



**Finolex Academy of Management and  
Technology, Ratnagiri**

**Information Technology Department  
Presents...**

# **INFOVIBE**

*In touch With tomorrow...*

*Academic Year - 2023-24*

# Editors Message

As we proudly unveil the latest edition of "INFOVIBE" the heartbeat of innovation within the Department of Information Technology at Finolex Academy of Management and Technology, I extend a warm welcome to all enthusiasts, scholars, and pioneers of the tech domain. In the ever-evolving landscape of information and technology, this magazine stands as a testament to our collective pursuit of excellence. It is a canvas where ideas converge, where theories find practical expression, and where the limitless potential of technology is explored by the bright minds that constitute our academic community. Serving as the editor of this remarkable publication, I am honoured to witness the synergy of intellect and creativity that flows through the veins of our contributors. Their dedication to pushing boundaries and unravelling the mysteries of technology is showcased in the diverse array of articles and insights presented in these pages. Thank you for being an integral part of the "INFOVIBE" community. May this magazine serve as a catalyst for your own technological explorations, sparking curiosity, and guiding you through the realms of information and technology.

## Creative Team:

- 1.Darshan Rane
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- 4.Sujal Khedekar
- 5.Shravani Mandavkar
- 6.Rohit Kalvankar

# Message From HOD

It is with immense pride and excitement that I extend my heartfelt greetings as we unveil another edition of "INFOVIBE" the quintessential expression of technological prowess within the Department of Information Technology at Finolex Academy of Management and Technology. As the Head of the Department, I am privileged to witness the remarkable journey of our students, faculty, and researchers who continue to push the boundaries of knowledge in the dynamic realm of information and technology. "INFOVIBE" serves as a testament to our commitment to fostering innovation, nurturing talent, and contributing to the ever-evolving landscape of IT.

**THANK YOU**

**Dr.Vinayak A.Bharadi**

# VISION AND MISSION

## VISION

TO PROVIDE EXCELLENT INFORMATION TECHNOLOGY EDUCATION AND ASPIRE TO NURTURE STUDENTS AS LEADERS WHO ARE IN TUNE WITH GLOBAL IT TRENDS.

## MISSION

**M1** TO ENRICH STUDENTS BY RIGOROUSLY IMPLEMENTING QUALITY EDUCATION (KNOWLEDGE)

**M2** TO EMPOWER THE STUDENTS WITH THE REQUIRED SKILLS TO SOLVE THE COMPLEX PROBLEMS OF MODERN SOCIETY BY FOLLOWING COLLABORATIVE, MULTIDISCIPLINARY AND SUSTAINABLE ACTIVITIES

(SKILLS)

**M3** TO IMBIBE PROFESSIONAL ETHICS AND SOCIAL VALUES IN THE STUDENTS AND MAKE THEM RESPONSIBLE CITIZENS (ATTITUDE)

# PEO'S, PO'S AND PSO'S

## PEO'S

**PEO1** TO PROVIDE LEARNERS WITH CORE COMPETENCE IN MATHEMATICAL, SCIENTIFIC AND BASIC ENGINEERING FUNDAMENTALS NECESSARY TO FORMULATE, ANALYSE AND SOLVE HARDWARE/SOFTWARE ENGINEERING PROBLEMS.

**PEO2** TO PREPARE LEARNERS TO SOLVE BUSINESS-CENTERED PROBLEMS BY IDENTIFYING, ANALYZING, DEVELOPING, AND IMPLEMENTING INFORMATION SYSTEM-BASED SOLUTIONS WITH MODERN PROGRAMMING TOOLS. TO ENCOURAGE LEARNERS TO USE BEST PRACTICES AND IMPLEMENT TECHNOLOGIES TO ENHANCE INFORMATION SECURITY AND ENABLE COMPLIANCE, ENSURING CONFIDENTIALITY, INFORMATION INTEGRITY, AND AVAILABILITY.

**PEO3** TO PREPARE LEARNERS FOR SUCCESSFUL CAREER IN INDIAN AND MULTINATIONAL ORGANIZATIONS, IDENTIFY AND EVALUATE CURRENT AND EMERGING TECHNOLOGIES. TO PROVIDE OUR GRADUATES WITH LEARNING ENVIRONMENT AWARENESS OF THE LIFE-LONG LEARNING. TO MOTIVATE STUDENTS TO PURSUE IT THROUGHOUT THEIR CAREER AND HIGHER STUDIES. TO ENCOURAGE AND MOTIVATE LEARNERS FOR RESEARCH & DEVELOPMENT AND ENTREPRENEURSHIP.

**PEO4** TO INTRODUCE LEARNERS TO ETHICAL CODES AND GUIDELINES INCLUDING PROFESSIONAL, ETHICAL, LEGAL AND PUBLIC POLICY ISSUES TO PERFORM EXCELLENCE, SHOW LEADERSHIP SKILLS AND DEMONSTRATE GOOD CITIZENSHIP.

**PEO5** TO DEVELOP EFFECTIVE WRITTEN AND ORAL COMMUNICATION SKILLS TO INTERACT WITH CLIENTS, USERS, CO-WORKERS AND MANAGERS. TO ENABLE LEARNERS TO WORK AS PART OF TEAMS ON MULTIDISCIPLINARY PROJECTS AND DIVERSE PROFESSIONAL ENVIRONMENTS TO ACCOMPLISH A COMMON GOAL BY INTEGRATING PERSONAL INITIATIVE AND GROUP COOPERATION.

# PEO'S, PO'S AND PSO'S

## PO's and PSO's

SR.	PO DOMAIN	PROGRAM OUTCOMES: THE STUDENTS OF INFORMATION TECHNOLOGY (IT) DEPARTMENT WILL BE ABLE TO:
PO1	ENGINEERING KNOWLEDGE	APPLY THE KNOWLEDGE OF MATHEMATICS, SCIENCE AND IT FUNDAMENTALS TO THE SOLUTION OF COMPLEX ENGINEERING PROBLEMS.
PO2	PROBLEM ANALYSIS	IDENTIFY, FORMULATE, REVIEW RESEARCH LITERATURE, AND ANALYSE COMPLEX IT PROBLEMS REACHING SUBSTANTIATED CONCLUSIONS USING PRINCIPLES OF MATHEMATICS, NATURAL SCIENCES, AND ENGINEERING.
PO3	DESIGN/DEVELOPMENT OF SOLUTIONS	USE RESEARCH-BASED KNOWLEDGE OF IT AND RESEARCH METHODS INCLUDING DESIGN OF EXPERIMENTS, ANALYSIS AND INTERPRETATION OF DATA, AND SYNTHESIS OF THE INFORMATION TO PROVIDE VALID CONCLUSIONS.
PO4	INVESTIGATION OF USER NEEDS	ABILITY TO INVESTIGATE, IDENTIFY AND ANALYSE USER NEEDS, AND TAKE THEM INTO ACCOUNT IN SELECTION, CREATION, EVALUATION, ADMINISTRATION OF IT-BASED SOLUTIONS INTO THE USER ENVIRONMENT.
PO5	MODERN TOOL USAGE	CREATE, SELECT, AND APPLY APPROPRIATE TECHNIQUES, RESOURCES, AND MODERN ENGINEERING AND IT TOOLS INCLUDING PREDICTION AND MODELLING TO COMPLEX IT ACTIVITIES WITH AN UNDERSTANDING OF THE LIMITATIONS.
PO6	THE ENGINEER AND SOCIETY	APPLY REASONING INFORMED BY THE CONTEXTUAL KNOWLEDGE TO ASSESS SOCIETAL, HEALTH, SAFETY, LEGAL AND CULTURAL ISSUES AND THE CONSEQUENT RESPONSIBILITIES RELEVANT TO THE PROFESSIONAL ENGINEERING PRACTICE IN THE FIELD OF IT.
PO7	ENVIRONMENT AND SUSTAINABILITY	UNDERSTAND THE IMPACT OF THE PROFESSIONAL IT SOLUTIONS IN SOCIETAL AND ENVIRONMENTAL CONTEXTS, AND DEMONSTRATE THE KNOWLEDGE OF, AND NEED FOR SUSTAINABLE DEVELOPMENT.
PO8	ETHICS	APPLY ETHICAL PRINCIPLES AND COMMIT TO PROFESSIONAL ETHICS AND RESPONSIBILITIES AND NORMS OF THE IT PRACTICE.

# PEO'S, PO'S AND PSO'S

## PO's and PSO's

P09	INDIVIDUAL AND TEAM WORK	FUNCTION EFFECTIVELY AS AN INDIVIDUAL, AND AS A MEMBER OR LEADER IN DIVERSE TEAMS, AND IN MULTIDISCIPLINARY SETTINGS.
P010	COMMUNICATION	COMMUNICATE EFFECTIVELY ON COMPLEX IT ACTIVITIES WITH THE ENGINEERING COMMUNITY AND WITH SOCIETY AT LARGE, SUCH AS, BEING ABLE TO COMPREHEND AND WRITE EFFECTIVE REPORTS AND DESIGN DOCUMENTATION, MAKE EFFECTIVE PRESENTATIONS, AND GIVE AND RECEIVE CLEAR INSTRUCTIONS.
P011	PROJECT MANAGEMENT AND FINANCE	DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF THE IT AND MANAGEMENT PRINCIPLES AND APPLY THESE TO ONE'S OWN WORK, AS A MEMBER AND LEADER IN A TEAM, TO MANAGE PROJECTS AND IN MULTIDISCIPLINARY ENVIRONMENTS.
P012	LIFE-LONG LEARNING	RECOGNISE THE NEED FOR, AND HAVE THE PREPARATION AND ABILITY TO ENGAGE IN INDEPENDENT AND LIFE-LONG LEARNING IN THE BROADEST CONTEXT OF TECHNOLOGICAL CHANGE.
PSO 1	REALISTIC FRAMEWORK DESIGNING	DESIGN AN ALGORITHM, COMPONENT, OR PROCESS TO MEET DESIRED NEEDS, WITHIN REALISTIC CONSTRAINTS THROUGH ANALYTICAL, LOGICAL AND PROBLEM-SOLVING SKILLS.
PSO2	IT INTEGRATION AND ADAPTABILITY	EFFECTIVELY INTEGRATE IT-BASED SOLUTIONS INTO THE USER ENVIRONMENT AND ADAPT THEMSELVES EASILY TO EMERGING TRENDS IN INFORMATION TECHNOLOGY.

# INDEX

1. AI BASED INTERVIEW PREPARATION  
SYSTEM

2. DATA: A GOLD OF NEW ERA

3. CONCEPT OF BLOCK CHAIN

4. CLOUD COMPUTING

5. DATA MINING



**6.EVOLUTION AND ORIGIN OF  
ENGINEERING:**

**7.CODE AND CONNECTION**

**8.SKETCHES AND PHOTOS**

**9.CROSSWORD**

# AI Based Interview Preparation System

**Introduction:** The AI-Based Interview Preparation System is a cutting-edge solution designed to revolutionize the way individuals prepare for job interviews and enhance their chances of success in the highly competitive job market. This system leverages the power of artificial intelligence (AI) and natural language processing (NLP) technologies to provide personalized and comprehensive interview preparation experiences. In an era defined by rapid technological advancements and dynamic changes in the job market, securing a coveted position through a job interview has become an increasingly competitive and challenging endeavour. As individuals endeavour to navigate the intricate landscape of employment, the need for innovative solutions that foster interview preparedness and confidence has never been more paramount. The AI-Based Interview Preparation System emerges as a groundbreaking solution, combining the prowess of Artificial Intelligence (AI) and Natural Language Processing (NLP) to equip job seekers with the tools they need to excel in interviews.

## ❖ Specific objectives of a system:

**Personalized Preparation:** Customize interview preparation plans for individual users based on their skills, experience, and career goals. Offer tailored recommendations to address each user's unique needs and weaknesses.

**Mock Interviews with AI Feedback:** Conduct simulated interview sessions with AI interviewers that mimic real interview scenarios. Evaluate user responses for content, tone, and body language, providing constructive feedback for improvement.

**Performance Tracking and Analytics:** Monitor user progress and performance throughout their interview preparation journey. Provide analytics and insights to help users identify areas for improvement and track their growth. Enable users to align their responses and knowledge with current industry demands.

**Confidence Building:** Boost users' confidence by offering guidance and practice that simulates real interview experiences. Encourage users to overcome nervousness and perform at their best during interviews.

**User Satisfaction and Success:** Measure and track user satisfaction and success rates, such as the percentage of users securing job offers after using the system. Continuously gather user feedback to enhance the system's effectiveness and user experience.

**Methodology:** • Project Planning and Requirements Gathering • Data Collection • Data Pre-processing • Speech Recognition • Natural Language Processing (NLP) • User Interface Development • Question and Response Generation • Practice Mode • Feedback Mechanism • Testing and Evaluation Deployment

**Technology Used:** The AI-Based Interview Preparation System incorporates a range of cutting-edge technologies to provide an advanced and comprehensive preparation experience for job seekers. Some of the key technologies used in developing this system include:

- **Artificial Intelligence (AI):** AI forms the backbone of the system, enabling it to simulate human-like intelligence and decision-making capabilities. It facilitates tasks such as analysing user data, generating personalized recommendations, and providing real-time feedback during mock interviews.
- **Natural Language Processing (NLP):** NLP enables the system to understand, interpret, and respond to human language input. It allows for the analysis of text and speech data, aiding in tasks such as resume analysis, question understanding, and the evaluation of user responses during mock interviews.
- **Machine Learning (ML):** ML algorithms are employed to enable the system to learn from user interactions and continuously improve its performance. It adapts its recommendations, question sets, and feedback based on user progress and performance, enhancing the overall learning experience and personalization.
- **Voice Recognition Technology:** Voice recognition technology enables the system to accurately transcribe and analyse spoken responses during mock interviews. It helps in assessing the user's communication skills, intonation, and overall verbal presentation, providing tailored feedback for improvement.
- **Application Programming Interfaces (APIs):** Integration with various APIs allows the system to access external data sources, industry insights, and real-time information about job trends and market dynamics. This enriches the user experience by providing up-to-date and relevant information to enhance interview preparedness.

**Implementation:** The implementation of an AI-Based Interview Preparation System involves several key components and steps. Here is a high-level overview of the implementation process:

**Requirement Analysis:** Define the specific requirements and objectives of the system, including the target audience, user goals, and desired features. Identify the technology stack and tools that will be used for development.

**Data Collection and Preparation:** Gather a diverse dataset of interview questions, sample answers, industry insights, and resume templates. Annotate and clean the data, ensuring it is well-structured and relevant.

**Technology Selection:** Choose the appropriate AI, NLP, and ML frameworks and libraries, such as TensorFlow, Pyotr, or pacy, for the development of various components. Set up cloud infrastructure or on-premises servers for hosting the system.

**User Interface (UI) Development:** Design an intuitive and user-friendly interface for the system, accessible through web applications, mobile apps, or both. Implement features for user registration, profile creation, and navigation within the system.

**Mock Interviews:** Create an AI-driven interviewer that can conduct mock interviews and record user responses. Implement voice recognition and NLP algorithms to evaluate user responses for content, tone, and presentation.

**Feedback and Recommendations:** Develop algorithms to provide personalized feedback to users based on their performance in mock interviews and resume analysis. Continuously adapt the feedback and recommendations using machine learning techniques.

**Performance Analytics:** Create dashboards and visualizations to display user performance metrics, progress tracking, and areas for improvement. Implement data analytics to extract insights from user interactions with the system.

The AI-Based Interview Preparation System represents a pivotal advancement in the realm of job readiness and career development. This innovative system harnesses the power of artificial intelligence, natural language processing, and machine learning to equip job seekers with a comprehensive and personalized toolkit to excel in interviews. With a focus on personalized preparation, resume optimization question and answer repositories, mock interviews, and ongoing performance tracking this system is designed to elevate the chances of job seekers securing their dream positions.

***-Fatima Solkar BEIT***

***-Sejal Nikam BEIT***

***-Shrushti Mhabdi BEIT***

***-Pooja Birje BEIT***

(Guidance by ***Dr. Vinayak A. Bharadi***)

# Data: A Gold of New Era

In the digital age, data has become the new gold. It's more than just information; it's the key to understanding, progress, and innovation. From personal preferences to global trends, data fuels decision-making in virtually every aspect of our lives.

Data is abundant, generated by everything from smartphones to IoT devices, and it's constantly growing. Its value lies in our ability to collect, analyse, and extract insights from it. Businesses, governments, and individuals are harnessing the power of data to make smarter choices, optimize operations, and drive economic growth.

One of the most prominent examples of data's importance is in artificial intelligence. Machine learning and deep learning algorithms rely on vast datasets to train and make predictions. Data enables these technologies to recognize patterns, recommend products, and even diagnose medical conditions with unprecedented accuracy.

**Data:** Data refers to raw facts, figures, or information. It is unprocessed, often in the form of numbers, text, or symbols. Data can represent anything from measurements and observations to text in documents, images, and much more.

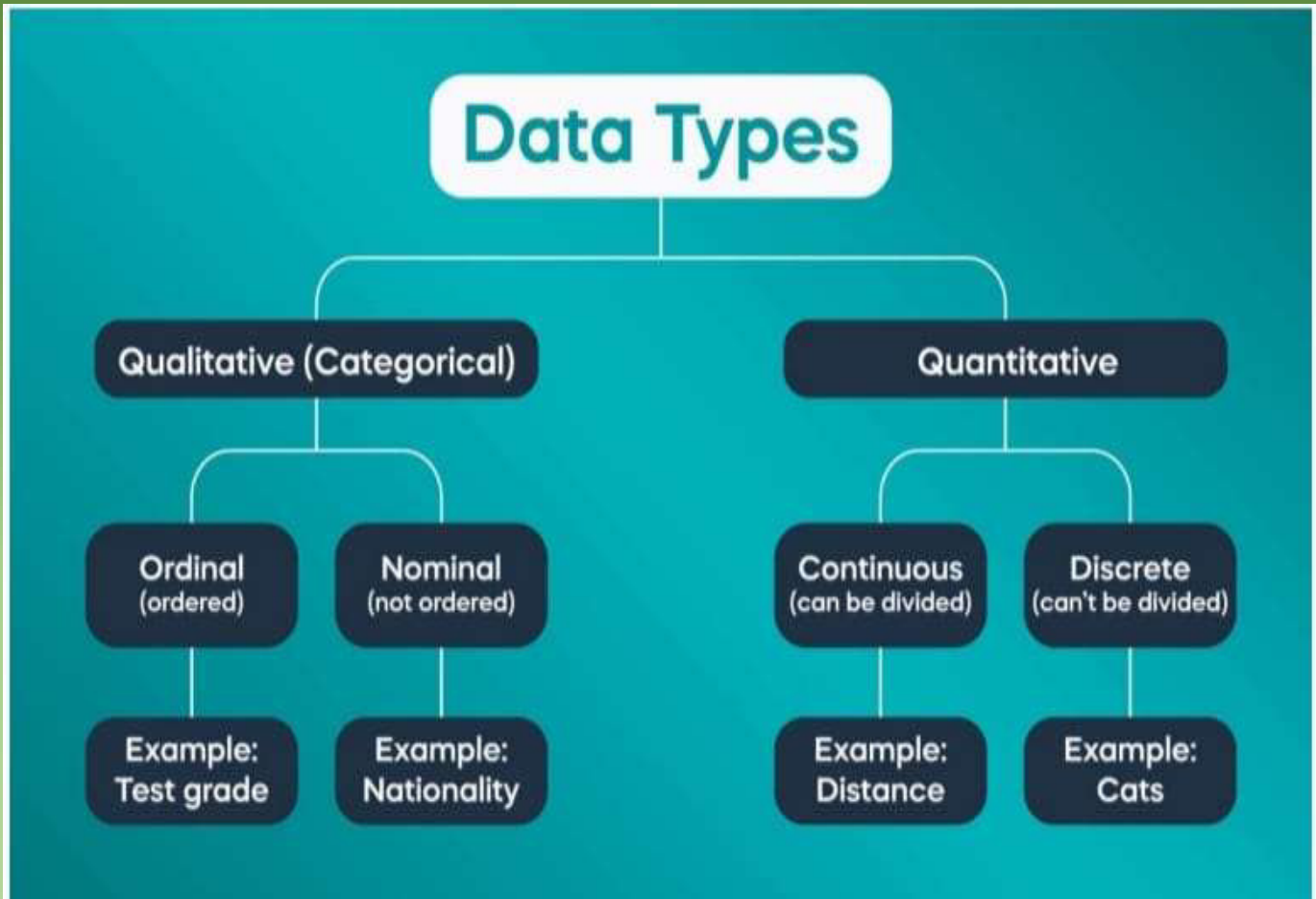
Data on its own may not hold significant meaning, but when it is organized, analysed, and interpreted, it can provide valuable insights and knowledge. Data is a fundamental building block for information, knowledge, and decision-making in various fields, including science, business, technology, and research.

**Importance of Data in New Era:** Growth in the field of technology, specifically in smartphones has led to text, video, and audio is included under data plus the web and log activity records as well. Most of this data is unstructured.

The term Big Data is used in the data definition to describe the data that is in the petabyte range or higher. Big Data is also described as 5Vs: variety, volume, value, veracity, and velocity. Nowadays, web-based eCommerce has spread vastly, business models based on Big Data have evolved, and they treat data as an asset itself. And there are many benefits of Big Data as well, such as reduced costs, enhanced efficiency, enhanced sales, etc.

The meaning of data has grown beyond the processing of data in the field of computer applications. Accordingly, finance, demographics, health, and marketing also have different definitions of data, which ultimately results in different answers to the persistent

## Types of Data:



**Data Extraction:** In today's data-driven world, the ability to extract meaningful information from a vast sea of data is a skill that can make or break businesses, drive research forward, and empower data-driven decision-making. Data extraction, the process of collecting and transforming data from diverse sources, is the gateway to unlocking valuable insights. This article explores the art and significance of data extraction.

### Challenges in Data Extraction:

**1. Data quality:** Data quality is one of the most important aspects in analytics. Many companies extract data from different sources to get a richer, more accurate picture of what is happening in their business, but this can come at a cost. The benefits of extracting data from multiple sources might not outweigh the risks that come with poor data quality.

**2. Lack of standardization:** Information is everywhere, but it's not always in the format you need. Most companies store their information in a way that only they can read, which means that you'll need to use their software. This can be costly and time-consuming when you're looking for information from different sources and they don't conform to your needs or expectations.

**3. Lack of access:** Finding the right data can be a daunting and costly process. There are many reasons why you might not be able to easily extract data from a source. One reason could be that the sources don't have the required data or it is hidden behind a high paywall.

**4. Incomplete data:** The extraction process is not always perfect. Some data may be missing due to errors or omissions during the extraction process.

**Conclusion:** In a world where data is the lifeblood of progress and decision-making, the importance of understanding, extracting, and harnessing data cannot be overstated. From structured numbers to unstructured text, data comes in many forms, and its diversity is both a challenge and an opportunity.

As technology advances and the demand for data-driven insights continues to grow, the art of data extraction remains a vital pillar of our digital age. With the right tools, techniques, and a commitment to data quality and compliance, we can navigate these challenges and transform raw data into actionable knowledge.

Data is the gold of the new era, and those who master the process of extracting, understanding, and utilizing it are the alchemists of our time, turning raw information into innovation and informed decisions that shape our world. So, as we forge ahead into an ever-more data-centric future, let us recognize the power and potential that data extraction holds in our quest for progress and understanding.

***-Maithali Yadav BEIT***

## **\*\*Concept Of Block Chain\*\***

The core ideas behind **Blockchain** technology emerged in the late 1980s and early 1990s. In 1989, Leslie Lamport developed the Paxos protocol, and in 1990 submitted the paper The Part-Time Parliament to ACM Transactions on Computer Systems; the paper was finally published in a 1998 issue. The paper describes a consensus model for reaching agreement on a result in a network of computers where the computers or network itself may be unreliable.



### ➤ **What is Block Chain?**

**B**lockchain is a secure series or chain of timestamped records stored in a database that group of users manages who are a part of a decentralized network.

**B**lockchain is a decentralized or distributed ledger where each node in the network has access to the data or records stored in a blockchain.

**T**he encryption of all the important data records in the blockchain is done using cryptographic techniques. This ensures the security of the data in the blockchain.

**Block:** The current version of the block •Previous block header hash as a reference to the parent block •An encrypted hash of all transactions taking place in this block known as Merkle root hash •Time of the block creation •nBits •Nonce – any random number that is assigned by a block creator that can be changed as and when required •All the transactions taking place within a blockchain network stay in the blockchain as a flat file or in database. A particular set of transactions together forms a block and that block gets added into the blockchain. • An interesting thing to note is how to efficiently store a huge number of transactions in a block? If we take all the transactions as it is and keep it in a block, the block size will get unmanageably large. •Merkle tree and root are a solution to this problem. Merkle trees structure the data in such a way that at the end of it there is only one root representing the entire tree.

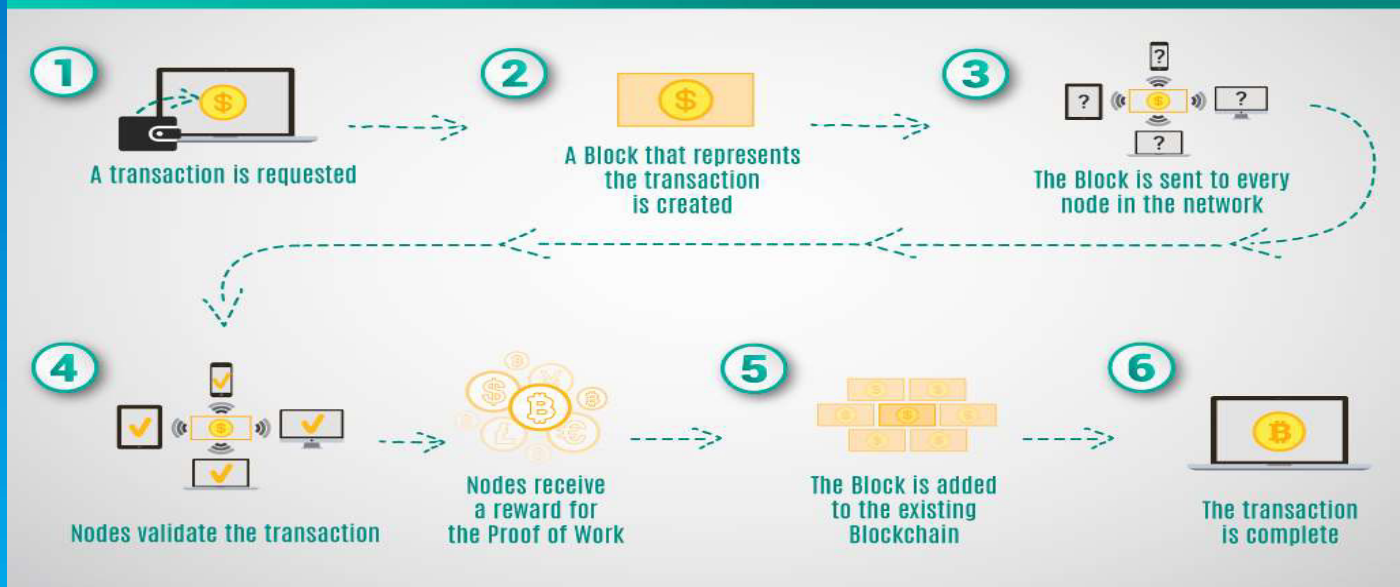


## ➤ How Blockchain works??

The transaction process in a blockchain can be summarized as follows:

1. **Facilitating a transaction:** A new transaction enters the blockchain network. All the information that needs to be transmitted is doubly encrypted using public and private keys.
2. **Verification of transaction:** The transaction is then transmitted to the network of peer-to-peer computers distributed across the world. All the nodes on the network will check for the validity of the transaction like if a sufficient balance is available for carrying out the transaction.
3. **Formation of a new block:** In a typical blockchain network there are many nodes and many transactions get verified at a time. Once the transaction is verified and declared a legitimate transaction, it will be added to the mempool. All the verified transactions at a particular node form a mempool and such multiple mempools form a block.
4. **Consensus Algorithm:** The nodes that form a block will try to add the block to the blockchain network to make it permanent. But if every node is allowed to add blocks in this manner then it will disrupt the working of the blockchain network. To solve this problem, the nodes use a consensus mechanism to ensure that every new block that is added to the Blockchain is the one and only version of the truth that is agreed upon by all the nodes in the Blockchain, and only a valid block is securely attached to the blockchain. The node that is selected to add a block to the blockchain will get a reward and hence we call them “miners”. The consensus algorithm creates a hash code for that block which is required to add the block to the blockchain.
5. **Addition of the new block to the blockchain:** After the newly created block has got its hash value and is authenticated, now it is ready to be added to the blockchain. In every block, there is a hash value of the previous block and that is how the blocks are cryptographically linked to each other to form a blockchain. A new block gets added to the open end of the blockchain.
6. **Transaction complete:** As soon as the block is added to the blockchain the transaction is completed and the details of this transaction are permanently stored in the blockchain. Anyone can fetch the details of the transaction and confirm the transaction.

# HOW BLOCKCHAIN WORKS



## **Benefits of Blockchain:-**

### 1. Enhanced security

Your data is sensitive and crucial, and blockchain can significantly change how your critical information is viewed. By creating a record that can't be altered and is encrypted end-to-end, blockchain helps prevent fraud and unauthorized activity. Privacy issues can also be addressed on blockchain by anonymizing personal data and using permissions to prevent access. Information is stored across a network of computers rather than a single server, making it difficult for hackers to view data.

### 2. Greater transparency

Without blockchain, each organization has to keep a separate database. Because blockchain uses a distributed ledger, transactions and data are recorded identically in multiple locations. All network participants with permissioned access see the same information at the same time, providing full transparency. All transactions are immutably recorded, and are time- and date-stamped. This enables members to view the entire history of a transaction and virtually eliminates any opportunity for fraud.

### 3. Automation

Transactions can even be automated with "smart contracts," which increase your efficiency and speed the process even further. Once pre-specified conditions are met, the next step in transaction or process is automatically triggered. Smart contracts reduce human intervention as well as reliance on third parties to verify that terms of a contract have been met.

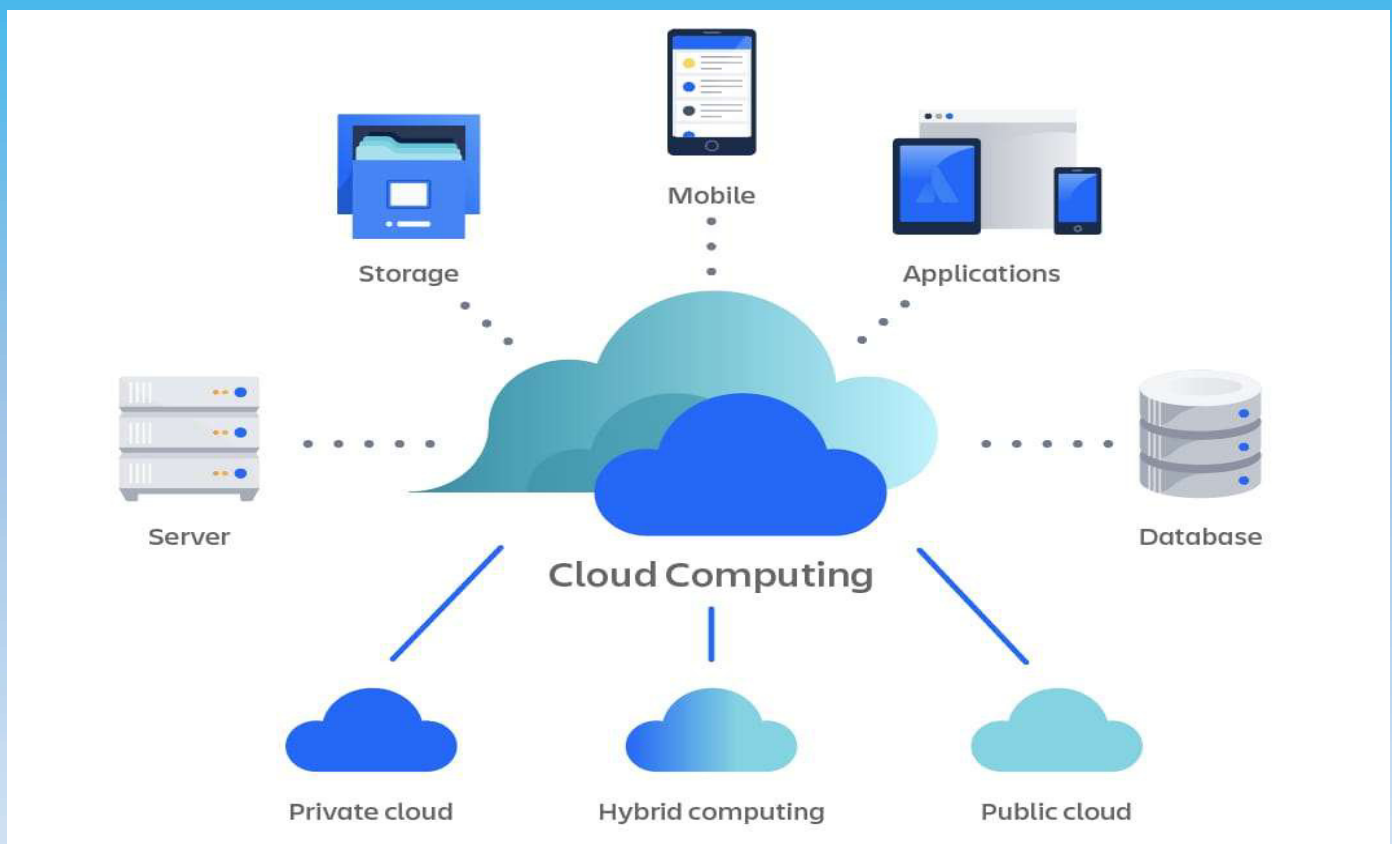
# \*\* Cloud Computing \*\*

## ->What is Cloud?

The cloud is a term used to describe a global network of servers, each with a unique function. The cloud is not a physical entity, but instead is a vast network of remote servers around the globe which are hooked together and meant to operate as a single ecosystem. These servers are designed to either store and manage the data, run applications, or deliver content or service such as streaming videos, web mail, office productivity software, or social media. Instead of accessing files and data from a local or personal computer, you are accessing them online from any Internet capable device. The information will be available anywhere you go and anytime you need it.

## ->CLOUD COMPUTING

It is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. Large clouds often have functions distributed over multiple locations , each of which is a data centre.



## -> Benefits

Cloud computing is a big shift from the traditional way businesses think about IT resources. Here are seven common reasons organizations are turning to cloud computing services:

**Cost:** Moving to the cloud helps companies optimize IT costs. This is because cloud computing eliminates the capital expense of buying hardware and software and setting up and running onsite data-centres—the racks of servers, the round-the-clock electricity for power and cooling, and the IT experts for managing the infrastructure. It adds up fast.

**Speed:** Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.

**Security:** Many cloud providers offer a broad set of policies, technologies, and controls that strengthen your security posture overall, helping protect your data, apps, and infrastructure from potential threats.

**Global scale:** The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when they're needed, and from the

Right

**Uses of cloud computing:** You're probably using cloud computing right now, even if you don't realize it. If you use an online service to send email, edit documents, watch movies or TV, listen to music, play games, or store pictures and other files, it's likely that cloud computing is making it all possible behind the scenes. A variety of organizations—from tiny startups to global corporations, government agencies to non-profits—have embraced cloud computing technology for all sorts of reasons.

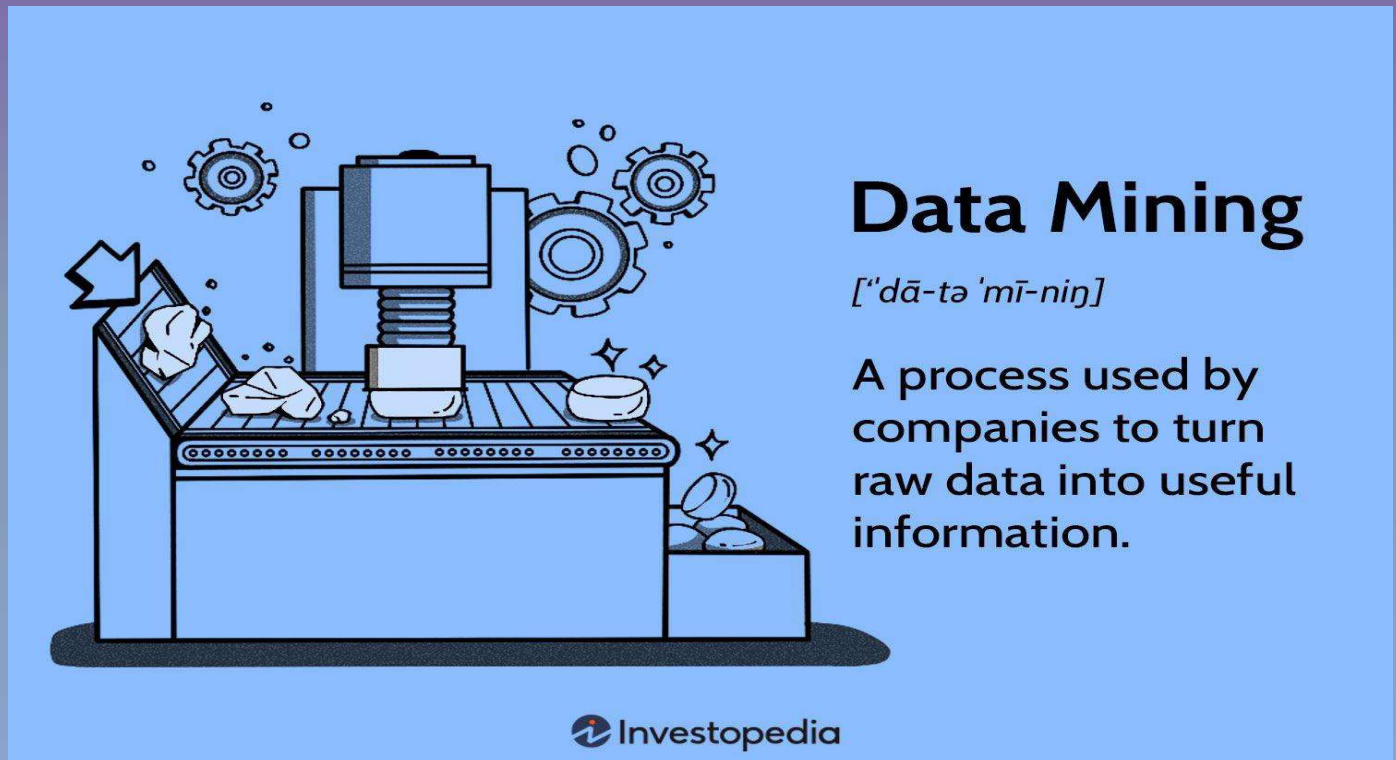
**Cloud services:** 'Create cloud-native applications', 'Test and build applications', 'Store, back up, and recover data', 'Stream audio and video', 'Stream audio and video', 'Analyse data', 'Embed intelligence'.

*-Darshan Rane SEIT*

# DATA MINING

## . What is Data Mining?

**Data mining** is the process of sorting through large data sets to identify patterns and relationships that can help solve business problems through data analysis. Data mining techniques and tools enable enterprises to predict future trends and make more-informed business decisions.



## Data mining process: How does it work?

**Data mining** is typically done by data scientists and other skilled BI and analytics professionals. But it can also be performed by data-savvy business analysts, executives and workers who function as citizen data scientists in an organization.

The data mining process can be broken down into these four primary stages:

**Data gathering.** Relevant data for an analytics application is identified and assembled. The data may be located in different source systems, a data warehouse or a data lake, an increasingly common repository in big data environments that contain a mix of structured and unstructured data. External data sources may also be used. Wherever the data comes from, a data scientist often moves it to a data lake for the remaining steps in the process.

**Data preparation.** This stage includes a set of steps to get the data ready to be mined. It starts with data exploration, profiling and pre-processing, followed by data cleansing work to fix errors and other data quality issues. Data transformation is also done to make data sets consistent, unless a data scientist is looking to analyse unfiltered raw data for a particular application.

**Mining the data.** Once the data is prepared, a data scientist chooses the appropriate data mining technique and then implements one or more algorithms to do the mining. In machine learning applications, the algorithms typically must be trained on sample data sets to look for the information being sought before they're run against the full set of data.

**Data analysis and interpretation.** The data mining results are used to create analytical models that can help drive decision-making and other business actions. The data scientist or another member of a data science team also must communicate the findings to business executives and users, often through data visualization and the use of data storytelling techniques.

### **Types of data mining techniques:**

Various techniques can be used to mine data for different data science applications. Pattern recognition is a common data mining use case that's enabled by multiple techniques, as is anomaly detection, which aims to identify outlier values in data sets. Popular data mining techniques include the following types:

**Association rule mining.** In data mining, association rules are if-then statements that identify relationships between data elements. Support and confidence criteria are used to assess the relationships -- support measures how frequently the related elements appear in a data set, while confidence reflects the number of times an if-then statement is accurate.

**Classification.** This approach assigns the elements in data sets to different categories defined as part of the data mining process. Decision trees, Naive Bayes classifiers, k-nearest neighbour and logistic regression are some examples of classification methods.

**Clustering.** In this case, data elements that share particular characteristics are grouped together into clusters as part of data mining applications. Examples include k-means clustering, hierarchical clustering and Gaussian mixture models.

**Regression.** This is another way to find relationships in data sets, by calculating predicted data values based on a set of variables. Linear regression and multivariate regression are examples. Decision trees and some other classification methods can be used to do regressions, too.

# Benefits of data mining:

In general, the business benefits of data mining come from the increased ability to uncover hidden patterns, trends, correlations and anomalies in data sets. That information can be used to improve business decision-making and strategic planning through a combination of conventional data analysis and predictive analytics.

Specific data mining benefits include the following:

**More effective marketing and sales.** Data mining helps marketers better understand customer behaviour and preferences, which enables them to create targeted marketing and advertising campaigns. Similarly, sales teams can use data mining results to improve lead conversion rates and sell additional products and services to existing customers.

**Better customer service.** Thanks to data mining, companies can identify potential customer service issues more promptly and give contact centre agents up-to-date information to use in calls and online chats with customers.

**Improved supply chain management.** Organizations can spot market trends and forecast product demand more accurately, enabling them to better manage inventories of goods and supplies. Supply chain managers can also use information from data mining to optimize warehousing, distribution and other logistics operations.

**Increased production uptime.** Mining operational data from sensors on manufacturing machines and other industrial equipment supports predictive maintenance applications to identify potential problems before they occur, helping to avoid unscheduled downtime.

**Stronger risk management.** Risk managers and business executives can better assess financial, legal, cybersecurity and other risks to a company and develop plans for managing them.

**Lower costs.** Data mining helps drive cost savings through operational efficiencies in business processes and reduced redundancy and waste in corporate spending.

Ultimately, data mining initiatives can lead to higher revenue and profits, as well as competitive advantages that set companies apart from their business rivals.

**Industry examples of data mining: Retail, Financial services, Insurance, Manufacturing, Entertainment, Healthcare.**

***-Aryan Talekar SEIT***

# "The Evolution and Origins of Engineering:

## A Journey Through Time"

### **Introduction:**

Engineering, as a discipline, has deep roots in the annals of human history, tracing its origins to the ingenious solutions devised by ancient civilizations. From the construction of monumental structures to the development of sophisticated technologies, the evolution of engineering reflects humanity's innate drive to innovate and solve practical problems. This article takes you on a journey through time, exploring the fascinating origins of engineering.

### **\*Ancient Civilizations: Pioneering Engineering Principles**

In the cradle of civilization, ancient societies laid the groundwork for engineering with remarkable feats of construction and technological innovation.

#### **1. Mesopotamia: The Birth of Urban Planning**

The fertile lands of Mesopotamia witnessed the creation of the first cities, where the need for efficient agriculture and water management led to the construction of canals and irrigation systems. The hanging gardens of Babylon are a testament to early engineering marvels.

#### **2. Egypt: Mastering Monumental Architecture**

The ancient Egyptians are renowned for their mastery of structural engineering, as evidenced by the construction of the pyramids. These monumental structures required precise planning, advanced knowledge of geometry, and innovative construction techniques.

### **\*Classical Antiquity: Advancements in Science and Mathematics**

The classical period, particularly in Greece and Rome, saw the emergence of theoretical principles that laid the foundation for engineering as a structured discipline.

#### **1. Archimedes: The Father of Engineering Mathematics**

Archimedes, a Greek mathematician and inventor, contributed significantly to engineering mathematics. His work on fluid mechanics and the principle of buoyancy remains influential in the design of ships and other buoyant structures.



## **2. Roman Engineering: Aqueducts and Roads**

The Romans were master builders, constructing intricate aqueducts that transported water across vast distances and engineering durable roads that connected their expansive empire. Their innovations in civil engineering continue to influence modern infrastructure.

## **20th Century and Beyond: Specialization and Technological Advancements**

The 20th century brought unprecedented advancements, specialization, and a proliferation of engineering disciplines.

### **1. Aerospace Engineering: Breaking the Bounds of Gravity**

The 20th century saw the rise of aerospace engineering, marked by achievements such as the Wright brothers' first powered flight and the subsequent exploration of space.

### **2. Information Technology: The Digital Revolution**

The latter half of the century witnessed the digital revolution, with the advent of computers and the establishment of software engineering as a distinct discipline. This era paved the way for transformative technologies and the interconnected world we live in today.

## **Conclusion:**

The origins of engineering are deeply intertwined with the human quest for understanding and manipulating the world around us. From ancient irrigation systems to space exploration, the evolution of engineering reflects humanity's enduring capacity for innovation and problem-solving. As we stand on the shoulders of these engineering pioneers, the discipline continues to evolve, addressing contemporary challenges and shaping the future of our interconnected world. The origins of engineering are not merely historical artifacts but a living testament to our collective ingenuity and the enduring pursuit of progress.

***-Shravani Mandavkar SEIT***

# Code And Connection

In the world of code and circuits, we dwell,  
Where Information Technology, its stories to tell.

Binary digits dance, in a digital ballet,  
Crafting a symphony, night and day.

Silicon minds, in servers and chips,  
Process our data with blinding eclipse.  
From mainframes of old to the cloud's endless sky,  
IT shapes our world, reaching ever so high.

In lines of code, the future is penned,  
From apps in our palms to the networks that bend.  
Cybersecurity knights guard against the dark,  
Defending our data, leaving no mark.

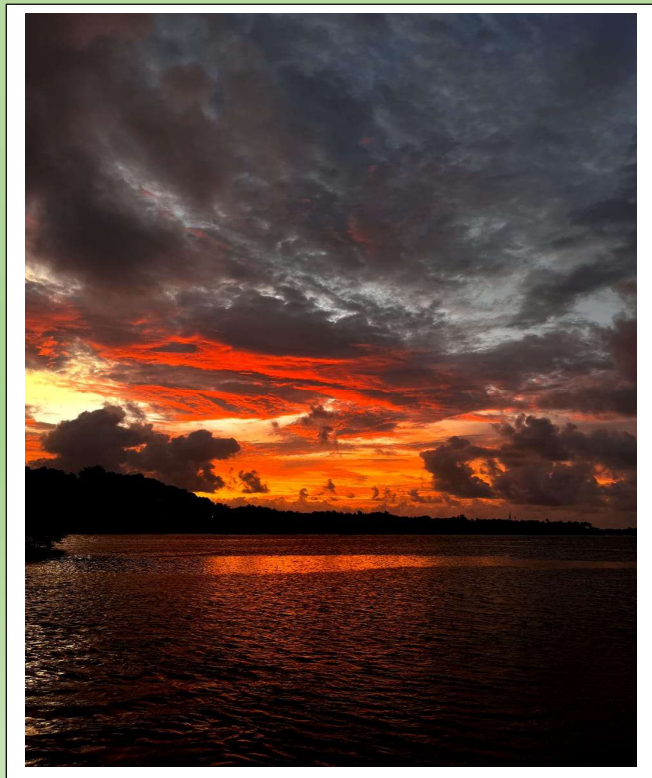
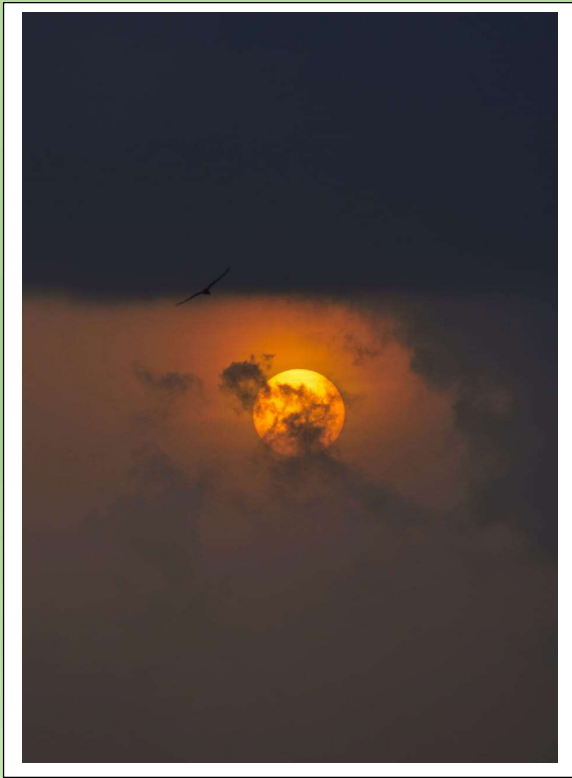
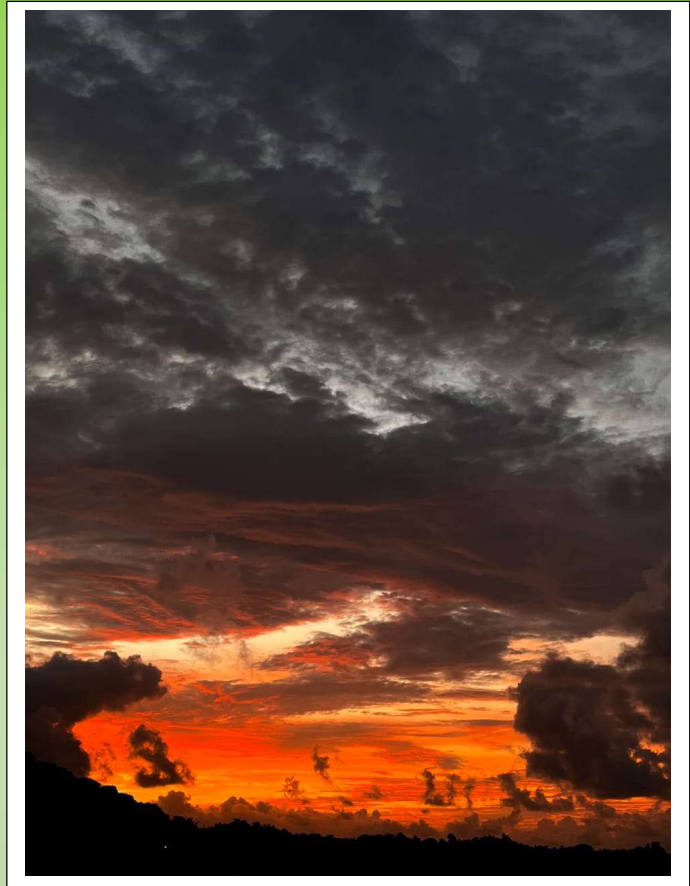
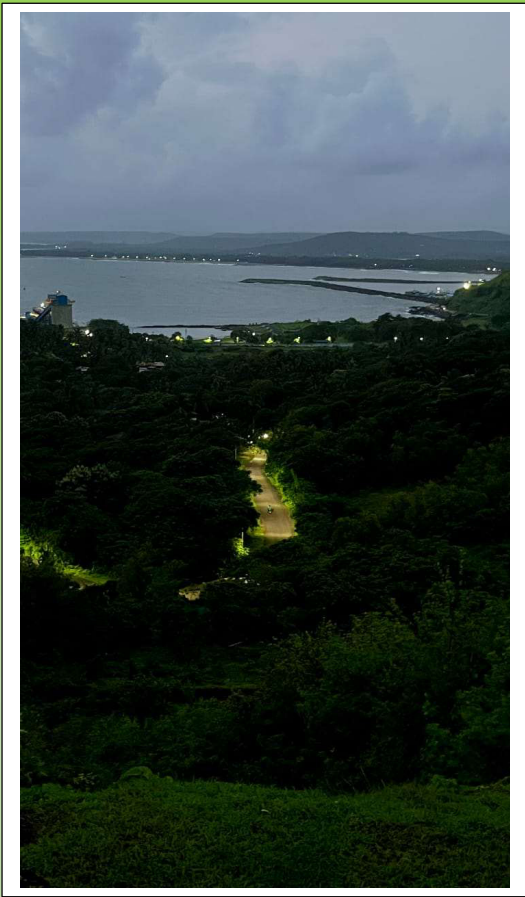
In bytes and in bits, we explore and create,  
In this IT world, where we all collaborate.  
From pixels to bytes, a digital delight,  
In the realm of technology, we take flight.

***-Sanika Salvi SEIT***



*-Supriya Jangle SEIT*





***-Rehan Dhamaskar SEIT***



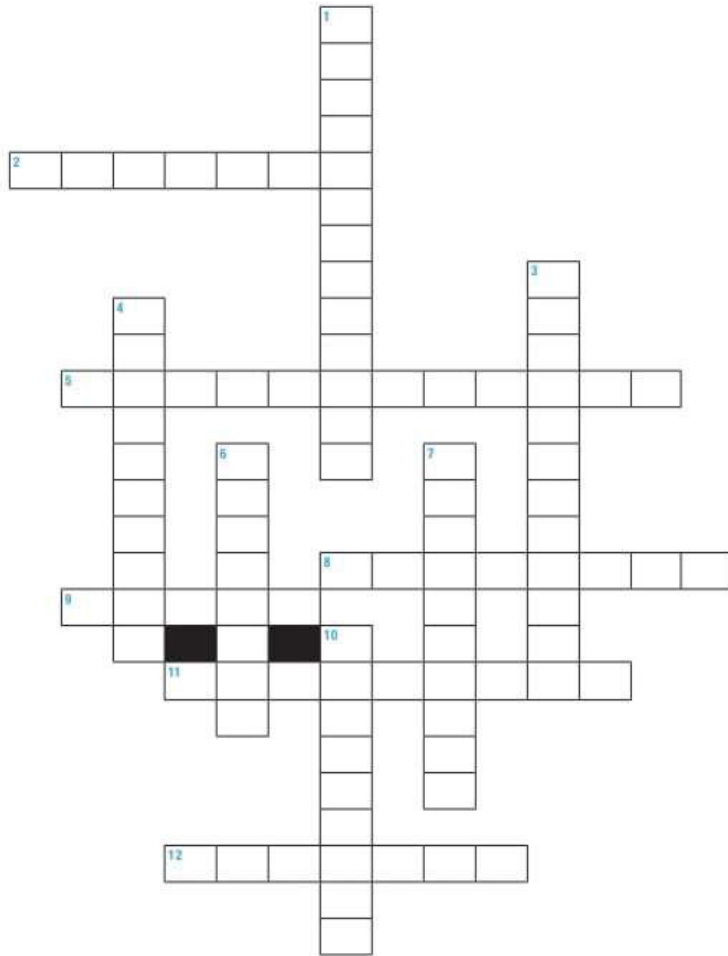
***-Kedar Damle SEIT***



***-Rohit Kalvankar SEIT***

# CROSSWORD

## ENGINEERS A-Z



### WORD BANK

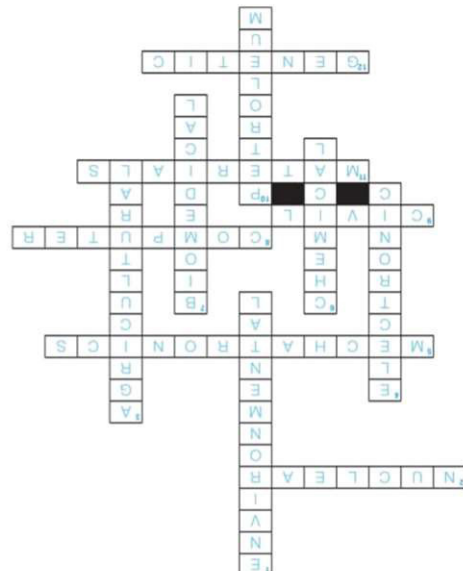
Agricultural, biomedical, chemical, civil, computer, electronic, environmental, genetic, materials, mechatronics, nuclear, petroleum (each word is only used once).

### ACROSS

2. \_\_\_\_\_ engineering uses the energy and radiation from atoms for industrial and medical use.
5. Combines mechanical and electronic engineering to increase efficiency in production and manufacturing.
8. \_\_\_\_\_ science engineers design, develop, test, and maintain technology software and hardware systems.
9. Type of engineering for communities including roads, buildings, water and sewage systems.
11. Chemistry and physics are used to develop, design and test raw \_\_\_\_\_ that we use to make products like clothes, houses or spaceships.
12. \_\_\_\_\_ engineering uses DNA and RNA to develop organisms better suited to meet environmental challenges and modern medicine.

### DOWN

1. \_\_\_\_\_ engineering focuses on solutions to global issues like climate change, renewable energy, pollution and safe drinking water.
3. \_\_\_\_\_ engineers design and improve farming practices and equipment.
4. \_\_\_\_\_ engineers focus on energy transmission for household lights, power plants and more.
6. \_\_\_\_\_ engineers develop, identify and evaluate the safe production of food, drugs, fuel and more.
7. \_\_\_\_\_ engineers design and create equipment, devices, artificial organs and software used in healthcare.
10. \_\_\_\_\_ engineers find ways to extract oil, gas and fossil fuels from underground rock formations.



### ENGINEERS A-Z: ANSWER KEY

