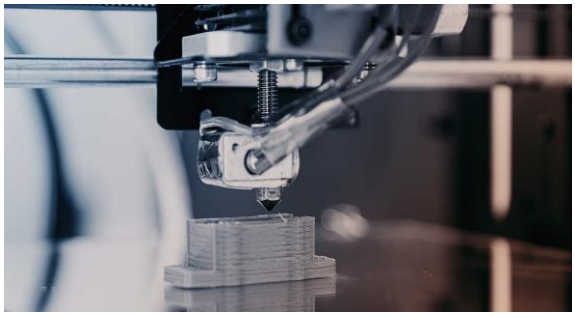
Introduction

In 1980, Dr Hideo Kodama filed the first additive manufacturing patent. The researcher at the Nagoya Municipal Industrial Research Institute was looking for a system to create photopolymer prototypes. Kodama wanted to use a container of photopolymer material, exposed to ultraviolet light, to harden a part.

Dr Hideo Kodama

The Additive Manufacturing (AM) process is a computer-controlled process that uses CAD representations to build physical parts layer by layer. Almost all computer-aided design (CAD) packages allow the creation of stereolithography (STL) files, which are translated into machine commands to drive the AM process. Unfortunately, the STL file has many weaknesses and is prone to error. Moreover, there is a need to investigate and understand the issues and errors associated with the software formats and how to control, eliminate, or minimize these errors. Failure to deal with these issues will lead to building poor parts and delayed lead time, which will result in a bad physical model. This chapter summarizes the CAD model of the AM process and explains the various software issues related to the selected CAD representation.

Types of Additive Manufacturing Processes



VAT Photopolymerization

- Material Jetting
- Binder Jetting
- Material Extrusion
- Powder Bed Fusion
- Sheet Lamination

Materials used in additive

Manufacturing

Three types of materials can be used in additive manufacturing: polymers, ceramics and metals. All seven individual AM processes cover the use of these materials, although polymers are most commonly used and some additive techniques lend themselves towards the use of certain materials over others.

Main objective of additive manufacturing:

It aims to coordinate the creation of standards related to materials, processes, equipment and finished-part properties while also supporting specific standards for aerospace, medical devices, automotive and other industries

Advantages of additive

- Lower start-up costs. Manufacturing start-up costs can be high.
- Easy to learn (and use).
- Reduced raw material wastage.
- Customisation to the individual.
- Digital design integration.
- Speed of first prototype.
- Speed from prototype to production.
- Lower energy and environmental costs.

Disadvantage of additive

- High cost of equipment and materials.
- The need for skilled operators.
- Limited choice of materials.
- The slow speed of the process.
- The need for post-processing (sintering, heat treatment, etc.).

Fields of Application

Additive manufacturing was first used to develop prototypes in the 1980s — these objects were not usually functional. This process was known as rapid prototyping because it allowed people to create a scale model of the final object quickly, without the typical setup process and costs involved in creating a prototype.

AM streamlines production of renewable energy systems, like solar panels and wind turbine components. Its flexibility allows for rapid customization, driving innovation in the pursuit of cleaner, more efficient energy sources.

- Aerospace Industry & Suppliers.
- Automotive Industry & Suppliers.
- Machinery (e.g., Turbines, Special Machinery)
- Medical implants (Dental, Orthopaedic)
- Handling and Robotics.
- Lifestyle & Sports (e.g., Jewellery, Biking)
- Custom Parts (e.g., Classic Car Parts, Surgical Tools)

2. BLOCK CHAIN TECHNOLOGY

S. Suri Babu (23155-CM-050) & O. Yuvaraj (23155-CM-044)

About: Blockchain technology is a decentralized and distributed ledger system that records transactions across a network of computers.

Blockchain technology can be integrated into multiple areas. The primary use of blockchains is as a distributed ledger for cryptocurrencies such as bitcoin; there were also a few other operational products that had matured from proof of concept by late 2016. As of 2016, some businesses have been testing the technology and conducting low-level implementation to gauge blockchain's effects on organizational efficiency in their back office.

In 2019, it was estimated that around $2.9 billion were invested in blockchain technology, which represents an 89% increase from the year prior. Additionally, the International Data Corp has estimated that corporate investment into blockchain technology will reach $12.4 billion by 2022. Furthermore, According to PricewaterhouseCoopers (PwC), the second-largest professional services network in the world, blockchain technology has the potential to generate an annual business value of more than $3 trillion by 2030.

PwC's estimate is further augmented by a 2018 study that they have conducted, in which PwC surveyed 600 business executives and determined that 84% have at least some exposure to utilizing blockchain technology, which indicates a significant demand and interest in blockchain technology.

Main points of blockchain technology:

1.Decentralisation

2.Block and chains

3.Security

4.Transparency

5.Consensus and Mechanism

6.Smart contracts

7.Use cases

8.Challenges

Decentralisation: Unlike traditional centralized systems, blockchain operates on a network of computers (nodes) that work together to validate and record transactions. There is no single central authority.

Block and chains: Transactions are grouped into blocks, and each block is linked to the previous one, forming a chain of blocks. This chain structure ensures the integrity of the data.

Security: Transactions in a blockchain are secured through cryptography. Once a transaction is added to a block, it's extremely difficult to alter, providing a high level of security and trust.

Transparency: The blockchain ledger is public and transparent. Anyone can view the entire transaction history, which can enhance trust and accountability.

Consensus Mechanism: Blockchain networks rely on consensus mechanisms (e.g., Proof of Work, Proof of Stake) to validate and add transactions to the ledger. These mechanisms ensure agreement among network participants.

Smart contracts:Some blockchains, like Ethereum, support smart contracts. These are self-executing contracts with predefined rules and conditions. They automate transactions when certain conditions are met.

Use cases: Blockchain technology has various applications beyond cryptocurrencies. It's used in supply chain management, healthcare, voting systems, and more to increase transparency, security, and efficiency.

Challenges: Blockchain faces challenges like scalability, energy consumption (in the case of Proof of Work), and regulatory concerns.

Blockchain technology has the potential to disrupt various industries by providing a secure, transparent, and decentralized way to record and verify transactions.

Cryptocurrencies:

Most cryptocurrencies use blockchain technology to record transactions. For example, the bitcoin network and Ethereum network are both based on blockchain.

The criminal enterprise Silk Road, which operated on Tor, utilized cryptocurrency for payments, some of which the US federal government has seized through research on the blockchain and forfeiture. Governments have mixed policies on the legality of their citizens or banks owning cryptocurrencies.

China implements blockchain technology in several industries including a national digital currency which launched in 2020. To strengthen their respective currencies, Western governments including the European Union and the United States have initiated similar projects.

3. BLUE LED

Jayashree, 22155-EC-024 And M Sivakumar, 22155-EC-030

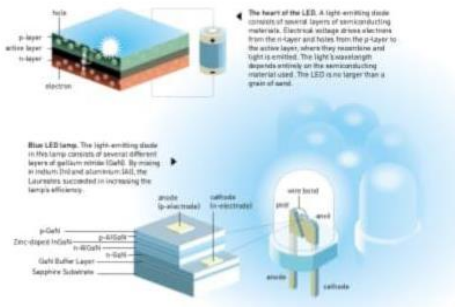
Blue LED Inventor

The development of the first blue LED was a significant breakthrough in lighting technology. Shuji Nakamura, a Japanese engineer, is credited with inventing the first high-brightness blue LED in the early 1990s while working at Nichia Corporation.

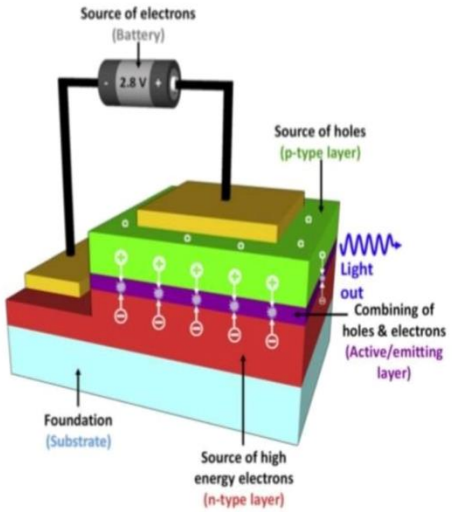
However, there were legal disputes over the patent rights, and Nakamura's employer initially did not recognize his contribution adequately, leading to a lawsuit. Ultimately, Nakamura won the Nobel Prize in Physics in 2014 for his invention.

Blue LED

- Blue LEDs, or light-emitting diodes, are semiconductor devices that emit blue light when an electric current passes through them. They have various applications, from indicator lights to backlighting in displays, and are known for their energy efficiency and longevity.

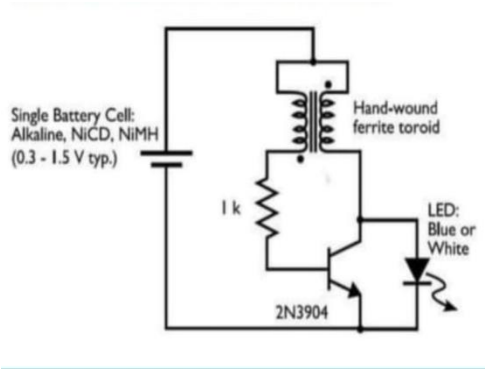


- Isamu Akasaki, Hiroshi Amano and Shuji Nakamura are rewarded for inventing a new energy-Efficient and environment-friendly light source – the blue light-emitting diode (LED). In the spirit of Alfred Nobel, the Prize awards an invention of greatest benefit to mankind; by using blue LEDs, white Light can be created in a new way. With the advent of LED lamps we now have more long-lasting and More efficient alternatives to older light sources



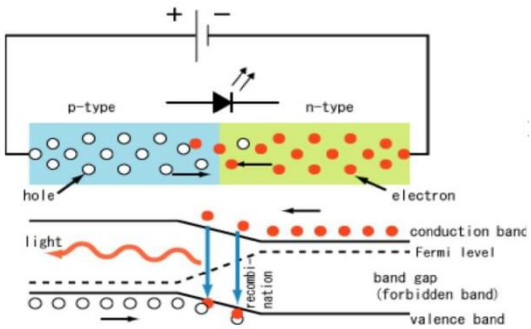
- When Akasaki, Amano and Nakamura arrive in Stockholm in early December to attend the Nobel Prize ceremony, they will hardly fail to notice the light from their invention glowing in virtually all the Windows of the city. The white LED lamps are energy-

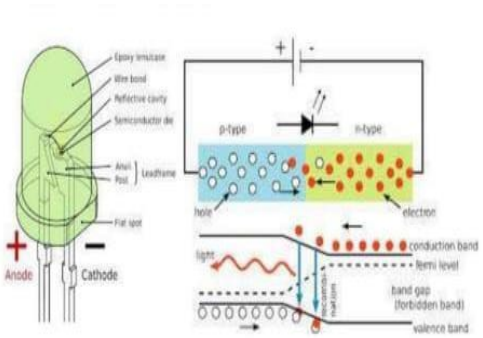
efficient, long-lasting and emit a bright white Light. Moreover, and unlike fluorescent lamps, they do not contain Mercury.



Circuit Image of blue LED:

Saving energy and resources





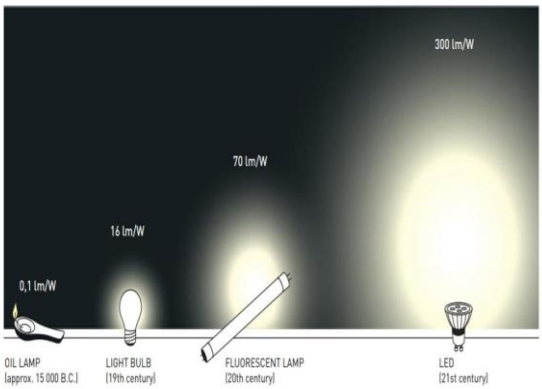
A light-emitting diode consists of a number of layered semiconductor materials. In the LED, electricity is directly converted into light particles, photons, leading to efficiency gains compared to other light sources where most of the electricity is converted to heat and only a small amount into light. In incandescent bulbs, as well as in halogen lamps, electric current is used to heat a wire filament, making it glow. In fluorescent lamps (previously referred to as low-energy lamps, but with the advent of LED lamps that label has lost its meaning) a gas discharge is produced creating both heat and light.

Creating light in a Semiconductor

The first report of light being emitted from a semiconductor was authored in 1907 by Henry J. Round, a co-worker of Guglielmo Marconi, Nobel Prize Laureate 1909. Later on, in the 1920s and 1930s, in the Soviet Union, Oleg V. Losev undertook closer studies of light emission. However, Round and losev lacked the knowledge to truly understand the phenomenon. It would take a few decades before the prerequisites for a theoretical description of this so-called electroluminescence were created.LED technology originates in the same art of engineering that gave us mobile phones, computers and all modern electronics equipment based on quantum phenomena.

A light-emitting diode consists of several layers: an n-type layer with a surplus of negative electrons, and a p-type layer with an insufficient amount of electrons, also referred to as a layer with a surplus of positive holes.

A bright revolution



The Laureates' inventions revolutionized the field of illumination technology. New, more efficient, cheaper and smarter lamps are developed all the time. White LED lamps can be created in two different ways. One way is to use blue light to excite a phosphor so that it shines in red and green. When all col-ours come together, white light is produced. The other way is to construct the lamp out of three LEDs, red, green and blue, and let the eye do the work of combining the three colors into white.

- The LED lamp also holds great promise when it comes to the Possibility of increasing the quality of life for the more than 1.5 Billion people who currently lack access to electricity grids, as The low power requirements imply that the lamp can be powdered by cheap local solar power. Moreover, polluted water can Be sterilised using ultraviolet LEDs, a subsequent elaboration Of the blue LED.
- The invention of the efficient blue LED is just twenty years old, but it has already contributed to creating white light in an entirely new manner to the benefit of us all.

Advantages of Blue LED;

- Blue LEDs are environment friendly with no toxic waste.
- Small, durable and need little power and saves energy.
- Operates at safe and low voltage.
- Blue LEDs are used to make highly efficient white LEDs.
- The white LEDs are energy-efficient, long-lasting and emit a bright white light, and unlike fluorescent lamps, they do not contain mercury.
- LEDs last upto 100,000 hrs compared to 10,000 hrs for fluorescent lights and 1,000 for incandescent bulbs.

Disadvantage of Blue LED;

- High initial price.
- Blue hazard-can damage the eye and can cause light pollution.
- Difficult to get native substrates in high quality and large quantities.
- Voltage sensitive-should supply with the voltage above the threshold and a current below the rating.

- Electrical polarity- only light with correct electrical

Application of Blue LED

- White LED Lamps
- Digital Displays
- Water Purification
- Enhancing Plant growth
- Commercial decoration

Awards for blue led(light emitting diode)

- Millennium Technology Prize (2006)
- Harvey Prize (2009)
- Nobel Prize in Physics (2014)
- Global Energy Prize (2015)
- National Inventors Hall of Fame (2015)
- Mountbatten Medal (2017)
- Zayed Future Energy Prize (2018)

4. ECO FRIENDLY GREEN BUILDINGS

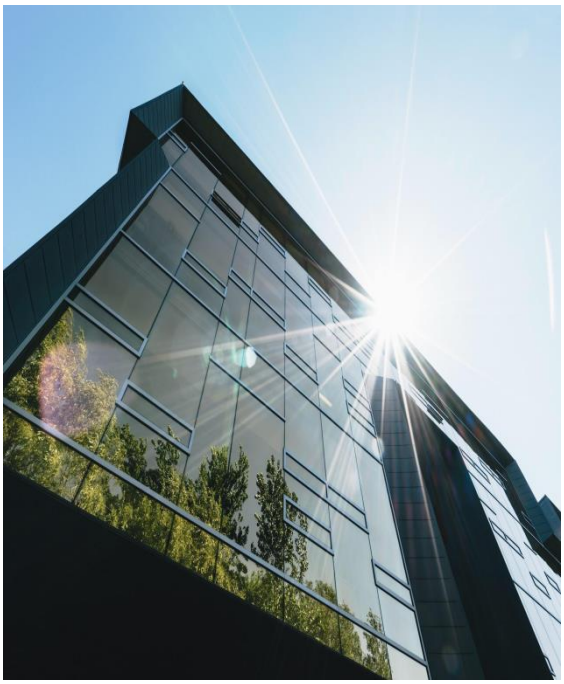
V R SIVA PRASAD, 21155-C-019

What are green building:

- Green buildings incorporate measures that are environmentally friendly and resource-efficient across the building lifecycle. The green buildings concept aims to comprehensively minimize the negative impact and maximize the positive impact a building has on its natural environment and human occupants.

As a holistic approach to their planning, design, construction, operation, and maintenance, green buildings successfully maximize the natural efficiencies of a building site and integrate them with renewable and low-carbon technologies to support the building's energy needs and create a healthy built environment. Areas of priority in green buildings include the efficient use of energy, water, and other resources; quality of the indoor environment; and impacts to the natural environment. Buildings and the supply chain that supports them are responsible for an enormous share of worldwide carbon dioxide emissions also referred to as greenhouse gasses and energy, water, and materials consumption. The global building sector also represents the largest opportunity for significant, cost-effective improvements in these areas, making it a broad and robust focus of research and development efforts.

Green buildings leverage elements of the natural environment combined with advanced techniques and technologies to improve performance over a building's lifespan. (Photo by Scott Webb | Pexels.com)



A history of green buildings:

The concept of ecological architecture was introduced in the 1960s. The energy crisis in the 1970s further fueled the development of renewable energy resources, including

solar, geothermal, and wind energy, as well as more energy-efficient buildings. In 1980, the concept of "sustainable development" took hold, and a few developed countries had begun widely implementing energy-saving building systems. In 1990, the United Kingdom introduced the world's first green building standard, followed by formation of the U.S. Green Building Council in 1993.

The U.S. Green Building Council established the Leadership in Energy and Environmental Design (LEED) green building rating system later in the 1990s to create a central framework for codifying and verifying the effective implementation of green building practices. It has grown into a robust and internationally recognized standard, despite its origination and predominant application in the United States.

Since the 1990s, agencies and countries around the world also have adopted their own green building programs and standards. Regardless of the system for guiding its implementation, the green buildings concept remains universal. It has evolved into a necessary cornerstone in the building sector and a major focus of academia and industry in seeking to address global energy challenges.

Green buildings importance and applications:

Buildings account for about 40 percent of our nation's energy use and consume 75 percent of our nation's electricity. The building sector accounts for more than one third of global energy-related greenhouse gas emissions, a percentage that could substantially increase over the years ahead without additional intervention. There are significant opportunities to improve the way buildings function, and the mounting pressure on our energy resources and environment has necessitated robust investment and effort to maximize them.

Green buildings combine a variety of approaches—to practices, technologies, and materials—across all stages of a building's lifecycle. The set of measures applied to a building is customized to that building's unique situation and work together to optimally reduce its impact on the human and natural environment.

Many of these approaches involve using renewable resources, as well as introducing techniques and technologies or using innovative materials that improve resource utilization. Maximizing energy, water, and materials performance are major drivers in configuring green buildings. The

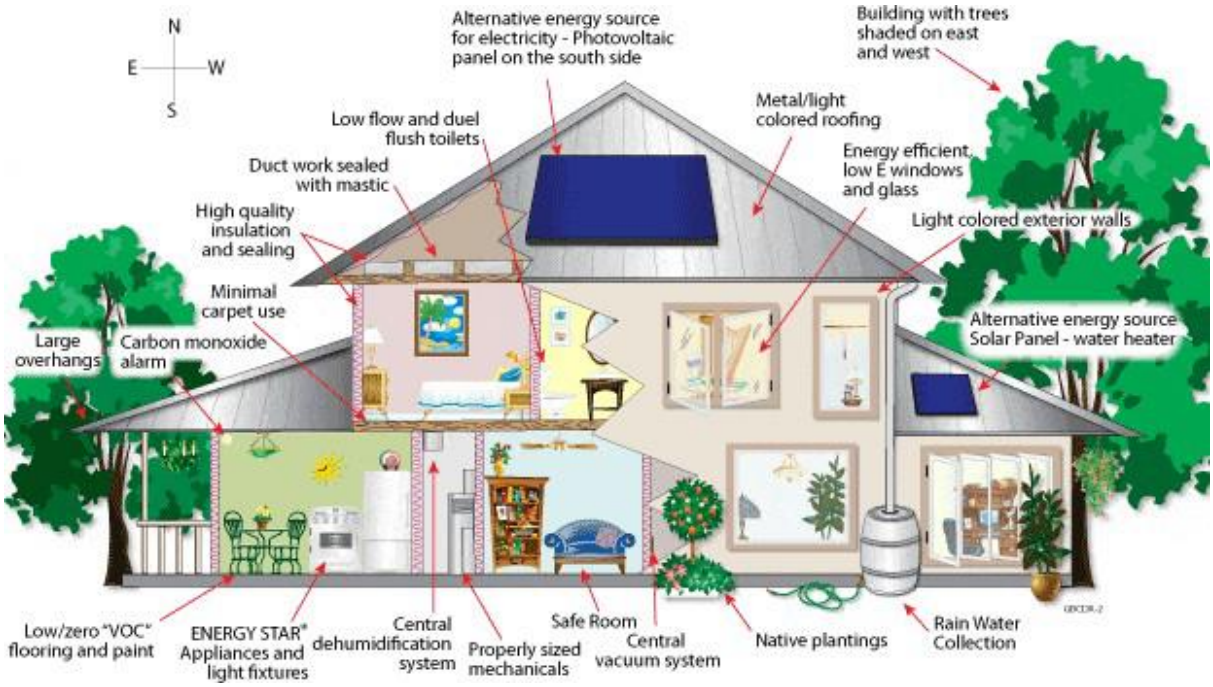
following examples are just a few of many options in the green builder's toolbox, a list of measures that continues to grow and evolve with new knowledge and innovation.

Renewable energy sources, including solar, are often factored into green buildings. For example, some use photovoltaic panels for on-site solar power generation. Others employ passive solar building design strategies that physically position building elements, including windows, walls, awnings, and landscaping, to maximize the benefits of cooling shade in summer and solar warmth in winter. The concept of daylighting calls for orienting windows in a manner that makes best use of natural light inside the building and reduces electric lighting needs. And solar-powered water heating cuts down on energy costs.

Plants and trees have also become firmly rooted within green building practices. They are used to create a form of "green roof" that helps manage rainwater, provides building insulation, and cools nearby urban air, among other benefits. They are also planted in "rain gardens" to filter pollution from stormwater runoff, allowing it to be redirected in various useful ways that ultimately conserve water and ease related infrastructure and environmental burdens.

The discovery and refinement of these and many other measures, including energy-efficient technologies across the building system, continues to inform and improve industry standards, codes, and rating systems used by government, building professionals, and consumers. This includes LEED and other guidance structures around the world.

As a notable example, LEED certification is now universally recognized as distinguishing a building's performance and resource efficiency, with various levels of potential achievement. There are tens of thousands of LEED-certified buildings in operation globally, most in major U.S. cities. The program is credited with igniting a green building industry around achieving its recognition, and its global foothold continues to expand. Other national and international programs and standards are in use and evolving, as well.



Green building concept; residential example. (Graphic: theconstructor.org)

Benefits of green buildings:

Green buildings help reduce negative impacts on the natural environment by using less water, energy, and other natural resources; employing renewable energy sources and eco-friendly materials; and reducing emissions and other waste. They can even provide net-positive impact in terms of generating their own energy or

increasing biodiversity. Among the

industry sectors that are major contributors to greenhouse gas emissions, the building sector has the largest potential difference to make in achieving significant reductions.

The implementation of green building measures that ultimately lead to these performance benefits also translates to economic benefits for multiple stakeholders. Developers benefit from higher property values due to optimized resource utilization and better-performing, longer-lasting buildings. Better buildings are more attractive to business owners and occupants for their environmental benefits, improved comfort, higher efficiency and less waste, and lower operating costs—which also positively impacts occupancy levels.

On top of that, the huge industry and job creation that exists around the development of green buildings continues to grow. And studies are showing that people who work in the improved environment of green buildings are realizing benefits in areas

such as work performance and sleep quality.

As the green buildings industry evolves and matures with more support from formal policies, standards, and incentives, the challenge is to continue refining those mechanisms and the building practices and technologies they represent and guide. Since their introduction, green buildings have helped make notable progress in reducing building sector energy consumption and environmental impact.

However, there is opportunity for further improvement and added pressures to accommodate for global growth and balance the economics of green buildings. To keep pace and make additional forward progress, further innovation is needed in areas including but not limited to land use, energy and water conservation, materials, indoor air quality, and construction management.

Limitations of green buildings

The most prevalent limitation for green buildings is their cost. While green buildings can provide significant long-term financial benefits, their initial costs are higher than conventional buildings. The materials and technologies they utilize tend to cost more, the materials may be less readily available, and construction may take longer. Additionally, bank funding for green building projects can be more difficult to secure. Developers and financers must understand the cost savings over the building's entire lifecycle and be willing and able to make a larger upfront investment.

Another challenge is that renewable energy sources, such as wind and solar, rely on varying weather conditions, which could make green buildings susceptible to fluctuations in energy supply. This also underscores that not all locations are equally suitable for green buildings; proper site selection is an important aspect in successful green building projects.

Related to fluctuations in renewable energy sources is a lack of full control over indoor conditions, such as building temperatures, when relying on natural resources to assist with heating and cooling. To solve this may require certain building features, including its positioning on a lot to be handled in a non-preferred way or even in conflict with neighborhood zoning or other building guidance.

New and future developments in green buildings:

Green buildings research is multi-faceted, with a lot of recent activity in the areas of construction and building technologies, energy and fuels, and civil

engineering.

While the concept of green buildings originated in the commercial sector, emphasis is growing in the residential sector. Added building regulations, policies requiring energy efficiency, and increased public awareness and interest in this sector are creating higher demand for environmentally friendly and energy-conserving materials and other solutions for residential buildings.

An interesting development emerging in the green building materials space is the use of living materials. These are materials that consist of biological compounds whose growth serves a practical purpose. One example is self-mending concrete, which contains bacteria that grow within the pores to increase its strength or fill in cracks.

Green building materials in general continue to be an area of new development, as demand grows for products and technologies that help achieve LEED certification. Some of the demand is driven by increased government investment in motivating green buildings through encouragement of LEED and other certification programs, additional regulations and incentives, and support of research and development to introduce technology improvements and refine codes and standards.

Another important area of focus is on advanced building controls, which can be applied to new buildings or retrofitted in existing buildings to improve their energy efficiency, increase integration of clean energy sources, and coordinate electricity consumption within buildings and with the power grid. This involves integrating technology that automates operational functions, such as ventilation, heating, cooling, and lighting systems, according to schedules and other energy-saving adjustment parameters.

5. BLACK HOLE

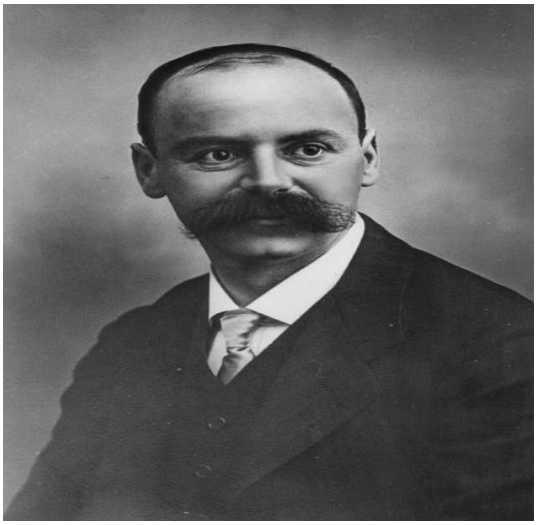
M.GuruTeja, 23155-EC-057

Space black holes, also known simply as black holes, are fascinating and mysterious objects in the universe. They are formed from the remnants of massive stars that have undergone gravitational collapse. When such a star exhausts its nuclear fuel, it can no longer withstand the inward pull of gravity, and it collapses under its own weight. If the core of the star is massive enough, it collapses into a singularity—a point of infinite density—surrounded by an event horizon, beyond which nothing can escape.

The most intriguing feature of black holes is their event horizon, which is the boundary beyond which nothing, not even light, can escape the black hole's gravitational pull. This concept leads to some mind-bending consequences, such as time dilation and gravitational lensing, which occur due to the extreme warping of space time near the black hole.

WHO INVENTED THE BLACK HOLE ?

KARL SCHWARZSCHILD (9/10/1873)



Karl Schwarzschild was a German physicist and astronomer born on October 9, 1873, in Frankfurt, Germany. He made significant contributions to various fields of science, including astrophysics and general relativity.

Schwarzschild is best known for his solution to Albert Einstein's field equations of general relativity, which describes the gravitational field around a spherically symmetric mass. This solution, known as the Schwarzschild metric, was found in 1916 while Schwarzschild was serving as an officer in the German army during World War I. His work was crucial in understanding the behavior of gravity near massive objects, including the

prediction of what is now known as the Schwarzschild radius, which represents the radius at which an object of a given mass would become a black hole.

Schwarzschild's contributions to astronomy and theoretical physics were profound, laying the groundwork for many subsequent advancements in our understanding of the universe. Despite his untimely death at the age of 42 in 1916 due to an autoimmune disease, his legacy continues to inspire scientists to this day.

EFFECTS OF BLACK HOLE

1. **Gravitational Pull**: Black holes have an incredibly strong gravitational pull due to their immense mass concentrated in a small space. This gravitational force affects nearby objects, distorting their trajectories and pulling them towards the black hole. The closer an object gets to a black hole, the stronger the gravitational pull becomes.

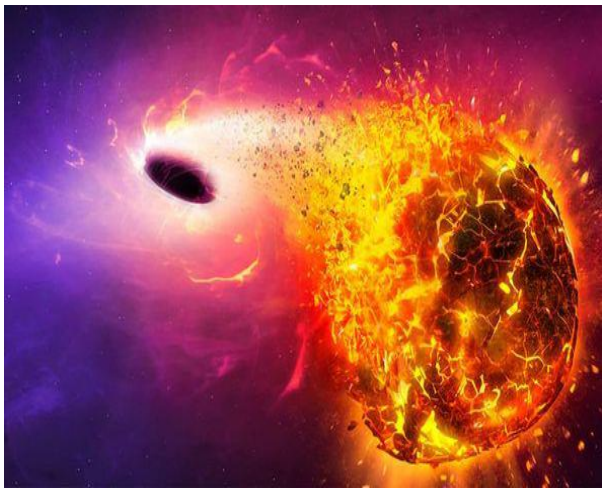
2. **Spaghettification**: Near a black hole, the gravitational force is so strong that it can stretch objects into long, thin shapes in a process called spaghettification. This effect occurs because the gravitational force exerted on an object is much stronger on the side closer to the black hole than on the side farther away, causing the object to be stretched along its length.

3. **Time Dilation**: According to Einstein's theory of general relativity, time passes more slowly in regions of strong gravitational fields. Near a black hole, where the gravitational pull is incredibly intense, time dilation becomes significant. Clocks closer to the black hole tick more slowly compared to clocks farther away. This effect has been observed and confirmed through experiments and astronomical observations.

4. **Event Horizon**: The event horizon of a black hole is the boundary beyond which nothing, not even light, can escape the gravitational pull of the black hole. Once an object crosses the event horizon, it is effectively trapped within the black hole's gravitational field and cannot escape.

5. **Accretion Disk**: Surrounding some black holes is a swirling disk of gas and dust called an accretion disk. As matter from the disk spirals inward towards the black hole, it releases a tremendous amount of energy in the form of radiation, including X-rays and gamma rays. Observations of accretion disks

provide valuable insights into the properties and behavior of black holes.



Influence on Galaxies: Supermassive black holes, which are found at the centres of most galaxies, play a crucial role in regulating the growth and evolution of their host galaxies. The intense gravitational pull of supermassive black holes can influence the movement of stars and gas within galaxies, shaping their structure and dynamics over cosmic timescales.

Overall, black holes have a profound impact on the universe, affecting the behavior of matter and energy on both small and large scales. Studying black holes is essential for understanding the fundamental laws of physics and unraveling the mysteries of the cosmos.

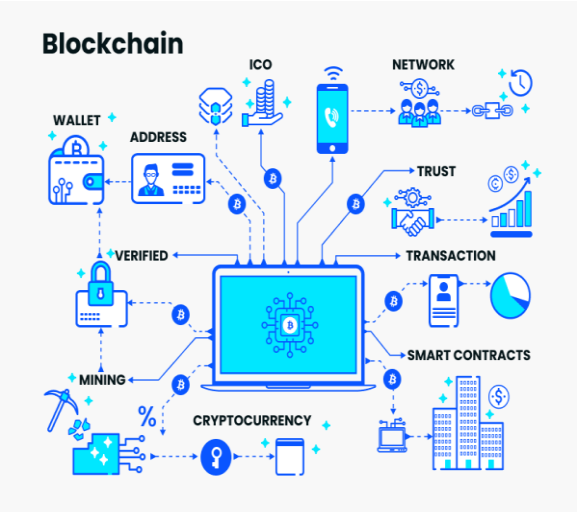
THANK YOU

6. "BLOCKCHAIN UNBOUND: TRACING THE PATH TO TECHNOLOGICAL DOMINANCE"

M.Rahul Reddy (22155-CM-044)

Introduction:

Blockchain Technology, once a niche concept associated with cryptocurrency, has now emerged as a transformative force reshaping industries and redefining digital trust. Originating from the Bitcoin into the intricate journey of blockchain, its meteoric rise to prominence, and the profound implications it holds for the future of technology and society.



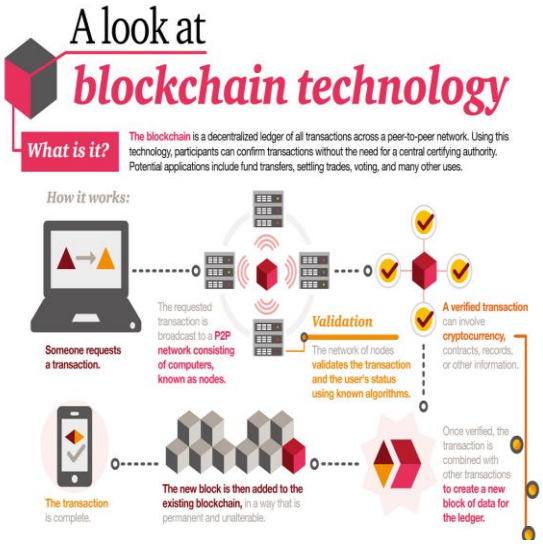
What is BlockChain Technology:

Blockchain technology is an advanced **database mechanism** that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain.

whitepaper in **2008 by the mysterious Satoshi Nakamoto**, blockchain has undergone a remarkable evolution, evolving beyond its initial application to revolutionize various sectors. This journal delves

Origins and Evolution:

Blockchain originates from the **Bitcoin** whitepaper, proposing a decentralized cash system. It operates as a distributed ledger, recording tamper-resistant transactions without intermediaries. Initially for **cryptocurrencies**, blockchain's potential expanded beyond digital currencies. Developers explored alternative consensus mechanisms like Proof of Stake and DAGs to address scalability and energy concerns.



Advantages:

1. Decentralization: Blockchain operates on a decentralized network, eliminating the need for a central authority or intermediary. This reduces the risk of single points of failure and enhances system resilience.
2. Transparency and immutability: Transactions recorded on a blockchain are transparent and immutable, meaning they cannot be altered or deleted once confirmed. This fosters trust among participants and ensures the integrity of the data.
3. Enhanced security: Blockchain utilizes cryptographic techniques to secure transactions and maintain the integrity of the network. This makes it highly resistant to fraud, hacking, and unauthorized tampering.
4. Increased efficiency and cost savings: By automating processes and reducing the need for intermediaries, blockchain can streamline operations, minimize errors, and lower transaction costs. This can lead to significant efficiency gains and cost savings for businesses.

Applications:

1. Money transfers: Facilitating faster and less expensive cross-border transactions.
2. Financial exchanges: Offering decentralized exchanges for faster and more secure transactions.
3. Insurance: Providing greater transparency for customers and providers, speeding up claim processes.
5. Real estate: Recording transactions on a blockchain for secure and efficient ownership verification and transfer.
6. Secure personal information: Enhancing security for sensitive data like Social Security numbers and birth dates.
7. Voting: Enabling secure and tamper-proof voting processes with increased accessibility.
8. Government benefits: Administering welfare programs and benefits more efficiently, reducing fraud and costs.

Scaling and Mainstream Integration:

Despite its promise, blockchain technology faces challenges related to **scalability, interoperability, and regulatory compliance**. Scalability solutions, such as sharding and layer 2 protocols, are being developed to address the limitations of existing blockchain networks, paving the way for increased throughput and transaction speeds. Moreover, interoperability protocols aim to foster seamless communication and data exchange between different blockchain platforms, unlocking synergies and driving innovation.

Blockchain technology promises a transformative era, reshaping transactions, communication, and governance. Its decentralization empowers individuals, democratizing access to finance and information. Overcoming hurdles, blockchain's ascent seems inevitable, yet collaboration is vital for responsible development. This journal highlights blockchain's profound societal impact, urging innovation and responsible adoption for humanity's benefit. legitimacy to blockchain-based applications, fostering greater trust and adoption among traditional institutions and investors.

7. CYBER CRIMES

S.Divya (22155-EC-043)

V.Rushitha (22155-EC-048)

What is Cyber Crime

Cyber crime is criminal activity that either targets or uses a computer, Cybercrime can be carried out by individuals or organizations. Some cybercriminals are organized, use advanced techniques and are highly technically skilled. Others are novice hackers. Most cybercrime is committed by cybercriminals or hackers who want to make money. However, occasionally cybercrime aims to damage computers or networks for reasons other than profit. These could be political or personal

The World Economic Forum's 2023 Global Risks Report ranks cybercrime as one of the top 10 risks facing the world today and for the next 10 years. If cybercrime were viewed as a nation state, cybercrime would count as the third largest economy in the world. In numbers, cybercrime is predicted to cause over 9 trillion in damages worldwide in 2024.

Types of Cyber Crime

- Hacking
- Salami attack
- Malware
- Software piracy
- Phishing
- Spam
- IRC crime
- Cyber stalking
- Cyber Defamation

The mostly used in Cyber Crimes are:

1. Hacking:

The act of compromising digital devices and networks through unauthorized access to an account or computer system. Hacking is not always a malicious act, but it is most commonly associated with illegal activity and data theft by cyber criminals.

2. Salami attack:

A salami attack is a cybercrime in which an attacker steals money in small amounts. It comes in two varieties: salami slicing and penny shaving. The damage done is so minor that it goes unnoticed. The attacker faces imprisonment under Section 66 IT if convicted of this attack.

3. Malware:

Malware, short for malicious software, refers to any intrusive software developed by cybercriminals (often called hackers) to steal data and damage or destroy computers and computer systems. Examples of common malware include viruses, worms, Trojan viruses, spyware, adware, and ransomware.

4. Software piracy:

Software piracy is the unauthorized use, copying or distribution of copyrighted software. It may take many forms, including: Unauthorized copying of software programs purchased legitimately, sometimes known as "end-user" piracy. Gaining illegal access to protected software, also known as "cracking"

5. Phishing:

Phishing is a type of online fraud that involves tricking people into providing sensitive information, such as passwords or credit card numbers, by masquerading as a trustworthy source. Phishing can be done through email, social media or malicious websites.

How to Protect yourself against Cyber Crime How to stop Cyber Crime?

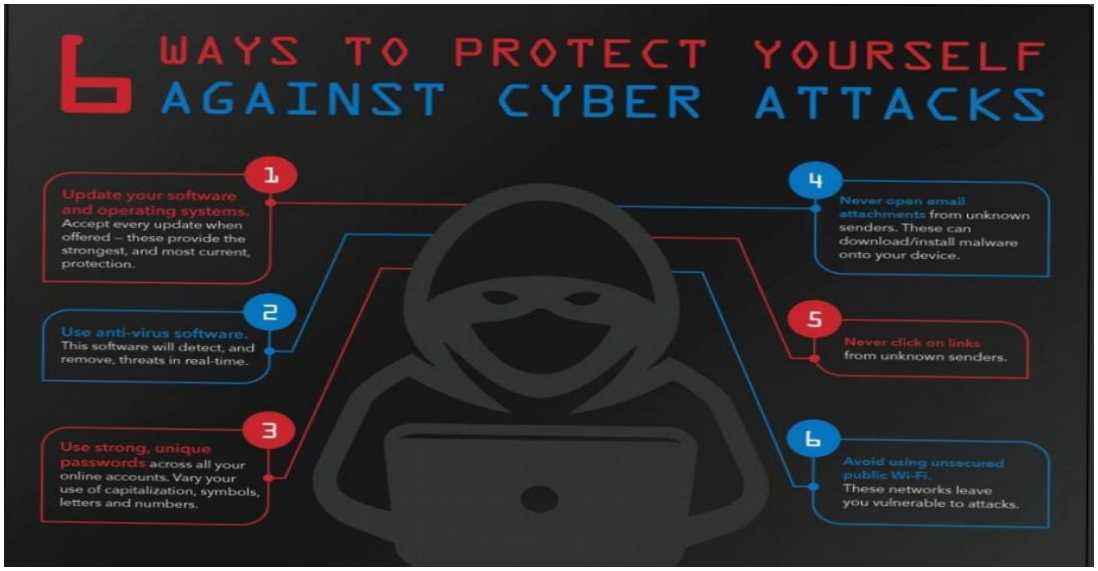
- Here are some sensible tips to protect your computer and your personal data from cybercrime

1. Keep software and operating system updated

- Update your software and operating systems. Accept every update when offered — these provide the strongest, and most current, protection.

2.Do not click on links in spam emails or untrusted website

- Never open email attachments from unknown senders. These can download/install malware onto your device.
- Never click on links from unknown senders.



3. Use strong passwords

- Use strong, unique passwords across all your online accounts. Vary your use of capitalization, symbols, letters and numbers.

4.Use anti-virus software and keep it updated

- Use anti-virus software. This software will detect, and remove, threats in real-time

5.Do not give out personal information unless secure

- Avoid using unsecured public Wi-Fi. These networks leave you vulnerable to attacks.

Advantages:

1. Improved security from cyberspace to the real world.

2. Increase in cyber-defense.

3. Business Continuity.

4.Remote Work Security.

5.Competitive Benefit.

Disadvantages:

1. High Cost of Implementation.

2. Complex Management.

3.Compatibility Issues.

4.Inconvenience to Users.

5.Limited Effectiveness Against Insider Threats.

8. SOME IMPORTANT CONVERSION FACTORS

A Mahitha, 21155-C-008

Linear Measurements:

1’ = 12”

1’ = 30.48 cm

1’ = 0.3048 m

1” = 2.54 cm

Length of 1 Gunters Chain = 66’ (100 links, length of each link = 2/3’ = 8”)

Areal Measurements:

1 m^2 = 10.75 ft^2

1 Hectare = 10^4 m^2

1 Acre = 43560 m^2 (10 square Gunters Chain = 10 x 66 x 66 = 43560 m^2)

1 Acre = 100 Cents

1 Cent = 435.6 m^2

Volumetric Measurements:

1 m^3 = 35.3 ft^3 (approximately 36 ft^3)

1 m^3 = 1000 litres of water

1 TMC = 1,000,000,000 cubic ft. = 10^9 ft^3

Discharge (rate of flow):

1 cumec = 1m^3/Sec = 1000 litres of water/Sec

1 cusec = 1ft^3/Sec

If water flows in a river at 1,00,000 Cusec over a period of 1 day, the volume of water is equal to 100000 x 24 x 60 x 60 = 8.64 x 10^9 cubic ft. = 8.64 T.M.C

Specific Gravity:

of water = 1.0

of Mercury = 13.6

of Steel = 7.85

9. CHANDRAYAN-3

B Sukanya, 23155-CM-005

Chandrayaan-3 is the third mission in the programme, a series of lunar-exploration missions developed by the Indian Space Research Organisation

If the Chandrayaan-3 soft-lands on the moon successfully, India will be only the fourth country to reach the moon after the US, China and the Soviet Union. Interestingly, Russia made an attempt to land on the moon on August 20, 2023. However, its Luna-25 spacecraft spun out of control and crashed on to the lunar surface..

India's lunar mission Chandrayaan 3 was launched on July 14, at 2:35 P.M. from Satish Dhawan Space Centre in Sriharikota announced by the Indian Space Research Organisation (ISRO). The date was later confirmed by Secretary of Space department and ISRO Chairman.

Chandrayaan-3 is a follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface. It consists of Lander and Rover configuration. It will be launched by LVM3 from SDSC SHAR, Sriharikota. The propulsion module will carry the lander and rover configuration till 100 km lunar orbit. The propulsion module has Spectro-polarimetry of Habitable

Planet Earth (SHAPE) payload to study the spectral and Polari metric measurements of Earth from the lunar orbit.

Lander payloads: Chandra's Surface Thermophysical Experiment (ChaSTE) to measure the thermal conductivity and temperature; Instrument for Lunar Seismic Activity (ILSA) for measuring the seismicity around the landing site; Langmuir Probe (LP) to estimate the plasma density and its variations. A passive Laser Retroreflector Array from NASA is accommodated for lunar laser ranging studies.

Rover payloads: Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscopy (LIBS) for deriving the elemental composition in the vicinity of landing site.

Chandrayaan-3 consists of an indigenous Lander module (LM), Propulsion module (PM) and a Rover with an objective of developing and demonstrating new technologies required for Interplanetary missions. The Lander will have the capability to soft land at a specified lunar site and deploy the Rover which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility. The Lander and the Rover have scientific payloads to carry out experiments on the lunar surface. The main function of PM is to carry the LM from launch vehicle injection till final lunar 100 km circular polar orbit and separate the LM from PM. Apart from this, the Propulsion Module also has one scientific payload as a value addition which will be operated post separation of the Lander Module. The launcher identified for Chandrayaan-3 is LVM3 M4 which will place the integrated module in an Elliptic Parking Orbit (EPO) of size ~170 x 36500 km.

The mission objectives of Chandrayaan-3 are:

- To demonstrate Safe and Soft Landing on Lunar Surface
- To demonstrate Rover roving on the moon and
- To conduct in-situ scientific experiments.
- To achieve the mission objectives, several advanced technologies are present in Lander such as

- Altimeters: Laser & RF based Altimeters
- Velocimeters: Laser Doppler Velocimeter & Lander Horizontal Velocity Camera
- Inertial Measurement: Laser Gyro based Inertial referencing and Accelerometer package
- Propulsion System: 800N Throttleable Liquid Engines, 58N attitude thrusters & Throttleable Engine Control Electronics

- Navigation, Guidance & Control (NGC): Powered Descent Trajectory design and associate software elements
- Hazard Detection and Avoidance: Lander Hazard Detection & Avoidance Camera and Processing Algorithm.
- Landing Leg Mechanism. - To demonstrate the above said advanced technologies in earth condition, several Lander special ni tests have been planned and carried out successfully viz.
- -Integrated Cold Test - For the demonstration of Integrated Sensors & Navigation performance test using helicopter as test platform.
- Integrated Hot test – For the demonstration of closed loop performance test with sensors, actuators and NGC using Tower crane as test platform.

The overall specifications for Chandrayaan-3 are:

Sl No.	Parameter	Specifications
1.	Mission Life (Lander & Rover)	One lunar day (~14 Earth days)
2.	Landing Site (Prime)	4 km x 2.4 km 69.367621 S, 32.348126 E
3.	Science Payloads	Lander:

10. DATA MINING

Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere (RAMBHA)

D. Anu, 23155-CM- 011

Definition :

Data mining is pivotal in leveraging the wealth of all the available data to make more informed decisions, optimize operations, and gain a competitive advantage in any field. Shortly, it is the process of extracting hidden patterns, valuable insights, and meaningful knowledge from large volumes of data.

In this regard, data mining equips organizations with the tools to make knowledgeable and data-backed solutions by leveraging their data, competitor information, publicly accessible data, or a combination of these resources. It also allows businesses to predict future trends and outcomes based on historical data, reducing guesswork and facilitating proactive rather than reactive response.

Introduction:

Data Mining is the process of extracting useful information from large sets of data. It involves using various techniques from statistics, machine learning, and database systems to identify patterns, relationships, and trends in the data. This information can then be used to make data-driven decisions, solve business problems, and uncover hidden insights. Applications of data mining include customer profiling and segmentation, market basket analysis, anomaly detection, and predictive modeling. Data mining tools and technologies are widely used in various industries, including finance, healthcare, retail, and telecommunications.

In general terms, "Mining" is the process of extraction of some valuable material from the earth e.g. coal mining, diamond mining, etc. In the context of computer science, "Data Mining" can be referred to as knowledge mining from data, knowledge extraction, data/pattern analysis, data archaeology, and data dredging. It is basically the process carried out for the extraction of useful information from a bulk of data or data warehouses.

One can see that the term itself is a little confusing. In the case of coal or diamond mining, the result of the extraction process is coal or diamond. But in the case of Data Mining, the result of the extraction process is not data!! Instead, data mining results are the patterns and knowledge that we gain at the end of the extraction process. In that sense, we can think of Data Mining as a step in the process of Knowledge Discovery or Knowledge Extraction.

Gregory Piatetsky-Shapiro coined the term "Knowledge Discovery in Databases" in 1989. However, the term 'data mining' became more popular in the business and press communities. Currently, Data Mining and Knowledge Discovery are used interchangeably.

Nowadays, data mining is used in almost all places where a large amount of data is stored and processed. For example, banks typically use 'data mining' to find out their prospective customers who could be interested in credit cards, personal loans, or insurance as well. Since banks have the transaction details and detailed profiles of their customers, they analyze all this data and try to find out patterns that help them predict that certain customers could be interested in personal loans, etc.

Main Purpose of Data Mining:

Basically, Data mining has been integrated with many other techniques from other domains such as statistics, machine learning, pattern recognition, database and data warehouse systems, information retrieval, visualization, etc. to gather more information about the data and to helps predict hidden patterns, future trends, and behaviors and allows businesses to make decisions.

Technically, data mining is the computational process of analyzing data from different perspectives, dimensions, angles and categorizing/summarizing it into meaningful information.

Data Mining can be applied to any type of data e.g. Data Warehouses, Transactional Databases, Relational Databases, Multimedia Databases, Spatial Databases, Time Series Databases, World Wide Web.

Applications:

- Financial Analysis
- Biological Analysis
- Scientific Analysis
- Intrusion Detection
- Fraud Detection
- Research Analysis

__Advantages of Data Mining__ :

Improved decision-making:

Data mining can provide valuable insights that can help organizations make better decisions by identifying patterns and trends in large data sets.

Increased efficiency:

Data mining can automate repetitive and time-consuming tasks, such as data cleaning and preparation, which can help organizations save time and resources.

Enhanced competitiveness:

Data mining can help organizations gain a competitive edge by uncovering new business opportunities and identifying areas for improvement.

Improved customer service:

Data mining can help organizations better understand their customers and tailor their products and services to meet their needs.

Fraud detection:

Data mining can be used to identify fraudulent activities by detecting unusual patterns and anomalies in data.

Predictive modeling:

Data mining can be used to build models that can predict future events and trends, which can be used to make proactive decisions.

New product development:

Data mining can be used to identify new product opportunities by analyzing customer purchase patterns and preferences.

Risk management:

Data mining can be used to identify potential risks by analyzing data on customer behavior, market conditions, and other factors.

Disadvantages of Data mining :

- Data mining is not always unerring and in certain cases can lead to repercussion.
- A large database is required to go for mining thus making the process hard.
- Selection of the right tool for a certain business is a cumbersome task as each tool has a different algorithm.
- Data mining is hard and complex, thus a proper training about various tools is required.

Conclusion :

Data mining is widely used in fraud detection contexts, as an aid in marketing campaigns, and even supermarkets use it. Data warehouse provides us generalized and consolidated data in a multidimensional view. Several types of analytical software are available: statistical, machine learning, and neural networks.

11. GODAVARI WATER DIVERSION IN POLAVARAM PROJECT

S AMANULLA, 21155-C-014

World's biggest multi-purpose irrigation project Polavaram Project receives its first fruit of success. On Friday, 11 June 2021, process of discharging water from Polavaram project to Godavari Delta region for the first time started. project on river Godavari near Ramayyapeta village of Polavaram mandal about 42 km upstream of Sir Arthur Cotton Barrage, where the river emerges out of the last range of the Eastern Ghats and enters the plains in East and West Godavari Districts of Andhra Pradesh. The project heralds a wide range of developmental activities across the region.

The project consists of Earth-cum-Rock fill dam on main river course, gated concrete spillway, left and right connectivities for carrying water from reservoir to Left Main Canal and Right Main Canal.

Components

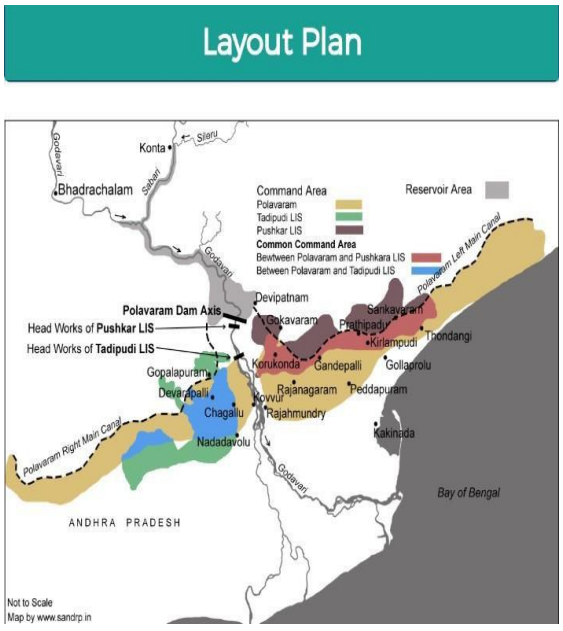
1. Earth cum Rock Fill Dam in the main river course and adjacent gap for a length of 2454 m (564 m + 1750 m + 140 m) with a maximum height of 50 m.
2. 1118.40 m long Spillway with 48 Nos. Radial Gates of size 16 m x 20 m with crest level

   +25.72 m for discharging probable maximum flood of 1,41,435 cumec.
3. Left Main Canal for a length of 181.999 km to provide irrigation to 1.619 lakh ha. (4.00 lakh acre) in East Godavari and Visakhapatnam Districts and supply of 23.44 TMC of water to in and around Visakhapatnam city including Vizag Steel Plant and drinking water facilities.
4. Right Main Canal for a length of 178.810 km to provide irrigation to 1.29 lakh ha. (3.20 lakh acre) in West Godavari and Krishna Districts. Diversion of 80 TMC of Godavari River to Krishna River
5. Left and Right Connectivities.
6. Surface Power House with installed capacity of 960 MW (12 x 80 MW) on Left flank with water conductor system.

Goadavari's water has been diverted from this stretch by building two temporary cofferdams - one upstream and the other downstream - to enable construction . Cofferdams are temporary structures erected to divert the river water during the construction phase, after which they are dismantled

The humongous delay since 2004-2005 has resulted in some of the dam structures suffering major damages on account of floods in the godavari in the intervening years. A senior engineer from the water resources department, who is working on the project, said that during the 2019 floods, half of the diaphragm wall - the core of the main dam built to restrict seepage from upstream to downstream - was washed away . It was built at a cost of rupees **442 crores.**

The 6.6 km River Diversion



The most volatile river Godavari's diversion for 6.6 kilometres has been completed. The second largest river in the country experiences floods ranging from 35 lakh to 50 lakh cusecs. Diversion of these massive floods for 6.6 kilometres is not an easy task. It is an engineering marvel on any parameter. The Godavari River's natural flow, diverting to the right side, will continue even after completing the project.

The fastest execution of works

Megha Engineering and Infrastructures Limited (MEIL) have completed the work required to divert the Godavari River flow in a record time. To turn the Godavari to the right and reach the spillway, excavating the approach channel to 2.4 kilometres was necessary. It looks like another river. Of the 1,54,8800 cubic meters of earth excavation, MEIL completed 1,04,88,00 cubic meters. Out of 5.92 crore cubic meters of earthwork, 5.24 crore cubic meters is already completed. The works are progressing round the clock.

Godavari River water diversion through Polavaram project spillway, at Polavaram in West Godavari district on Friday.

Major loss in the project

The cost of this guide bund and retaining wall type construction is Rs.81 crores. Engineering officials are not sure whether it will be enough to fix the guide bund as both are sagging. It is said that the extent of damage to the retaining wall and the condition of the stonework should be studied. The authorities do not believe that repairs can be made. It is said that if the entire Bund is to be built again, the expenditure will increase.

80 TMC of Godavari water can be diverted through Polavaram

"Excess flood water to the tune of 2,500 TMC (thousand million cubic feet) from Godavari river flows into sea, which is considered as a national waste and we can only save about 308 TMC water from this project,"

Out of the 80 TMC water that can be diverted from Godavari, 45 TMC of water can be used for drought-hit Rayalaseema districts," the minister said. He said diversion of water from Godavari can irrigate 16 lakh acres of land additionally in Andhra Pradesh. On Polavaram project, Venkaiah said, "The project will provide 23.44 TMC water to Visakhapatnam for the drinking and industrial purpose in addition to the current water supply for irrigating 7.06 lakh acres of land in the district...960 MW of power can also be generated from the project

"Only 154 villages are affected (due to the project) and all the displaced persons would be rehabilitated under the government's Resettlement and Rehabilitation scheme," he said, adding that linking of rivers is a priority for the NDA government at Centre to ensure that drought-prone areas in the country get water. Polavaram project is a multi-purpose irrigation project which has been accorded national project status by the Central government. This under-construction dam, across Godavari river is located in West Godavari and East Godavari districts in Andhra Pradesh and its reservoir spreads in parts of Chhattisgarh and Odisha also.

12. HACKING

Noor Jahan, 23155-CM-042

Hacking is an attempt to exploit a computer system or a private network inside a computer. Simply put, it is the unauthorised access to or control over computer network security systems for some illicit purpose.

Introduction

Hacking has become an integral part of the modern technological landscape. While it is often depicted in movies as a thrilling, high-stakes endeavor, the reality of hacking is a complex and multifaceted one, with both dark and ethical sides. This article explores the world of hacking, delving into the different aspects, its history, and its impact on society.

The History of Hacking

Hacking has deep roots that trace back to the early days of computing. It originally referred to clever or innovative ways of modifying hardware or software to achieve unintended purposes. In the 1960s and 1970s, early computer enthusiasts engaged in what they called "phreaking" to manipulate the telephone system. Over time, hacking evolved, and individuals began to explore and exploit security vulnerabilities in computer systems.

Dark Side of Hacking

Cybercrime: The dark side of hacking includes malicious activities, such as data theft, financial fraud, and identity theft. Cybercriminals use hacking techniques to compromise systems and networks, often with the intent of financial gain.

Malware: Hacking is responsible for the creation and distribution of malware, including viruses, worms, and ransomware, which can wreak havoc on individuals and organizations.

Privacy Invasion: Hacking can lead to the invasion of personal privacy, with criminals gaining access to sensitive information, leading to unwarranted surveillance or extortion.

Ethical Hacking

Hacking is the act of gaining unauthorized access to computer systems, networks, or data with the intent to exploit, manipulate, or steal information. It can be divided into two main categories: ethical hacking and malicious hacking.

Pros of Ethical Hacking:

Security Improvement: Ethical hackers, also known as "white-hat hackers," help organizations identify and patch vulnerabilities in their systems, making them more secure.

Vulnerability Discovery: Ethical hacking exposes potential weaknesses before malicious hackers can exploit them, allowing for preemptive actions.

Knowledge Transfer: Ethical hackers often share their findings and knowledge, contributing to the overall cybersecurity community.

Cons of Malicious Hacking:

Illegality: Malicious hacking is illegal and can lead to severe legal consequences, including fines and imprisonment.

Data Breaches: Hacking can result in the theft of sensitive information, which can lead to financial losses and privacy breaches.

Damage to Reputation: Organizations that suffer security breaches may face a loss of trust from customers and partners, as well as reputational damage.

Disruption: Hacking attacks can disrupt business operations, causing downtime and financial losses.

It's important to distinguish between ethical and malicious hacking, as the former serves a legitimate purpose in enhancing security,

while the latter poses significant risks and consequences.

Cybersecurity: Ethical hackers, also known as white-hat hackers, play a crucial role in bolstering cybersecurity. They help organizations identify vulnerabilities in their systems, allowing for proactive security measures.

Vulnerability Research: Ethical hackers often engage in responsible disclosure, reporting security flaws to companies and helping them fix these issues before malicious hackers exploit them.

Knowledge Sharing: The ethical hacking community fosters knowledge sharing and collaboration. Conferences and forums provide a platform for security experts to share insights and improve the collective understanding of cybersecurity.

Impact on Society

Hacking's impact on society is profound. On one hand, it has led to significant advancements in the field of cybersecurity, making our digital world safer. On the other hand, it has also contributed to widespread data breaches, identity theft, and the erosion of online privacy. The balance between these two sides of hacking remains delicate, as society grapples with the ever-evolving threat landscape.

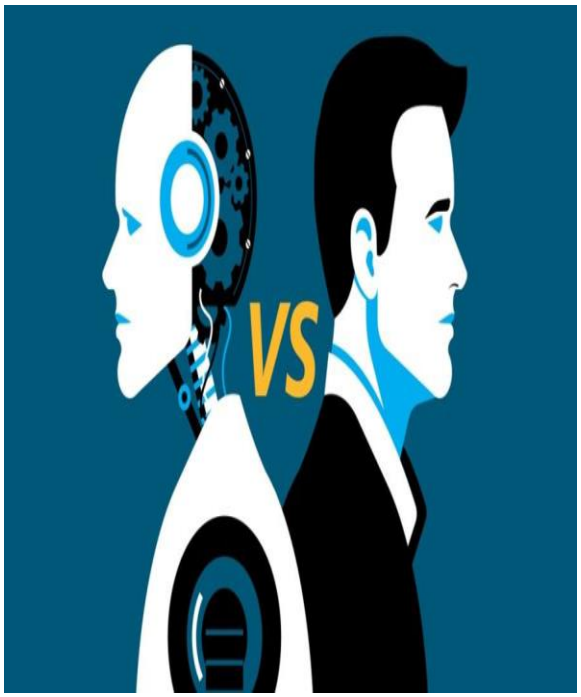
Conclusion

Hacking is a double-edged sword, with its dark and ethical sides coexisting in the digital realm. Understanding the history and impact of hacking is crucial for individuals and organizations alike. While it's essential to combat malicious hacking, ethical hacking has become an indispensable tool in securing our increasingly interconnected world. As technology advances, the role of hacking, whether for good or ill, will continue to shape the future of our digital society.

13. HUMAN LIFE WITH COMPUTER

B. Eswar (23155-EC-007)

A computer is an electronic device that manipulates information, or data. It has the ability to store, retrieve, and process data.("Common Operating Machine Purposely Used for Technological and Educational Research)

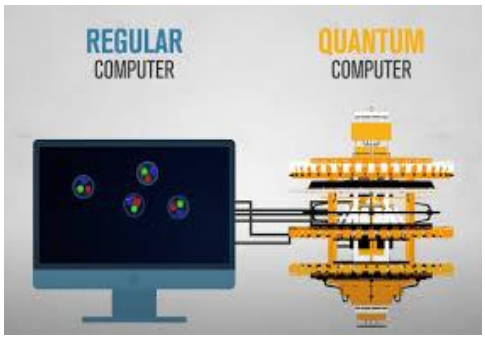


Advantages of computers:

- more information sources.
- more opportunities for cooperation and networking.
- increased access to the information in the resource centre.
- increased efficiency.
- more services.

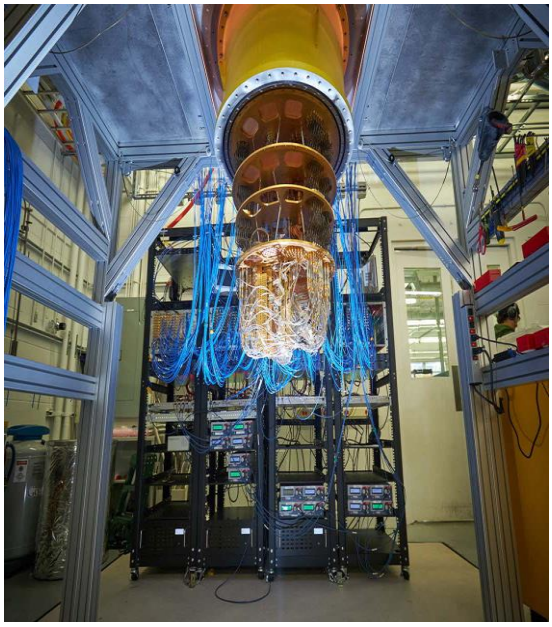
The computer is more accurate at providing data or information when compared to humans. In 20th century they two types of computer

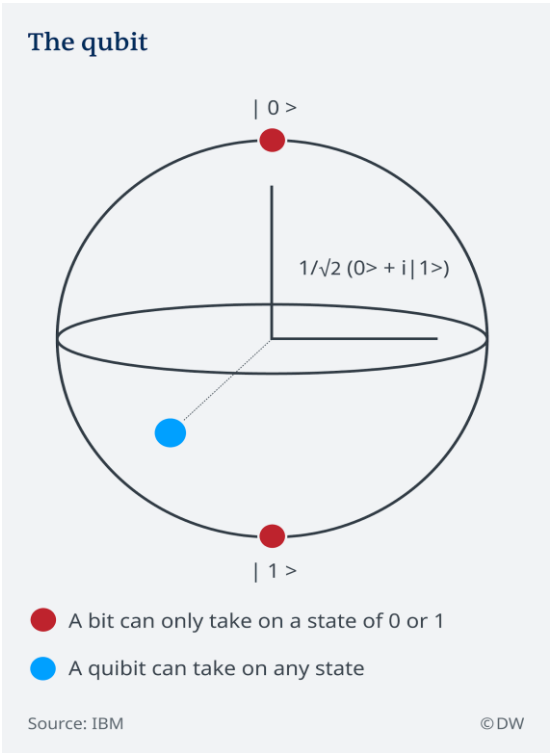
- Classical computer
- Quantum computer



Classical computer: Classical computing is another name for binary computing. In this traditional approach to computing, information is stored in bits that are represented logically by either a 0 (off) or a 1 (on)

Quantum computer: Quantum computing uses the qubit as the basic unit of information rather than the conventional bit.





Classical computer also know as pc is the mostly used computer in Now a days

Frontier as the world's only official exascale supercomputer.

Completed in May 2022, Frontier opened for general scientific use in April. Weighing nearly 270 tons, Frontier contains more than 40,000 processors that make it about 1 million times more powerful than an average desktop computer Frontier uses an internal 75 TB/s read / 35 TB/s write / 15 billion IOPS (input/output operations per second) flash storage system, along with the 700 PB Orion site-wide Lustre file system when compared when compared to human the memory capacity of the human brain was reported to have the equivalent of 2.5 petabytes of memory capacity.

Computers are capable of performing many things faster and more

accurately than people, but they are fundamentally constrained by their programming and lack human traits like creativity, emotional intelligence, and flexibility

How Does the Brain Store Information?:

- The brain's memory storage involves intricate neural connections and synapses.

- Here's a simplified explanation:

- The human brain consists of approximately *100 billion neurons, each forming 1,000 or more connections with other neurons, totaling around **100 trillion synapses*.

- These synapses are the communication points between neurons.

- When two neurons on either side of a synapse are active simultaneously, that synapse becomes more robust.

- The *dendritic spine* (the antenna on the receiving neuron) also grows larger to support increased signal strength.

- These changes in strength and size are believed to be the molecular correlates of memory.

- Researchers have identified *26 unique synapse sizes* in the hippocampus (an area involved in memory storage), indicating a *10-fold greater storage capacity* than previously thought[1].

- Essentially, the brain encodes information through these varying synapse strengths and sizes.

In summary, our brains are remarkable data repositories, capable of storing vast amounts of information—far beyond what we might imagine!

14. INTERLINKING OF RIVERS

S Amanulla, 21155-C-014

The idea of interlinking rivers was first mooted by the Chief Engineer of the Madras Presidency in 1919, Sir Arthur Cotton.

- This idea was revisited in 1960 by the then Minister of State for Energy and Irrigation, KL Rao, who proposed to link rivers Ganga and Cauvery.

What is Inter-linking of Rivers (ILR)?

The idea behind the interlinking of rivers is that many parts of the country face problems of drought while many others face the problem of flooding every year.

- The Indo-Gangetic rivers are perennial since they are fed by rains as well as the glaciers from the Himalayas.
- The peninsular rivers in India are, however, not seasonal because they are rain-fed mainly from the south-west Monsoons.
- Due to this, the Indo-Gangetic plains suffer from floods and the peninsular states suffer from droughts.
- If this excess water can be diverted from the Plains to the Peninsula, the problem of floods and droughts can be solved to a large extent.
- Hence, the interlinking of rivers will bring about an equitable distribution of river waters in India.

This project envisages the transfer of water from the water-excess basin to the water-deficient basin by interlinking 37 rivers of India by a network of almost 3000 storage dams. This will form a gigantic South Asian water grid.

(NRLP)

This project envisages the transfer of water from the water-excess basin to the water-deficient basin by interlinking 37 rivers of India by a network of almost 3000 storage dams. This will form a gigantic South Asian water grid.

There are two components to this project:

1. Himalayan Component
2. Peninsular Component

Under the National Perspective Plan for water resources development through inter basin transfer of water, prepared by the then Ministry of Irrigation (now Ministry of Jal Shakti), for transferring water from water surplus basins to water deficit basins, NWDA has identified 30 links (16 under Peninsular Component & 14 under Himalayan Component) for preparation of Feasibility

Reports. NWDA has completed water balance studies of basins/sub-basins and catchments up to diversion points, topo sheet studies of reservoirs and link alignments, storage capacity studies of reservoirs, pre-feasibility studies, feasibility studies and Detailed Project Report (DPR) towards the implementation of inter-linking of rivers in the country

Benefits of River Interlinking

There are many benefits that the proposed interlinking projects will bring about. They are discussed below:

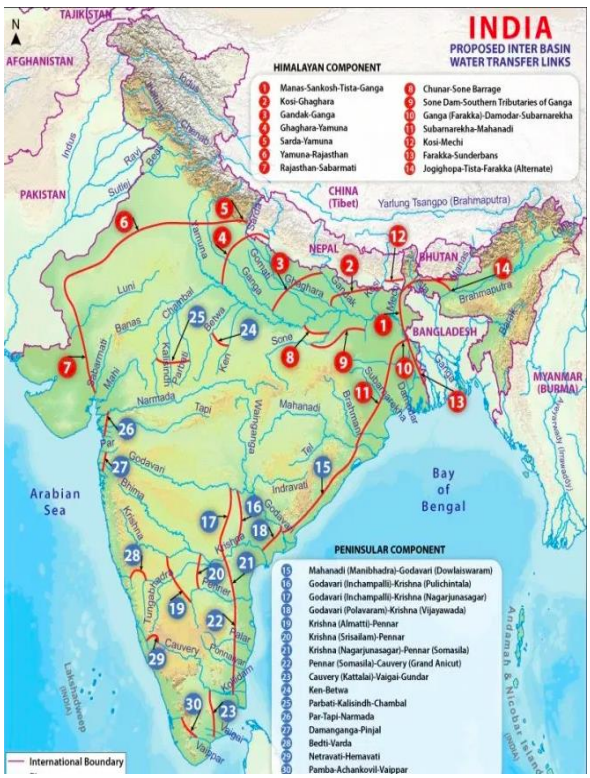
- Interlinking rivers is a way to transfer excess water from the regions which receive a lot of rainfall to the areas that are drought-prone. This way, it can control both floods and droughts.
- This will also help solve the water crisis in many parts of the country.
- The project will also help in hydropower generation. This project envisages the building of many dams and reservoirs. This can generate about 34000 MW of electricity if the whole project is executed.
- The project will help in dry weather flow augmentation. That is when there is a dry season, surplus water stored in the reservoirs can be released. This will enable a minimum amount of water flow in the rivers. This will greatly help in the control of pollution, in navigation, forests, fisheries, wildlife protection, etc.
- Indian agriculture is primarily monsoon-dependent. This leads to problems in agricultural output when the monsoons behave unexpectedly. This can be solved when irrigation facilities improve. The project will provide irrigation facilities in water-deficient places.
- The project will also help commercially because of the betterment of the inland waterways transport system. Moreover, the rural areas will have an alternate source of income in the form of fish farming, etc.
- The project will also augment the defence and security of the country through the additional waterline defence.

Challenges in River Interlinking

- Despite the many benefits that are associated with the river interlinking project, the project is yet to take off because of the many hurdles it is facing. Some of the challenges in this regard are as follows:
- **Project feasibility**: The project is estimated to cost around Rs.5.6 lakh crores. Additionally, there is also the requirement of huge structures. All this requires a great engineering

capacity. So, the cost and manpower requirement is immense.

- **Environmental impact**: The huge project will alter entire ecosystems. The wildlife, flora and fauna of the river systems will suffer because of such displacements and modifications. Many national parks and sanctuaries fall within the river systems. All these considerations will have to be taken care of while implementing the project. The project can reduce the flow of fresh water into the sea, thus affecting marine aquatic life.
- **Impact on society**: Building dams and reservoirs will cause the displacement of a lot of people. This will cause a lot of agony for a lot of people. They will have to be rehabilitated and adequately compensated.



- **Controlling floods**: Some people express doubts as to the capability of this project to control floods. Although theoretically, it is possible, India's experience has been different. There have been instances where big dams like Hirakud Dam, Damodar Dam, etc. have brought flooding to Odisha, West Bengal, etc.
- **Inter-state disputes**: Many states like Kerala, Sikkim, Andhra Pradesh, etc. have opposed the river interlinking project. Read more on interstate river disputes in India at the linked article.
- **International disputes**: In the Himalayan component of the project, the effect of building dams and interlinking rivers will have an effect on the neighboring countries. This will have to be factored in while implementing the project. Bangladesh has opposed the transfer of water from the Brahmaputra to the Ganga.

About polavaram Dam Project as part of interlinking of rivers:

Godavari's water has been diverted from this stretch by building **two temporary cofferdams** — one upstream and the other downstream — to enable construction. **Cofferdams are temporary structures erected to divert the river water during the construction phase, after which they are dismantled**.

To turn the Godavari to the right and reach the spillway, excavating the approach channel to 2.4 kilometres was necessary. It looks like another river.

The most volatile river Godavari's diversion for 6.6 kilometres has been completed. The second largest river in the country experiences floods ranging from 35 lakh to 50 lakh cusecs. Diversion of these massive floods for 6.6 kilometres is not an easy task. It is an engineering marvel on any parameter. The Godavari River's natural flow, diverting to the right side, will continue even after completing the project.

CONCLUSION:

Unexplored alternatives such as watershed development, rainwater harvesting, optimising existing infrastructure and cropping methods also should be studied well to address the water woes of the country.

15. MEMORABLE INVENTIONS IN ELECTRONICS

B.Eswar, 23155-EC-007

W. Shockley, J. Barden, W. Brattain invented the Transistor in 1948

The transistor make change in every human life the transistor provide a way to make a world's first computer in year 1958 the worlds transistor based computer was experiment +ally invented by University of Manchester's the first transistor was about the size 1 cm in each dimension But Now a Day's it become to 7-10 nanometers The computers make communication Calculation Creation Solution Easy Now a Days

The Computer may be the best invention in human evolution

According to science the memory capacity of a human brain was testified to be equal to 2.5 Petabytes. A supercomputer is a computer with a high level of performance as compared to a general-purpose computer. The performance of a supercomputer is commonly measured in floating-point operations per second instead of million instructions per second. The storage capacity of Tianhe-2 supercomputer 12.4 petabytes The supercomputer computes faster and has more central memory than conventional computers. Its high performance can be utilized to solve complex computation, design, and simulation problems instantly.

Introduction

One the best INVENTION IN 19th 1998. The first experimental demonstration of a quantum algorithm was reported. A working 2-qubit NMR quantum computer was used to solve Deutsch's problem by Jonathan A. Jones and Michele Mosca at Oxford University and shortly after by Isaac L.century The current qubit record holder is IBM's Osprey computer, with

433, but IBM hasn't yet released details about how it performs. Its previous device, the 127-qubit Eagle, has been put head-to-head with a supercomputer at the Lawrence Berkeley National Laboratory in California and won.

Quantum computers offer several distinct advantages over classical computers:

Faster Computations: Quantum computers can perform computations at a much faster rate than normal computers. They have computation power higher than supercomputers, processing data up to 1000 times faster. Some calculations that would take a normal computer 1000 years can be done by quantum computers in just a few seconds1.

Best for Simulation: Quantum computers excel at data simulation computing. Various algorithms have been created for simulating weather forecasting, chemical reactions, and other complex phenomena1.

Medicine Creation: Quantum computers can significantly impact the medical field. They can detect diseases, create formulas for medicines, and diagnose different types of illnesses in scientific laboratories1.

Improved Google Searches: Google uses quantum computers to refine searches, providing more relevant results at a faster pace1.

High Privacy and Security: Quantum computers are excellent for cryptography. They can create high-level encryption that is nearly impossible to break. China has even launched a satellite using quantum computing, claiming it cannot be hacked1.

Artificial Intelligence: Quantum computers perform well in artificial intelligence, making more precise decisions than normal computers1.

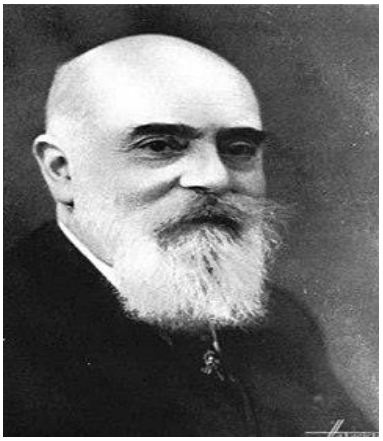
Radar and Missile Accuracy: Quantum computing is used in making radar missiles, improving their accuracy1.

Remember that quantum computers are still in the early stages of development, and their full potential is yet to be realized. However, these advantages make them an exciting area of research and innovation.

16. MULTIVIBRATORS

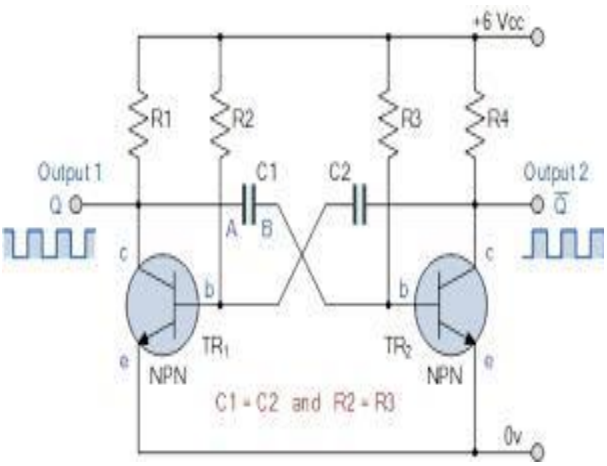
JAI SURYA, 22155-EC-034 & GOVARDHAN, 22155-EC-055

The multivibrator circuit was invented by Abraham H. Cohen in 1924. Cohen's Design laid the foundation for the development of various multivibrator configurations, including astable, monostable, and bistable circuits, which find applications in electronic timing circuits and pulse generators.



DEFINITION:

Multivibrators are electronic circuits capable of generating square wave or Pulse waveforms. There are three types: astable, monostable, and bistable.



IMPORTANCE:

- Signal Generation: They are commonly used for generating square, rectangular, or pulse waveforms, which are essential in electronic systems for tasks like clock generation.
- Timing Circuits: Multivibrators are employed in timing circuits, such as astable multivibrators, for producing periodic pulses, which are valuable in applications like timers and oscillators.
- Pulse Shaping: They help in shaping pulses and controlling the width and frequency of pulses, which is vital in digital circuits.
- Frequency Division: Bistable multivibrators, like flip-flops, are used in frequency division circuits, contributing to digital counters and frequency dividers.
- Switching Operations: Monostable multivibrators are utilised in one-shot pulse generation, which is beneficial in applications like debouncing switches or triggering events with a single pulse.

- Digital Electronics: They find extensive use in digital systems for tasks such as synchronisation, pulse-width modulation, and sequencing.
- Instrumentation: Multivibrators are applied in electronic instruments, like waveform generators, to produce specific types of waveforms for testing and measurement purposes.

Astable Multivibrator: A multivibrator is an electronic circuit used to generate square waves or rectangular pulses. It typically consists of two amplifying stages connected in a feedback loop, which allows it to switch continuously between two states. There are different types of multivibrators, such as astable, monostable, and bistable, each with its own unique behaviour and applications. They are commonly used in timing circuits, pulse generation, and oscillator circuits in various electronic devices

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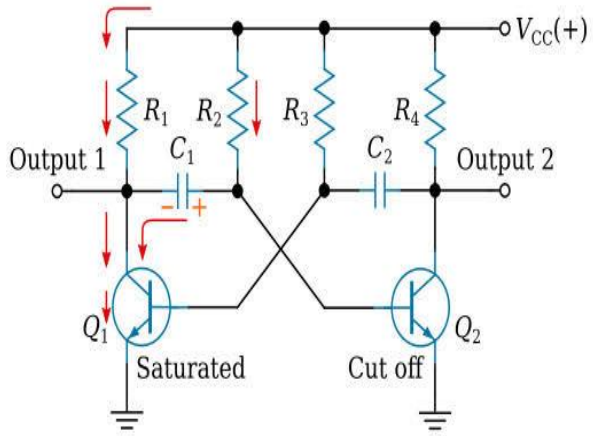
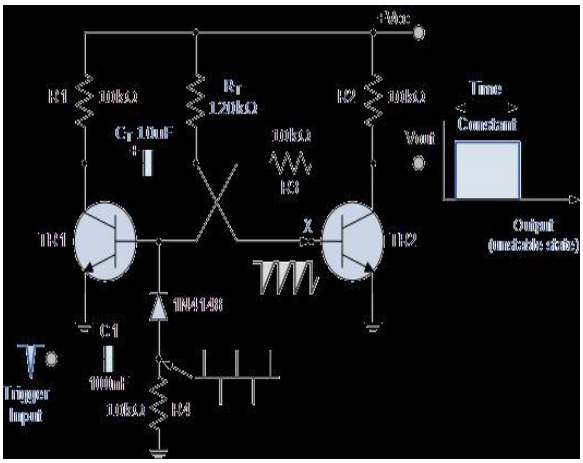
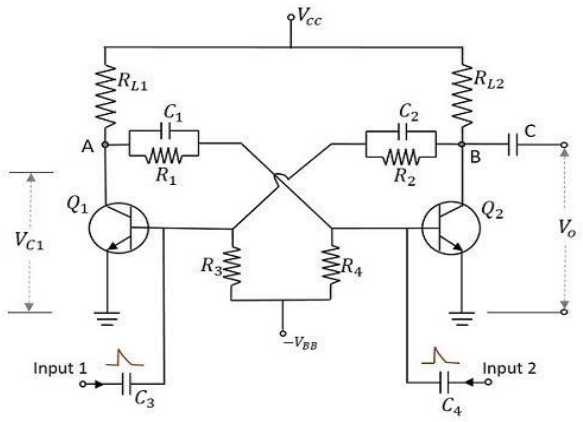


Monostable Multivibrator: A monostable multivibrator, also known as a one-shot multivibrator, is a circuit that generates a single output pulse when triggered. It has one stable state and one unstable state. When triggered, it temporarily switches to the unstable state, producing a pulse of a fixed duration, and then returns to its stable state. Monostable multivibrators are widely used in timing, pulse generation, and signal conditioning applications. They are often implemented using components such as transistors, resistors, and capacitors.



Bistable Multivibrator (Flip-Flop):A bistable multivibrator, also known as a flip-flop or a latch, is a circuit with two stable states. Unlike a monostable multivibrator, it remains in one state until it receives a trigger to switch to the other state, where it stays until triggered again. Bistable multivibrators are commonly used in digital electronics for storing binary information, forming the basis of memory elements in computer circuits. They can be implemented using various configurations

of logic gates or with dedicated flip-flop ICs.



ADVANTAGES OF MULTIVIBRATORS:

Oscillation Generation: Multivibrators, particularly astable ones, generate continuous oscillating waveforms without the need for external triggering. This is an advantage in applications requiring a stable and periodic signal.

Timing Applications:They are widely used in timing circuits, such as clocks, timers, and pulse generators. The ability to produce precise and adjustable frequencies is valuable in these applications.

Pulse Generation: Multivibrators are effective in generating pulses of different durations. This is crucial in applications like pulse-width modulation (PWM), where the duty cycle can be controlled.

Memory Elements:Bistable multivibrators (flip-flops) are used as memory elements in digital circuits. They can store binary information and are foundational in sequential logic.

Controlled Switching:Multivibrators offer controlled and predictable switching between states, providing stability in digital systems.

Simplicity in Design:Many multivibrator circuits can be designed with a relatively small number of components, making them simple and cost-effective solutions.

DISADVANTAGES OF MULTIVIBRATOR:

- Temperature Sensitivity:Multivibrators, especially those relying on analog components, can be sensitive to temperature changes, affecting their performance and accuracy.
- Component Tolerances:The accuracy of multivibrator circuits depends on the tolerances of the individual components (resistors, capacitors, etc.). Variations in component values can impact the desired output.
- Power Consumption:Depending on the configuration and application, multivibrators may consume relatively higher power, which can be a concern in battery-powered or energy-efficient designs.

- Limited Frequency Range:In some cases, multivibrators may have limitations on the frequency range they can cover. Extreme high or low frequencies may require specialised circuit configurations.
- Noise Sensitivity:Multivibrators can be sensitive to noise, leading to unwanted triggering or fluctuations in the output waveform. This can be a concern in applications requiring high precision.

APPLICATIONS:

Signal Generation: Astable multivibrators produce continuous square waves for various applications.

- Pulse Shaping: Monostable multivibrators shape input pulses, creating precise output pulses.
- Frequency Division: Astable multivibrators divide frequencies in digital circuits.
- Tone Generation: Used in audio applications for generating tones and sounds.
- Clock Circuits: Astable multivibrators serve as clock generators in digital systems.
- PWM Circuits: Astable multivibrators can generate Pulse Width Modulation signals for motor control and LED dimming.
- Sequential Logic: Bistable multivibrators (flip-flops) are building blocks for sequential logic circuits.

FUNCTIONALITY:

Astable Multivibrator:

Purpose: Generates a continuous square wave or pulses.

Operation: Alternates between two distinct states, oscillating continuously.

Applications: Commonly used in clock generators, pulse-width modulation, and tone generators.

Monostable Multivibrator:

Purpose: Produces a single output pulse in response to an external trigger.

Operation: Normally in a stable state, triggered to an unstable state for a finite duration, then returns to stable state.

Applications: Used in one-shot pulse generation, pulse-width modulation, and timing circuits.

Bistable Multivibrator (Flip-Flop):

Purpose: Stores a binary state (0 or 1) until changed by an external trigger.

Operation: Has two stable states, toggling between them when triggered.

Applications: Essential in digital memory elements, storage devices, and as basic building blocks in digital circuits.

COMPONENTS:

Multivibrators typically consist of transistors, resistors, and capacitors. Common types include astable, monostable, and bistable multivibrators. The specific components and their configurations vary based on the type of multivibrator circuit.

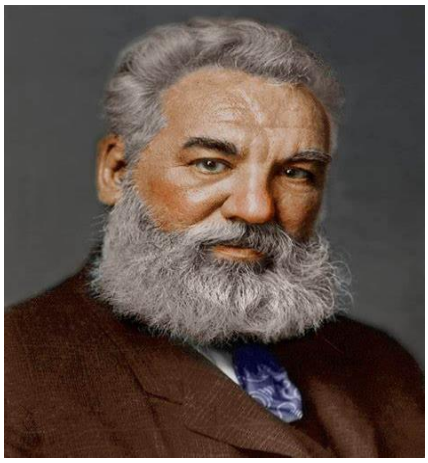
CONCLUSION:

In conclusion, multivibrators play a crucial role in electronic circuits, providing stable oscillations for various applications such as signal generators and time-keeping devices. Their ability to produce square or rectangular waveforms makes them versatile in digital systems. Understanding and utilizing multivibrators contribute to the design and functionality of electronic devices across different industries.

17. NOTABLE ACHIEVEMENTS

CHANDRASEKHAR, 23155-EC-044

1876-First practical telephone was founded Alexander Graham Bell



Alexander Graham Bell born **Alexander Bell**; March 3, 1847 – August 2, 1922)was a Scottish-born Canadian-American inventor, scientist and engineer who is credited with patenting the first practical telephone. He also co-founded the American Telephone and Telegraph Company (AT&T) in 1885.

Bell was born in Edinburgh, on March 3, 1847.The family home was at South Charlotte Street, and has a stone inscription marking it as Bell's birthplace. He had two brothers: Melville James Bell (1845–1870) and Edward Charles Bell (1848–1867). His father was Alexander Melville Bell, a phonetician, and his mother was Eliza Grace Bell. Born as just "Alexander Bell", at age 10, he made a plea to his father to have a middle name like his two brothers.For his 11th birthday, his father acquiesced and allowed him to adopt the name "Graham", chosen out of respect for Alexander Graham, a Canadian being treated by his father who had become a family friend.

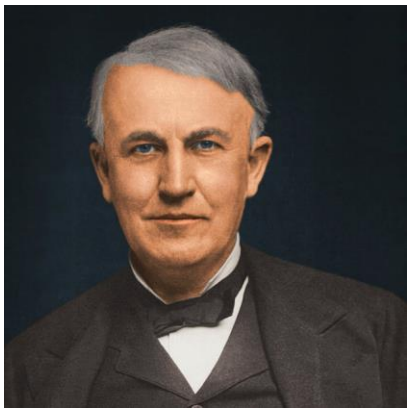
Bell's father, grandfather, and brother had all been associated with work on elocution and speech, and both his mother and wife were deaf; profoundly influencing Bell's life's work.His research on hearing and speech further led him to experiment with hearing devices which eventually culminated in Bell being awarded the first U.S. patent for the telephone, on March 7, 1876. Bell considered his invention an intrusion on his real work as a scientist and refused to have a telephone in his study.

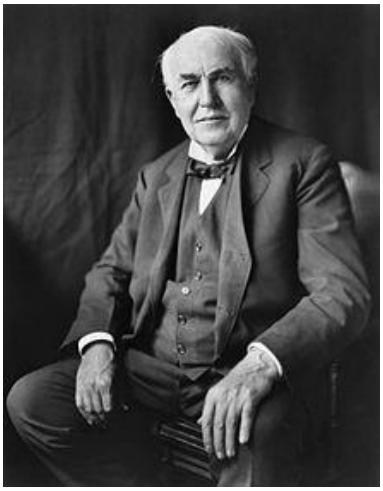
Many other inventions marked Bell's later life, including groundbreaking work in optical telecommunications, hydrofoils, and aeronautics. Bell also had a strong influence on the National Geographic Society and its magazine while serving as the second president from January 7, 1898, until 1903.

Beyond his work in engineering, Bell had a deep interest in the emerging science of heredity.His work in this area has been called "the soundest, and most

useful study of human heredity proposed in nineteenth-century America... Bell's most notable contribution to basic science, as distinct from invention."

1878-Phonograph-Thomas Edison



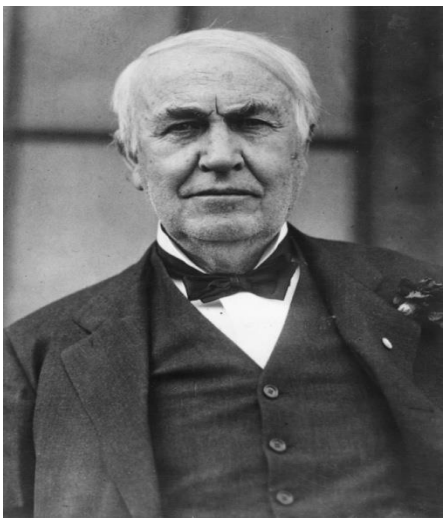


Thomas Alva Edison (February 11, 1847 – October 18, 1931) was an American inventor and businessman. He developed many devices in fields such as electric power generation, mass communication, sound recording, and motion pictures.These inventions, which include the phonograph, the motion picture camera, and early versions of the electric light bulb, have had a widespread impact on the modern industrialized world.He was one of the first inventors to apply the principles of organized science and teamwork to the process of invention, working with many researchers and employees. He established the first industrial research laboratory.

Edison was raised in the American Midwest. Early in his career he worked as a telegraph operator, which inspired some of his earliest inventions.

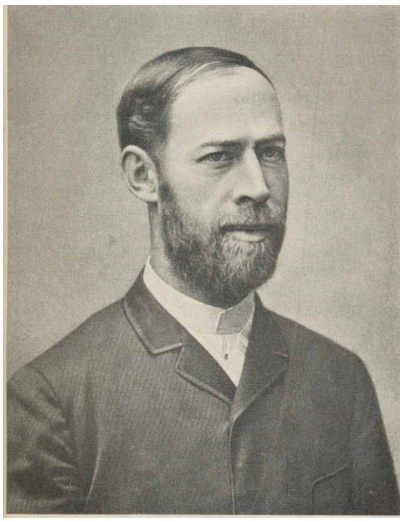
In 1876, he established his first laboratory facility in Menlo Park, New Jersey, where many of his early inventions were developed. He later established a botanical laboratory in Fort Myers, Florida, in collaboration with businessmen Henry Ford and Harvey S. Firestone, and a laboratory in West Orange, New Jersey, that featured the world's first film studio, the Black Maria. With 1,093 US patents in his name, as well as patents in other countries, Edison is regarded as the most prolific inventor in American history.. He died in 1931 due to complications from diabetes

1880-First commercially viable electric light- Thomas Edison



Edison light bulbs, also known as **filament light bulbs** and retroactively referred to as **antique light bulbs** or **vintage light bulbs**, are either carbon- or early tungsten-filament incandescent light bulbs, or modern bulbs that reproduce their appearance. Most of the bulbs in circulation are reproductions of the wound filament bulbs made popular by Edison Electric Light Company at the turn of the 20th century. They are easily identified by the long and complicated windings of their internal filaments, and by the very warm-yellow glow of the light they produce (many of the bulbs emit light at a color temperature of 2200–2400 K).

1888- Radio waves—Heinrich hertz



Heinrich Hertz (born February 22, 1857, Hamburg [Germany]—died January 1, 1894, Bonn, Germany) German physicist who showed that Scottish physicist James Clerk Maxwell's theory of electromagnetism was correct and that light and heat are electromagnetic radiations.

He received a Ph.D. magna cum laude from the University of Berlin in 1880, where he studied under Hermann von Helmholtz. In 1883 he began his studies of Maxwell's electromagnetic theory. Between 1885 and 1889, while he was professor of physics at the Karlsruhe Polytechnic, he produced electromagnetic waves in the laboratory and measured their length and velocity. He showed that the nature of their vibration and their susceptibility to reflection and refraction were the same as those of light and heat waves. As a result, he established beyond any doubt that light and heat are electromagnetic radiations. The electromagnetic waves were called Hertzian and, later, radio waves

1924-Vladimir Zworykin

Vladimir Kosma Zworykin(1888/1889–July 29, 1982) was a Russian-American inventor, engineer, and pioneer of television technology. Zworykin invented a television transmitting and receiving

system employing cathode ray tubes. He played a role in the practical development of television from the early thirties, including charge storage-type tubes, infrared image tubes and the electron microscope.

1946-Electronic digital computer-**Eckert Mauchley**

The **Eckert–Mauchly Computer Corporation** (**EMCC**) (March 1946 – 1950) was founded by J. Presper Eckert and John Mauchly. It was incorporated on December 22, 1947. After building the ENIAC at the University of Pennsylvania, Eckert and Mauchly formed EMCC to build new computer designs for commercial and military applications. The company was initially called the **Electronic Control Company**, changing its name to Eckert–Mauchly Computer Corporation when it was incorporated. In 1950, the company was sold to Remington Rand, which later merged with Sperry Corporation to become Sperry Rand, and survives today as Unisys.

1947- Transistor-

Shockley,Bardeen,Brattain

Walter Houser Brattain (February 10, 1902 – October 13, 1987) was an American physicist at Bell Labs who, along with fellow scientists John Bardeen and William Shockley, invented the point-contact transistor in December 1947.They shared the 1956 Nobel Prize in Physics for their invention. Brattain devoted much of his life to research on surface states.

Walter Brattain was born in Amoy (now in China, to American parents Ross R. Brattain and Ottilie Houser Brattain.Ross R. Brattain was a teacher at the Ting-Wen Institute,a private school for Chinese boys; Ottilie Houser Brattain was a gifted mathematician. Both were graduates of Whitman College. Ottilie and baby Walter returned to the United States in 1903, and Ross followed shortly afterward. The family lived for several years in Spokane, Washington, then settled on a cattle ranch near Tonasket, Washington in 1911.

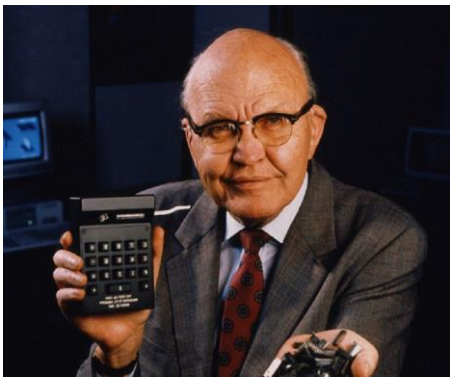
1954-Solar cell- Gerald Pearson

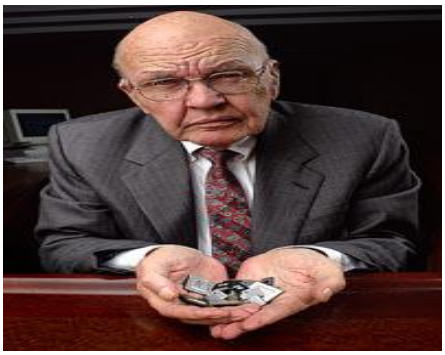
On 26 April 1954, a headline appeared on the front page of the New York Times: "Vast Power of the Sun Is Trapped by Battery Using Sand Ingredient." This headline foreshadowed the 2008 induction of Gerald L. Pearson into the National Inventors Hall of Fame for his co-invention of the silicon solar cell.

Efforts to capture solar energy for human use began decades before Gerald L. Pearson was born in Salem, Oregon, in 1905. His father was a fruit farmer with a fourth-grade education who insisted that Gerald and his two brothers go to college. Pearson studied physics at Willamette University in Salem, then earned a master's degree at Stanford University.

1958-Integrated circuit - Jack Kilby and Robert Noyce

Jack St. Clair Kilby (8 November 1923 - 20 June 2005) was an American electrical engineer who took part, along with Robert Noyce of Fairchild Semiconductor, in the realization of the first integrated circuit while working at Texas Instruments (TI) in 1958. He was awarded the Nobel Prize in Physics on 10 December 2000**.** Kilby was also the co-inventor of the handheld calculator and the thermal printer, for which he had the patents. He also had patents for seven other inventions.

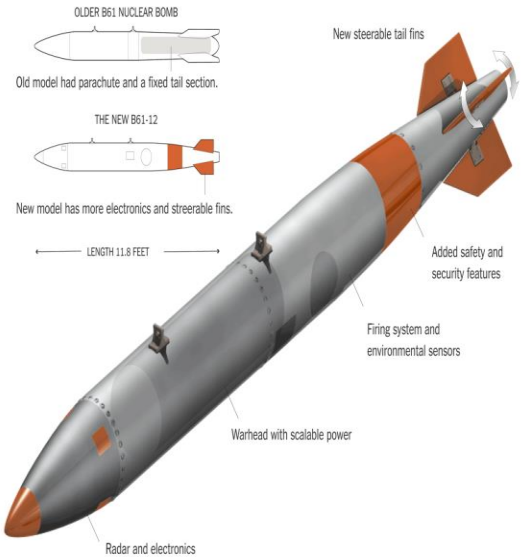




18. NUCLEAR WEAPON

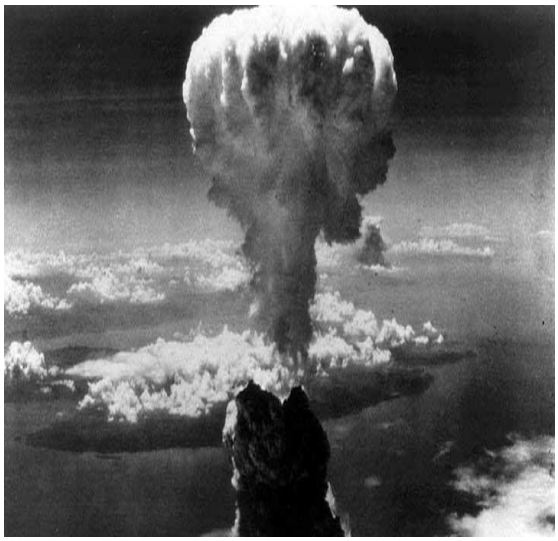
A.CHARAN, 23155-EC-001

Nuclear weapon, device designed to release energy in an explosive manner as a result of nuclear fission or a combination of the two processes. Fission weapons are commonly referred to as atomic bombs. Fusion weapons are also referred to as thermonuclear bombs or, more commonly, hydrogen bombs; they are usually defined as nuclear weapons in which at least a portion of the energy is released by nuclear fusion



Nuclear weapons produce enormous explosive energy. Their significance may best be appreciated by the coining of the words kiloton (1,000 tons) and megaton (1,000,000 tons) to describe their blast energy in equivalent weights of the conventional chemical explosive TNT. For example, the atomic bomb dropped on Hiroshima, Japan, in 1945, containing only about 64 kg (140 pounds) of highly enriched uranium, released energy equaling about 15 kilotons of chemical explosive. That blast immediately produced a strong shock wave, enormous amounts of heat, and lethal ionizing radiation. Convection currents created by the explosion drew dust and other debris into the air, creating the mushroom-shaped cloud that has since become the virtual signature of a nuclear explosion. In addition, radioactive debris was carried by winds high into the atmosphere, later to settle to Earth as radioactive fallout. The enormous toll in destruction, death, injury, and sickness produced by the explosions at Hiroshima and, three days later, at Nagasaki was on a scale never before produced by any single weapon. In the decades since 1945, even as many countries have developed nuclear weapons of far greater strength than those used against the Japanese cities, concerns about the dreadful effects of such weapons have driven governments to negotiate arms control agreements such as the Nuclear Test-Ban Treaty of 1963 and the Treaty on the Non-proliferation of Nuclear Weapons of 1968.

Among military strategists and planners, the very presence of these weapons of unparalleled destructive power has created a distinct discipline, with its own internal logic and set of doctrines, known as nuclear strategy



The first nuclear weapons were bombs delivered by aircraft. Later, warheads were developed for strategic ballistic missiles, which have become by far the most important nuclear weapons. Smaller tactical nuclear weapons have also been developed, including ones for artillery projectiles, land mines, anti submarine depth charges, torpedoes, and shorter-range ballistic and cruise missiles. By far the greatest force driving the development of nuclear weapons after World War II (though not by any means the only force) was the Cold War confrontation that pitted the United States and its allies against the Soviet Union and its satellite states. During this period, which lasted roughly from 1945 to 1991, the American stockpile of nuclear weapons reached its peak in 1966, with more than 32,000 warheads of 30 different types. During the 1990s, following the dissolution of the Soviet Union and the end of the Cold War, many types of tactical and strategic weapons were retired and dismantled to comply with arms control negotiations, such as the Strategic Arms Reduction Talks, or as unilateral initiatives. By 2010 the United States had approximately 9,400 warheads of nine types, including two types of bombs, three types for intercontinental ballistic missiles (ICBMs), two types for submarine-launched ballistic missiles (SLBMs), and two types for cruise missiles. Some types existed in several modifications. Of these 9,400 warheads, an estimated 2,468 were operational (that is, mated to a delivery system such as a missile); the rest were either spares held in reserve or retired warheads scheduled to be dismantled. Of the 2,468 operational warheads, approximately 1,968 were deployed on strategic (long-range) delivery systems, and some 500 were deployed on nonstrategic (short-range) systems. Of the 500 nonstrategic warheads in the U.S. arsenal, about 200 were deployed in Europe.

The Soviet nuclear stockpile reached its peak of about 33,000 operational warheads in 1988, with an additional 10,000 previously deployed warheads that had been retired but had not

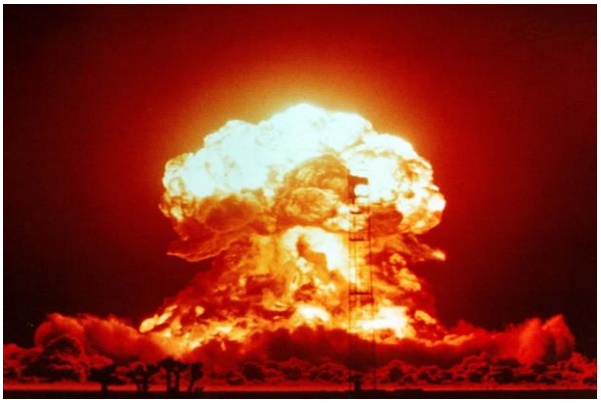
been taken apart. After the disintegration of the Soviet Union, Russia accelerated its warhead dismantlement program, but the status of many of the 12,000 warheads estimated to remain in its stockpile in 2010 was unclear. Given limited Russian resources and lack of legitimate military missions, only about 4,600 of these 12,000 warheads were serviceable and maintained enough to be deployed. Of the 4,600 operational warheads, some 2,600 were deployed on strategic systems and some 2,000 on nonstrategic systems. A global security concern is the safety of Russia's intact warheads and the security of nuclear materials removed from dismantled warheads.

Beginning in the 1990s, the arsenals of the United Kingdom, France, and China also underwent significant change and consolidation. Britain eliminated its land-based army, tactical naval, and air nuclear missions, so that its arsenal, which contained some 350 warheads in the 1970s, had just 225 warheads in 2010. Of these, fewer than 160 were operational, all on its ballistic missile submarine fleet.

Meanwhile, France reduced its arsenal from some 540 operational warheads at the end of the Cold War to about 300 in 2010, eliminating several types of nuclear weapon systems. The Chinese stockpile remained fairly steady during the 1990s and then started to grow at the beginning of the 21st century. By 2010 China had about 240 warheads in its stockpile, some 180 of them operational and the rest in reserve or retirement.

A nuclear weapon would cause great destruction, death, and injury and have a wide area of impact. People close to the blast site could experience:

- Injury or death (from the blast wave)
- Moderate to severe burns (from heat and fires)
- Blindness (from the intense light)
- Radiation sickness, also known as acute radiation syndrome or ARS (caused by the radiation released)

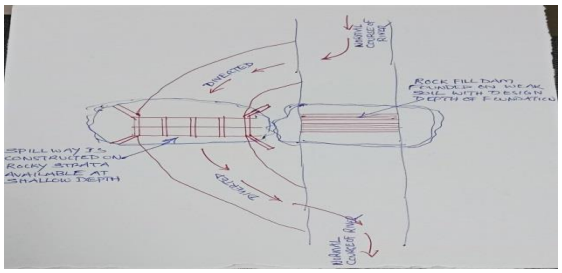


19. POLAVARAM PROJECT

K Leelavathi, 21155-C-022, DCE V Semester

The Polavaram Irrigation Project is a multi-purpose project situated on the Godavari River, near Ramayyapeta village in the Polavaram mandal. It lies approximately 42 kilometers upstream of the Sir Arthur Cotton Barrage

The entire river course has been diverted in this project to the right bank, spill way constructed and is founded on rocky foundation through which river flows during flood season. The main reason is to avoid high cost if the spillway is constructed across the river in the river bed.



Salient features of Polavaram Project:

1. Earth-cum-Rock Fill Dam:

   Length = 2,454 m (comprising segments of 564 m, 1,750 m, and 140 m).

   Maximum height = 50 m

2. Spillway:

   Length = 1118.4m, equipped with 48 radial gates measuring 16 meters by 20 meters.

   Crest Level of spillway = +25.72 meters

   Design Flood discharge Capacity = 141435 m^3/Sec (approximately 50 lakh cusecs).

3. Left Main Canal:

181.999 kilometers, the Left Main Canal serves the purpose of irrigation.

It provides water to 1.619 lakh hectares (equivalent to 4.00 lakh acres) in the East Godavari and Visakhapatnam Districts.

Additionally, it supplies 23.44 thousand million cubic feet (TMC) of water to the vicinity of Visakhapatnam city, including the Vizag Steel Plant, and caters to drinking water needs.

4. Right Main Canal:

   L = 178.810 km

   It irrigates an area of 1.29 lakh hectares (approximately 3.20 lakh acres) in the West Godavari and Krishna Districts.

5. Godavari River Diversion:

   The project facilitates the diversion of 80 TMC (thousand million cubic feet) of water from the Godavari

River to the Krishna River through both left and right connectivities.

6. Surface Power House:

   On the left flank, a surface power house with an installed capacity of 960 megawatts (MW) (comprising 12 units of 80 MW each) harnesses hydel power.

(1 TMC = 1,000,000,000 cubic ft. = 10^9 cubic ft.)

(If water flows a river at 1,00,000 Cusec over a period of 1 day, the volume of water is equal to 100000 x 24 x 60 x 60 = 8.64 x 10^9 cubic ft. = 8.64 T.M.C)

20. SORA AI

G.Madhulatha Reddy, 22155-CM-030

Sora is a text-to-video model developed by the U.S.-based artificial intelligence research organization Open AI. It can generate videos based on descriptive prompts, extend existing videos forwards or backwards in time and generate videos from still images. As of March 2024,it is unreleased and not yet available to the public.

The team that developed Sora named it after the Japanese word for sky to signify its “limitless creative potential”. On February 15,2024. OpenAI first previewed Sora by releasing multiple clips of high-definition videos that it created, including an SUV [Sport Utility Vehicle] driving down a mountain road,an animation of a “short fluffy monster” next to a candle, two people walking through Tokyo in the snow, and fake historical footage of the California gold rush, and stated that it was able to generate videos up to one minute long. The company then shared a technical report, which highlighted the methods used to train

the model. OpenAI CEO Sam Altman also posted a series of tweets, responding to Twitter users' prompts with Sora-generated videos of the prompts.

OpenAI has stated that it plans to make Sora available to the public but that it would not be soon ; it has not specified when . The company provided limited access to a small “red team”, including experts in misinformation and bias, to perform adversarial testing on the model . The company also shared Sora with a small group of creative professionals, including video makers and artists, to seek feedback on its usefulness in creative fields.

Capabilities and Limitations:

The technology behind the Sora is an adaptation of the technology behind

DALL-E 3. According to OpenAI, Sora is a diffusion transformer. A video is generated in latent space by denoising 3D ”patches”, then transformed to standard space by a video decompressor. Re-captioning is used to augment training data,by using a video-to-text model to create detailed captions on videos.

OpenAI trained the model using publicly available videos as well as copyrighted videos licensed for the purpose, but did not reveal the number or the exact source of videos.

OpenAI also stated that, in adherence to the company ‘s existing safety practices, Sora will restrict text prompts for sexual, violent, hateful, or celebrity imagery, as well as content featuring pre-existing intellectual property.

Tim Brooks, a researcher on Sora, stated that the model figured out how to create 3D graphics from its dataset alone, while Bill Pebbles, also a Sora researcher, said that the model automatically created different video angles without being prompted. According to OpenAI, Sora-generated videos are tagged with C2PA metadata to indicate that they were AI-generated.

21. TRANSFORMER

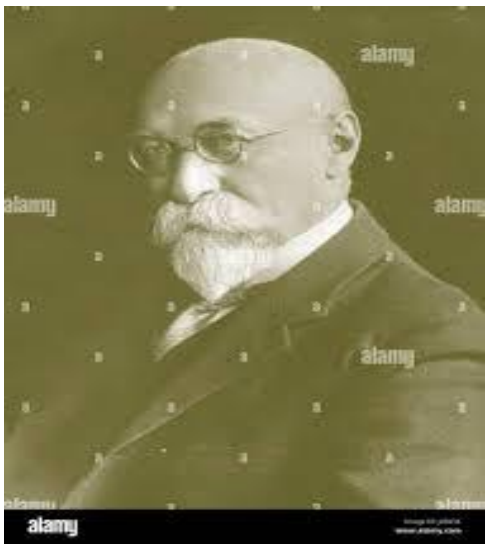
M.DILLI PIN;22155-EC-026 & T.SANTHOSH PIN;22155-EC-04

DEFINITION

A transformer is an electrical device that transfers energy between two or more circuits through electromagnetic induction. It consists of two coils, known as the primary and secondary windings, which are magnetically coupled but electrically isolated. It's commonly used to step up or step down voltage levels in electrical systems.

INVENTOR

The transformer was invented by Hungarian engineer Ottó Bláthy, Hungarian physicist Miksa Déri, and Serbian-American engineer Nikola Tesla in the late 19th century. They made significant contributions to its development and practical application.



TYPES OF TRANSFORMER

There are several types of transformers, each designed for specific purposes:

Power Transformers: These are used for transmission and distribution of electrical energy in power grids, stepping voltage levels up or down as needed.Power transformers need regular maintenance, including oil testing, insulation checks, and cooling system inspections, to ensure optimal performance and longevity.

Certainly! Power transformers play a crucial role in electricity distribution. Here are some key points:

- **Maintenance:** Regular checks on oil levels, quality, and dielectric strength are essential. Insulation resistance and winding resistance should be monitored.
- **Cooling Systems:** Efficient cooling systems, such as fans or oil coolers, are

vital to prevent overheating. Regular inspection ensures their proper functioning.

- **Testing:** Periodic testing of insulation materials and overall transformer health helps identify potential issues before they escalate.
- **Dissolved Gas Analysis (DGA):** Monitoring gases dissolved in transformer oil can reveal developing faults, helping to prevent major failures.
- **Load Monitoring:** Transformers should be operated within their rated capacity to avoid overloading, which can lead to overheating and reduced lifespan.
- **Environmental Conditions:** Transformers should be placed in areas with good ventilation and protected from extreme temperatures to maintain efficiency.
- **Security Measures:** Implementing security measures to prevent unauthorized access or vandalism is crucial to safeguard transformers.
- **Monitoring Instruments: Installing monitoring devices like temperature sensors and pressure gauges enhances real-time assessment of transformer conditions.

Distribution Transformers:

Typically used to supply lower voltage to homes, businesses, and industrial facilities from the main power grid.Distribution transformers are crucial components in electrical power systems, facilitating the efficient distribution of electricity to end-users. Here are key points about distribution transformers:

- **Purpose:** Distribution transformers step down high-voltage electricity from the transmission system to lower voltages suitable for local distribution.
- **Voltage Levels:** They typically operate at lower voltage levels, such as 11 kV or lower, depending on the specific distribution network requirements.
- **Types:** Common types include pole-mounted transformers, pad-mounted transformers, and underground vault transformers, each designed for specific installation locations.
- **Construction:** Distribution transformers consist of a core, winding,

and insulating oil. The core is often made of laminated steel sheets to reduce energy losses.

- **Efficiency:** Distribution transformers are designed to be highly efficient, minimizing energy losses during the step-down process.
- **Load Variability:** They are built to handle varying loads, making them suitable for the diverse consumption patterns in residential, commercial, and industrial areas.
- **Cooling Systems:** Distribution transformers may use various cooling methods, such as natural convection, fans, or oil cooling, to maintain optimal operating temperatures.
- **Monitoring:** Regular monitoring of parameters like temperature, oil quality, and insulation resistance is important for preventive maintenance.

Industrial Transformers: These are used for measuring and protection purposes in electrical systems. Examples include current transformers (CTs) and voltage transformers (VTs).Industrial transformers are essential components in various industrial applications, including power distribution, manufacturing processes, and heavy machinery. Here are some key points about them:

- **Types**: Industrial transformers come in various types, including distribution transformers, power transformers, and autotransformers, each designed for specific applications and voltage levels.
- **Voltage Regulation**: Transformers regulate voltage levels by adjusting the turns ratio between the primary and secondary windings. This ensures that the voltage supplied to equipment or machinery remains within acceptable limits.
- **Efficiency**: Modern industrial transformers are designed to be highly efficient, minimizing energy losses during the transformation process. This is crucial for reducing energy costs and environmental impact.
- **Cooling Systems**: Large industrial transformers often incorporate cooling systems such as oil-immersed cooling or forced-air cooling to dissipate heat generated during operation and maintain optimal temperature levels.

Protection: Transformers are equipped with various protection features such as overload protection, overvoltage protection, and short-circuit protection to ensure safe and reliable operation under different conditions.

- Maintenance**: Regular maintenance and testing are essential to ensure the reliability and longevity of industrial transformers. This includes inspection of insulation, checking for overheating, and monitoring oil levels and quality.Safety**: Industrial transformers pose certain safety risks due to high voltage levels and potential hazards associated with electrical equipment. Proper installation, grounding, and adherence to safety standards are crucial to prevent accidents and ensure worker safety.
- Customization**: Manufacturers often offer customization options to meet specific requirements, such as size, voltage rating, and environmental conditions. This allows industrial transformers to be tailored to the unique needs of different industrial facilities and applications.

Overall, industrial transformers play a vital role in ensuring the efficient and reliable distribution of electrical power in industrial settings, contributing to the smooth operation of machinery and processes.

Isolation Transformers: Designed to isolate the input power from the output power, providing electrical safety and protecting sensitive equipment from electrical noise and voltage spikes.Isolation transformers are commonly used in various applications, including:

Safety: They provide a layer of protection against electric shock by isolating the primary and secondary circuits.**Noise reduction:** Isolation transformers can reduce common-mode noise and ground loops, which can improve the performance of sensitive electronic equipment.

- **Voltage regulation:** They can help stabilize voltage levels by providing a consistent output voltage even when the input voltage fluctuates.
- **Equipment protection:** Isolation transformers can protect sensitive equipment from power surges and spikes, as well as from interference caused by nearby equipment or power lines.
- **Medical equipment:** They are often used in medical settings to isolate sensitive equipment from electrical noise and to ensure patient safety.
- **Testing and instrumentation:** Isolation transformers are used in testing and measurement applications to provide a clean and isolated power source for accurate readings.
- **Industrial applications:** They are commonly used in industrial settings to isolate machinery and equipment from the main power supply, reducing the risk of electrical interference and improving safety.

APPLICATIONS OF TRANSFORMER

Transformers have various applications across different industries and settings:

1. **Power Transmission**: Transformers are crucial for stepping up voltage levels for efficient long-distance transmission of electricity over power lines and then stepping it down for distribution to homes and businesses.
2. **Electrical Distribution**: They are used in substations to step down high voltage from transmission lines to lower voltages suitable for distribution to consumers.
3. **Industrial Applications**: Transformers are used in industrial settings to power machinery, equipment, and lighting systems, providing the necessary voltage levels for operation.
4. **Electronic Devices**: Many electronic devices, such as chargers, use transformers to convert voltage levels for charging batteries or powering circuits.
5. **Renewable Energy Systems**: In renewable energy systems like solar and wind farms, transformers are used to step up voltage levels for connection to the grid.

ADVANTAGES OF TRANSFORMER

1. **Voltage Regulation**: Transformers allow for the stepping up or stepping down of voltage levels, enabling efficient transmission and distribution of electrical power over long distances.
2. **Energy Efficiency**: They have high efficiency levels, typically ranging from 95% to 98%, which

helps in minimizing energy losses during power transmission and distribution.

3. **Electrical Isolation**: Transformers provide electrical isolation between the input and output circuits, ensuring safety and protecting equipment and users from electrical hazards.

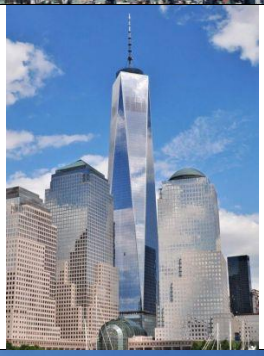
DISADVANTAGES OF TRANSFORMER

1. **Size and Weight**: Transformers can be large and heavy, especially for high-power applications, which may pose challenges in terms of installation and transportation.
2. **Cost**: High-quality transformers can be expensive to manufacture and install, especially for specialized or custom applications.
3. **Energy Losses**: Despite their high efficiency, transformers still experience energy losses due to factors such as resistive losses in the windings and core losses, which can reduce overall system efficiency.

NON TECHNICAL ARTICLES

22. 10 TALLEST BUILDINGS IN THE WORLD 2024

1	**Burj Khalifa**	829.8 m	Dubai	
2	**Merdeka 118**	678.9 m	Kuala Lumpur, Malaysia	
3	**Shanghai Tower**	632 m	Shnghai, China	
4	**Abraj Al Bait**	601 m	Mecca	
5	**Ping An International Finance Center**	599 m	Shenzhen, China	

6	**Goldin Finance 117**	597 m	Tianjin, China	
7	**Lotte World Tower**	555 m	Seoul, South Korea	
8	**One World Trade Center**	541 m	NewYork City	
9	**Chow Tai Fook Finance Center**	530 m	Guangzhou,China	
10	**Tianjin Chow Tai Fook Binhai Center**	530 m	Tianjin, China	

Compiled by

V Nisha, 22155-C-007, DCE IV Semester

23. IAS AMRAPALI KATA

G.Madhulatha Reddy, 22155-CM-030

Amrapali kata is an IAS officer of the 2010 batch of Telangana cadre. She is popularly known for her diligence and passion.

Amrapali Kata was born on 4th November 1982. She is a native of Visakhapatnam, Andhra Pradesh, India. She is a proud daughter of Venkat Reddy Kata and Padmavati. Her father, Venkat Reddy Kata, has served as a professor at Andhra University. She also has a sister who works in the revenue department of Karnataka. She tied her knot on 18

February 2018 with IPS officer Sameer Sharma.

Amrapali Kata IAS was the first lady IAS officer of Warangal urban district. She has proved to the community that a woman can elevate the whole society. She has emerged as an influential leader by breaking the norms of the professional space where women are looked down upon.

She was born in Visakhapatnam and most of her schooling took place in various parts of the state. For her Bachelors, she pursued BTech from IIT Madras. She has been a scholar student since the very beginning.

Just after completing her MBA from IIM in Bangalore, Amprapali joined ABN AMRO as a Junior Relationship Banker. She was working there and earned a decent salary; however , one day , her zeal and passion towards becoming an IAS made her quit job , and she started preparing for the civil services exam.

Her perseverance and hard work made her the youngest candidate to crack UPSC in 2010. Her rank was 39th all over India. IAS Amrapali ‘s mark sheet brings out real inspiration to the young minds, as she scored 1241/2300 in her civil service exam.

Amrapali kata‘s first posting was in Andhra pradesh. After becoming an IAS officer, she worked as a sub-collector in Vikarabad, Telangana in 2013. Later in 2014 she was transferred and posted as the director in the department of women and child welfare . In 2015 she was offered a position of Joint Collector of Ranga Reddy district, Telangana. In 2016 she was appointed as the first lady IAS officer of warangal urban district. She is an epitome of perfection and an inspiration to youth. Amrapali has been working against the common problems of society, such as poverty, hygiene, sanitation issues, inadequate water supply, and many more.

IAS Amrapali has suspended a few officers due to which every subordinate working under her strictly follows her rules and commands. Her visionary leadership qualities and absolute integrity has made her commendable at her job.

Amrapali has given numerous speeches in colleges such as in SREC college of Engineering, Warangal where she shared her experience of becoming an IAS officer and explained about various obstacles faced by women in any industry across the country.

She is my biggest inspiration to become an IAS Officer.

24. "INSPIRED BY SAGAYAM: MY JOURNEY TOWARDS THE IAS DREAM"

M.Rahul Reddy, 22155-CM- 044

Introduction:

Inspired by exemplary IAS officer **Mr. U.Sagayam**, renowned for fearless pursuit of justice and commitment to transparency, I aspire to follow his footsteps in the **Indian Administrative Service (IAS)**. His courageous leadership embodies transformative potential and upholds values of integrity and social justice, guiding countless individuals, including myself, towards excellence in civil service.

Early Encounters with Sagayam:

My admiration for **Mr. Sagayam** began with hearing stories of his fearlessness and tireless efforts to combat corruption and promote transparency in governance. His reputation as a no-nonsense officer who fearlessly stood up against powerful vested interests captured my imagination and ignited a spark within me. Through news articles, documentaries, and anecdotes shared by mentors, I gleaned insights into his unyielding resolve to uphold the values of honesty and accountability in the civil service.

Inspiring Ethical Leadership:

What truly sets **Mr. Sagayam** apart is his unwavering commitment to ethical leadership, even in the face of formidable challenges. His refusal to succumb to pressure or compromise his principles serves as a powerful example for aspiring civil servants. Whether it was taking on the **sand mafia in Tamil Nadu** or implementing innovative measures to ensure transparent governance, Mr. Sagayam's approach was characterized by integrity, transparency, and a steadfast dedication to the welfare of the people.

Championing Social Justice:

At the heart of **Mr. Sagayam's** endeavors lies a deep-seated commitment to social justice and empowerment of marginalized communities. His initiatives to **improve education, healthcare, and livelihood opportunities for underprivileged sections of society** have had a transformative impact, earning him widespread acclaim and admiration. His tireless advocacy for the rights of the

downtrodden and marginalized serves as a powerful reminder of the pivotal role that civil servants can play in effecting positive change.

Embracing Fearlessness and Resilience:

Mr. Sagayam's journey is also a testament to the virtues of fearlessness and resilience in the face of adversity. **Despite facing threats, intimidation, and personal hardships, he remained steadfast in his pursuit of justice and accountability**. His courage in standing up against entrenched interests and his unwavering commitment to the principles of honesty and fairness serve as a source of inspiration for aspiring civil servants, reminding us of the importance of courageously upholding our ideals, no matter the odds.

Personal Reflections:

As I tread the path towards civil service, **Mr. Sagayam's** example continues to inspire and guide me. His life and career embody the highest ideals of public service, reminding me of the profound impact that one dedicated individual can have on society. His legacy serves as a beacon of hope, urging aspiring civil servants like myself to strive for excellence, uphold integrity, and tirelessly work towards the betterment of society.

Conclusion:

In the annals of civil service, figures like **Mr. Sagayam** stand as beacons of hope and catalysts for change. Their exemplary lives serve as a testament to the transformative power of principled leadership and unwavering commitment to the public good. As I embark on my own journey towards the IAS, I carry with me the invaluable lessons and inspiration derived from Mr. Sagayam's extraordinary legacy, knowing that with dedication, courage, and integrity, I too can make a meaningful difference in the lives of others.

He serves as my greatest inspiration to pursue a career as an IAS officer.

25. LEANING TOWER OF PISA

INTRODUCTION

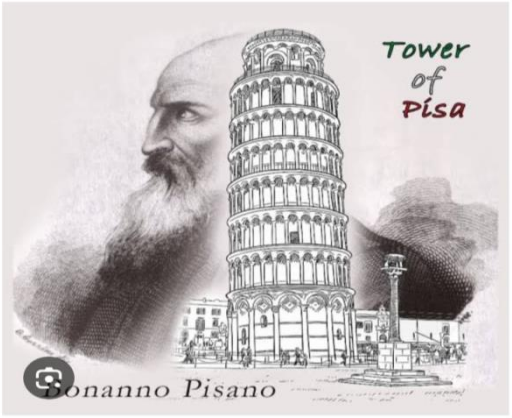
- The Leaning Tower of Pisa is one of the most famous monuments in the World.

- Located in Tuscany, Italy, the Tower was built as a freestanding bell tower for the nearby cathedral. The construction started in 1173 and it took 200 years.
- The tower, 58.4m high (on 8 floors), was supposed to be straight but due to the unstable soil, it ended up leaning.
- During its life (over 840 years), several attempts were made to save it from falling. The most remarkable attempt is dated to the end of the previous century when, with a budget of 30 million

WHEN WAS IT BUILT ?

- ✔ It was the year 1172 when Donna Berta di Bernardo gifted sixty silver coins to purchase some of the stones for the foundation of a tower to be built nearby the newly constructed Cathedral in Pisa.
- ✔ Excavation works for the foundation started right away and the first stones were laid on Thursday the 9th August 1173.
- ✔ Took 200 years to complete this incredible piece of art and engineering.
- ✔ Started as a failure, the Leaning Tower of Pisa is today one of the most remarkable achievements in engineering.

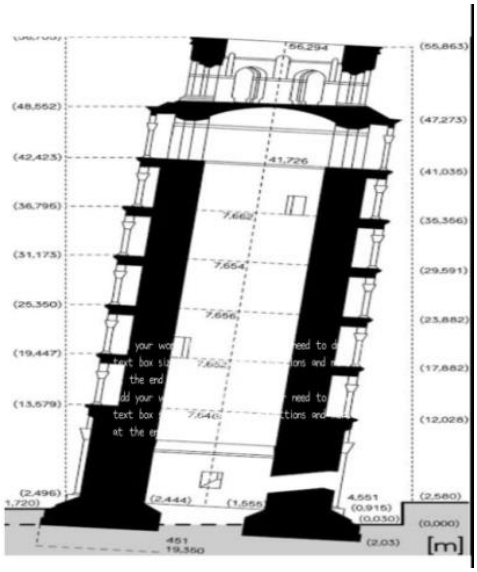
WHO BUILT IT ?



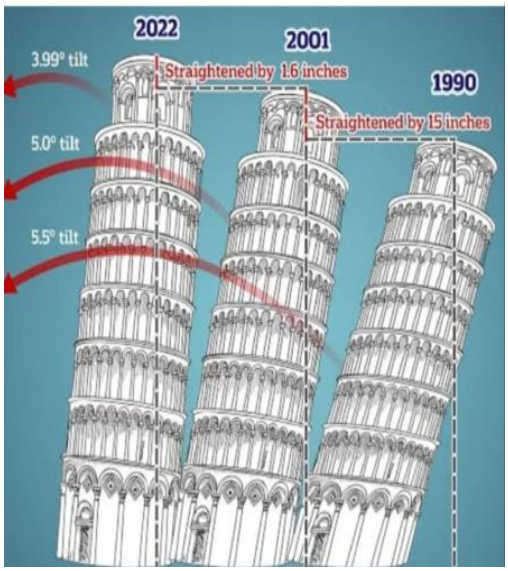
✔ **The First Name**

✔ The first name that comes up in the history of the Tower is Donna Berta di Bernardo, a local widow who donated sixty silver coins to the "Opera Campanilis petrarum Sancte Marie ". That money financed the purchase or part of the stones used for the foundation of the Tower. It was the year 1172.

ARCHITECTURE



❖ The Leaning Tower of Pisa is an example of Romanesque architecture, which is characterized by rounded arches, barrel vaults, and thick walls.



❖ Who designed the Leaning Tower of Pisa? The architect who designed the tower is not definitively known, although it is believed to be either Bonanno Pisano or Diotisalvi

❖ The form of the tower is a combination structure.

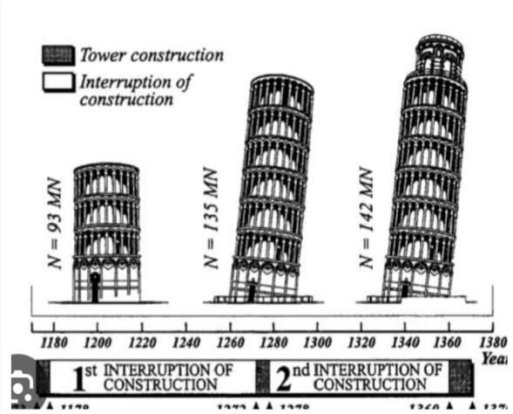
WHY IS IT LEANING ?

❖ The Tower started to lean about five years into construction, when the builders finished the third tier (about 23m high).

❖ As the original design planned a total of eight tiers, it became immediately evident that the construction had to be stopped until they found a solution to the problem of the

❖ sinking foundation

- In the meantime, at least two other towers were built in Pisa, which followed the same faith:
- bell tower of San Michele degli Scalzi; bell tower of San Nicola



CONSTRUCTION HISTORY

The Early Years of the Leaning Tower of Pisa

The construction of the Tower began in 1173. Originally designed to be a bell tower, it stood upright for over 5 years, but when the third floorwas completed in 1178 it began to lean. Italians were shocked by the event, as the tower began to lean ever so slightly.

Mistake after mistake!

After 100 years, engineer Giovanni di Simone stepped forward and started to add more floors to the tower. He tried to compensate for the original lean by making one side of the upper floors taller than the other.

HOW MUCH DOES IT COST ?

Cost of the day: The price of white marble is about $ 2.900. 000 dollars, and the cost of labor amounted to about $ 1,200,000, which means that the cost of building the Tower of Leaning Tower today is estimated at $ 4.100. 000 dollars.

By
M G MANOJ KUMAR
21155-C-010,
DCE-III Year.

26. NUTRITION

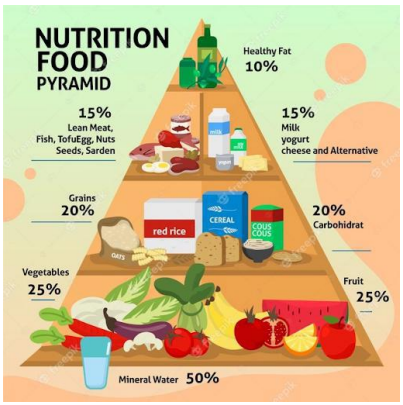
A.CHARAN & A.HARI BABU 23155-EC-001 & 23155-EC-048

Nutrition is a critical part of health and development. Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases (such as diabetes and cardiovascular disease), and longevity.

Healthy children learn better. People with adequate nutrition are more productive and can create opportunities to gradually break the cycles of poverty and hunger.

NUTRITION

Malnutrition, in every form, presents significant threats to human health. Today the world faces a double burden of malnutrition that includes both undernutrition and overweight, especially in low- and middle-income countries. There are multiple forms of malnutrition, including under nutrition (wasting or stunting), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non communicable diseases.



8 tips for healthy eating

1. Base your meals on higher fiber starchy carbohydrates
2. Eat lots of fruit and veg
3. Eat more fish, including a portion of oily fish.
4. Cut down on saturated fat and sugar.
5. Eat less salt: no more than 6g a day for adults.
6. Get active and be a healthy weight.
7. Do not get thirsty
8. Do not skip breakfast

PROBLEMS IN CHILDREN suffering from Mal NUTRITION

Most recent estimates show that globally, 149.2 million children under the age of 5 years of age are stunted (too short for their age) and 45.4 million are wasted (underweight for their height). The number of children with stunting is declining in all regions except Africa. Over three-quarters of all children suffering from severe wasting live in Asia. Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries.

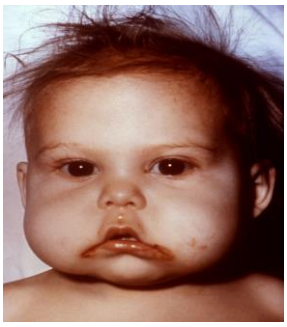
Anaemia is a serious global public health problem that particularly affects young children and pregnant women. WHO estimates that 40% of children less than 5 years of age and 37% of pregnant women worldwide are anaemic. Thirty percent of women of reproductive age have anaemia.

Globally, 1.9 billion adults are overweight or obese and 38.9 million children under 5 years of age are overweight. Rates of childhood overweight and obesity are rising, particularly in high-income and upper-middle-income countries.

Although breastfeeding protects against undernutrition and being overweight, only 44% of infants under 6 months of age are exclusively breastfed.

High sodium consumption (>5 g salt/day) contributes to high blood pressure and increases the risk of heart disease and stroke. Most people consume too much salt – on average 9–12 grams per day, or around twice the recommended maximum level of intake.

Kwashiorkor and Marasmus Disease in children



WHO's RESPON ON MALNUTRITION

According to the 2016–2025 nutrition strategy, WHO uses its convening power to help set, align and advocate for priorities and policies that move nutrition forward globally; develops evidence-informed guidance based on robust scientific and ethical frameworks; supports the adoption of guidance and implementation of effective nutrition actions; and monitors and evaluates policy and programme implementation and nutrition outcomes.

This work is framed by the Comprehensive implementation plan on maternal, infant, and young child nutrition, adopted by Member States through a World Health Assembly resolution in 2012. Actions to end malnutrition are also vital for achieving the diet-related targets

of the Global action plan for the prevention and control of non communicable diseases 2013–2020, the Global strategy for women's, children's, and adolescent's health 2016–2030, the report of the Commission on Ending Childhood Obesity (2016), and the 2030 Agenda for sustainable development.

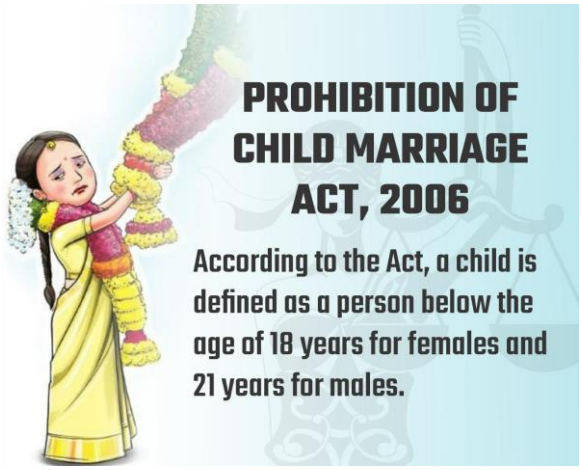
In May 2018, the Health Assembly approved the 13th General Programme of Work (GPW13), which guides the work of WHO in 2019–2023. Reduction of salt/sodium intake and elimination of industrially produced trans-fats from the food supply are identified in GPW13 as part of WHO's priority actions to achieve the aims

27. PROHIBITION OF CHILD MARRIAGE

G. Pushpa 23155-EC-012

Introduction: Child marriage refers to any formal marriage or informal union between a child under the age of 18 and an adult or another child.

- Prohibition of Child Marriage Act:



The Prohibition of Child Marriage Act 2006 came into force on 1 November 2007 in India. It forbids child marriages, and protects and provides assistance to the victims of child marriages.

Reduce of child marriages:

- Educating girls
- Empowering girls
- Rallying the wider community
- Providing girls and their families with income opportunities.
- Petitioning government and encouraging supportive laws.

Who protects girls from child marriage:

UNFPA(**United Nations Fund for Population Activities)** promotes policies, programmes and legislation designed to end child marriage. UNFPA supports evidence-based, girl-centred investments that empower girls with the information, skills and services they need to be healthy, educated and safe, helping them make a successful transition to adulthood**.**

Effect on prohibition of child marriage:

- The amendment to the Child Marriage Restraint Act, 1929 was a significant step towards preventing child marriages in India. Child marriages can have severe negative impacts on the physical and mental health of young girls, and can also lead to early dropout from education and limited economic opportunities.23 May 2023 to stand up for girls' rights.

- **Disadvantage of child marriage:**
- Lack of understanding.
- Absence of higher education.
- Risk of miscarriage.
- Underage pregnancy.
- Compatibility issues, finances.
- Lack of individuality.
- Making compromises.

- Conclusion:Never support child marriage. Child marriage deprives a young girl or boy of their basic right to education, health care and freedom.

28. RELATIONSHIP BETWEEN MOTHER AND SON

A.Rohith 23155-EC-002

A mother's love doesn't make her son more dependent and timid, it actually makes him stronger and more independent. No man can succeed without a good woman behind him. If it is both, he is twice blessed indeed. Raise them to respect women, raise them to stand up for others, raise them to care for the earth, raise them to be kind, compassionate and honest. These mother and son quotes will help you celebrate their special bond. A son is a mothers precious treasure.

How can you build a strong bond

- Teach your son important life skills.
- Spend quality time together doing the things he loves.
- Help him build strong relationships with others.
- Respect and trust each other.
- Continue to make time to talk one to one.
- Know when to stay out of it.

Some important quotes

'' To be a mother of a son is one of the most important things you can do to change the world . Raise them to respect women, raise them to stand up for others, raise them to be kind''

'' A mother has to think twice, once for herself and once for her child''

29. SOCIAL MEDIA

T.B.Mounika, Pin:23155-CM-056

Social media can be broadly defined as the set of interactive Internet applications that facilitate (collaborative or individual) creation, curation, and sharing of usergenerated content. Examples of social media platforms are numerous and varied. They include Facebook, Friendster, Wikipedia, dating sites, Craigslist, recipe sharing sites (e.g. all- recipes.com), YouTube, and Instagram. Social media platforms all share the above- mentioned characteristics, but are unique from one another in many respects. In par- ticular, platforms often vary in their architectures, structures, norms, and user bases. In working to differentiate between different kinds of social media platforms, scholars distinguish and label several subsets of social media, with a particular emphasis on social network sites. Boyd and Ellison (2007) explicitly differentiate social network sites from social networking sites. They argue that social networking implies meeting new people and making new connections, which contrasts with actual user practices. Specif- ically, social network site users tend to interact with existing-rather than new-social contacts. Examples of social network sites include Facebook, MySpace, YouTube, and LiveJournal. A second subcategory of social media consists of microblogging sites. These allow users to distribute short messages to a broad audience, often through links and images. Such sites have explicit limits on the number of characters or amount of content allowed per message. Twitter, the predominant microblogging site in the United States, and Weibo, China's suite of microblogging sites, limit each message to 140 characters. Vine, Twitter's video application, limits clips to 6 seconds. In addition to the label of social media, the contemporary Internet- characterized by interactivity and user generated content-is also known as "Web 2.0." Some argue that the newest era of digital technologies, characterized by user collaboration and cooper- ation, can be labeled "Web 3.0." Others, however, contend that Web 1.0, 2.0, and 3.0 are better understood as variations in user practice rather than technological capabil- ity. Of particular relevance, social media users, who can engage in participatory and collaborative activities online, also utilize social media platforms to send email type messages, or engage in asynchronous discussions, both of which characterize the Web 1.0 era (Barassi & Treré, 2012). Researchers at the Pew Internet and American Life Project show that 69% of

all US Internet users participate in some form of social media (Brenner, 2012), with Facebook, the most popular brand, utilized by 66% of Internet users. Women are significantly more likely than men to participate in social media, with 75% versus 63% participa- tion, respectively.

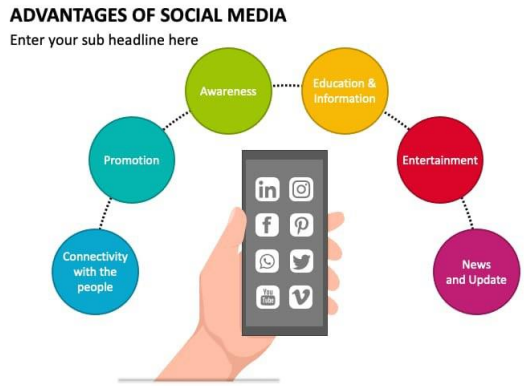
Identity:

Identity Social media platforms are often anonymous. As such, much research focuses on the identity implications of social media. Early Internet research, based primarily on multi-user domains (MUDs) and MUDs object oriented, emphasized the dual nature of identity in a digital era. Interactive digital technologies were a reprieve from bodily and social constraints. More recent work, however, recognizes the integration of the digital and physical, and understands that social and physical reality are part and parcel of identity processes within social media. In particular, identity within social media, though enacted and negotiated in new ways, is subject to the race, class, and gender relations of the larger society. The earlier view of a separateness between online and offline-or the assumption that social media are a less "real" form of sociality-is "digital dualism." Social actors come to know themselves by seeing what they do, and how others respond to them. By producing and consuming profiled content, social actors produce and consume selves and identities into being. This has significant implications for social movements, as social media become places to learn about, teach about, and come to identify with, contested identities. Similarly, social media can be a means by which people come to associate with political parties and causes, developing politicized identities through production and consumption of biased content.

Social media platforms enable other generated content (OGC), in which an actor's network contributes-in sometimes unexpected ways-to the actor's profiled performance(s). The presence of OGC is further complicated by the collapsed nature of network walls within social media, such that previously segmented networks (e.g. parents, friends, colleagues, bosses, and drinking buddies) all come together within a shared interaction space, bringing with them different expectations about who the actor is and how s/he is supposed to be. In this vein the ordinances of social media create a tension between ideal and authen- tic self presentation, with the added complexity of collapsed contexts. Social actors must

manage these tensions as they prosume selves and identities into being. They do so in several ways, including complex use of privacy settings and careful navigation of the social media architectures.

Advantages:



Increased connectivity and communication: Social media enables individuals to connect and communicate with each other across geographic and cultural boundaries, fostering a sense of community and promoting socialization.

Enhanced learning and education: Social media platforms can be used to share educational resources, connect learners with experts, and foster collaborative learning experiences.

Increased access to information: Social media can serve as a platform for sharing news, current events, and other forms of information, providing individuals with a more diverse range of perspectives and opinions.

Business and career opportunities: Social media can provide opportunities for networking, job searching, and professional development, enabling individuals to connect with potential employers, customers, or collaborators.

Promotion of activism and social change: Social media can be used to raise awareness about social and political issues, mobilize support for causes, and facilitate social change movements.

Disadvantages:

Addiction and time-wasting: Social media can be addictive, leading individuals to spend excessive amounts of time on these platforms at the expense of other activities or responsibilities.

Cyberbullying and harassment: Social media can be used as a platform for bullying, harassment, and other forms of online abuse, which can have negative impacts on mental health and well-being.

Privacy and security concerns: Social media platforms may collect and share personal information, leading to concerns about privacy and data security.

Spread of misinformation and fake news: Social media can be used to spread false or misleading information, which can have harmful consequences for individuals, communities, and society as a whole.

Negative impacts on mental health: Social media use has been linked to increased levels of anxiety, depression,

and other mental health concerns, particularly among vulnerable populations such as children and teenagers. It's worth noting that the advantages and disadvantages of social media are often interconnected, and the impact of social media use can vary depending on individual factors such as age, gender, and socioeconomic status.

Conclusion:

In conclusion, the use of social media in education has the potential to greatly enhance learning and engagement, but it must be approached with caution and care. By carefully considering the benefits and challenges, and taking proactive steps to mitigate potential risks, K-12 public schools can harness the power of social media to create meaningful and engaging learning experiences for all students.

30. VIRAT KOHLI: A CRICKETING LEGEND

K. Giridhar Reddy, 23155-CM-018

Early life and journey to stardom

Born on November 5, 1988, in Delhi, India, Virat Kohli exhibited an early passion for cricket that would propel him to the pinnacle of the sport. Raised in a middle-class family, his father's support and encouragement played a crucial role in shaping his cricketing journey. Kohli's talent was evident from a young age, and he quickly rose through the ranks of Delhi's age-group cricket.

Making his mark in the cricketing landscape, Kohli's international debut came in august 2008 in an odi against Sri Lanka. His aggressive and fearless batting style immediately caught the attention of fans and pundits alike, foreshadowing the emergence of a cricketing maestro.

Captaincy and leadership

Kohli's leadership qualities became apparent when he took over the reins of the Indian cricket team. In 2014, he assumed the test captaincy, displaying a blend of aggression and strategic acumen. His leadership extended to all formats in 2017, marking a new era for Indian cricket.

Under Kohli's captaincy, India achieved historic victories, both at home and abroad.

Batting prowess and records

Virat Kohli's batting records stand as a testament to his skill and consistency. The records for being the fastest to reach milestones such as 8,000, 9,000, 10,000, and unparalleled 11,000 runs in Odis underscore his dominance in the limited-overs format. His adaptability to different conditions and formats has made him a

complete batsman, capable of thriving in any situation.

Analysing Kohli's technique, mental resilience, and ability to handle pressure provides insights into his approach to the game. His aggressive yet controlled style has redefined modern batting, earning him admiration from cricket enthusiasts worldwide.

Off the field: personal life and endorsements

Beyond the cricket field, Virat Kohli's life is marked by his marriage to Bollywood actress Anushka Sharma. The power couple, often in the public eye, welcomed their daughter, Vamika, adding a new chapter to their personal journey.

Kohli's influence extends beyond cricket, making him a sought-after personality for brand endorsements. His association with high-profile brands reflects not only his cricketing prowess but also his marketability and impact on popular culture.

As he evolved from a young, fiery batsman to a seasoned captain and statesman of the game, Kohli's cricketing journey mirrors a relentless pursuit of excellence and a commitment to continuous improvement.

Legacy and impact

Virat Kohli's impact transcends the cricketing world. His philanthropic initiatives, dedication to fitness, and outspoken advocacy for various causes contribute to his status as a role model for aspiring athletes. The Virat Kohli foundation, established to support underprivileged children, exemplifies his commitment to making a positive impact beyond the boundary ropes.

The Kohli technique: a batting masterclass

From his impeccable cover drives to his mastery of the short ball, Kohli's technique is a blend of classical strokes and innovative shot-making. A closer look at his footwork, hand-eye coordination, and shot selection provides insights into what makes him one of the most

technically sound batsmen in contemporary cricket.

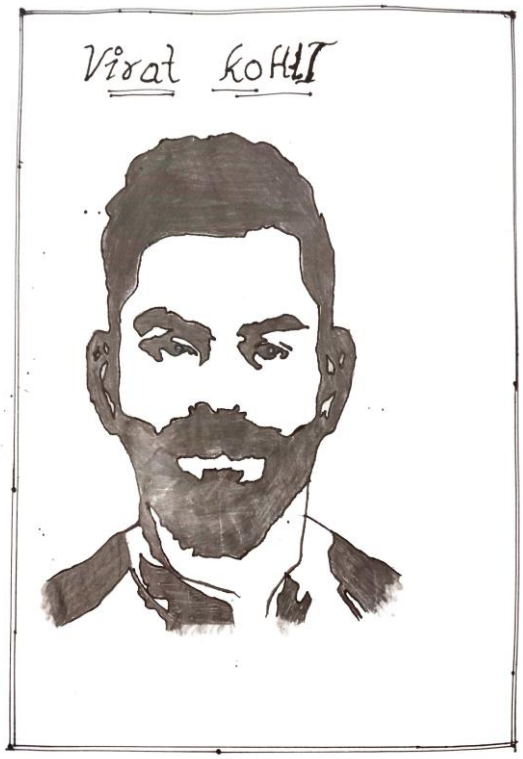
Additionally, his role as a social media influencer and advocate for a healthy lifestyle opens up discussions about the changing dynamics of a cricketer's image off the field.

Kohli's impact on Indian cricket culture: A shift towards fitness and work ethic

Virat Kohli has been a torchbearer for a new era in Indian cricket, emphasizing fitness and work ethic. Investigate how his commitment to physical fitness has influenced not just his own performance but has also set new standards for the entire team. .

In conclusion, Virat Kohli's journey from a cricket-loving youngster in Delhi to a global icon embodies the spirit of dedication, perseverance, and excellence. His legacy is not just in the runs he scores or the matches he wins but, in the inspiration, he provides to generations of cricket enthusiasts and athletes around the world.

31. ARTS AND SCIENCES



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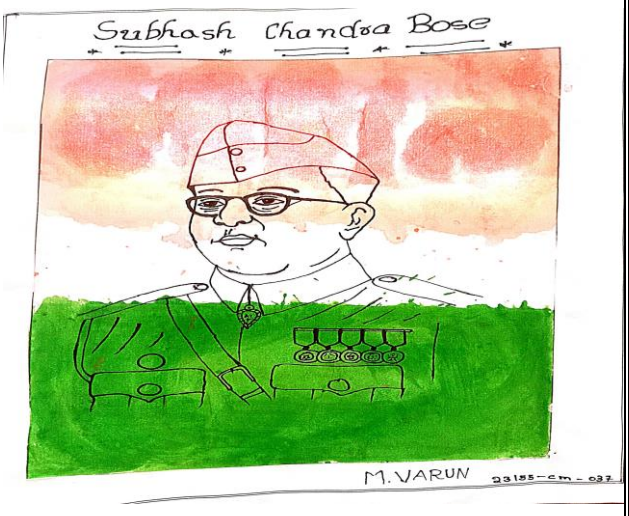

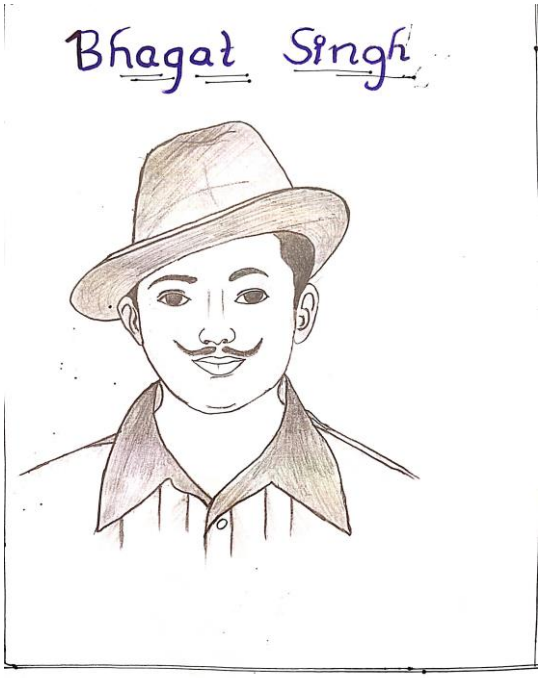

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