CITY ENGINEERING COLLEGE

Tech Samachar

"Ideas are the beginning points of all fortunes"

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

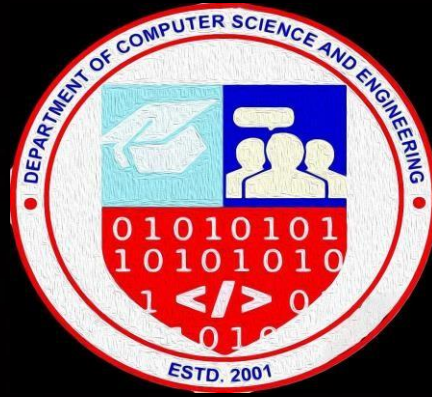# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION

"To contribute to Global Development by producing Knowledgeable and Quality professionals who are Innovative and Successful in advanced field of Computer Science & Engineering to adapt the changing Employment demands and social need "

MISSION

M1: To provide Quality Education for students, to build Confidence by developing their Technical Skills to make them Competitive Computer Science Engineers.

M2: To facilitate Innovation & Research for students and faculty and to provide Internship opportunities

M3: To Collaborate with educational institutions and industries for Excellence in Teaching and Research.

About the Department

The Department of Computer Science & Engineering was started in the year 2001 is known for imparting Quality education and carrying out cutting edge research. In addition to the UG program, PG CSE program and Research facilities for Ph.D. The department offers undergraduate program and has a comprehensive curriculum on topics related to software and hardware with an emphasis on theoretical and practical learning. It has well equipped, state of the art laboratories supported by highspeed Internet and wireless networks.

The students of CSE Department deliver value to the department with a dynamic character and active culture towards learning and delivering through assigned projects guided by faculty. The faculty members are highly qualified experienced and dedicated. All faculty members are masters, some doctorates and few are pursuing their Ph.D. from various reputed universities. All are inspired in delivering top class education blending their research in the area of information technology. The infrastructure of the department provides the student and staff a conducive learning environment.

The Department regularly organizes industrial visits, conferences, workshops, technical talks, project exhibitions for the faculty and students training by using in-house resources as well as industry experts. This helps in effectively bridging the gap between academic and industry.

Editorial Committee

Faculty Members

Prof. Vivekavardhana Reddy, HOD CSE

Dr. Sowmya, Professor, CSE (Alumni)

Prof. Ambika P R , A.P.CSE

Prof. Archana Bhat, A.P. CSE

Prof. Laxmi M C , A.P. CSE

Chairman's Message

Tech Samachar is particularly important as it encourages the students to share the knowledge they have acquired. Writing articles for the Newsletter also improves the communication skills of the budding engineers of the Computer Science and Engineering Department. It is common knowledge thatrepresentation of an idea is as important as, if not more important, than the ideaitself.

Tech Samachar aims to inspire and nurture upcoming Engineers to bring a revolution in this ever-evolving world of Technology. The Newsletter captures the current Technological advancements.

To conclude I would like to congratulate the faculty and the students of the editorial team on bringing out this Issue of Tech Samachar. I am glad to see that they have lived up to the high standards and my best wishes to the students for a bright future.

Dr K. R. Paramahamsa

Chairman, AMC – CITY – BROOKLYN – CAMBRIDGE Group of Institutions

Principal's Message

Congratulations to the students and faculty associated to Newsletter committee for successfully publishing this Issue of Departmental Technical Newsletter Tech Samachar. Tech Samachar is creating platform which provides an opportunity to the students and staff to express their original thoughts on technical topics.

The Newsletter plays an important role in providing exposure to the students to develop written communication skills and command over the language. It is a step towards building professional and ethical attitude in them. The entire journey of creating Tech Samachar is an outcome of rigorous effort made by students and faculty. Students not only gain the knowledge about the latest technological developments and advancements through reading and writing articles but they also develop verbal and written communication skills.

On concluding note, I would like to thank all the stakeholders for their involvement and encouragement and wish All the Best for their bright future.

Dr. Thippe Swamy H N

Principal ,City Engineering College

HOD's Message

This is the Tenth Issue of the Computer Science and Engineering Department Newsletter. Tech Samachar is all about the technology that motivates students to do something, that leaves an eternal mark on the world of Technology. Thus, it was our job to ensure inspiring technological developments are being brought to the students of CEC, by the students of CEC itself.

The work was performed in an organized, almost professional manner and credits to my entire Tech Samachar team, for their admirable job.

I would also like to Thank every member of the Tech Samachar team, without whose contribution, this issue would not have been possible. I hope you enjoy reading this Newsletter as much as I enjoyed working towards its creation and more importantly, I hope that the articles in this magazine inspire you.

Mr. Vivekvardhana Reddy

HOD, Computer Science and Engineering

Editorial

At the outset, on behalf of the entire Computer Science and Engineering Department and all the readers we extend our whole hearted gratitude to our beloved Chairman, Dr. K. R. PARAMAHAMSA, to the honorable principal Dr. Thippe Swamy H N, and also to our HOD, CSE Mr. VIVEKAVARDHANA REDDY for their dynamic, inspirational, enthusiastic contribution and motivation towards ourdepartment also boosting our confidence for the publishing of ninth Issue of the Monthly Newsletter TECH SAMACHAR. This technical newsletter named 'TECHSAMACHAR' signifies an giving out of current technical datum. Team 'TECH SAMACHAR' will always remain grateful for the massive support and interest shown by you all.

Computer Science and Engineering is an ever-expanding field and the power what technology holds today is definitely beyond one's imagination rendering impressive set of ideas. This 10th Issue is full of exciting new technologies and Department achievements. This Newsletter is intended to be published once in a month. Finally, quoting our special thanks to the departmental faculty members and also to all our team members without whom this Issue wouldn't have been possible. We hope all the readers will enjoy this issue as much as we enjoyed creating it Happy Reading!

AMBIKA P R
ARCHANA BHAT
LAXMI M C
A.P. CSE

STUDENT EDITORIAL TEAM

Namratha S
7th Sem

Rahul Mulge
5th Sem

Shalini R
5th Sem

Charan Simha D
5th sem

Iqra Fathima
5th Sem

Mrudula S
5TH Sem

Vivek Goutam
3rd Sem

Karthik AN
7th Sem

Udanka Aarunjain
7th Sem

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Overview of Neural Networks

INTRODUCTION

Artificial Neural Networks (ANN) is inspired by the human brain and it's can be used for machine learning and artificial intelligence. With these networks, various problems can be solved computer-based. The artificial neural network (ANN) is to some extent modeled on the structure of the biological brain. It consists of an abstracted model of interconnected neurons, whose special arrangement and linking can be used to solve computer-based application problems in various fields such as statistics, technology or economics. The neural network is a research subject of Neuro informatics and part of the artificial intelligence. Neural networks must be trained before they can solve problems.
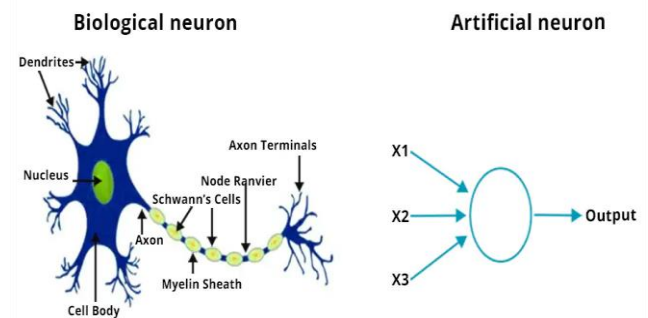

CONSTRUCTION OF A NEURAL NETWORKS

To simplify matters, the structure and operation of a neural network can be described as follows: First, the abstract model of a neural network consists of neurons, also called units or nodes. They can pick up information from outside or from other neurons and pass it on to other neurons or output it as a final result.

Basically, a distinction can be made between input neurons, hidden neurons and output neurons. The input neurons receive information in the form of patterns or signals from the outside world.

The hidden neurons are located between the input and output neurons, and map internal information patterns. The output neurons relay information and signals to the outside world as a result. The different neurons are connected to each other via the so- called edges. Thus, the output of one neuron can become the input of the next neuron. Depending on the strength and meaning of the connection, the edge has a certain weighting. The stronger the weighting, the greater the influence a neuron can exert on the connection to another neuron.
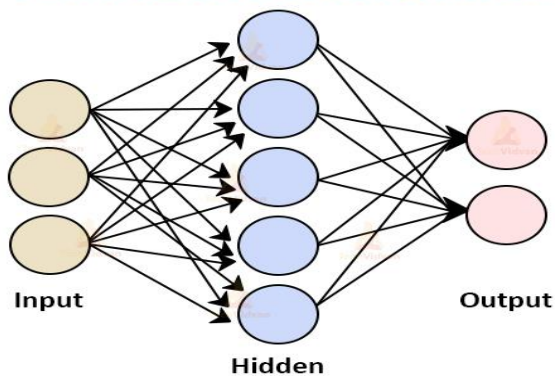

POSITIVE AND NEGATIVE WEIGHTS

There are positive and negative weights that are an exciting or inhibiting influence. If the weight is zero, one neuron exerts no influence over the connection on the other neuron. The knowledge and thus the artificial intelligence of a neural network are ultimately stored in the connections and their weightings. The number of neurons and neuronal layers as well as the connectivity of the neurons of different layers determines the complexity (the depth) of the neural network and its ability to solve problems.

During the training of the neural network, i.e. the learning, the weightings of the connections change, depending on the applied learning rules and obtained results. The number of neurons in an artificial neural network is theoretically unlimited. However, with the number of neurons and the existing layers and connections, the required computing power for training and operation increases.

TYPICAL STRUCTURES OF NEURAL NETWORKS

Neural networks can have a variety of different structures whose description would go beyond the scope of this definition. In principle, a distinction is possible in feed forward networks and recurrent networks. In feed forward networks, the information flow takes place only forward-directed from the input neurons via the hidden neurons to the output neurons. In recurrent networks, there are connections in which information can traverse backwards and forward through certain network neuron connections. These networks are also referred to as feedback networks or feedback neural networks.

Architecture of Artificial Neural Network

TYPICAL APPLICATIONS OF NEURAL NETWORKS

Neural networks are used in many areas. They are predestined for applications in which there is little systematic solution knowledge and a large amount of sometimes imprecise input information must be processed to a concrete result. Areas of application are, for example, speech recognition or image recognition. Neural networks can also create simulations and predictions for complex systems and relationships, such as in weather forecasting, medical diagnostics or business processes.

Typical applications of artificial intelligence and neural networks are:

- ❖ Image recognition
- ❖ Voice recognition
- ❖ Pattern recognition
- ❖ Speech synthesis
- ❖ Handwriting recognition
- ❖ Control of complex processes
- ❖ Forecasts for complex systems
- ❖ Early warning systems
- ❖ Time series analysis
- ❖ Machine-based translation
- ❖ Simulations of complex systems
- ❖ Biometric systems
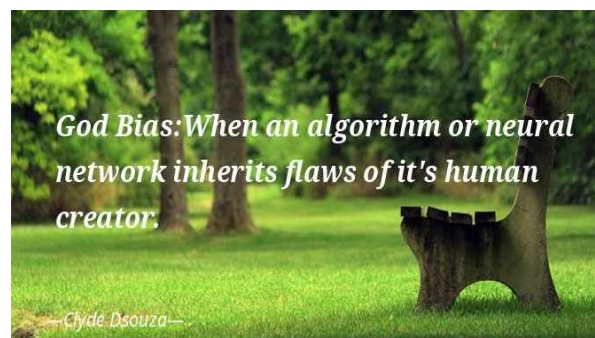- ❖ Economic models and more

NEURAL NETWORK TRAINING

Before a neural network can be used for the intended problem or task, it must first be trained. Based on given learning material and learning rules, the neural network weights the connections of the neurons until it has developed certain "intelligence". The learning rules dictate how the learning material alters the neural network. In principle, a distinction can be made between supervised learning and unsupervised learning. In supervised learning, a concrete result of the different input options is given. On the basis of the constant comparison between the target and actual results, the network learns to connect the neurons appropriately. Unattended learning gives no result. The learning process is based solely on the information of the many different patterns entered. The neural network only makes the changes based on the input patterns. There are various learning rules for this purpose, such as adaptive resonance theory or Hebb's learning rule.

By

Dr. Sowmya
Professor, Dept. of CSE

God Bias:When an algorithm or neural network inherits flaws of it's human creator.

—Clyde Dsouza—

TOP 10 PROGRAMMING LANGUAGES TO LEARN FOR BETTER JOB OPPORTUNITIES IN 2022

These programming languages will help you get better jobs

Programming languages are computer languages that are used by programmers (developers) to communicate with computers. It is a set of instructions written in any specific language (C, C++, Java, Python) to perform a specific task. A programming language is mainly used to develop desktop applications, websites, and mobile applications. Here are the top languages that will be most popular in 2022.

Java

Built-in 1991 by James Gosling, Mike Sheridan, and Patrick Naughton as the language 'Oak', Java was the first language to have a big global impact. While the new programming language used the same format as C/C++, it incorporated certain new ideas to make it more appealing to more people. Java runs on the principle of "Write Once, Run Anywhere" – implying that systems with varying hardware and OS configurations can run Java programs with ease.

Java also has a wide variety of libraries and frameworks which utilize Java under the hood. Java is used for app development through Spring and Hibernate. JUnit helps us set up unit tests for our Java projects. Most importantly, Java is being used in the development of native Android applications (the Android SDK is itself powered by the Java Development Kit or the JDK). Java is probably the language that most people were introduced to as part of an introductory computer programming course in college or in school. Java is the language used for teaching object-oriented programming to the masses.

Java is also highly respected in the field of analytics and research. The only problem with Java is that there are very few support packages and projects for the language at present.

There's very little community involvement – something that most mainstream languages have. Despite that, Java is a language that is very easy to pick up and learn – partly explaining the appeal for the language. However, it does take some time for one to attain some form of mastery over the language.

Python

Python was built by Guido van Rossum in the late 1980s in the Netherlands. Initially built as a competitor for Java in the industry, Python slowly shot forward in popularity. Currently, Python has built huge popularity among both the researcher as well as the developer community. Python sits at the top of the language ranking for the IEEE Spectrum, having a score of a perfect 100. Moreover, Python also commands respect and has a support percentage of 44.1%.

Python is suitable for pretty much anything. You have Django and Flask which can be utilized for web development, while scientific tools like Jupyter and Spyder are used for analysis and research purposes. If you're into automation, Selenium is out there to help you! The flexibility of the language allows Python to be used pretty much anywhere. These, by far, are the more popular products of Python. Python's huge support base (second only to that of JavaScript) produces tons of packages, frameworks, and even full-fledged open-source software using the language.

Python probably has the largest support for data science and machine learning in general. While there are other languages like R and MATLAB which do offer competition, Python's the strict ruler of the data science space. A majority of the frameworks and libraries used in machine learning are made in Python only, making it probably the best language to pick up if one wants to learn about machine learning (or data science in general).

JavaScript

JavaScript is pretty much the industry leader at this point. Built originally as a scripting language for Netscape

Navigator (one of the best browsers back in the day) in 1994, JavaScript's ascent to greatness has been swift.

It wasn't until 2008 that modern-day JavaScript was devised by Google when they built the V8 engine for Google Chrome. Originally built as a competitor to Java by Netscape, JavaScript now commands a space of its own in the development sphere. JavaScript is widely favored as the "language of the internet" because of its popularity. JavaScript enjoys the highest support amongst developer communities – as high as 67.7%. In general, JavaScript is suitable for any kind of development activities like mobile app development, web development, desktop app development, and so on.

JavaScript has a wide variety of libraries and frameworks which can be utilized during development. There's Angular, Vue, and React for frontend development, while Node.js is a very flexible language for working on the backend. Jest and Mocha are two flexible tools that help set up unit tests to check if the functionality is working as intended or not. Of course, if you're not very comfortable with either of these, you can just go for vanilla HTML, CSS, and JavaScript for the frontend – it's that simple! Because of the enormous support from developers around the world, JavaScript has the largest number of support packages that any language can boast about. Despite that, people continue to build more and more packages to add to the ease of using the language.

C++

Perhaps one of the most shocking answers that one can expect in this article is C++. Despite being the language that most people use to learn the concepts of data structures and algorithms, the language itself finds little usage in the practical world. First created by Bjarne Stroustrup as an extension of the C programming language in 1982, C++ went on to make a name for itself in the years to come. C++ finds use in analytics, research as well as in game development. The popular game development engine – the Unreal Engine – uses C++ as the scripting language for all of the functionality one can define while building a game. C++ also finds extensive use in software development. Being mid-way between the object-oriented approach and the method-oriented approach allows C++ to be flexible in the nature

of software that can be produced using it.

Being located 4th in the TIOBE index signifies that C++ continues to have an appeal to this day.

C++ is also extensively used in system software development, being easier to understand than other languages. The main reason for using C++ in a sensitive area like the OS is that C++ programs have a very low compilation time.

C++ probably has the largest learning community among all of the languages. Most students would start their algorithms courses building trees, linked lists, stacks, queues, and numerous other data structures in C++. Naturally, it is quite easy to pick up and learn as well as easy to master if one pays attention to details.

CUDA-C

CUDA-C is one of the top programming languages used by game developers to build desktop games. When it comes to gaming, CUDA-C cores make your game appear more realistic by presenting high-resolution visuals that create a profound 3D impression. You will also examine that your games are more lifelike, with better lighting and colors.

HTML

HTML is a popular platform for creating cross-platform and cross-browser applications and games, according to game developers. It can also be utilized interchangeably with JavaScript. HTML is a simple to learn programming language and does not need extensive programming understanding of algorithms, making it a prominent choice among game designers.

TypeScript

TypeScript is the superset of JavaScript and has almost the same applications as JavaScript. TypeScript can be used in web development, mobile app development, desktop app development, and so on. TypeScript is the second most popular language as mentioned by Stack Overflow's list of most loved languages, being loved by 67.1% of developers (being second only to Rust).

By,

Mrs. Shashikala H.C

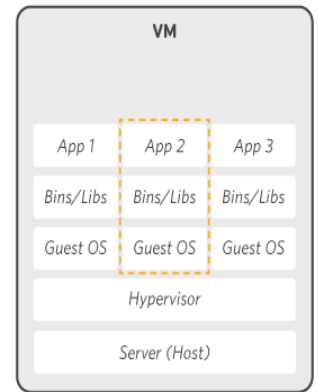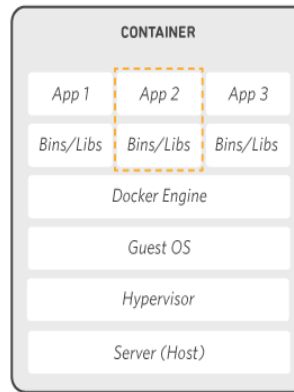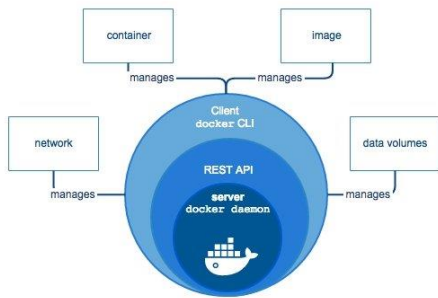Assistant Professor & Head of Placement and Training.

Docker

Docker is a software platform that allows you to build, test, and deploy applications quickly. Docker packages software into standardized units called containers that have everything the software needs to run including libraries, system tools, code, and runtime. Using Docker, you can quickly deploy and scale applications into any environment and know your code will run.

Running Docker on AWS provides developers and admins a highly reliable, low-cost way to build, ship, and run distributed applications at any scale. Recent announcements: Docker collaborates with AWS to help developers speed delivery of modern apps to the cloud. This collaboration helps developers use Docker Compose and Docker Desktop to leverage the same local workflow they use today to seamlessly deploy apps on Amazon ECS and AWS Fargate.
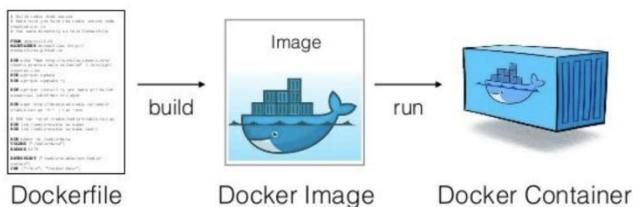
How Docker works?

Docker works by providing a standard way to run your code. Docker is an operating system for containers.

Similar to how a virtual machine virtualizes (removes the need to directly manage) server hardware, containers virtualize the operating system of a server.

Docker is installed on each server and provides simple commands you can use to build, start, or stop containers. AWS services such as AWS Fargate, Amazon ECS, Amazon EKS, and AWS Batch make it easy to run and manage Docker containers at scale.

Why use Docker?

Using Docker lets you ship code faster, standardize application operations, seamlessly move code, and save money by improving resource utilization. With Docker, you get a single object that can reliably run anywhere. Docker's simple and straightforward syntax gives you full control. Wide adoption means there's a robust ecosystem of tools and off-the-shelf applications that are ready to use with Docker.

When To Use Docker?

You can use Docker containers as a core building block creating modern applications and platforms. Docker makes it easy to build and run distributed microservices architectures, deploy your code with standardized continuous integration and delivery pipelines, build highly-scalable data processing systems, and create fully-managed platforms for your developers. The recent collaboration between AWS and Docker makes it easier for you to deploy Docker Compose artifacts to Amazon

ECS and AWS Fargate.

Using Docker, you can quickly deploy and scale applications into any environment and know your code will run. You can do this because Docker packages software into standardized units called containers that have everything the software needs to run including libraries, system tools, code, and runtime.

Docker Image

A Docker image is a read-only template that defines your container. The image contains the code that will run including any definitions for any libraries and dependencies your code needs. A Docker container is an instantiated (running) Docker image. AWS provides Amazon Elastic Container Registry (ECR), an image registry for storing and quickly retrieving Docker images.

Dockerfile → build → Docker Image → run → Docker Container

Should You Use Docker?

Docker is one of several different container platforms. So, why would choose it over other container solutions? Well, first, Docker is, far and away, the most widely used container service. It's popularity rests squarely on the fact that it's a robust, secure, cost-effective, and feature-rich solution that's easier to deploy than any of its competitors. Second, it's an open-source solution that's backed by a large community of companies and individuals who are continually contributing to the project. It offers strong support and a large ecosystem of complementary products, service partners, and third-party container images and integrations. Moreover, selecting Docker won't tie you to a specific vendor.

Finally, the Docker platform allows you to run its containers on Windows. This is made possible by a Linux virtualization layer, which sits between the Windows OS and the Docker runtime environment. In addition to Linux container environments, Docker for Windows also supports native Windows containers.
Although alternatives are now gradually maturing, when one looks across the container landscape, Docker

still leads the way and remains the best choice for the majority of use cases. But before you decide whether Docker is right for you, here are the key concepts you'll need to understand in advance of getting started with the Docker platform:

1. Docker Engine
This is the application you install on your host machine to build, run, and manage Docker containers. As the core of the Docker system, it unites all of the platform's components in a single location.

2. Docker Daemon
The workhorse of the Docker system, this component listens to and processes API requests to manage the various other aspects of your installation, such as images, containers, and storage volumes.

3. Docker Client
This is the primary user interface for communicating with the Docker system. It accepts commands via the command-line interface (CLI) and sends them to the Docker daemon.

4. Docker Image
A read-only template used for creating Docker containers. It consists of a series of layers that constitute an all-in-one package, which has all of the installations, dependencies, libraries, processes, and application code necessary to create a fully operational container environment.

5. Docker Container
A living instance of a Docker image that runs an individual microservice or full application stack. When you launch a container, you add a top writable layer, known as a container layer, to the underlying layers of your Docker image. This is used to store any changes made to the container throughout its runtime.

6. Docker Registry
A cataloging system for hosting, pushing, and pulling Docker images. You can use your own local registry or one of the many registry services hosted by third parties (e.g., Red Hat Quay, Amazon ECR, Google Container Registry, and the Docker Hub). A Docker registry organizes images into storage locations, known as repositories, where each repository contains different versions of a Docker image that share the same image name.

By,

Mr. Ramesh B

Assistant Professor, Dept. of CSE

5G MOBILE TECHNOLOGY

5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra-low latency more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Broadly speaking, 5G is used across following

Enhanced mobile broadband:5G mobile technology can usher in new immersive experiences such as VR and AR with faster, data rate, latency etc.

Mission-critical communications:5G can enable new services that can transform industries

Massive IoT:5G is meant to seamlessly connect a massive number of embedded sensors in virtually everything.

INVENTION OF 5G:

The first nation to adopt on a large scale was South Korea, in April 2019, at which point there were some 224 operators in 88 countries around the world investing in the technology.

In South Korea, all the 5G carriers used Samsung, Ericsson and Nokia base stations and equipment, apart from one who used Huawei equipment. Of these suppliers, Samsung was the largest, having shipped 53,000 base stations from a total of 86,000 base stations installed in the country at the time.

EVOLUTION OF 5G:

First generation - 1G1980s: 1G delivered analog voice.

Second generation-2G Early 1990s: 2G introduced digital voice (e.g., CDMA-Code Division Multiple Access).
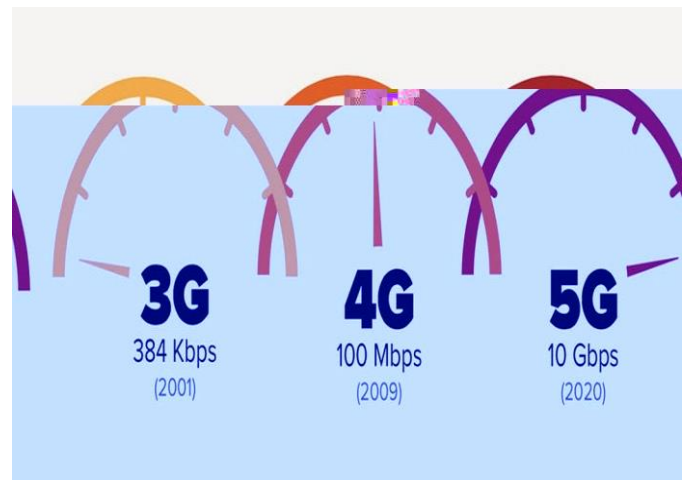
Third generation - 3G
Early 2000s: 3G brought mobile data (DMA2000).

Fourth generation - 4G LTE

2010s: 4G LTE ushered in the era of mobile broadband.

1G, 2G, 3G, and 4G all led to 5G, which is designed to provide more connectivity than was ever available before.

5G is a unified, more capable air interface. It has been designed with an extended capacity to enable next-generation user experiences, empower new deployment models and deliver new services. With high speeds, superior reliability and negligible latency, 5G will expand the mobile ecosystem into new realms. 5G will impact every industry, making safer transportation, remote healthcare, precision agriculture, digitized logistics and more a reality.

ADVANTAGE OF 5G OVER 4G

The most evident advantage of 5G networks over 4G is the speed of the network. However, there are also advantages relating to reduced latency – meaning faster response times as well as fast download speeds. This opens up a wealth of potential applications across industry due to improved operational efficiency.

Latency is the delay between a command being issued and the response being received. 3G has a 65-millisecond latency, advanced 4G is around 40 milliseconds of latency, while fixed broadband has a latency of between 10-20 milliseconds. By comparison, 5G is expected to operate with as little as 1 millisecond of latency, allowing mission-critical and Internet-of-Things applications to operate below the 4-millisecond target for an enhanced mobile broadband service.

This means, for example, that it would take between 4 and 40 seconds to download a full HD film on 5G, as compared to over 7 minutes on 4G and over a day with 3G.

IS THE WORLD READY TO USE 5G?

While 5G services have already started to be rolled out in countries like the US and South Korea, this is only in a limited form with limited coverage right now. Meanwhile, in the UK, 5G is still in its early stages. However, the technology rollout is set to continue through 2020, with more places being prepared.

So, at the moment, the world is not ready, but steps are being made to spread the technology.5G looks set to revolutionize a wide range of products, services and industries. While the technology will offer performance increases for mobile technology

5G is also being trialled with artificial intelligence and holographic technologies, while it is also being tested for the world's first 5G television. Other entertainment-related uses include the deployment of the new networks to provide coverage at festivals and sporting events. Transport is also set to be revolutionized, including developments in connected cars and the advent of autonomous transport

CONSUMERS USE

The average consumer is expected use close to 11 GB of data per month on their smartphone in 2022.2 This is driven by explosive growth in video traffic as mobile is increasingly becoming the source of media and entertainment, as well as the massive growth in always-connected cloud computing and experiences.

4G completely changed how we consume information. In the past decade we have witnessed leaps and bounds in the mobile app industry around services such as video streaming, ride sharing, food delivery and more.

5G will expand the mobile ecosystem to new industries. This will contribute to cutting-edge user experiences such as boundless extreme reality (XR), seamless IoT capabilities, new enterprise applications, local interactive content and instant cloud access, to name a few.

BUSINESS USE

With high data speeds and superior network reliability, 5G will have a tremendous impact on businesses. The benefits of 5G will enhance the efficiency of businesses while also giving users faster access to more information.

For example, smart factories could use 5G to run industrial Ethernet to help them increase operational productivity and precision. At Verizon's 5G Labs, we're partnering with innovators from startups, universities and enterprise teams on breakthroughs in public safety, gaming, education, retail and many other applications.

Together, we're rethinking what's possible in a 5G world.

5G SHAPE FUTURE TECHNOLOGY

The first and most evident advantage is that it is faster and more reliable than 4G or 3G. While this means that you will be able to download a movie on your 5g home broadband in a matter of seconds, or stream a 4K film without buffering, there will also be an improvement in virtual and augmented reality applications. Due to 5G's high capacity and low latency, advanced processing will be able to be handled remotely rather than relying on mobile devices and headsets for local handling.

This greater capacity will enable a growth of Internet of Things devices, with goods including refrigerators, lights, cars and even advertising

hoardings being able to connect and communicate with one another. While Internet of Things devices are already taking hold in the market, 5G will improve the speed and capacity whereby almost every device could become connected and 'smart.'

Autonomous vehicles are not the only technology that will critically use 5G, as remote surgery would also be made possible with doctors being able to control medical robots to perform procedures from anywhere in the world.

As previously mentioned, there has already been a successful trial of an excavator being controlled across continents, but 5G looks set to transform the world of industry through the ability to monitor and control robots, drones and entire factories in real time and with a greater degree of connectivity.

Where is 5G being used?

Broadly speaking, 5G is used across three main types of connected services, including enhanced mobile broadband, mission-critical communications, and the massive IoT. A defining capability of 5G is that it is designed for forward compatibility—the ability to flexibly support future services that are unknown today.

Enhanced mobile broadband

In addition to making our smartphones better, 5G mobile technology can usher in new immersive experiences such as VR and AR with faster, more uniform data rates, lower latency, and lower cost-per-bit.

Mission-critical communications

5G can enable new services that can transform industries with ultra-reliable, available, low-latency links like remote control of critical infrastructure, vehicles, and medical procedures.

Massive IoT

5G is meant to seamlessly connect a massive number of embedded sensors in virtually everything through the ability to scale down in data rates, power, and mobility—providing extremely lean and low-cost connectivity solutions.

Is 5G available now?

Yes, 5G is already here today, and global operators started launching new 5G networks in early 2019. Also, all major phone manufacturers are commercializing 5G phones. And soon, even more people may be able to access 5G.

5G has been deployed in 60+ countries and counting. We are seeing much faster rollout and adoption compared with 4G. Consumers are very excited about the high speeds and low latencies. But 5G goes beyond these benefits by also providing the capability for mission-critical services, enhanced mobile broadband and massive IoT. While it is hard to predict when everyone will have access to 5G, we are seeing great momentum of 5G launches in its first year and we expect more countries to launch their 5G networks in 2020 and beyond.

By,

Ms. Durgadevi M S
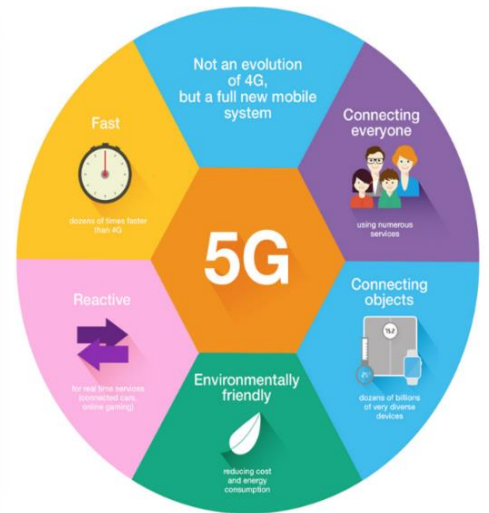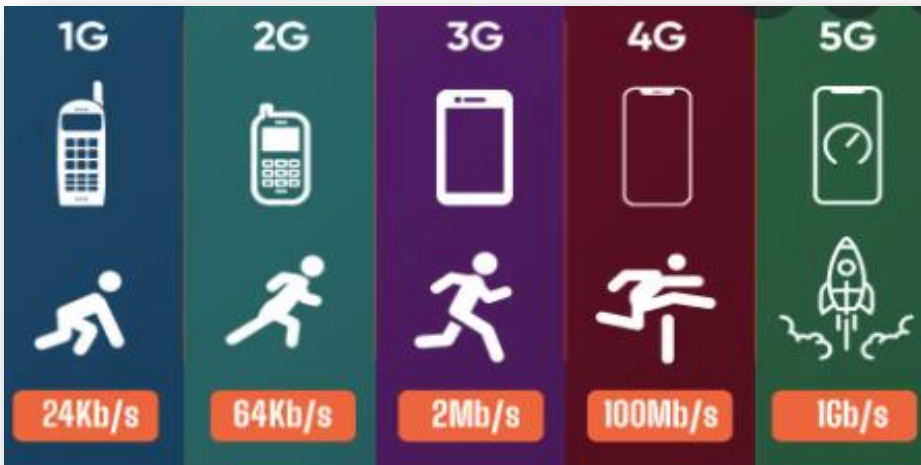
7Th Sem "A" Section

1G to 5G Technology

1G TECHNOLOGY–

2G TECHNOLOGY

3G TECHNOLOGY

4G Technology

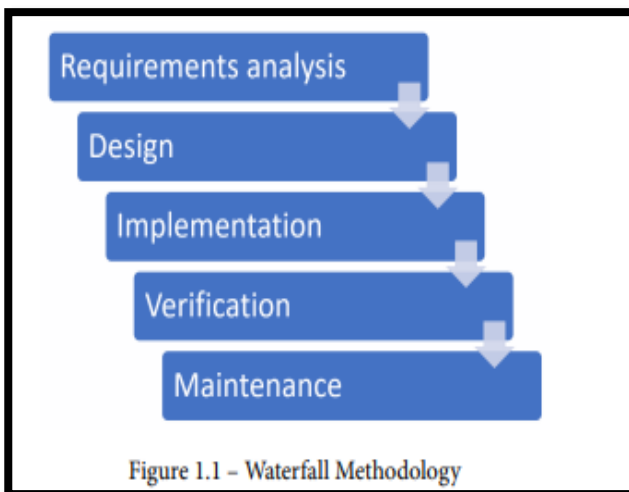The most-awaited technological shift to transform the world is here.

Azure DevOps overview for Beginners

Introduction to DevOps

DevOps has paved the way for faster and more agile software development processes by unifying teams, processes, and technologies to create an ever-evolving software development lifecycle (SDLC). This has led to more robust and efficient SDLCs, now capable of handling any user request, market demand, or technological issue.

A range of tools is available in the market to facilitate DevOps, such as CI/CD tools, version control systems, artifact repositories, IaC tools, and monitoring tools. With the increased demand for cloud-based technologies, DevOps tools have also transitioned to cloud offerings.

These cloud offerings can be used by teams spread across the world with nearly unlimited scalability and efficiency. In this article, we will explore such a cloud-based DevOps service offered by Microsoft called AzureDevOps.

Figure 1.1 – Waterfall Methodology

The Waterfall Methodology is well suited for projects in the following circumstances:

• Early in the development life cycle, customers and developers agree on what will be delivered, with minimal to no changes during the development of the project.

• For integration with external systems, it is common for multiple components of the software to be designed in parallel. In these cases, it is desirable to have the design document complete at an early stage in the development life cycle

. • Various team members are involved in other projects simultaneously as well. For example, business analysts can gather the requirements and create the design while developers are working on another project.

• Where it is not possible to break down the requirements phase, customers are not fully engaged in smaller deliverables.

The following diagram illustrates the different parts that DevOps consists of:

Figure 1.2 – DevOps methodology

It is a team-based and iterative approach to development where all stakeholders, such as developers, administrators, testers, and a representative of the customer, are part of the same team. Applications are delivered in functional components, and rather than creating schedules and tasks at the start of the project, the project is divided into smaller phases, called sprints. The duration of each sprint is defined up front and has a list of deliverables that are planned at the start of each sprint.

Understanding DevOps principles

There are a lot of different definitions when it comes to DevOps. Most of them are good at explaining the different aspects of finding the right flow in delivering software and IT projects. In the upcoming sections, we will highlight six DevOps principles that we think are essential when adopting a DevOps way of working.

Principle 1 – Customer-centric action

Nowadays, it is important that software development projects have short cycles and feedback loops, with end users and real customers integrated into the team. To fully meet the customers' requirements, all activity around building software and products must involve these clients

Principle 2 – Create with the end in mind

Organizations need to act more like product companies. They should focus more on building working products that are sold to real customers. This engineering mindset needs to be shared by all employees.

Principle 3 – End-to-end responsibility

In most traditional software development projects, the software and services that are developed are handed over to operations, where they then deploy and maintain those solutions after the initial development process.

Principle 4 – Cross-functional autonomous teams

Organizations that work with vertical and fully responsible teams will need to let these teams work completely independently throughout the whole life cycle. To enable these teams to work completely independently, a broad and balanced set of skills are required.

Principle 5 – Continuous improvement

Another part of end-to-end responsibility is that, for organizations, it is important to adapt changes continuously. There can be a number of changing circumstances, such as new technology that has been released, changing customer requirements, and so on.

Principle 6 – Automate everything

To fully adopt and embed a continuous improvement culture inside an organization, most organizations have a lot of waste and tech depth to eliminate.

To work with high cycle rates and to process the instant feedback from customers and end users as soon as possible, it is imperative to automate everything.

Introducing Azure DevOps key concepts

Azure DevOps provides a wide variety of services for DevOps teams so that they can plan, work, collaborate on code development, and build and deploy software and services. Most DevOps teams rely on several tools and build custom toolchains for each phase in the application life cycle.

The following diagram shows the phases that are defined in the application life cycle:
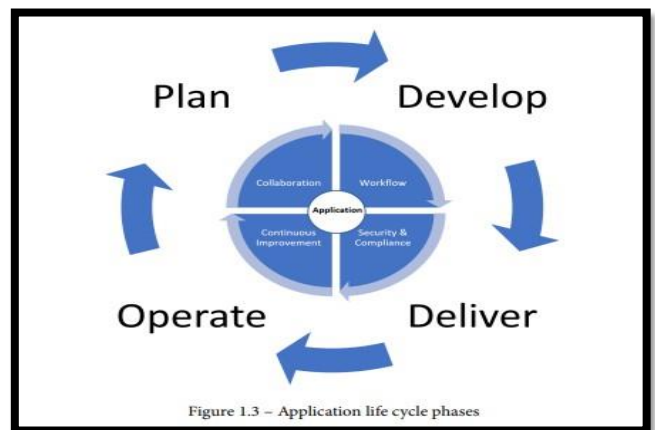

Figure 1.3 – Application life cycle phases

In the following sections, we'll explain these phases and the corresponding Microsoft tooling and products in more detail

Plan

During the planning phase, teams can use Kanban boards and backlogs to define, track, and lay out the work that needs to be done in Azure Boards. They can also use GitHub for this. In GitHub, an issue can be created by suggesting a new idea or stating that a bug should be tracked. These issues can be organized and assigned to teams.

Develop

The development phase is supported by Visual Studio Code and Visual Studio. Visual Studio Code is a cross- platform editor, while Visual Studio is a Windows- and Mac-only IDE. You can use Azure DevOps for automated testing and use Azure Pipelines to create automatic builds for building the source code. Code can be shared across teams with Azure DevOps or GitHub.

Deliver

The deliver phase is about deploying your applications and services to target environments. You can use Azure Pipelines to deploy code automatically

to any Azure service or on-premises environments. You can use Azure Resource Manager templates or Terraform to spin up environments for your applications or infrastructure components. You can also integrate Jenkins and Spinnaker inside your Azure DevOps Pipelines.

Operate

In this phase, you implement full-stack monitoring for monitoring your applications and services. You can also manage your cloud environment with different automation tools, such as Azure Automation, Chef, and more. Keeping your applications and services secure is also part of this phase. Therefore, you can use features and services such as Azure Policy and Azure Security Center.

To support the full life cycle of analyzing, designing, building, deploying, and maintaining software and infrastructure products and services, Azure DevOps provides integrated features that can be accessed through any web browser. Azure DevOps offers a combination of solutions and tooling that can be used to create unique and custom workflows throughout each of the application life cycle phases. These solutions will be described in the upcoming sections.

Continuous integration and continuous delivery (CI/CD)

You can automate each DevOps process with CI/CD (and continuous deployment) in Azure DevOps. CI is used in the development phase of a project and refers to building and testing code in a fully automated way. Every time you commit changes to the master branch, the changes will be validated and then packaged into a build artifact automatically. With CD, the delivery phase is automated. Every time a build artifact is available, the artifact is automatically deployed to the desired environment. When continuous integration and continuous deployment are both used by development teams, the code remains ready for production at any time. The only thing that teams must do to deploy a working application into production is trigger the transition from development to deploy. This will make the automated build artifact available for deployment. This triggering can be as simple as pressing a button.

Agile development support

Azure DevOps supports teams that adopt Agile development methods with planning, tracking, and reporting capabilities. This will result in shorter release cycles and full visibility in the software development process. You can use Azure Boards, which will be covered in more detail in the next section of this chapter, to manage backlogs and define, assign, and track work items. You can also use advanced analytics and reporting and create custom dashboards to track progress
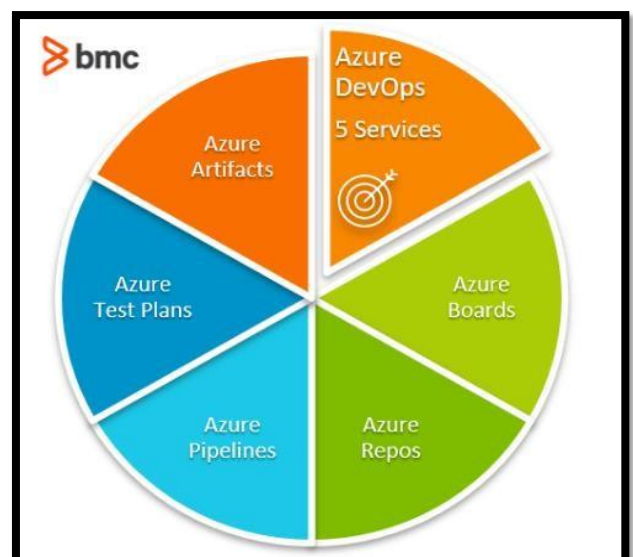
Version control

A version control system, also known as a source control system, is an essential tool for multi-developer projects. It allows developers to collaborate on the code and track changes. The history of all the code files is also maintained in the version control system. This makes it easy to go back to a different version of the code files in case of errors or bugs. Azure DevOps supports two different types of source control: Git (distributed) and Team Foundation Version Control (TFVS)

Discovering Azure DevOps services

Azure DevOps services include:

- Azure Boards
- Azure Pipeline
- Azure Repos
- Azure Test Plans
- Azure Artifacts

Azure Boards

The Boards service in Azure DevOps is the management hub of the project.

Boards can be used to plan, track, and collaborate between team members. With Azure, the Boards team can create Work items, Kanban boards, backlogs, dashboards, and custom reports to track all aspects of the project. You can also customize boards to suit the exact workflow requirements and gain meaningful insights through built- in reporting and monitoring tools. Additionally, Azure Boards comes with first-party integrations with services like Microsoft Teams and Slack, which enables efficient ChatOps.

Figure 1.4 – Azure Boards

Azure Repos

The Azure Repos are code repositories that enable users to manage their codebases. These are private and cloud- based repositories that support both Git and TFVC version control systems. Azure Repos can support projects of any scale, from individual hobby projects to enterprise developments. They also consist of the following features:

• Support for any Git client (IDE, Text Editor, CLI)

• Semantic code search

• Collaboration tools to interact with other team members

• Direct integration with CI/CD tools

Azure Pipelines

Pipelines are the CI/CD tool that facilitates automated building, testing, and deployment. Azure Pipelines supports any programming language or platform
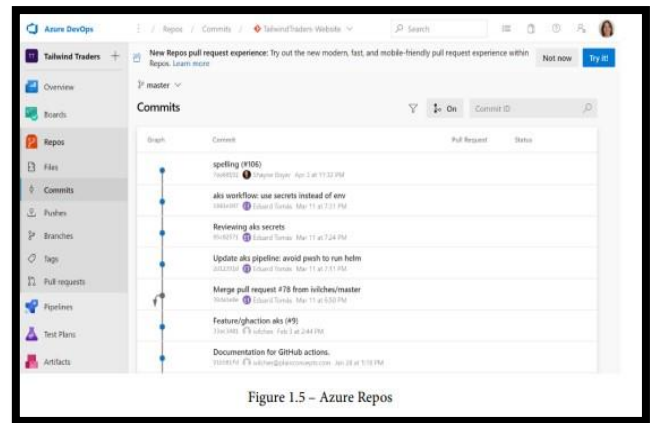

Figure 1.5 – Azure Repos

which enables users to create pipelines that support Windows, Linux, and macOS using cloud-hosted agents. These pipelines are easily extensible through the extensions available in the marketplace. Besides, they support advanced workflows that can be used to facilitate:

• Multi-phase builds

• Test integrations

• Custom reporting functions

On top of that, Azure Pipelines provide native container support, enabling them to push containers to container registries from the pipeline directly.

The pipelines offer flexibility to deploy to multiple environments from Kubernetes clusters to serverless functions and even deploy to other cloud providers such as AWS or GCP.
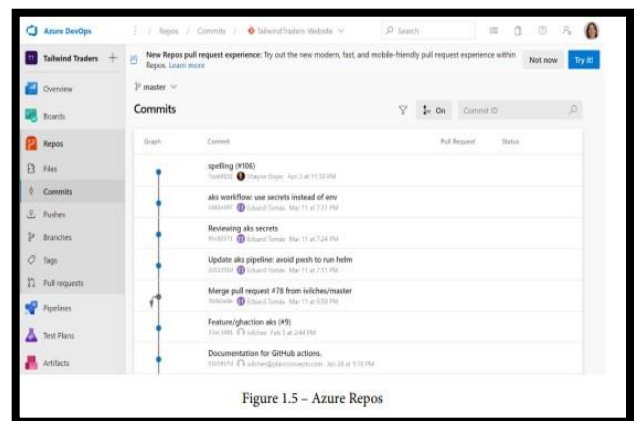

Figure 1.5 – Azure Repos

Azure Test Plans

Test Plans is the Azure DevOps service that allows users to integrate a cloud-based testing platform to manage all the testing requirements such as:

Planned manual testing

User acceptance testing (UAT)

Exploratory testing

Gathering feedback from stakeholders

Azure Test Plans allow users to create test plans and execute test cases within a pipeline. This can be combined with Azure Boards to create a test that can be executed from the Kanban boards and plan and author tests collaboratively.

Test Plans support creating UAT plans for user acceptance testing and assign users from the DevOps platforms. It also supports the Test and Feedback browser extension to easily enable exploratory testing for interested parties without utilizing third-party tools. Furthermore, Test Plans enable users to test on any platform while having end-to-end traceability and powerful data gathering tools to diagnose any remedy identified issues. It is the only service in Azure DevOps with no free tier due to its rich toolset that is only accessible for commercial users.
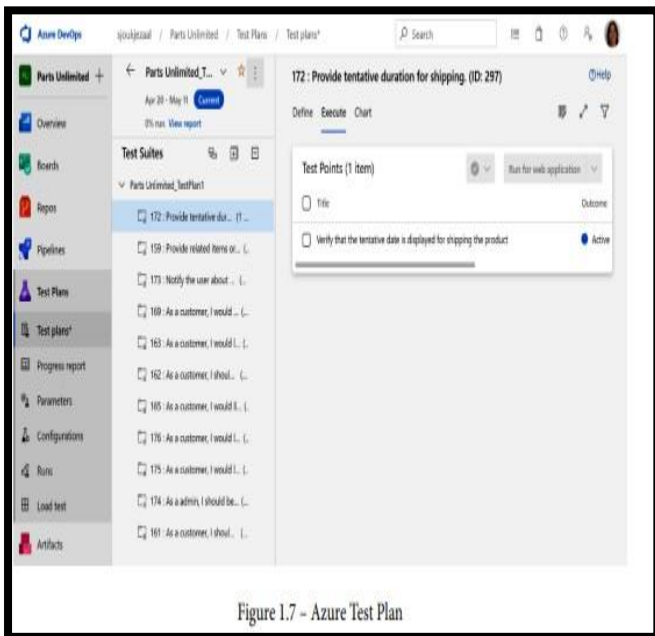

Figure 1.7 – Azure Test Plan

Azure Artifacts

This is the artifact library service by Azure DevOps that can be used to create, store, and share packages (development artifacts). Azure Artifacts enable users to integrate fully featured package management functionality to CI/CD pipelines.

Moreover, Azure Artifacts enable users to manage all package types like npm, Maven, etc., and keep them organized in a central library scoped only to the specific project.
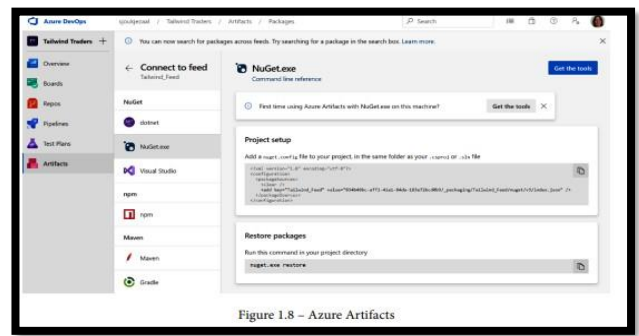

Figure 1.8 – Azure Artifacts

Azure offers cloud-based DevOps services

Azure DevOps is one of the leading cloud-based DevOps services that offer a robust and feature-rich toolset to create and manage a complete DevOps process. It enables users to:

Cater to any DevOps need regardless of the programming language, technology, or the targeted platform.

Deploy anywhere from containers to third-party clouds.

Azure DevOps facilitates all these with unparalleled scalability and availability without the hassle of maintaining specific software to carry out separate DevOps tasks.
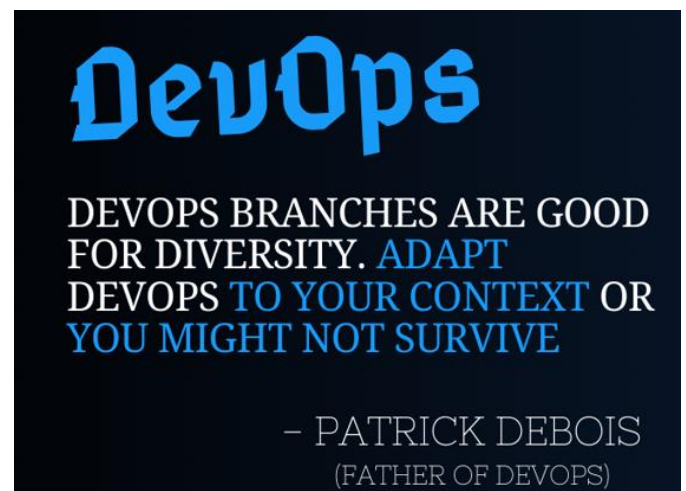

By.

Mr. Chiranjeevi M

Batch:2019-2020

DevOps Engineer

DEVOPS BRANCHES ARE GOOD FOR DIVERSITY. ADAPT DEVOPS TO YOUR CONTEXT OR YOU MIGHT NOT SURVIVE

– PATRICK DEBOIS
(FATHER OF DEVOPS)

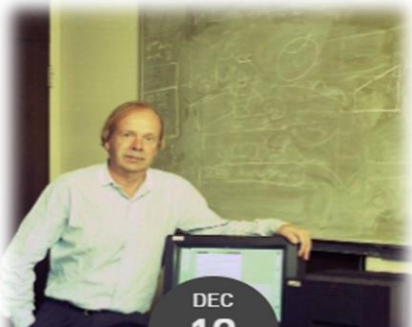**DEC 03 1968**
CDC Announces 7600 Supercomputer

DEC 04 1985
Cray X-MP Supercomputer Begins Operation

DEC 12 1980
Apple Computer's Initial Public Offering

DEC 13 1991
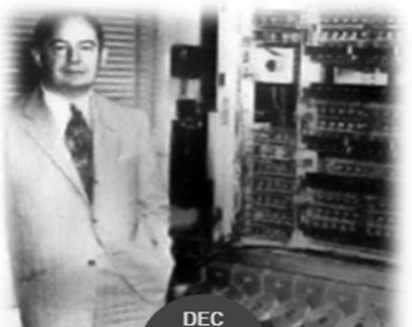Stanford Linear Accelerator Center Launches First Web
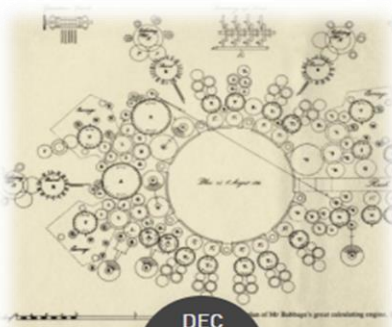
DEC 18 1991
IBM and Siemens AG Announce 64M DRAM Chip

DEC 26 1982
Time magazine Names a Non-Human "Man of the Year"

DEC 28 1903
John von Neumann Born

DEC 26 1791
Charles Babbage Born

DEC 30 2004
Facebook Registers One Millionth User

ACTIVITIES

CITY
ENGINEERING
COLLEGE
ART'S DAY
Coordinators

Nandish AC   Nandini S B   Surendranatha Cowda

Sangeetha   Rakesh M
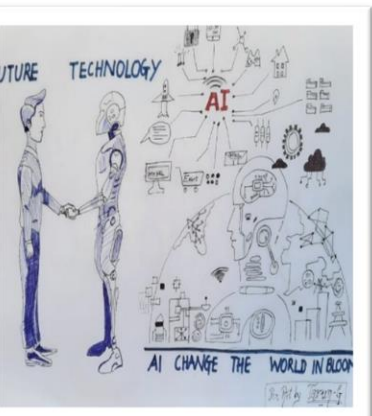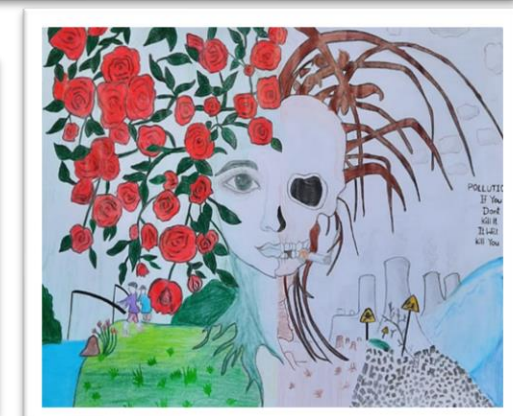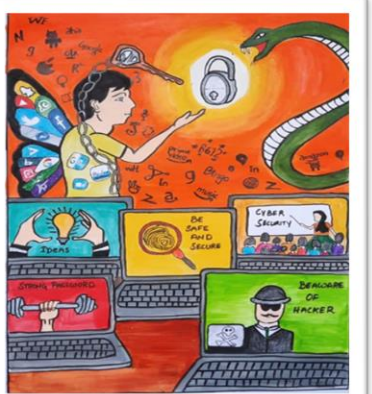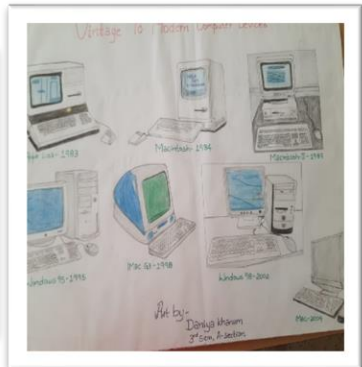
CONGRATULATIONS

TO WINNERS

1St Prize
Bhanuprakash R -5th Sem

2nd Prize
Deepthi S -3rd Sem

3rd Prize
Ashwini S -5th Sem

FIRST YEAR 2021-2025 BATCH

Mrs. Swethashree R N, Asst. professor from Dept. of CSE has participated one-week AICTE-VTU joint Training Programme for Teachers on "**An Overview of Teaching Techniques in Innovation and Design Thinking**" on 6th to 10th December 2021.

Mrs. Ambika P.R, Asst. professor from Dept. of CSE has participated one- week online FDP entitled "**Bare Metal Programming and Real Time Operating System Programming**" from 13th to 17th Dec, 2021.

Congratulations

To 2020–21 Batch for getting placed in Campus placement

Priya G. 1CE17CS091
Sapphire

Shravani. 1CE17CS118
Herman Miller

Geeta S. 1CE17CS037
Cap Gemini

Poojashree A1CE17CS085
Temenos, Cap Gemini

Abhishek P.V. A1CE16CS003
THIS, Nucleus Teq

MAHARUDRA
1CE15CS069, **TCS**

Bhavya Aggarwal
1CE17CS023 **Cap Gemini**

Kalpana G. J
1CE17CS048 **Cap Gemini**

Sindhu Pai. 1CE17CS124
NTT DATA

Mohammed Burhaan
1CE16CS052

Worldline Global Services Pvt Ltd
T-system
Byju's
HINDUJA GLOBAL SOLUTIONS
LIMITED

GV RITWIK 1CE18CS022
TRADE STOCK

DHRUTHI K A 1CE18CS016
TRADE STOCK

ANUSHA 1CE18CS009
WIPRO and TRADE STOCK

KAVYA 1CE18CS033
TRADE STOCK

PRIYANKA.R 1CE18CS059
TRADE STOCK

VAISHNAVI P
1CE18CS094 **TRADE STOCK**

Surabhi G.R. 1CE18CS084
HCL

BHAVANA D A.
1CE18CS011 **TRADE STOCK**

VAMSINANDAN 1CE18CS095
TCS and TRADE STOCK

PRAMOD KUMAR B S
1CE18CS056 **TRADE STOCK**

KUSHAL C 1CE18CS037
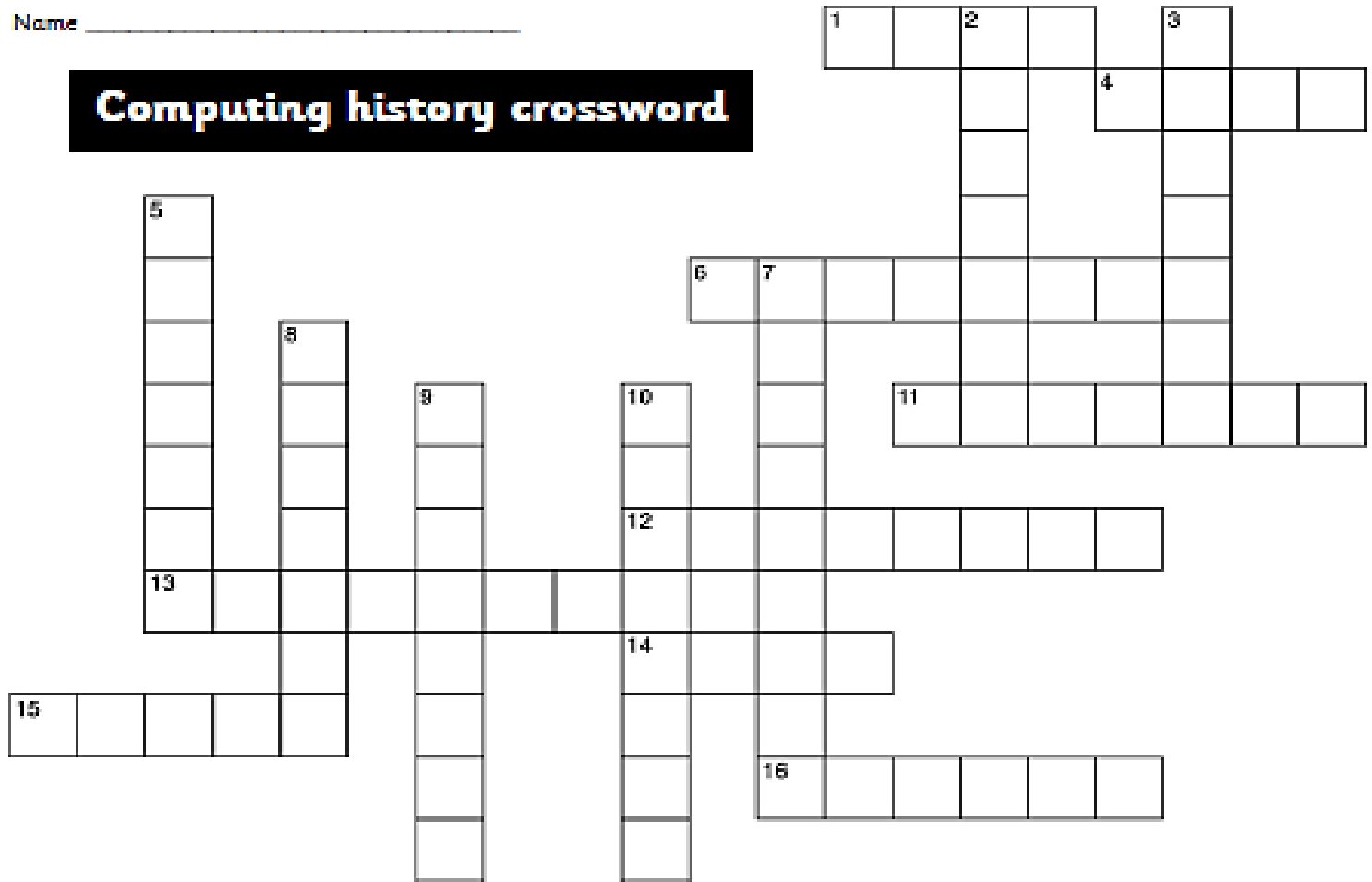**WIPRO and TRADE**

KARTHIK A N
1CE18CS030 **TRADE STOCK**

Mahesh R. 1CE18CS040
HCL

Name _____

Computing history crossword

Across

1. The founder and past chief executive of Apple. Steve _ _ _ _ (4)

4. The Manchester _ _ _ _ computer, first ran in 1948. (4)

6. The first computer available for people to buy in 1952. _ _ _ _ _ _ _ _ Mark 1. (8)

11. Inventor of the World Wide Web. Tim _ _ _ _ _ _ _ -Lee. (7)

12. The world's first electronic programmable computer, built to help solve encrypted German messages in World War II. (8)

13. A popular home computer released in 1982 by Clive Sinclair. ZX _ _ _ _ _ _ _ _ (8)

14. The first tablet computer released by Apple in 2010. (4)

15. The founder and past chairman of Microsoft. Bill _ _ _ _ _ (5)

16. The founder of computer science. Alan _ _ _ _ _ _ (6)

Down

2. A Victorian mathematician who first developed the idea of a programmable computer. Charles _ _ _ _ _ _ _ (7)

3. Invented in 1936 to simulate the logic of a computer algorithm. The Turing _ _ _ _ _ _ _ (7)

5. An operating system which increased sales of home desktop computers. Microsoft _ _ _ _ _ _ _ 95 (7)

7. Inventor of the computer mouse. Douglas _ _ _ _ _ _ _ _ _ (9)

8. The British designer of the world's first programmable electronic computer. Tommy _ _ _ _ _ _ _ (7)

9. A games console released in 1986. The _ _ _ _ _ _ _ _ Entertainment System (8)

10. A computer built for the BBC Computer Literacy Project in 1981. The _ _ _ _ _ _ _ _ (3,5)

Note: Send your answers to csenewsletter@cityengineeringcollege.ac.in

CONGRATULATIONS

To the previous Issue's QUIZ winners

Dhanya Jogi

Sneha S

Namratha Palaki

Ayusha Kumari