DGITechChronicle

EDITORIAL MESSAGE

Dr. Bipin Pandey
(HOD CSE)

Dear Readers,

Welcome to the latest edition of DGI Tech Chronicle. It gives me immense pleasure to present this issue, a culmination of diligent efforts from our talented contributors, showcasing the innovative spirit and technical prowess of our college community.

In these pages, you'll find a diverse array of articles, research findings, and insights that reflect the ever-evolving landscape of technology. As an engineering college community, we stand at the forefront of technological breakthroughs, and it is our mission to empower youths with the knowledge and insights to not only keep pace but to lead in this ever-accelerating race of innovation.

As we continue to push the boundaries of innovation, I extend my gratitude to everyone involved in bringing this publication to life – the writers, editors, designers, and all contributors who have made this edition a reality.

Each piece of writing embodies the spirit of exploration & advancement that defines the creativity of budding technocrats of our institution.

As readers, you play an integral role in this journey. Your curiosity & engagement drive us to explore deeper, question further, and innovate beyond boundaries. We hope this edition complement with your interest, sparks new ideas, and fosters a deeper appreciation for the transformative power of technology.

Warm regards,
Dr. Bipin Pandey
Editor-in-Chief, DGI Tech Chronicle

EDITORIAL BOARD

Dr. Bipin Pandey
(HOD CSE)

Editor in Chief

In this issue, we delve into a captivating array of topics and developments, all tailored to the inquisitive minds of the future engineers. As an engineering college community, we stand at the forefront of technological breakthroughs, and it is our mission to empower you with the knowledge and insights to not only keep pace but to lead in this ever-accelerating race of innovation.

Manvi Chauhan
(15173; CSE)

Co- Editor

Sanjali Kumari
(15106; CSE)

Editor- Design

Shashank Yadav
(15109; CSE)

Editor- Text

DGI TechChronicle

CSE EDITION

VISION

Empowering the future with innovative advancements in computer science technology, fostering human values and principles, through technical education.

MISSION

Advancing computer science technology through cutting-edge research and education, driving innovation and excellence.

Promoting a culture of ethical responsibility and human-centered design in technology, ensuring advancements benefit society.

Empowering individuals with technical skills and values to create a sustainable and impactful future in the digital age.

Program Educational Objectives (PEO)

To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs.

To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

To prepare students to analyze existing literature in an area of specialization and ethically develop innovative methodologies to solve the problems identified.

Program Specific Outcome (PSO)

To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.

To apply software engineering principles and practices for developing quality software for scientific and business applications.

To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems.

PROGRAMME OUTCOME (POS)

Po1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering 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.

PO7. Environment and sustainability: Understand the impact of the professional engineering 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 engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering 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.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering 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.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Roadmap To Learn DSA From Scratch

Akansha
(16016; CSE)

The first and foremost thing is dividing the total procedure into little pieces which need to be done sequentially.

The complete process to learn DSA from scratch can be broken into 5 parts:

1.Learn a programming language of your choice

2.Learn about Time and Space complexities

3.Learn the basics of individual Data Structures and Algorithms

4.Practice, Practice, and Practice more

5.Compete and Become a Pro Before starting any data structure or algorithm you need to know the means to express it or implement it. So, the first task is to learn any programming language. Then you should learn about one of the most important and most used concepts about DSA, the complexity of a program. Now equipped with the prerequisites, you can start learning DSA and at the same time practice it regularly and compete in challenges to gauge and sharpen your ability.

1. Learn at least one Programming language

This should be your first step while starting to learn data structure and algorithms. We as human beings, before learning to write a sentence or an essay on a topic, first try to learn that language: the alphabet, letters, and punctuations in it, how and when to use them. The same goes for programming also.

Firstly, select a language of your choice, be it Java, C, C++, Python, or any other language of your choice.

You can also explore our other **courses for Programming languages** on our Practice portal.

2. Learn about Complexities

Here comes one of the interesting and important topics. The primary motive to use DSA is to solve a problem effectively and efficiently. How can you decide if a program written by you is efficient or not? This is measured by complexities. Complexity is of two types:

1.**Time Complexity:** Time complexity is used to measure the amount of time required to execute the code.

2.**Space Complexity**: Space complexity means the amount of space required to execute successfully the functionalities of the code. You will also come across the term Auxiliary Space very commonly in DSA, which refers to the extra space used in the program other than the input data structure.

Both of the above complexities are measured with respect to the input parameters. But here arises a problem. The time required for executing a code depends on several factors, such as:

•**The number of operations performed in the program,**
•**The speed of the device, and also**
•**The speed of data transfer if being executed on an online platform.**

So how can we determine which one is efficient? The answer is the use of asymptotic notation.

It neglects the system-dependent constants and is related to only the number of modular operations being performed in the whole program. The following 3 asymptotic notations are mostly used to represent the time complexity of algorithms:

•**Big-O Notation (O)** – Big-O notation specifically describes the worst-case scenario.
•**Omega Notation (Ω)** – Omega(Ω) notation specifically describes the best-case scenario.
•**Theta Notation (θ)** – This notation represents the average complexity of an algorithm.

•Big-O Notation (O) – Big-O notation specifically describes the worst-case scenario.
•Omega Notation (Ω) – Omega(Ω) notation specifically describes the best-case scenario.
•Theta Notation (θ) – This notation represents the average complexity of an algorithm.
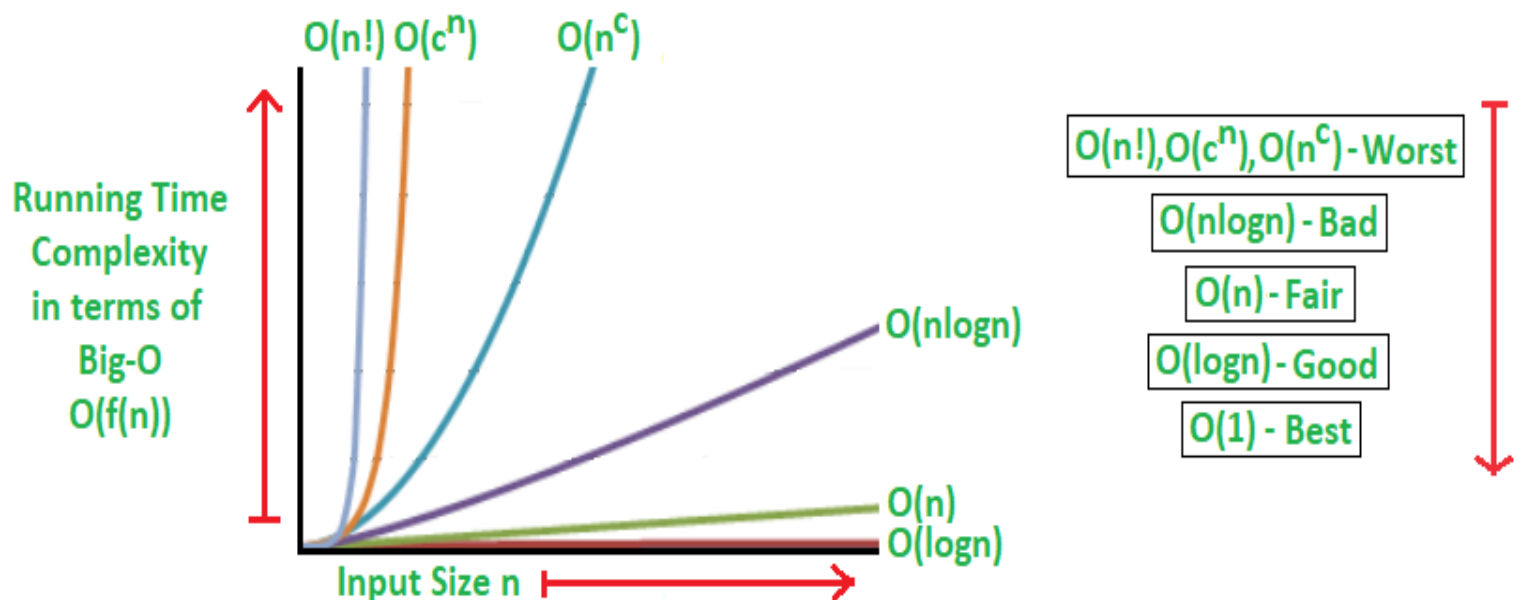
The most used notation in the analysis of a code is the Big O Notation which gives an upper bound of the running time of the code (or the amount of memory used in terms of input size).
To learn about complexity analysis in detail, you can refer to our complete set of articles on the Analysis of Algorithms.

3. Learn Data Structures and Algorithms

Here comes the most crucial and the most awaited stage of the roadmap for learning data structure and algorithm – the stage where you start learning about DSA. The topic of DSA consists of two parts:
•Data Structures
•Algorithms
Though they are two different things, they are highly interrelated, and it is very important to follow the right track to learn them most efficiently. If you are confused about which one to learn first, we recommend you to go through our detailed analysis on the topic:
What should I learn first- Data Structures or Algorithms?

Here we have followed the flow of learning a data structure and then the most related and important algorithms used by that data structure.

How to Integrate AI in Excel Formula

Gulshan KUMAR

(16074; CSE)

There are several ways to integrate AI in Excel formulas, each offering a different level of benefits and ease of use. Here are a few options to consider while integrating AI in Excel formulas:

1.Third-party Add-ins:

Here are some Third-party Add-ins to integrate AI in Excel that you can consider using:

•AI Assistant for Excel: This add-in offers various AI-powered features like smart assistant suggestions, data analysis tools, formula generation and interpretation, and text translation. It's great for both novice and advanced users.

•Excel Formula Bot: This add-in excels at generating complex formulas from your natural language descriptions. Simply type your desired outcome, and the bot suggests relevant formulas you can copy and paste into your spreadsheet.

•AI aided Formula Editor: This add-in helps you understand existing formulas by providing explanations and visualizations. It also allows you to edit formulas step-by-step with AI guidance.

2.Online Tools for AI in Excel:
Here are some online tools to integrate AI in Excel:

HOW TO INTEGRATE AI IN EXCEL?

•**Ajelix Excel Formula Generator: This free online tool lets you specify your formula requirements, and it generates the appropriate Excel formula for you.**

•**Excel Macro Recorder with AI Assist: Websites like exceltooly offer Macro recorder add-ins with AI that record your actions and suggest formulas based on your data manipulation.**

3.Built-in Features:

Here are some Microsoft Excel AI features:

•**Power Query: While not strictly AI, Power Query offers powerful data transformation capabilities like data cleansing, manipulation, and aggregation. You can combine it with AI plugins like PowerExcel.ai to automate complex data analysis workflows.**

•**Excel LAMBDA function: This new function allows you to define your own custom functions using JavaScript, opening doors for incorporating your own AI models into your Excel formulas.**

•**Choosing the right option to integrate AI in Excel depends on your needs and comfort level**

Cloud Computing and Distributed Systems

Omveer Panwar
(16118; CSE)

Cloud computing has several advantages in accessing stored information. In In your presentation, you can highlight its key features like rapid elasticity and easy network access. Make sure to discuss the major cloud computing models in detail. For example, infrastructure as a service (IaaS), software as a service (SaaS), and platform as a service (PaaS).

STUDENTS ARTICLES
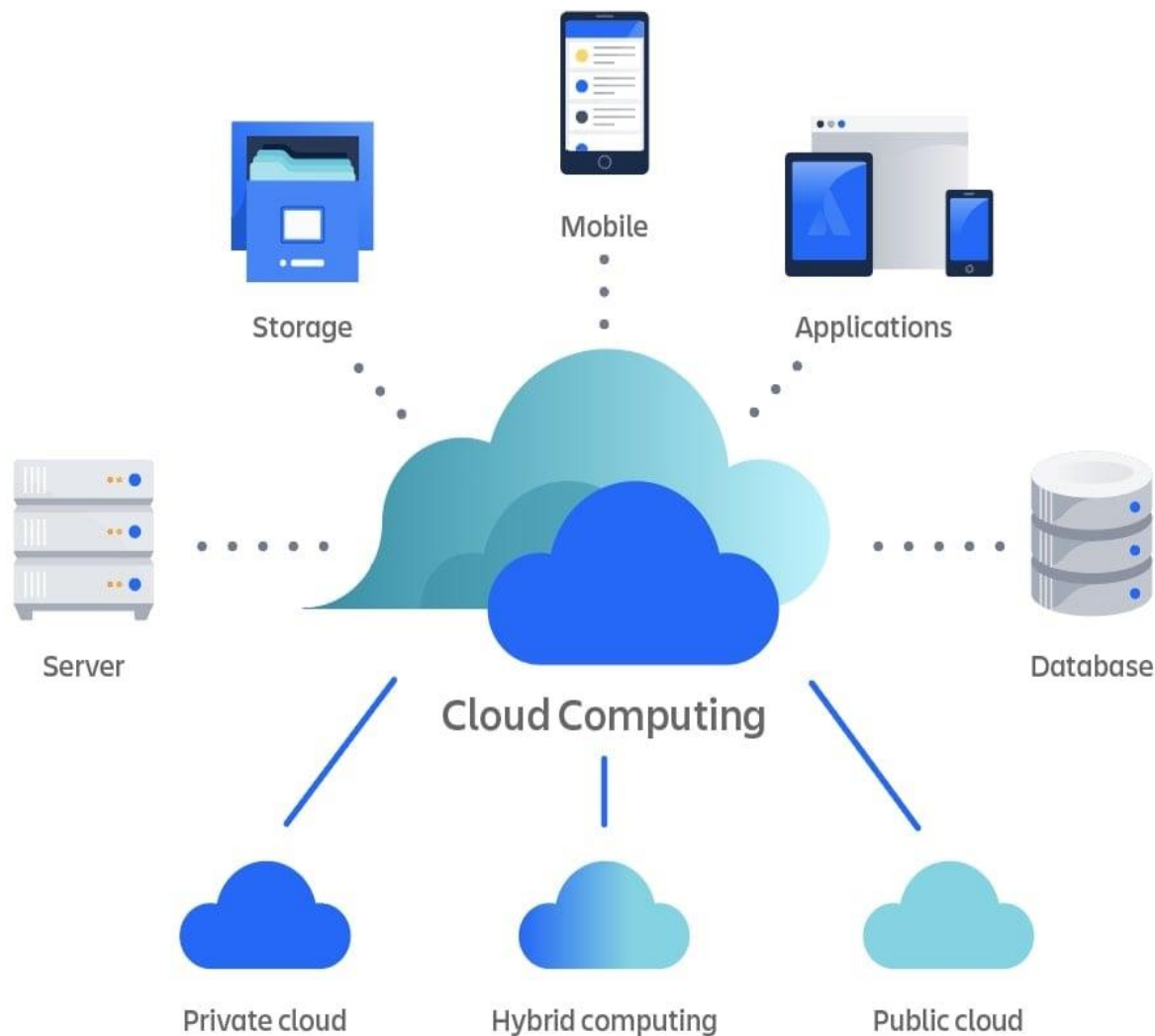
Similarly, you can talk about distributed systems and their goals in achieving scalability. Distributed systems also help in data consistency and replication. Moreover, you can also draw comparisons between cloud computing and distributed systems. This will help the audience to differentiate between these two concepts.

How Does Cloud Computing Work?

The cloud is basically a decentralized place to share information through satellite networks. Every cloud application has a host, and the hosting company is responsible for maintaining the massive data centers that provide the security, storage capacity and computing power needed to maintain all of the information users send to the cloud.

Types of Cloud Computing Delivery Models

Public Cloud
This is the most common and all of the players in cloud computing (Amazon, Microsoft, Apple and Google) run public clouds accessible anywhere with login credentials and the right web app.

Private Cloud

This model offers the same kind of flexibility as the public cloud, but with the infrastructure needs (hosting, data storage, IT staff, etc.) provided by the companies or users of the service. Additionally, the restricted access and hands-on management of hosting gives the private model an extra layer of security.

Hybrid Cloud
Hybrid cloud computing is a combination of the public and private models. The two cloud types are linked over the internet and can share resources when needed (for example, if the private cloud reaches storage capacity or becomes corrupted, the public cloud can step in and save the day).

USES OF CLOUD COMPUTING

Companies and individuals use cloud computing in a variety of unique and exciting ways. The Cloud Infrastructure Report 2021 from cloud management company Cloud Checkr revealed close to 60 percent of the 304 IT and business stakeholders surveyed said they had more than half their infrastructure already in the cloud.

The most prominent companies hosting the cloud are major players like Amazon (Amazon Web Services), Microsoft (Azure), Apple (iCloud) and Google (Google Drive), but there's also a bunch of other players, large and small.

Among the most common applications of cloud computing people might encounter both at work and in their everyday lives are cloud-based collaboration tools like Microsoft OneDrive and Dropbox, movie and music streaming and backup storage for iPhones and other mobile devices.
In addition to some of the examples already covered, here is a quick look at some other important application areas.

Blockchain for Trusted Information Systms

Anshika Nautiyal
(16008; CSE)

Automakers are looking into blockchain technology, known for its use in cryptocurrencies like Bitcoin, to enhance security in increasingly linked automobiles. The demand for a more sophisticated database will rise as the average car gets closer to becoming completely connected, electric, and driverless, and blockchain is the solution.

What Is a Blockchain and How Does it Work?

A blockchain is a distributed database that keeps track of a growing collection of ordered documents known as blocks rather than being connected to a central processor. It is impossible to change one block

without also affecting the blocks behind it since each block carries a timestamp and a link to a preceding block. Users can alter portions of the blockchain that they "own" by having the private keys required to write to the file. Everybody's copy of the distributed blockchain is kept in sync thanks to cryptography.

Since blockchains are secure databases by nature, they are fantastic candidates for storing data related to identity management, medical records, financial transactions, and provenance. Blockchain can cut out the intermediaries in transaction processing and trading.

How Blockchain is Impacting Automotive Industry?

Here are 5 ways blockchain has changed the automotive business and encouraged adoption:

Do you have the curiosity to know how blockchain technology is contributing to transform the scenario of automotive software companies? If yes, keep your eye on the below-mentioned ways:-