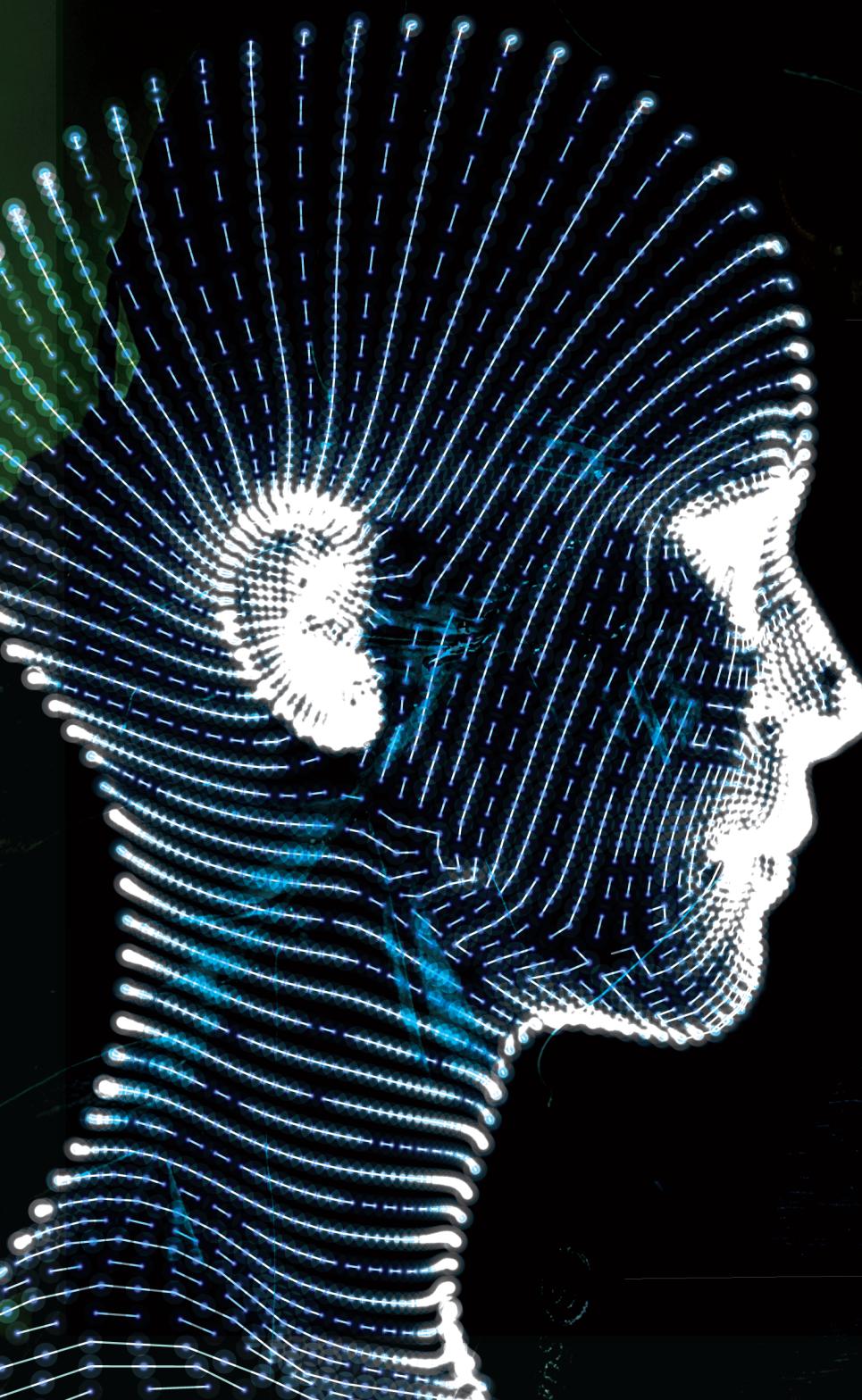


ALGORICA

Ist Edition | November 2022

“The best time for new beginnings is now”



Android:
The platform pushing
what's possible

Startups:
Solving on Ground ,
not paper

Language guide:
Choose your programming
language.
It works and i love it!



Computer Engineering Society

Madan Mohan Malviya University of Technology

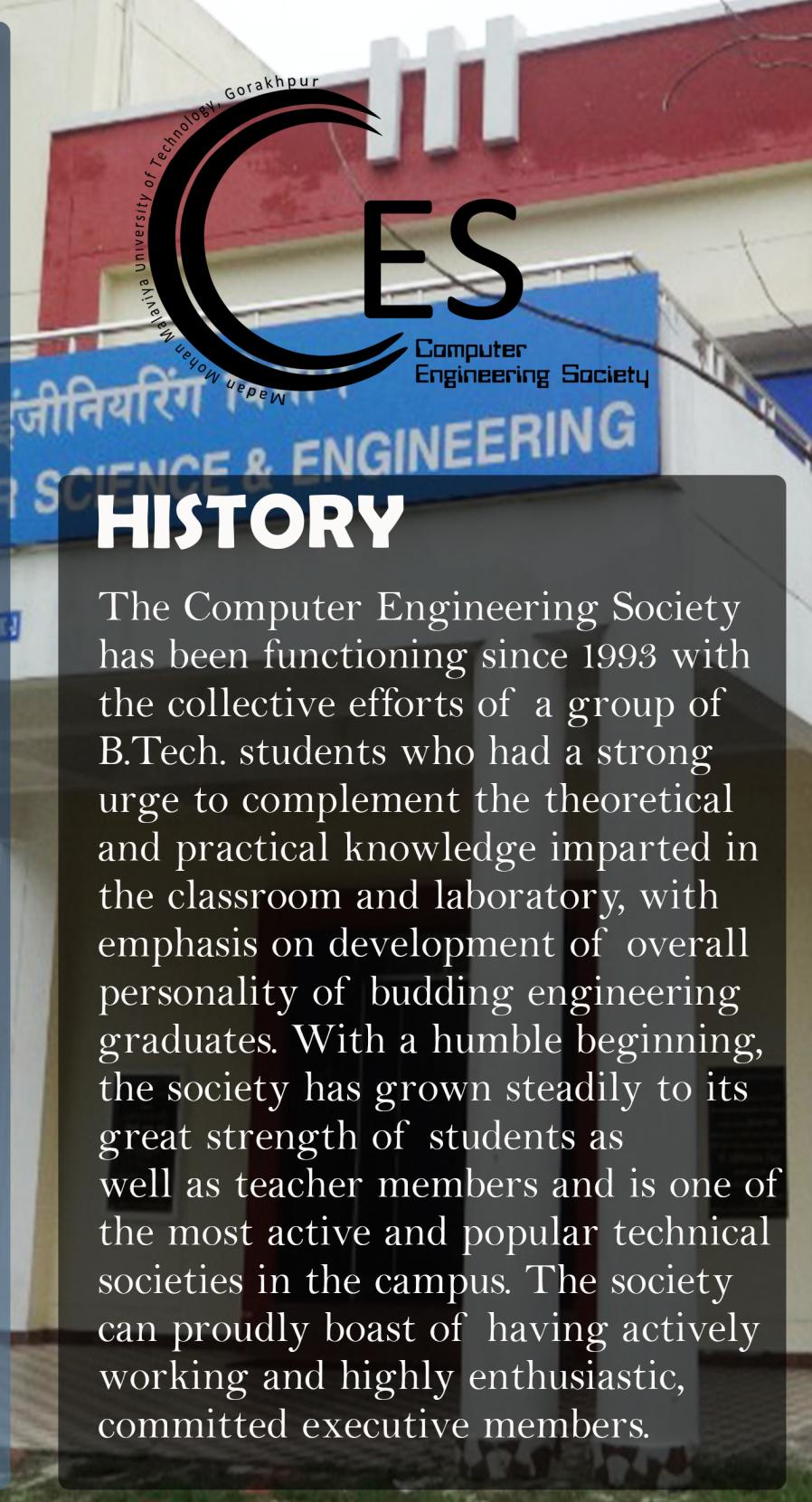
ALGORICA
1st Edition (2022)

VISION

To facilitate and promote studies, research, technology, and to foster the students into globally competent professionals with expertise in software field and Management Education and also to achieve excellence in higher technical education.

ABOUT

Computer Science and Engineering society provides a platform to the students to share and increase their knowledge. Apart from improving technical awareness, the society has also emphasized on the overall development of the students. It also conducts Data Structures and Competitive programming classes for first year. The society conducts various C quizzes to enhance the grasp on C language. It organizes events such as Game of codes and Wield the Web. Ennexus, the annual techno event of the society offers the students a platform to turn daydreams into a realm of human imagination and delve deeper into the aspects of technology and innovation.



HISTORY

The Computer Engineering Society has been functioning since 1993 with the collective efforts of a group of B.Tech. students who had a strong urge to complement the theoretical and practical knowledge imparted in the classroom and laboratory, with emphasis on development of overall personality of budding engineering graduates. With a humble beginning, the society has grown steadily to its great strength of students as well as teacher members and is one of the most active and popular technical societies in the campus. The society can proudly boast of having actively working and highly enthusiastic, committed executive members.

Message from

FACULTY ADVISOR



Prof. SUSHIL KUMAR SAROJ

It has been a great honor to serve as a faculty advisor of the Computer Engineering Society. We are very excited to publish our first edition of the annual magazine, Algorica.

Society magazine is the culmination of great efforts by a dedicated team led by the editor. This magazine reflects the mood of the activities and the vision that is performed enthusiastically every year as well as the soft skills and technical skills of students.

I am sure that this edition would be the best reflection of all the efforts done continuously by the society members. I wish the whole team all the very best in this endeavor.

Message From PRESIDENT

KAUSTUBH SRIVASTAVA



With college life gradually evanescing and reaching its inevitable end, I feel immensely honoured and emotional at the same time to pen down my thoughts for the first edition of Algorica, an idea which began shaping since the summers of 2020. Before saying anything else, I take a moment to felicitate my amazing junior team of CES 2nd year, for whose tireless efforts and dedication any amount of appreciation would fall short. I also thank my beloved 3rd year juniors, without whose supervision this initiative would never materialize into its final form. A debt of gratitude to our Faculty Advisor Prof. Sushil Kumar Saroj sir for being an encouraging supervisor and guide, and thanks to my batchmates, especially Anubhav, Apoorv and Ujjawal, whose unconditional support always aids in thinking for the betterment of this society.

Coming to the magazine, in its 29 years of functioning, CES has always strived to outperform its past milestones. Algorica is one such small addition to our repertoire, which is designed keeping in mind the hustle and hurdles freshmen face in the journey of their preparation. Ranging from competitive programming to development and from placements to global level contests, this magazine aims helping a computer science undergraduate on every turn of the road to his/her dream destination. Algorica tries to establish the link with students which we feel remains missing in their very first year, while they brainstorm to find the right path. With events like Game of Codes, Wield the Web, Debugger King, Chakravyuh, Capture the Flag and many others, CES tries to cover all technical and presentational aspects a student needs to get exposure with. Apart from what has been done, there is much to be done in the upcoming months.

On the closing note, I realize that among all other collegiate bodies I was part of, CES formed an integral part of my college life, with which I have grown a strange bonding. I still remember and feel nostalgic that how at the time of induction I requested seniors to not recommend me and let the result be as unbiased as it could be, no matter whether it turns out in rejection. I also realize that apart from all events CES organizes, its Personal Interview round closely resembles the kind of interview students will face in their final year, at the time of their placements. Hence it's my suggestion to every CSE freshmen to witness the induction process of this society at least once, so as to get the exposure of a complete formal hiring process they are sure to face after three years. I have complete trust that CES will grow even better in the imminent years under the leadership of the upcoming flagbearers of this society.

Message From

VICE PRESIDENT

ANUBHAV MILLER



I am really feeling grateful to put my thoughts into the maiden draft of Algorica, this thing is not possible without the effort of the CES team, the faculty advisor Prof. Shuhsil Kumar Saroj sir and our President Kaustubh Srivastava.

To give you a brief of my connection with CES from my freshmen year to final year it's just about connecting the dots and learning up things in both aspects technical and social , also building up a character with confidence that can stand out and take charge to do things with our team to achieve our targets and goal that is totally centric towards what can we provide to the newly enrolled students of our university in an era of technical education specially B.tech focuses on a placement or a higher education at the end which will people start exploring about or seeking after or even before joining into the undergraduate programs.

To elaborate more about my CES journey every day is new in the 1st year and many cell societies come to us to brief about them but the thing which attracted many of us is an event that was CTF (Capture The Flag) and the seniors told us that many colleges and the prestigious one have their own CTF event and we also have that that make me so much full of enthusiasm and energy to take part to explore it and it was the first and the best experience which a 1st year student can have. From there I knew that this society is a place where the team does things that are new, innovative and very much beneficial for us to explore the domain which we want to pursue.

After that induction happened, I was very fortunate that I got selected after hearing about CTF to be the person which was involved to host the CTF for the next consecutive years this feeling is just very good that the thing I felt after giving it to the juniors to the very possible way me with our team can provide it's just really nice.

The three years that I have been here it's just a great feeling and also it teaches me a very important lesson which I would like to put up in the end that being not that much skilled is not that important but what really important is you have to take the initiative and have faith in yourself that you will definitely pull up the bar and do all the desired things beyond anyone's expectations.

Getting started with DSA

What is Data Structure and algorithm (DSA)?

Data structure and algorithms is a branch of computer science that deals with creating machine-efficient and optimized computer programs. The term Data Structure refers to the storage and organization of data, and Algorithm refers to the step by step procedure to solve a problem. By combining "data structure" and "algorithm", we optimize the codes in software engineering.

Steps to learn DSA from scratch

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.

Learn a programming language of your choice.

- Python. High-level languages like Python, JavaScript, and Ruby are generally highly suggested due to their readability
- C , C++ , C# , Java

Learn about Time and Space complexities.

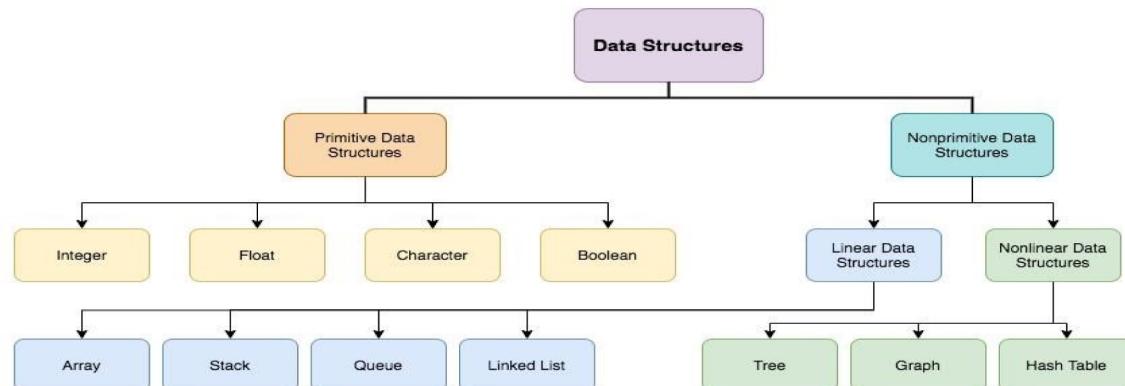
What is Time Complexity?

Time complexity is a type of computational complexity that describes the time required to execute an algorithm. The time complexity of an algorithm is the amount of time it takes for each statement to complete.

What is Space Complexity?

When an algorithm is run on a computer, it necessitates a certain amount of memory space. The amount of memory used by a program to execute it is represented by its space complexity.

Learn the basics of individual Data Structures and Algorithms.



Side by side learn basic Algorithms such as

Sorting Algorithms

1. Bubble Sort
2. Selection Sort
3. Insertion Sort

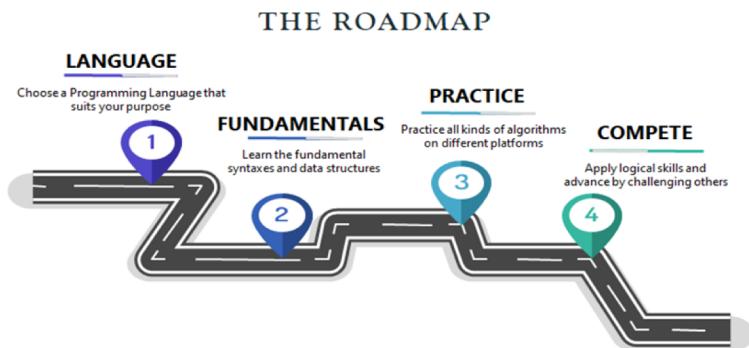
Searching Algorithms

1. Linear Search $O(N)$
2. Binary Search $O(\log N)$

Greedy Approach

Bit Manipulation / Bit Masking:

1. AND (`&`)
2. OR (`|`)
3. XOR (`^`)
4. NOT (`~`)
5. Left Shift (`<<`)
6. Right Shift (`>>`)



Recursion

Backtracking

Dynamic Programming

Some Advance Topics:

1. Segment Tree
2. Tries
3. Suffix Tree,
4. Suffix Array,

Now, it's time to solve problems as much as you can:) Some Tips:

While solving problems if you don't come up with a solution with spending at most 1 hour, I will suggest you leave that question as for that time no need to spend more time on that!

Try that question another day or some days later. If still stuck, then you can refer to some editorials or hints.

One thing is very important is that suppose you successfully solved some questions . Congratulations, but still, I will suggest going to discussion and see other's solution as well. It will be more insightful, and you can get to know different approaches.

And suppose you are in that situation that you can't solve the problem or even seeing the solution, you are unable to think that logic which are used in the solution. So, don't be panic and don't depress. Just dry run the solution, it really helps (Personally it helps me a lot).

If still you are thinking that the concept is not so much clear then try to write on paper what you understand the concept via dry running! (Also, you can refer to video lectures).

Develop your own website

What is web development?

Those websites which you scroll to are created by none other than web developers. A person who creates amazing websites for businesses and startups. A full-stack web developer looks after both the front-end and the back-end parts. The front-end deals with how the websites look when delivered to the customers while the back-end stores and processes all the data safely.

You should be eager and curious as well to dive deep into it to become a successful web developer.

Here's a step-by-step process:

Frontend Development

Backend Development + Database

Build projects and learn framework

Frontend Development

Front-End is the UI (User Interface), it deals with the website's overall appearance, on how interactive and dynamic it is.

HTML, CSS and JavaScript are backbone of all websites.

HTML provides the basic structure.

CSS provides the skin to the structure in the form of design, formatting, and layout.

JavaScript adds interactivity and logic to the website.

Start with HTML, CSS and JavaScript. Do not directly jump to learning React or other frameworks/libraries.

CSS is difficult but is something that you should learn well. Do not directly jump to using Tailwind or Bootstrap.

In early stages don't try to learn complete CSS just do basic and you are good to go .

Do not wait to complete JS before starting to build projects, JS is huge and takes time to learn.

Backend Development + database

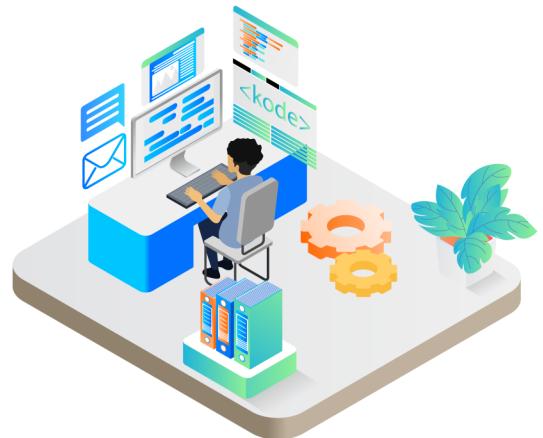
Code that allows a database and an application to communicate with one another is known as

backend. It includes the database which stores all of the data of the application. Code written by back-end developers communicates information from the database to the browser.

Node js and Express

Express is a minimal and flexible Node.js web application

framework that provides a robust set of features for web and mobile applications. Most of the big companies use Java or Java-like languages for the backend. Most start-ups use Python or Node+Express for the backend. Express helps build the backend very easily while staying in the JavaScript ecosystem. It is preferred for self-projects as it helps focus on learning development and building projects pretty fast.



Database:

Various DBMS includes MongoDB, MySQL, SQL Server, etc. It handles with storage and management of data.

MongoDB:

MongoDB is a non-relational document database that provides support for JSON-like storage. The MongoDB database has a flexible data model that enables you to store unstructured data, and it provides full indexing support and replication with rich and intuitive APIs. MongoDB has become popular amongst developers due to its intuitive API, flexible data model, and includes a wide variety of features.

Build projects and learn different frameworks

Now the time is to move on next step.

Start building projects and side by side learn different framework. One can begin via simple and easy projects like calculator or personal portfolio and further move to the more advanced ones like healthcare web apps, blockchain based cloud sharing systems and many more.

React

React is a JavaScript library created by Facebook, it is one of the most prominent frontend libraries in tech companies. Almost all modern tech companies from early-stage start-ups to the biggest tech companies like Microsoft and Facebook, use React.

Concept to master in react –

- Class and function-based components
- State and props
- Lifecycle hooks
- Fetching data from APIs
- Controlled & Uncontrolled Components



Sources

W3schools - <https://www.w3schools.com/html>

Android: The platform pushing what's possible



Android operating system is the largest installed base among various mobile platforms across the globe. Hundreds of millions of mobile devices are powered by Android in more than 190 countries of the world. In September 2008, the first Android-powered device was launched in the market. Android dominates the mobile OS industry because of the long list of features it provides.

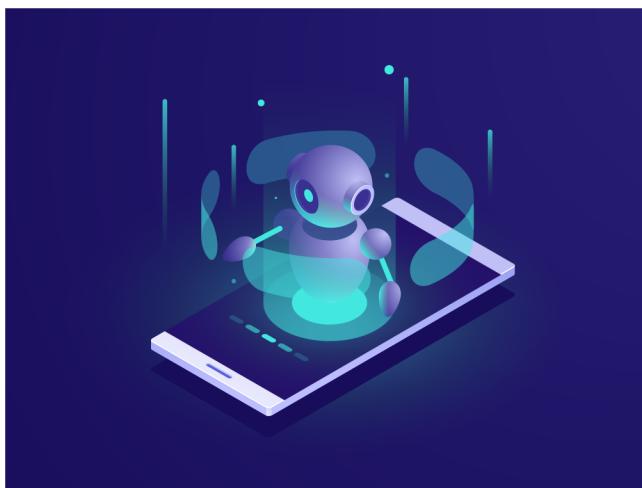
It's user-friendly, has huge community support, provides a greater extent of customization, and a large number of companies build Android-compatible smartphones. As a result, the market observes a sharp increase in the demand for developing Android mobile applications, and with that companies need smart developers with the right skill set.

Features of Android

- We can manage all data storage-related activities by using the file manager.
- It contains a wide range of media supports like AVI, MKV, FLV, MPEG4, etc. to play or record a variety of audio/video.
- It also supports different image formats like JPEG, PNG, GIF, BMP, MP3, etc.
- It supports multimedia hardware control to perform playback or recording using a camera and microphone.
- Android has an integrated open-source WebKit layout-based web browser to support User Interfaces like HTML5, and CSS3.
- Android supports multi-tasking means we can run multiple applications at a time and can switch between them.
- It provides support for virtual reality or 2D/3D Graphics.

Android Versions

Google first publicly announced Android in November 2007 but was released on 23 SEPTEMBER 2008 to be exact. The first device to bring Android into the market was the HTC Dream with version Android 1.0. Since then, Google released a lot of android versions such as Apple Pie, Banana Bread, Cupcake, Donut, Éclair, Froyo, Gingerbread, Jellybeans, Kitkat, Lollipop, marshmallow, Nougat, Oreo, etc. with extra functionalities and new features.



Programming Languages used in Developing Android Applications

1. Java
2. Kotlin

Developing the Android Application using Kotlin is preferred by Google, as Kotlin is made an official language for Android Development, which is developed and maintained by JetBrains. Previously before Java is considered the official language for Android Development. Kotlin is made official for Android Development in Google I/O 2017.

Advantages of Android

Development .

- Android is an open-source Operating system and hence possesses a vast community for support.
- The design of the Android Application has guidelines from Google, which becomes easier for developers to produce more intuitive user applications.
- Fragmentation gives more power to Android Applications. This means the application can run two activities on a single screen.
- Releasing the Android application in the Google play store is easier when it is compared to other platforms.



Categories of Android applications.

There are many android applications in the market. The top categories are –

 Music	 News	 Multimedia
 Sports	 Lifestyle	 Food & Drink
 Travel	 Weather	 Books
 Business	 Reference	 Navigation
 Social Media	 Utilities	 Finance

ITS TIME TO BE KNIGHT OF CHESS



"ACM-ICPC" refers to the **Association for Computing Machinery-International Collegiate Programming Contest**. Every year, it is hosted by the Alpha Chapter of the UPE Computer Science Honor Society. Among the world's oldest, most prestigious, and largest programming contests, it is the oldest and largest of its kind.

Hacker Cup is Facebook's annual open programming competition, open to participants around the world. The program's motto is to apply problem-solving and algorithmic coding skills to advance through each year's online rounds, win prizes, and have a chance to make it to the global finals and win the grand prize. This program starts in August and lasts until October, and there will be four rounds. You need to be qualified in every round to get into the next rounds.

HACKER CUP

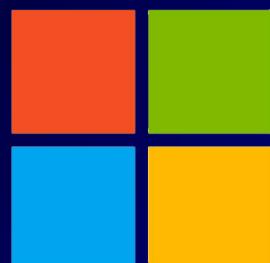
FACEBOOK



Google's Coding Competitions are meant to excite, challenge, and test coders around the world. Google conducts three coding contests every year, and everyone can register around the world.

Google Hash Code is a coding challenge for students and professionals worldwide. Two rounds will be held from November to April. An optimization problem must be solved in 4 hours by a team of 2 to 4. During **Google Code Jam**, professional and student programmers solve complex algorithmic challenges in a limited amount of time. There will be five rounds of this program from April to August. Designed to recruit top talent from the Asia Pacific region, **Google Kick Start** consists of three-hour rounds. Algorithms, data structures, & problem-solving skills are the main focus of the test.

Microsoft Imagine Cup is conducted by Microsoft every year, and it has been two decades since they started. This program invites you to take on real-world problems submitted by IGOs, NGOs, and nonprofit organizations that you can then take on as part of your Imagine Cup project. The main idea behind this is "Code with purpose," which assists in putting your ideas into action as you create solutions that have the potential to change the world. The winner of the Imagine cup will receive cash prizes, Azure Grant, and a mentoring session with Microsoft CEO.



ICFP stands for "**International Conference on Functional Programming**". Since 1998, the ICFP Programming Contest has been held near June or July, with results announced at the International Conference on Functional Programming. Participants can participate from anywhere without a fee or pre-registration. There is no limit to the size of teams. Participants have 72 hours to complete and submit their entries. There is often also a 24-hour challenge called "lightning division." One of the competition goals is to showcase the programming languages and tools that the contestants admire. The winners boast the right to claim that their language is "the programming tool of choice for discriminatory hackers."

IT'S C{}DE



HackerRank is a competitive coding platform where you can practice different coding problems and participate in many challenges. This provides you with coding challenges, hackathons, and some companies conduct their hiring tests here. You can also earn badges by solving challenges on the HackerRank website, and these badges will be added to your profile.



To begin with, you must learn the language. This guidance can be found in our language guide, and you can learn data structures and basic algorithms as well. Afterward, practice the HackerRank daily problem set. Next, go to CodeChef's practice section, and then to the Wednesday starters. Following that, we will be participating in CodeChef's long challenges, lunch events, and cookoffs. A certain level is reached when you need to stop practicing on Codechef and move to Codeforces to practice, and then give their rounds a go. You should go for Leetcode or Interviewbit for interview purposes and for advanced practice you may try Atcoder or Topcoder

Each month, **CodeChef** conducts a programming competition, followed by two smaller contests. Additionally, CodeChef offers algorithm tutorials and forums to make computer programming easier. CodeChef laddus are awarded to the top Indian programmers. The company organizes three contests a month: Cash prizes, gadgets, and one of the most exciting prizes is CodeChef laddus.



The **Topcoder** community is a global group of designers, developers, data scientists, and competitive programmers. They organize online and on-location tournaments twice a year, challenging leading brands like IMB, Google, and eBay. Every week, they conduct individual matches in an automated and online format called Single Round Match (SRM). We can augment and recreate our learning in this age of cutthroat competition by using it. The SRM's make the event quite exciting and funny.



Codeforces is a website that hosts programming competitions. ITMO University maintains it under Mikhail Mirzayanov's leadership. Competitors on Codeforces learn to adapt classic algorithms to new problems, improving their understanding of the algorithm's concept.

Every week, Codeforces Rounds last for two hours. 2 to 2.5 hour educational contests, with a 24-hour hacking period, held 2-3 times per month. During the hacking period, you can challenge other contestants' solutions. Train by solving previous contest problems. Create and test problems with the "Polygon" feature. Social networking through internal public blogs. Contestants are divided into ranks based on their ratings.

With millions of active users, LeetCode is one of the largest tech communities. It offers weekly and biweekly programming competitions. There are different monthly challenges offered by Leet Code. A total of 30 problems will be assigned to you over the next 30 days. Every day, LeetCode adds a new problem, which you have 24 hours to solve and submit.



In addition to the Coding Contest, LeetCode offers additional features such as job interview preparation, discussions, etc. Their platform hosts contests for 90 minutes in which you can solve the challenges in their online editor, aka, Playground, in any one of the supported programming languages.

DECENTRALIZE ALL THE THINGS

A step into the world of emerging technologies

Blockchain is a type of distributed ledger technology (DLT), a digital system for recording transactions and related data in multiple places at the same time. It stores data in blocks that are digitally chained together. It makes the history of any digital asset unalterable and transparent through the use of a decentralized network and cryptographic hashing. Each computer in a peer-to-peer blockchain network maintains a copy of the ledger to prevent even a single point of failure, and every copy is updated and validated simultaneously, making it nearly impossible to hack the system or forge the data stored on it, thereby guaranteeing the fidelity and security of a record of data and generates trust without the need for a trusted third party.

Nowadays Blockchains are best known for their crucial role in cryptocurrency systems . Logistics companies use blockchain to track and trace goods as they move through the supply chain. Government central banks and the global financial community have been testing blockchain technology as a foundation for digital currency exchange. And various industries, including the legal community and entertainment, are using blockchain as the basis for smart contracts and other mechanisms for transferring and protecting intellectual property rights. Many industries are now exploring blockchain-based applications as a secure and cost-effective way to create and manage a distributed database and maintain records for digital transactions of all types. As a result, blockchain is increasingly viewed as a solution for securely tracking and sharing data between multiple business entities.



Blockchain works in simple steps as follows:

1. An authorized participant inputs a transaction, which must be authenticated by the technology.
2. That action creates a block that represents that specific transaction or data.
3. The block is sent to every computer node in the network.
4. Authorized nodes verify the transaction and add the block to the existing blockchain.
5. The update is distributed across the network, which finalizes the transaction.

These steps take place in close to real time and involve a range of elements including:-

Hash Encryptions

It uses hashing and encryption to secure the data, relying on the hashing algorithms to secure the information. The address of the sender (public key), the receiver's address, the transaction, and his/her private key details are transmitted via the hashing algorithm across the world and added to the block chain after verification.

Proof of work

In a Blockchain, each block consists of 4 main headers.

- 1.Previous Hash: This hash address locates the previous block.
- 2.Transaction Details: Details of all the transactions that need to occur.
- 3.Nonce: An arbitrary number given in cryptography to differentiate the block's hash address.
- 4.Hash Address of the Block: All the details are transmitted through a hashing algorithm. This gives an output containing a 256-bit value, which is called the unique 'hash address'.



AI : THE FUTURE LIES WITHIN

A step into the world of emerging technologies

AI is a branch of computer science that studies the properties of intelligence by synthesizing intelligence. In general, AI systems work by ingesting large amounts of labeled training data, analyzing the data for correlations and patterns, and using these patterns to make predictions about future states. AI is important because it can give enterprises insights into their operations that they may not have been aware of previously and because, in some cases, AI can perform tasks better than humans. Particularly when it comes to repetitive, detail-oriented tasks like analyzing large numbers of legal documents to ensure relevant fields are filled in properly, AI tools often complete jobs quickly and with relatively few errors.

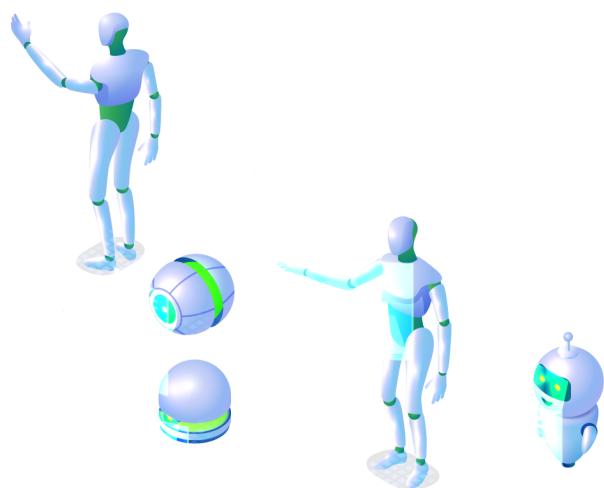
AI programming focuses on three cognitive skills:

Learning processes. This aspect of AI programming focuses on acquiring data and creating rules for how to turn the data into actionable information.

AI

Reasoning processes. This aspect of AI programming focuses on choosing the right algorithm to reach a desired outcome.

Self-correction processes. This aspect of AI programming is designed to continually fine-tune algorithms and ensure they provide the most accurate results



AI can be divided into four categories, based on the type and complexity of the tasks a system is able to perform.:-

Type 1: Reactive AI. These AI systems have no memory and are task specific, and are able to perceive and react to the world in front of it as it performs limited tasks.

Type 2: Limited memory AI. These AI systems have memory, so they can store past data and use these to inform future decisions and predictions.

Type 3: Theory of mind AI. These type of AI systems are able to infer human intentions and predict behavior , a necessary skill for AI systems to become integral members of human teams, it means that the system would have the social intelligence to understand emotions.

Type 4: Self-aware AI. these AI systems have a sense of self-awareness, which gives them human-level consciousness and can understand their own existence. This type of AI does not yet exist.

Some examples of AI technology :-



Machine learning.

It is a method of data analysis that automates analytical model building. It is a branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention.

There are three types of machine learning algorithms:

1. Supervised learning. Data sets are labeled so that patterns can be detected and used to label new data sets.
2. Unsupervised learning. Data sets are not labeled and are sorted according to similarities or differences.
3. Reinforcement learning. Data sets are not labeled but after performing an action or several actions, the AI system is given feedback.

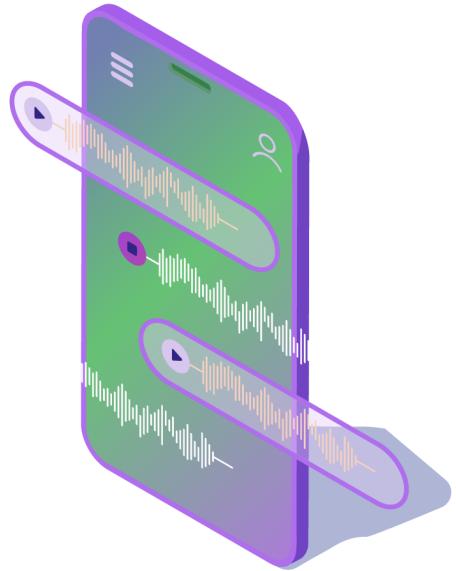
Automation.

When paired with AI technologies, automation tools can expand the volume and types of tasks performed . It is the creation and application of technologies to produce and deliver goods and services with minimal human intervention. The implementation of automation technologies, techniques and

processes improve the efficiency, reliability, and/or speed of many tasks that were previously performed by humans.

Self-driving cars.

Autonomous vehicles use a combination of computer vision, image recognition and deep learning to build automated skill at piloting a vehicle while staying in a given lane and avoiding unexpected obstructions, such as pedestrians.



Robotics.

This field of engineering involves conception, design, operation and manufacturing of robots. The objective of this field is to create intelligent enough machines that can assist humans in a variety of ways and can perform tasks that are too difficult for humans to perform or perform consistently.

Machine vision.

This technology gives a machine the ability to see. It captures and analyzes visual information using multiple cameras with analog-to-digital and digital signal processing. It is often compared to human eyesight, but machine vision is not bound by biology and can be programmed to see through walls.

Natural language processing (NLP).

This is the processing of human language by a computer program. It helps computers communicate with humans in their own language, making it possible for computers to read text, hear speech, interpret it, measure sentiment and determine which parts are important.

Deep Learning .

It is a type of machine learning that trains a computer to perform human-like tasks, such as recognizing speech, identifying images or making predictions. Instead of organizing data to run through predefined equations, deep learning sets up basic parameters about the data and trains the computer to learn on its own by recognizing patterns using many layers of processing.

LOCK IT, PROTECT IT OR BE EXPOSED!

Cyber security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data from malicious attack. as these attacks can costs loss of wealth or theft of personal , financial or medical, which may damage your reputation and safety ,and can cause other severe damages .

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Common cyber threats include:

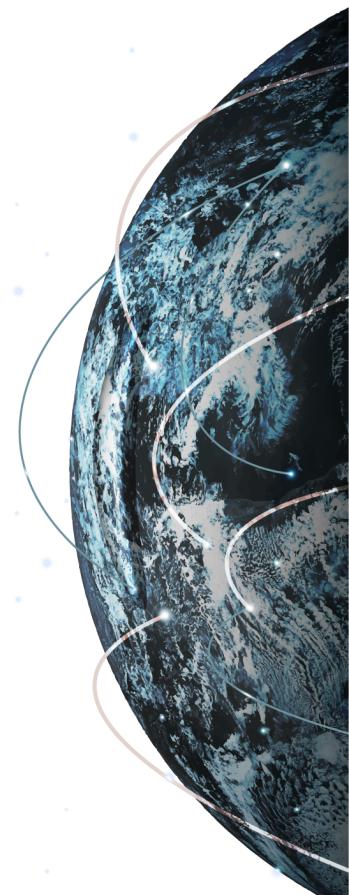
Malware: these are designed to create persistent access to a victim's network, to spy on the victim device in order to obtain credentials or other valuable data, and to cause disruption; such as ransomware, botnets , RATs (remote access Trojans), spyware, Trojans, viruses, and worms.

Backdoors: which allow remote access and can gain high level user access on network , system , or any application.

Formjacking: where attacker inject malicious codes into webpage forms.

Cryptojacking: which uses victim's system to mine cryptocurrency

DDoS (distributed denial-of-service) attacks: which flood servers, systems, and networks with traffic in an attempt to disrupt, and perhaps even bring down the target.



What are the five types of cyber security?



1.Critical infrastructure security

Critical infrastructure security is the area of concern surrounding the protection of systems, networks and assets whose continuous operation is deemed necessary to ensure the security of a given nation, its economy, and the public's health and/or safety.

2. Network security

Network security involves addressing vulnerabilities affecting your operating systems and network architecture, including servers and hosts, firewalls and wireless access points, and network protocols. It protects the usability and integrity of network and data.

3. Cloud security

Cloud security is concerned with securing data, applications, and infrastructure in the Cloud. This includes keeping data private and safe across online-based infrastructure, applications, and platforms. Securing these systems involves the efforts of cloud providers and the clients that use them, whether an individual, small to medium business, or enterprise uses. In this, different technologies, protocols and practises are used to protect cloud computing environments, applications running in the cloud, and data held in the cloud.

4. IoT (Internet of Things) security

IoT security involves securing smart devices and networks connected to the IoT. IoT devices include things that connect to the Internet without human intervention, such as smart fire alarms, lights, thermostats, and other appliances.

5. Application security

Application security involves addressing vulnerabilities resulting from insecure development processes in designing, coding, and publishing a software or a website, and preventing data or



Essential cyber security measures

1. Use strong passwords
2. Update programs and systems regularly
3. Use multi-factor authentication
4. Limit login attempts
5. Control access to data and systems
6. Put up a firewall.
7. Be suspicious of fraudulent emails and phone calls
8. Keep Your Software Up to Date

DATA IS THE NEW SCIENCE!

Data science is the domain of study that deals with vast volumes of data using modern tools and techniques to find unseen patterns, derive meaningful information, and make business decisions. Data science uses complex machine learning algorithms to build predictive models.

A step into the world of emerging technologies

The Data Science Lifecycle

1. Capture: Data Acquisition, Data Entry, Signal Reception, Data Extraction.

This stage involves gathering raw structured and unstructured data.



2. Maintain: Data Warehousing, Data Cleansing, Data Staging, Data Processing, Data Architecture.

This stage covers taking the raw data and putting it in a form that can be used.

3. Process: Data Mining, Clustering/Classification, Data Modeling, Data Summarization.

Data scientists take the prepared data and examine its patterns, ranges, and biases to determine how useful it will be in predictive analysis.



4. Analyse: Exploratory/Confirmatory, Predictive Analysis, Regression, Text Mining, Qualitative Analysis.

Here is the real meat of the lifecycle. This stage involves performing the various analyses on the data.

5. Communicate: Data Reporting, Data Visualisation, Business Intelligence, Decision Making.

In this final step, analysts prepare the analyses in easily readable forms such as charts, graphs, and reports.



Prerequisites for Data Science

1. Machine Learning
2. Modeling
3. Statistics
4. Programming
5. Database

Who oversees the Data Science Process?

- IT Managers
- Business Managers
- Data Science Managers

Who is a Data Scientist?

Data scientists are among the most recent analytical data professionals who have the technical ability to handle complicated issues as well as the desire to investigate what questions need to be answered. They're a mix of mathematicians, computer scientists, and trend forecasters. They're also in high demand and well-paid because they work in both the business and IT sectors.

On a daily basis, a data scientist may do the following tasks:

1. Discover pattern and trends in datasets to get insights.
2. Create forecasting algorithms and data models.
3. Improve the quality of data or product offerings by utilising machine learning technology.
4. Distribute suggestions to other teams and top management.
5. In data analysis, use data tools such as R, SAS, Python, SQL.
6. Top the field of data science innovations.



Where do you fit in Data Science?

Data science offers you the opportunity to focus on and specialize in one aspect of the field. Here's a sample of different ways you can fit into this exciting, fast-growing field-

- Data Scientist
- Data Analyst
- Data Engineer

Data Science Tools

The data science profession is challenging, but fortunately, there are plenty of tools available to help the data scientist succeed at their job.

- Data Analysis: SAS, Jupyter, R Studio, MATLAB, Excel, Rapid-Miner
- Data Warehousing: Informatica/ Talend, AWS Redshift
- Data Visualisation: Jupyter, Tableau, Cognos, RAW
- Machine Learning: Spark MLlib, Mahout, Azure ML studio



Applications of Data Science

- Healthcare
- Gaming
- Recommendation Systems
- Logistics
- Fraud Detection
- Speech Recognition
- Airline Route Planning
- Augmented Reality
- Image Recognition
- Internet Search



Wrapping it all up

Data will be the lifeblood of the business world for the foreseeable future. Knowledge is power, and data is actionable knowledge that can mean the difference between corporate success and failure. By incorporating data science techniques into their business, companies can now forecast future growth, predict potential problems, and devise informed strategies for success.



IOT - THE WAY TO AUTOMATED FUTURE

A step into the world of emerging technologies

Over the past few years, IoT (Internet of Things) has become one of the most important technologies of the 21st century. The idea is to make machines smart enough to connect and share information with each other and with cloud-based applications. Simply the vision is to make connected-devices smart.

First, lets find out what is Internet of Things (IoT)?

The Internet of Things describes the network of physical objects that are embedded with software, sensors and other applications for the purpose of utilizing every bit of data that is further used to interact with you or with each other.

A thing on the internet of things can be a person with a heart monitor implant, an automobile that has built-in sensors to alert the driver when tire pressure is low, or a system that alerts for fire. These devices will bridge the gap between physical and digital world to improve the quality and productivity of life, society and industries.



How does it work?

IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. The devices do most of the work without human intervention, although people can interact with the devices - for instance, to set them up, give them instructions or access the data.



What technologies have made IoT possible?

Access to low-cost, low-power sensor technology: Affordable and reliable sensors are making IoT technology possible for more manufacturers.

Machine learning and analytics: With advances in machine learning and analytics, businesses can gather insights faster and more easily.

gather insights faster and more easily.

Conversational artificial intelligence (AI): Advances in neural networks have brought natural-language processing (NLP) to IoT devices (such as digital personal assistants Alexa) and made them appealing, affordable, and viable for home use.

Cloud Computing Platforms: These platforms allow businesses and consumers to enjoy IoT infrastructure completely without having to manage it.

A simple example of connected cars

IoT is reinventing the automobile by enabling connected cars. With IoT, car owners can operate their cars remotely—by, for example, preheating the car before the driver gets in it. Given IoT's ability to enable device-to-device communication, cars will even be able to book their own service appointments when warranted.

The connected car allows car manufacturers or dealers to turn the car ownership model on its head. Instead of selling cars, they can charge drivers usage fees, offering a “transportation-as-a-service” using autonomous cars. IoT allows manufacturers to upgrade their cars continuously with new software, a sea-change difference from the traditional model of car ownership in which vehicles immediately depreciate in performance and value.



Find me if you can , I am a gingerbread man

Capture the Flag walkthrough

Capture-the-Flag is a game for hackers or can be called treasure hunting for "flags" which are secretly hidden in purposefully-vulnerable programs or websites. Competitors are expected to "capture flags" to increase their score, hence the name of the event. Flags are usually random strings embedded in the challenges.

Now as you know a little about the CTF, I would suggest you to watch this video on "Cicada 3301" (<https://youtu.be/hfAuYcxpNWM>). CTF is a little different version from this one but it will definitely excite you and will give you an insight for these types of events.



These events are held at regular intervals worldwide by different organizations in mainly two styles:

Capture

1. Jeopardy style: Play and solve individual challenges to find flags hidden inside them and gain gradual points for each. It consists of variety of challenges related to web, crypto, pwning, forensics, reverse engineering, steganography and miscellaneous categories.

2. Attack-Defense (Wargames): Teams are given their own random machines and they need to penetrate each other's machines, simultaneously defending their own ones, by finding and patching vulns as quickly as possible.

Beginner to advanced level labs for practicing, competing and sharpening skills for competitions are also available such as:

- TryHackMe: <https://tryhackme.com>
- Hacker101: <https://www.hacker101.com/>
- PicoCTF: <https://picoctf.com/>
- Google CTF: <https://capturetheflag.withgoogle.com/>
- HackTheBox: <https://www.hackthebox.eu/>

Some of the very helpful websites which are often used for getting help in various cryptography and steganography problems are:

- Cryptography: <https://www.dcode.fr/en>
- CyberChef : <https://gchq.github.io/CyberChef/>
- Steganography: <https://www.aperisolve.com/>

PRO-TIP:

YOU CAN GET THE DETAILS OF ALL
THE MAJOR CTF
EVENTS AT
[HTTPS://CTFTIME.ORG/](https://ctftime.org/)

theFlag

Our very own Computer Engineering Society(CES) also organizes a CTF event under the banner of ‘Ennexus’ to evaluate and hone your infosec skills.

CTFs are a fun way to learn and hone your skills in the guise of a competition. If you have never tried one before, you may realize you have been missing out! So, what are you waiting for, go and explore this amazing world of CTFs.

You can start from this one: (Flag in the form of : Algorica{flag} :)

Have you seen the contents of Algorica....

Blended and finished

CSSBattle:
A code golfing platform

CSS battle is an awesome challenging competition for CSS freaks. The aim of this game is simple - you have an image target which you need to replicate with the smallest possible CSS (and slight HTML if you please) code. More visual matches and fewer bytes get you a higher score.

WHO CAN PLAY THIS??

CSSBattle is a free-to-play platform. It only costs you your time.

CSSBattle needs you to code in HTML (slightly) and CSS. If you have ever coded in these 2 web technologies, you are all set to play here. Even if you don't have any experience with HTML and CSS, they are super easy to start with.



WHAT IS CSS BATTLE?

A Battle is a collection of unique targets with its own separate leaderboard. Each Battle runs for a set amount of days/weeks and once it's finished, the Battle leaderboard is locked, and the winners are crowned. The targets in a Battle remain playable even after a Battle is over and changes in target leaderboard rankings still occur.

HOW TO PLAY?

The objective of the game is to write HTML/CSS to replicate the given target image in the least code possible.

On the target page, start coding in the editor area on the left. As you start typing, the output area in the middle will start rendering your code. When you're confident that the output matches the target image, hit the Submit button to see your score.



IMPORTANT POINTS TO NOTE :

- 1) It is recommended to play on Chromium-based browsers (Chrome/Safari) because that is what is used for scoring at the backend. Other browsers may have some differences in how they render a particular code.
- 2) Since this is "CSS" battle, you are not allowed to use JavaScript, SVG or images in your code. In fact, any external asset is not allowed.



HOW ARE SCORES EVALUATED?

Our scoring algorithm takes into account 2 things:

- 1) How closely you have replicated the target image.
- 2) The number of characters in the code.

Based on these 2 factors, a score is calculated. Better the match and lesser the characters used, more the score. Also, it's worth mentioning that when your visual match with the target image is low, reducing character count won't give too much jump in the score. Initially focus more on getting the match to 100%. Once you are on 100% match, the points start increasing more rapidly with decreasing character count. This exponential scoring is done to make it more rewarding for those who sweat it all out to get to extreme character counts!

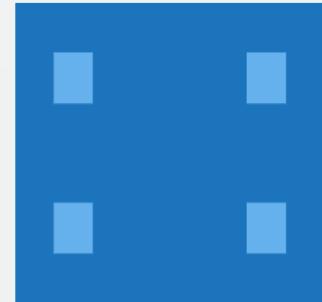
LETS UNDERSTAND THIS WITH A SIMPLE QUESTION

FROM CSS BATTLE: (refer to <https://cssbattle.dev/play/2>)

CODE:

```
<div></div><div></div><div></div><div></div><div></div></div>

<style>
body {
margin:50;
display:grid;
grid-template-columns:auto auto;
grid-column-gap:200px;
grid-row-gap:100px;background: #1c75bc;
}
div {
width:50px;
height:50px;
background: 65b1ed;
}
</style>
```



Out of many possible codes. This one will give you 100% correct as answer.
Now it's time for you to try *out your own code !!!*

Good luck and happy development !!

FUN WITH GRAPHICS

A step into the world of graphic designing

Today, in this world where youtube is dominating the internet, and essentially has become a source of income for a lot of people, Graphic designing has become a sought after skill.



While many software engineers in India are struggling to make ends meet, there are Graphic designers making tons of money while working from home. A successful YouTuber will always be ready to even pay you some extra bucks if your content is worth that much.

Jack of all trades, Master of one, it is a fact that working in this industry might not pay you all that much, but let me tell you, most people struggling to make money in this field are those that do this thing as a part-time work, if you actually have an interest so deep than remember this, you will definitely succeed.

The best thing about graphics? Well, you can take a completely random video, poster, logo etc., use your creativity and expertise to find new ways of using the same tool, and make a completely blank and soulless project, full of life, creativity and fun! Yupp, adding transitions, character, maybe some colors, some captions and some objects. The best part, giving a simple video, a personality of its own, maybe some bg music, some cool filters, something dramatic, something calm, something rocking, its all upon you!

Few resources that you could use to make a career in video editing: Upwork, Indeed, SolidGigs, FlexJobs, SimplyHired, Freelancer, ZipRecruiter, LinkedIn, Fiverr, Remotive.





Premiere Pro

Premiere Pro is the leading video editing software for film, TV, and the web. It allows for both video image and audio editing. It allows users to open files and work with any modern video format, including 8K, web files, and even virtual reality. Premiere Pro is robust enough that you can create and edit a full-length feature film. Yep, that's how powerful it is.

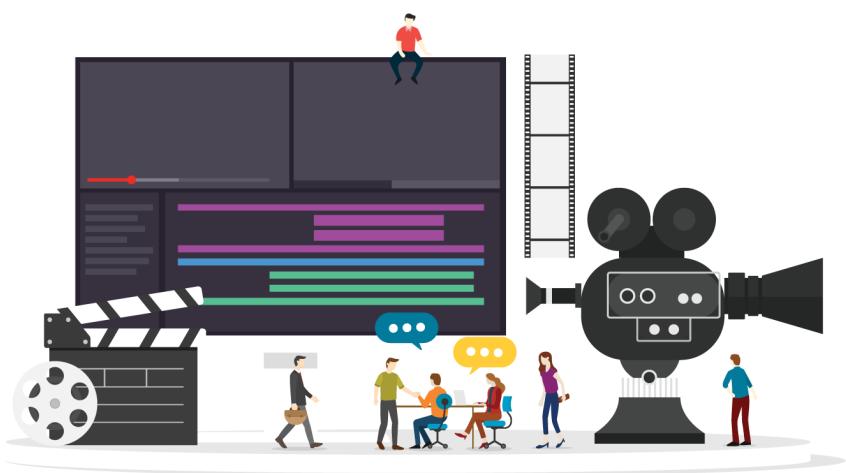


Getting started:

- To convert a video clip to a format and size that will play on a website.
- Add captions or an intro/outro to a clip before posting it online.
- Edit out a few seconds of a video and replace them with something else.
- Adjust color for better viewing.
- Tweak volume levels or sound quality to clean up scratchy or difficult audio.

Becoming a pro!..Yep, some of the best features:

- Auto Ducking for ambient sounds that helps you mix background noise into a video without overpowering other sounds elements and channels.
- Robust export options for closed captions that allow you to share captions with third-party applications for easier workflows.
- Graphics panel to help you add special elements or text to video content with ease.
- Rulers and guides that work like other Adobe tools to help you keep everything aligned in just the right manner on the canvas.
- Snappy mask tracking for HD, 4K, and super high-res formats.



Photoshop

In the field of image/graphic editing, Adobe Photoshop is one of the most powerful, easy-to-use, and widely used software applications.

With Photoshop, you can edit photos and create posters, where images should be in a raster format.

In order to access Photoshop, you need a subscription.

Photoshop is a software that edits images using raster data. There is a range of advanced tools like masking, image wrapping tools, alpha compositing, fluid camera rotation, file display tools, and much more.

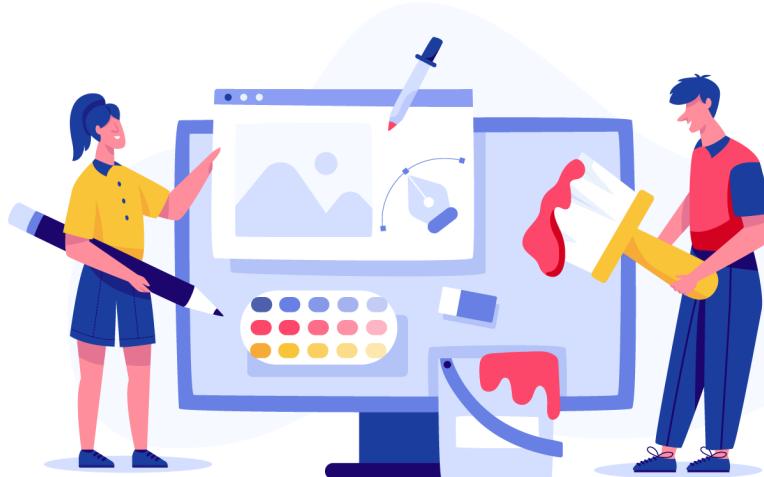


Reasons Why You Should Use Photoshop

Inspite of Photoshop's wide range of capabilities, I have summarized its main uses below.

Creating photo manipulations and removing distractions from images

- A primary purpose of Photoshop is to edit the color, exposure, and contrast of your photographs. Using layer-based photo editing and layer masks, you can make more complex adjustments.
- Adjustment layers allow you to do just about anything in Camera Raw. The Adjustments Panel offers a variety of options for applying and editing adjustments.
- A unique feature of Photoshop is the ability to manipulate images. By manipulating photos, you can create something entirely your own. By cutting and blending different elements, you end up merging graphic design and photo editing.
- The tools in Photoshop make it easy to resize, crop, and blend images. Other photo editing programs don't allow this.



- In most cases, you would want to remove something distracting from your photo. Unfortunately, most editing programs only offer automatic removal adjustments. With Photoshop, you can not only remove spots automatically but also manually. It's only Photoshop that you should use while removing things from a pattern.

Canva

It is a graphic design tool that works to simplify the process of digital design. As such, an account can easily be created and everything works either via a web browser or on the iOS or Android apps.

Canva allows for image editing and project-based learning using a simple drag-and-drop interface . With more than 250,000 template available, starting and progressing through a topic is very easy, even for those new to the platform. Stock photos, videos, and graphics are also available, with hundreds of thousands of choices available.

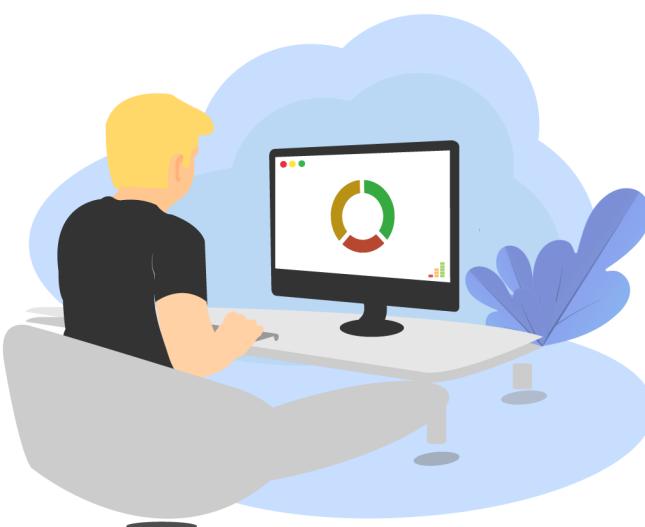
How does Canva work?

Canva is easy to sign up , using either an email, Google account, or Facebook login. Once an account is created, for free, you can pick if you're using it as a teacher, student, or anything else.

After successfully creating account on Canva you can start using it for your work. For example : Making a poster will start by offering templates down the left, then the main image on the right that you can customize. Clicking into this will make a toolbar appear with options to edit – this reacting as you work keeps things minimal and clear throughout.

What are the best Canva feature?

Canva is crammed full of features but many are education specific. Before getting into that it's worth noting that Canva auto-saves. This is a great feature both for teachers and students as it means never worrying about losing work – something Google's ecosystem of tools has got many people used to.



While the templates are fantastic to make any presentation, poster, or image have more impact, there are powerful sub-tools. The graph templates, for example, are a great way to help in math and science classes – allowing for specific results to be displayed in a clear visual and engaging way.



CRACK IT

Algorithmic thinking has recently become somewhat of a buzz word among computer science educators, and with some justice: ubiquity of computers in today's world does make algorithmic thinking a very important skill for almost every student. Even computer science students have a tendency to think about algorithmic problems in terms of a computer language they know instead of applying general design and analysis.

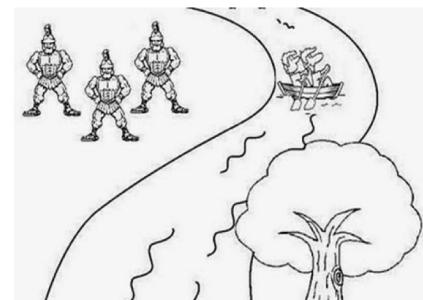
SOME ALGORITHMIC PUZZLES

1.A Fake Among Eight Coins

There are eight identical coins, one of them is counterfeit and is known to be lighter than the genuine coins. What is the minimum number of weighings needed to identify the fake coin with a two-pan balance scale without weights?

2.Ferrying Soldiers

A detachment of 25 soldiers must cross a wide and deep river with no bridge in sight. They notice two 12-year old boys playing in a rowboat by the shore. The boat is so tiny, however, that it can only hold two boys or one soldier. How can the soldiers get across the river and leave the boys in joint possession of the boat? How many times does the boat pass from shore to shore in your algorithm?

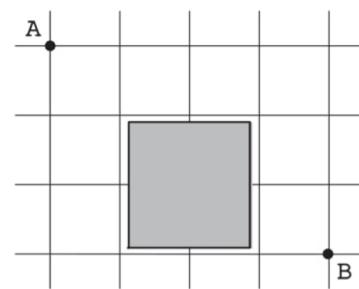


3.Page Numbering

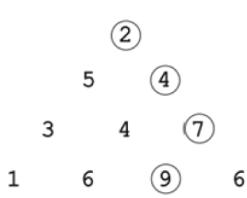
Pages of a book are numbered sequentially starting from 1. If the total number of decimal digits used is equal to 1578, how many pages are there in the book?

4.Blocked Paths

Find the number of different shortest paths from point A to point B in a city with perfectly horizontal streets and vertical avenues as shown in Figure 2.4. No path can cross the fenced off area shown in gray in the figure.



Grid of city streets with a fenced off area (shown in gray).



5. Maximum Sum Descent

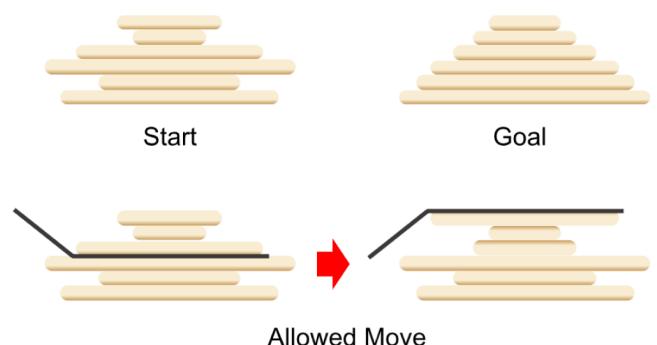
Some positive integers are arranged in a triangle like the one shown in Figure 2.5. Design an algorithm to find the largest sum in a descent from its apex to the base through a sequence of adjacent numbers, one number per each level.

6. Fibonacci's Rabbit Problem

A man put a pair of rabbits in a place surrounded on all sides by a wall. The initial pair of rabbits (male and female) are newborn. All rabbits pair are not fertile during their first month of life but give birth to one new male/female pair at the end of the second month and every month thereafter. How many pairs of rabbits will be there in a year?

7. Pancake Sorting

There are n pancakes, all of different sizes, that are stacked on top of each other. You are allowed to slip a spatula under one of the pancakes and flip over the whole stack above the spatula. The objective is to arrange the pancakes according to their size with the biggest at the bottom. Figure 2.7 shows an instance of the puzzle for $n=7$. Design an algorithm for solving this puzzle and determine the number of flips made by the algorithm in the worst case.



8. Hitting a Battleship

What is the minimum number of shots needed to guarantee hitting a battleship, a 4×1 rectangle on a 10×10 board? The battleship can be located anywhere on the board and may be oriented either horizontally or vertically. You may assume that there are no other ships. (A "shot" is a blind guess of square on the board.)

ANSWERS

- | | |
|--------|-----------|
| 1) 2 | 5) 22 |
| 2) 100 | 6) 233 |
| 3) 562 | 7) $2n-3$ |
| 4) 17 | 8) 24 |

Choose your Programming Language

Guide to
Computer Programming



It is used for:

- Mobile applications (speciall Android apps)
- Desktop applications
- Web applications
- Web servers and application servers
- Games
- Database connection

Java is a general purpose, object-oriented programming language, created in 1995. It is owned by Oracle, and more than 3 billion devices run Java. It can be utilised to design highly scalable applications that are light, fast and serve a variety of purposes. The demand for Java developers remains strong, even with competition from new languages

Privileges of Java over other languages

Some advantages over Python are:

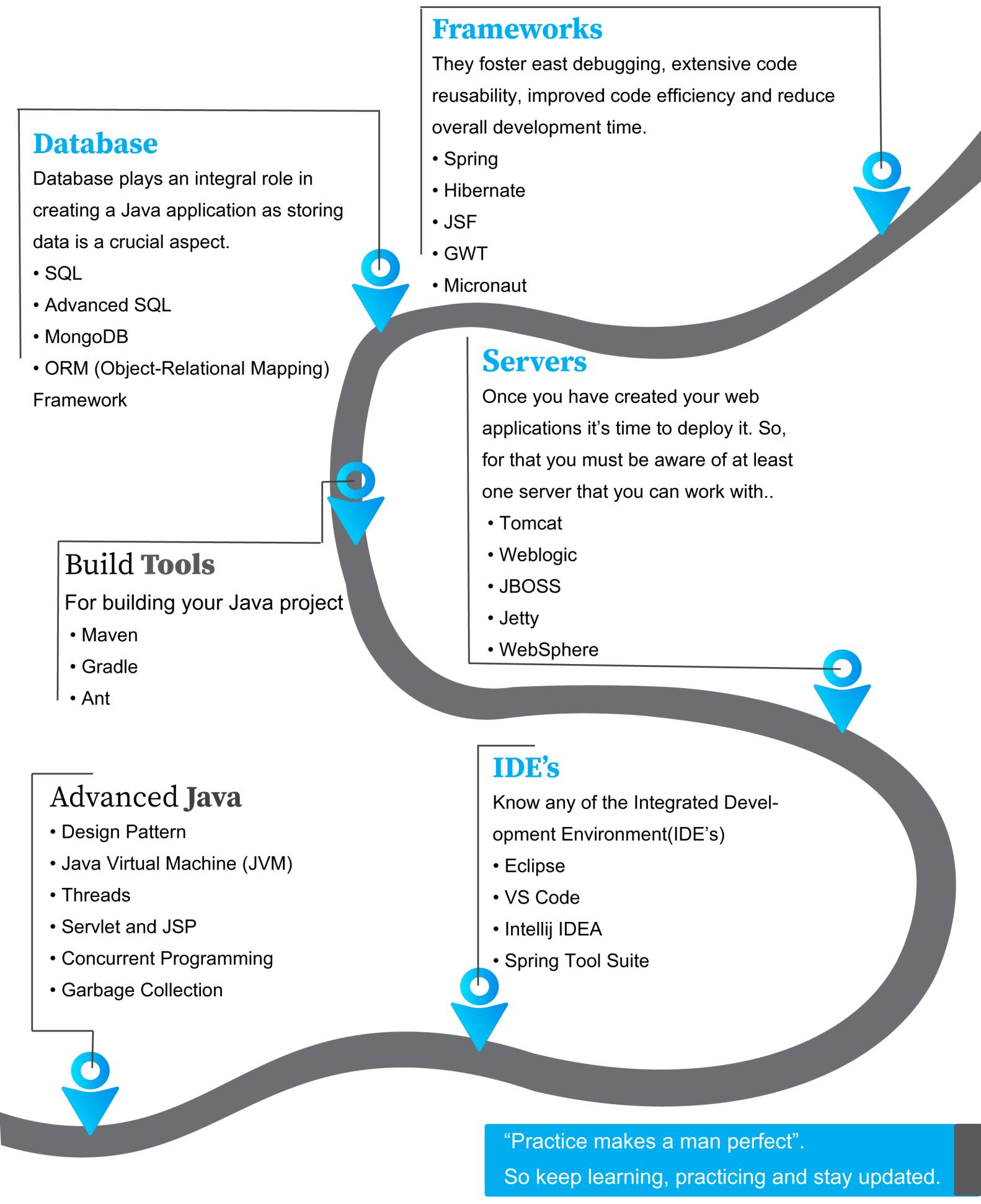
- **Much stronger IDE support.** More apparent for enterprise-level application development, which Java has rich set of mature libraries and frameworks.
- **Java Virtual Machine (JVM),** is very quick to execute, whereas Python, being an interpreted language, is slow.
- **Lot better for cross platform support.**
- Provides **type safety** which catches all potential errors at compile time rather than at runtime like Python.
- Much **easier to analyse** Java code than Python which is useful in situations when a team of programmers working on the same project.

Some advantages over C++ are:

- More popular for app development.
- Stronger database connectivity thanks to JDBC.
- Platform independence.
- Garbage Collection: In Java, you don't have to worry about manually de-allocating objects like you do in C++, it's done automatically.
- Java has better and more consistent libraries.
- Java developers don't have to deal with PHP legacy.

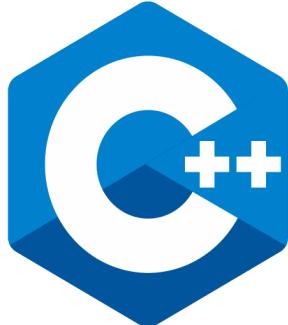
Core JAVA

- Data types and variables
- Features and Architecture
- Operators and Expressions
- String
- Conditional statements and loops
- OOPs concept in depth
- Multithreading
- Java IO streams, basically Scanner and Buffered Reader
- Collection Framework



Choose your Programming Language

Guide to
Computer Programming



C++ is still considered to be one of the most popular programming languages. It offers rich library support in the form of a Standard Template Library. The language is widely used in various GUI platforms, Cloud/Distributed Systems, Operating Systems, real-time simulations, etc. Moreover, as C++ is an object-oriented programming language, it allows you to implement real-time problems through OOPS concepts.

Know about **C++**

Features of the C++ language and applications.
Set up an environment.
Basic syntax.
Create your first C++ program.
C++ vs other languages.
Comments, New Line, Input/Output.

Intermediate

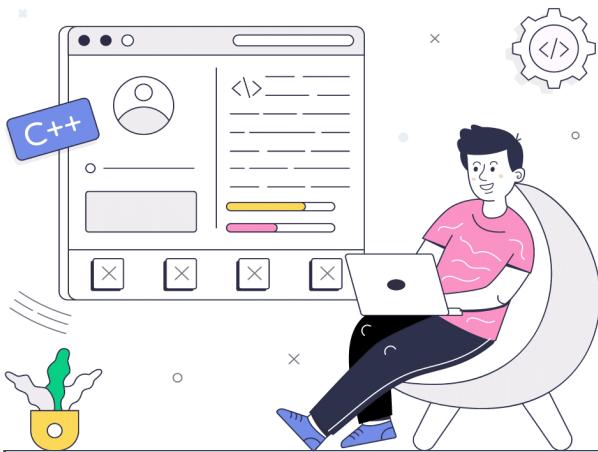
Classes and objects, Access Specifiers, Constructors, Destructors, Inheritance, Function Overloading, Operator Overloading, Unary and Binary Operator Overloading, Function overriding, Friend Function, Virtual Function, Pure Virtual Function. Pointers to Derived Classes, Abstractor.

Basics

Data Types, Keywords, Identifiers, Constants, String, Storage Classes Operators, Scope Resolution Operator, Memory Management Operators, Type Conversion, Sequence structure. Selection structure (one or many branches):(If, If Else, Switch Statements), Loop structure including (Continue, Break, Goto Statement), Types of Function and recursion.

Drift

From here you can start practicing c++ at platforms like **hackerrank**, **geeks for geeks**. And then move on to **codechef**, **codeforces** and **leetcode**.



Finally

Just one more step and you will become an expert in C++. Learn web programming, and standard libraries.

Get off with OOPs

Whoa! We are halfway done with C++. Time to go a little deep into some very important concepts. OOPs concepts i.e polymorphism, data abstraction, data encapsulation, interfaces, files and streams, Signal Handling. Try/catch, Throwing Mechanism, Catching Mechanism, Stack Unwinding.



The remains

Learn exception handling, dynamic memory, namespaces, preprocessors, multithreading, POSIX Threads, List, Stack, Queue, Map, Multimap, Bitset.

Choose your Programming Language

Guide to Computer Programming

C is a general-purpose high level language that was originally developed by Dennis Ritchie for the Unix operating system. It was first implemented on the Digital Equipment Corporation PDP-11 computer in 1972.

The Unix operating system and virtually all Unix applications are written in the C language. C has now become a widely used professional language for various reasons.

- Easy to learn
- Structured language
- It produces efficient programs.
- It can handle low-level activities.
- It can be compiled on a variety of computers.



Facts about C

- C was invented to write an operating system called UNIX.
- C is a successor of B language which was introduced around 1970
- The language was formalized in 1988 by the American National Standard Institute (ANSI).
- By 1973 UNIX OS almost totally written in C.
- Today C is the most widely used System Programming Language.
- Most of the state of the art software have been implemented using C

>> All the C programs are written into text files with extension ".c" for example hello.c.

Why to use C ?

C was initially used for system development work, in particular the programs that make-up the operating system. C was adopted as a system development language because it produces code that runs nearly as fast as code written in assembly language. Some examples of the use of C might be:

- | | |
|---|---|
| <ul style="list-style-type: none">• Operating Systems• Assemblers• Network Drivers• Data Bases | <ul style="list-style-type: none">• Language Compilers• Text Editors• Modern Programs• Language Interpreters |
|---|---|



Sources to follow :

>> Youtube channels:

- Code with harry
- Apna college
- Jenny's lectures

>> Sites that can be followed:

- W3school
- javatpoint
- GeeksforGeeks

LAPTOP GUIDE

Discover what kind of laptop you should buy based on your needs and requirements, keeping in mind that everyone has different needs.



The guide will help you to understand the different features of laptops so that you can make an informed decision about which laptop suits your needs and fits within your budget.

COMPARISON MATRIX

There are widely different features that a student might get confused to choose in between. Depending upon the requirements of a persona there is a chart given here that helps you to get understanding of what features you need which meets your requirements.

Use the CHART given to decide what kind of Laptop would meet your needs.

NOTE - you will be needing a high end LAPTOP with efficient graphics processor and Central Processor in order to carry out some of the following :

- Heavy graphics dev.
- Deep learning
- 3d tasks
- Blender
- Game development
- High volume data processing

Comparison Matrix

Use the laptop buying guide matrix below to quickly see how important a laptop feature is to each of the personas, helping you to identify the needed mix of features that define the right laptop to purchase.

	Student	Gaming	Creative	Engineering/ Scientific	Business/Travel	Office Workstation	Military/Industrial/ Construction	Home/Light/ Average
Portability	●	-	-	●	-	●	●	-
SSD Storage	●	●	●	●	●	●	●	●
HDD Storage	+	+	●	●	●	●	+	●
Intel i5/AMD Ryzen 5	●	●	●	●	●	●	●	●
Intel i7/AMD Ryzen 7	●	●	●	●	●	●	●	●
Intel i9/AMD Ryzen 9	-	●	●	●	●	●	●	●
RAM: 2-4 GB	●	-	-	●	●	●	●	●
RAM: 8 GB	+	●	●	●	●	●	●	●
RAM: 16+ GB	-	●	●	●	●	●	●	●
Wi-Fi	●	●	●	●	●	●	●	●
12.5-14 in. Screen Size	●	●	-	●	●	●	●	●
15 in. Screen Size	+	●	●	●	●	●	●	●
17 in. Screen Size	-	-	●	●	●	-	-	-
Touch Screen	-	-	-	●	●	●	●	●
Stylus	●	-	-	●	●	-	-	-
Rugged Build	-	-	-	-	-	●	●	●
Enhanced Security	-	●	●	●	●	-	-	-
On-Board GPU	+	●	●	●	●	●	●	●
HD "High Definition" Resolution	+	-	-	-	-	-	-	-
UHD "Ultra High Definition" Resolution	+	●	●	●	●	●	●	●
Retina Display (Only on Apple Products)	●	●	●	●	●	●	●	●
4K Resolution	-	+ ●	●	●	●	●	●	●
Long Battery Life	●	●	●	●	●	●	●	●
Ethernet	+	●	●	●	●	●	●	●

● = Important/Very Useful | + = Moderately Important/Somewhat Useful | - = Not Important/Of Little Use

Your next laptop should have these key features

- **CPU (Central Processing Unit):** AMD and Intel are two major processor manufacturers. Intel processors are designed to meet the needs of all users. There are several types of Intel CPUs, ranging from the Celeron and Pentium lineup, which are great for home computing, to the Core i3, and Core i9 range, which are amazing for creative work and extreme gaming. From the entry-level A4 to the high-end FX series, AMD offers a robust computing lineup for in-depth HD gaming and high-end software.
- **Memory RAM (8GB is the best choice):** Inserting more RAM will boost your computer's performance. Most laptops come with at least 4 GB of RAM. A memory upgrade of 6 or 8 GB is worth the investment if you can afford it. The best option is to ensure that you will be able to upgrade your RAM even if higher RAM is not in your budget. It is not possible to upgrade every laptop, and you don't want to be surprised later on.
- **Solid State Drive (SSD) (512GB or more):** Contains no moving parts, starts up much faster than a typical HDD, and consumes very little power, so the battery lasts much longer. Even so, they tend to be smaller.
- **Graphics card:** Graphics card can either be dedicated or integrated. Integrated graphics cards are fine for browsing the web or writing emails on a daily basis. It is fine to watch films on YouTube or see images, but more complex tasks may take longer. Dedicated graphics cards have more up-to-date technology and can handle intensive tasks such as video editing. When gaming, a higher card will produce great frame rates, but this can drain the battery. For the best performance, you might also consider a laptop with dual cards. You can get much better performance from these machines than from individual graphics cards.
- **Battery Life (Average 6hrs or more):** The first charge is always the most important charge. Whenever you buy a new laptop, you should charge its battery for 24 hours to ensure that it gets a full charge on the first use. You can extend the life of your battery by charging it completely during its first charge.
- **Ports (USB3.0, HDMI, USB-C Thunderbolt, Media Reader, etc):** Laptop ports should cover most of your needs: plugging in headphones, connecting an external keyboard and mouse, and connecting an external monitor
- **Display size (15.6 inches is recommended) and quality. (OLED/IPS):** For the best viewing experience when playing games or watching films, choose a 15inch display.
- **Refresh rate :** Refresh rate of at least 120 Hz (or more).

Emanating Startups of IT Sector

→ MEESHO

Meesho which is a popular online reseller platform Founded in 2015 by IIT-Delhi Graduates Vedit Aatreya and Sanjeev Barnwal. It was in 2015, Vedit Aatreya (Founder & CEO) of Meesho decided to quit



their job from InMobi and start working upon his idea . Then he started Meesho with his partner Sanjeev Barnwal (Founder & CTO) of Meesho. They both were the batchmates (2008-12) in IIT Delhi and came up with the idea to build a online platform to help individuals. Meesho became the platform that became the bridge between supplier and reseller. The platform enables small businesses ,individuals and housewives to start their online stores with zero investment via social media such as WhatsApp, Facebook, Instagram etc and earn money from their home.

The company is valued at \$2.1 billion after raising funds of \$300 million.



→ BOAT

The boat is an Indian Start-up founded by Aman Gupta in 2016. It is a Delhi-based start-up that was started in 2016 by Aman Gupta and Sameer Mehta. The company term itself



as a lifestyle brand that deals in fashionable consumer electronics. boAt Lifestyle was started with the sole aim of bringing affordable, durable, and more importantly, 'fashionable' audio products and accessories to millennials. It offers a wide array of services such as headphones, earphones, speakers, travel chargers & premium cables. The company also designs audio-focused electronic appliances like wireless speakers, earbuds (Airdopes), wired headphones, home audio equipment. This India based start-up has managed to attract customers with its trendy and pocket-friendly products.

→ SWIGGY

Who doesn't know Swiggy? Imagine you are working on a Monday and craving for a cheesecake post lunch. Swiggy has made that easy for you to satiate your cravings even while sitting at home.



Swiggy, which was launched in the Bengaluru neighbourhood of Koramangala by Sriharsha Majety, Nandan Reddy and Rahul Jaimini, which is becoming the fastest start-up to become a unicorn. The largest food delivery platform in India, started just with 5 delivery boys and 25 restaurant partners in 2014. Swiggy is serving in 27 cities and has partnered with more than 40,000 restaurants.

It uses ML(Machine Learning) and AI (Artificial Intelligence) to show the food items which customer likes. Headquartered in Bangalore, the company has recently raised funding of \$800 million and is now valued at nearly \$5 billion. The company's target market has also grown to 50 million over the period, which is like a lifetime opportunity for Swiggy.



→ PHYSICS WALLAH



Physics Wallah is an EdTech start-up founded in 2014 by Alakh Pandey. Started as a YouTube Channel, Physics Wallah, as of today, has mentored over 6 million students and has over 13,700 video lectures on its platform. Sir always had a love for teaching.

Alakh Sir was also a college dropout and started his career as a physics teacher in a coaching institute. Alakh Pandey's love for teaching pulled him toward a coaching institute in Allahabad. His style of teaching received a huge reception and the Physics he taught was loved by everyone. But due to limited number of students in offline mode he came up with the idea of starting a YouTube channel named 'Physics Wallah' in 2016 to reach to a large number of students across India. Now it became India's 101st unicorn by raising \$100 million at a valuation of \$1.1 billion in ed-tech industry.



→ PHARMEASY

PharmEasy is an online pharmacy and medical store in India which specialises in OTC products, diagnostic tests, and medical instruments. The company was founded in 2015 in Mumbai, Maharashtra and has become an essential service that tech startup has raised a massive \$350 million, becoming the first Epharmacy unicorn in India. The funding has been raised after the merger of PharmEasy with its rival Medlife. The founders Dharmil Sheth and Dr Dhaval Shah have planned to reach over 100,000 pharmacies in the next 12 months in the new geographical markets of India.



seen incredible growth since then. It is product you could ever imagine in an COVID-19 pandemic, the company has has contributed to its growth. This health

→ DREAM11

Founded in 2008, DREAM 11 is an online fantasy sports platform that now has more than 10 crore users in India. Based in Mumbai, Maharashtra, the company was founded by two young cofounders, Harsh Jain and Bhavit Sheth. DREAM 11 has raised \$400 million just before the commencement of IPL 2021.



DREAM 11 is also India's first Unicorn start-up as the company's valuation is now escalated to \$5 billion. Dream 11 is the first and leading fantasy gaming platform in India. It has attracted a lot of young users who are crazy about games. It took three years for the company to hit the mark of 1 million users and post that it crossed 3 million mark in less than 2 months. The company had around 75 million users before pandemic COVID-19 started in India and now reached 100 million users. As per the reports of Deloitte, the fantasy Sports in India has grown by nearly 200% that is a catalyst for the growth of the company.

NOTABLE ALUMNI



Priyanshu Kumar (Batch 2021)
@SEBI



Arjun Singh (Batch 2021)
@Amazon



Rohit Verma (Batch 2021)
@HummingWave



Abhijeet Singh (Batch 2021)
@HummingWave



Akshat Singh (Batch 2021)
@IIM Bangalore



Utkarsh Yadav (Batch 2022)
@Payatu



Ashutosh Pandey (Batch 2022)
@MakeMyTrip



Priyanshi Rawat (Batch 2022)
@Amazon



Amit Tiwari (Batch 2022)
@Amazon

and many more ...

EVENT CALENDAR

WEILD THE WEB

Includes WebD Classes through which one gets to learn HTML, CSS, Javascript, Bootstrap, Git, Github, and the art of web development.

GAME OF CODES

Which gives you chance to enhance and brush up your programming skills by providing you a perfect stage to showcase your talent.

Through these classes, you will learn to develop algorithms in a systematic way and read and write the C code to implement them..

Classes provides you the guidance on how to Master the Theory and Application of Algorithms and Data Structure to excel in programming

C CLASSES

CP CLASSES

COMPUTER ENGINEERING SOCIETY

PS CLASSES

You will learn about the basic tools and techniques of adobe photoshop. Introduces to the amazing skill of photoshop work area.

ENNEEXUS

The Annual Fest Of Ces

CHAKRAVYUH

The event not only tests the coding skills but also test the participant's cognitive ability.

CAPTURE THE FLAG

Gives you a breathtaking experience in the field of cryptography and cyber forensics.

CODINGO

The event provides you a platform to showcase your programming skills and knowledge.

CARPE DIEM

An amazing event to show up your Development skills, presentation skills and communication

DEBUGGER KING

Errors don't really gives you the desired output in the coding world, to reach the perfectionism debugger king is conducted to ace your debugging journey.

Final Year MEMBERS



Kaustubh Srivastava
President



Anubhav Miller
Vice -President



Ujjawal Gupta
Competitive
Programming Head



Saumya Srivastava
Planning and
Strategic Head



Rupal Singh
Contests Head



Anupriya Sharma
Editorial Head



Siddhartha Pandey
Editorial Head



Apoorv Dwivedi
Fiscal Head and
Design Head



Prakhar Saxena
Development Head



Namita Chaudhary



Aradhya Tripathi



Swati Singh



Anubhav Omar



Aradhya Ranjan



Arpit Jain



Vaibhav Sharma



Soumya Gupta

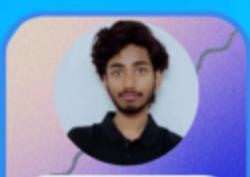
Third Year MEMBERS



Kumari Astha Rani
Session Coordinator



Naveen Kushwaha
Session Coordinator



Sai Arya
Competitive Programming
Assistant



Adarsh Srivastava
Competitive Programming
Assistant



Yash Tiwari
Development Assistant



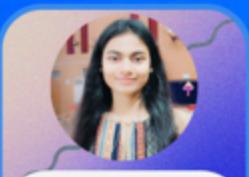
Vaishnavi Porwal
Development Assistant



Akriti Srivastava
Planning and Strategic Assistant



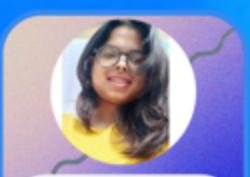
Shivendra Tripathi
Planning and Strategic Assistant



Ayushi Mishra
Editorial Assistant



Kushagra Shukla
Editorial Assistant



Sophiya Singh
Design Assistant



Sejal Gangwar
Publicity and Outreach
Assistant



Abhijeet Srivastava
Publicity and Outreach
Assistant



Abhiyodaya Pandey



Aryan Mangla



Harsh Mishra



Sanskriti Singh



Shailesh Maddhesiya



Shivansh Jaiswal

Second Year MEMBERS



Aastha Singh Sachan



Niraj Kumar



Ayushi Singh



Devansh Tripathi



Manvendra Sharma



Somiya Kumari



Pragyanand Singh



Sonali Rao



Anant Sharan Pandey



Anjali Mishra



Pankaj Rana



Kartikay Singh



Sheetal Singh



Gautam Kumar
Shah



Yashi Agrawal



Prashu Verma



Deepak Kumar



Raghwendra
Tiwari



Yashaswi Sahi



Ankush Gupta

Message from us

"The entire team of CES is overwhelmed to publish our first edition of ALGORICA, a tech-magazine to uplift your technical knowledge and guide you in every aspect. Roadmaps to learn a new language, placement at premium companies, or even keep you up to date about the latest start-up. Feedback would be heartily accepted to make the desired amendments."

-Team CES

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ALGORICA

COMPUTER ENGINEERING SOCIETY

*“The art challenges the technology,
and the technology inspires the art.”*

-JOHN LASSETER



COMPUTER ENGINEERING SOCIETY

MMMU, GORAKHPUR