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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LINUX CAMPUS CLUB

CONNECT

FOSS CAMP EDITION

2021
DEC

LCC, JSSSTU

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TEAM LCC '21

MESSAGE FROM THE CHIEF MENTOR

"I AM FILLED WITH PRIDE AND DELIGHT TO OVERSEE THE ENTHUSIASTIC USE OF THE FREE AND OPEN SOURCESOFTWARE (FOSS) BY THE STUDENT-MEMBERS OF THE LINUX CAMPUS CLUB (LCC) UNDER THEDEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING, FOR A MULTITUDE OF PRODUCTIVE PURPOSES. SINCE ITS ORIGIN IN 2004, THE LCC HAS SHOWN RAPID GROWTH, BECOMING THE FOCAL POINT OF OPENSOURCE ACTIVITY IN THE CAMPUS, EVIDENCED BY THE RISING MEMBERSHIP, A FLURRY OF TECHNICAL ANDRELATED PROGRAMS BEING ORGANIZED AND ITS OVERALL POPULARITY AMONG THE STUDENT COMMUNITY.

THE LCC 'CONNECT' MAGAZINE SERVES AS A VALUABLE MEDIUM FOR PROMISING STUDENTS TO CONNECTWITH THE FOSS ECOSYSTEM. I ENCOURAGE STUDENTS TO WRITE AND REVIEW ARTICLES, DISCUSS AND DEBATEIDEAS AMONG PEERS AND HENCEFORTH CONTRIBUTE TO THIS SYNTHESIS OF KNOWLEDGE WHICH WOULD BE AFITTING TRIBUTE TO THE OPEN SOURCE MOVEMENT.

MY WARMEST CONGRATULATIONS TO THE EDITORS AND THE ENTIRE TEAM OF THE LCC CONNECT MAGAZINE. "

-Dr. M.P.Pushpalatha,
Head of the Department,
CS&E,
JSSSTU,Mysuru

MESSAGE FROM EDITORS

LINUX CAMPUS CLUB IS CURRENTLY IN ITS EIGHTEENTH YEAR AND HAS CONTINUED TO UPHOLD THE VISION OF CREATING AWARENESS ABOUT FREE AND OPEN SOURCE SOFTWARE (FOSS) SINCE 2004. BEING ONE OF THE MOST POPULAR TECHNICAL ASSOCIATIONS IN THE COLLEGE, IT HAS WITNESSED IMMENSE SUCCESS OVER THE YEARS.

WE HAVE SEEN GREAT RESPONSE AND ACTIVE PARTICIPATION FROM THE STUDENTS IN ALL THE EVENTS AND COMPETITIONS HELD. ESPECIALLY WITH MOST OF THE EVENTS BEING HELD VIRTUALLY THIS YEAR, THE ENTHUSIASM AND PARTICIPATION FROM ALL THE STUDENTS WERE SPECTACULAR AND APPRECIABLE.

FOSS CAMP 2021, OUR ANNUAL TECHNICAL FEST, PROVIDES A PLATFORM FOR ENTHUSIASTIC STUDENTS TO EXPLORE, PARTICIPATE AND GAIN INSIGHTS INTO OPEN SOURCE AND EXPERIENCE THE JOYS OF PROGRAMMING.

WE ARE THRILLED AND PRESENT TO YOU CONNECT'21, OUR YEARLY MAGAZINE, AIMED AT SHOWCASING THE DEVELOPMENTS IN THE WORLD OF TECHNOLOGY AND FOSS TO THE STUDENTS.

THE SUCCESS OF LCC IN ALL ITS ENDEAVORS IS LARGELY DUE TO THE EFFORTS AND HARD WORK OF ALL THE FACULTY MENTORS, TEAM MEMBERS AND VOLUNTEERS, WHO HAVE STRIVED HARD TO HELP LCC ACHIEVE ITS GOAL. WE SINCERELY THANK OUR HEAD OF THE DEPARTMENT AND CHIEF MENTOR, DR. M. P. PUSHPALATHA FOR PROVIDING IMMENSE SUPPORT AND GUIDANCE THROUGHOUT OUR JOURNEY.

THE EDITORIAL TEAM IS EXTREMELY GRATEFUL TO EVERYBODY WHO HAS CONTRIBUTED AND SUPPORTED US IN SUCCESSFULLY BRINGING OUT THE CONNECT MAGAZINE.

WISHING EVERYONE ALL THE BEST!

- EDITORS:
ANURAG ANAND VAIDYA
SAMHITHA N S
ANUSHA R SHENOY

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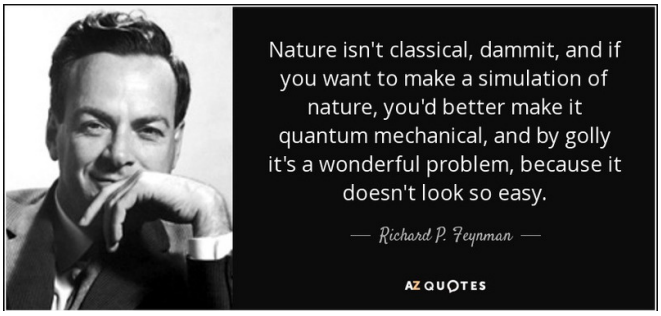
QUANTUM COMPUTING

BY SRIVATSA JOSHI

Since, the dawn of time humans are interested in achieving something bigger something that blows their mind with the crazy massive magnitudes. With this in mind they made great achievements they created rockets that can carry humans to moon (now on mars), Hubble telescope, massive ships tanks and missiles.
But now "small" is the next big thing, and our hero 'QUIBITS' is here to save the day. We'll look at the history of quantum computing before getting into QUBITS.

Origin: -

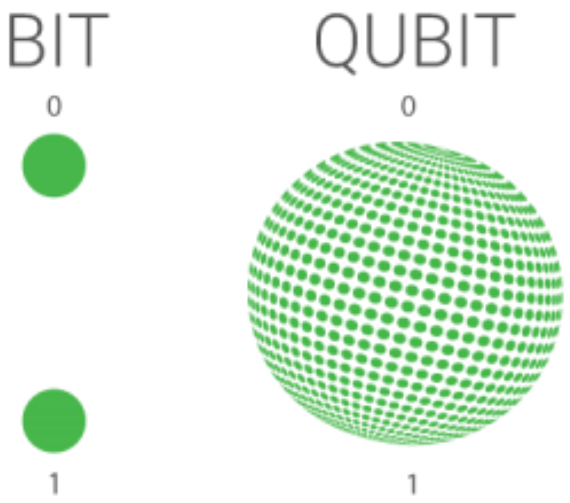
Richard Feynman and Yuri Manin hypothesized quantum computers in the 1980s. The idea for quantum computing came from what was formerly considered one of physics' biggest embarrassments: remarkable scientific progress met with an inability to simulate even simple systems. Richard Feynman addressed the following problem at MIT in 1981: conventional computers cannot efficiently model the development of quantum systems. As a result, he suggested a fundamental model for a quantum computer capable of doing such simulations. He outlined the prospect of massively outpacing traditional computers with this. However, it took more than a decade for the Shor algorithm, a unique method, to shift people's minds about quantum computing.



BITS & QUBITS: -

In quantum computing, qubits are the size units that function in the same way that bits do in a traditional computer. It is usually thought of as having two states: yes/no or true/false mechanisms as its value. In quantum mechanics, the orbit level measurement is taken into account, and so all values are taken into account in the system (As it incorporates quantum mechanics, you might find it difficult to understand, be on track;). Bits are the smallest unit of computer data, containing all of the information. Bits are commonly

employed in groupings called bytes and are classed as yes/no or true/false.



Why Quantum computers when we have Super-computers?

Before getting into working of quantum computer we will see how important is Quantum computing.

- In 2019, Google's quantum computer completed a computation in less than four minutes that would have taken 10,000 years on the world's most powerful computer. It is the seed for the world's first fully working quantum computer, which will be capable of producing better medications, developing smarter artificial intelligence, and solving cosmic mysteries.
- Google and UCSB have a partnership to develop a 50 qubits computer, as it would represent 10,000,000,000,000,000 numbers that would take a modern computer petabyte-scale memory to store
- Quantum computing, which employs quantum tunneling, is supposed to be more energy efficient than traditional computer. They are predicted to cut power usage by a factor of 100 to 1000.
- In 1997, IBM's Deep Blue computer defeated chess champion Garry Kasparov by calculating 200 million alternative potential moves per second. These calculations could be done at a trillion times per second with a quantum computer.
- Quantum computers have the potential to speed up AI learning, reducing thousands of years of learning to seconds.

Brief overview on working of quantum computer

Traditional computer processors run in binary, which means that the billions of transistors that process data on your laptop or smartphone are either on or off. Computers execute logical processes depending on the state of switches using a sequence of circuits known as "gates."

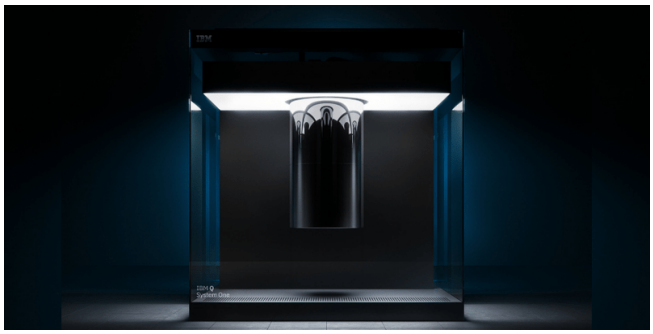
Traditional computers are programmed to follow rigid rules. This makes them incredibly dependable, but it also makes them unsuitable for solving some types of problems, such as those involving finding a needle in a haystack. Instead of merely 1s or 0s, quantum computers execute computations based on the likelihood of an object's condition before it is measured. Unmeasured quantum states exist in a mixed state called 'superposition' rather than having a definite position, similar to a coin spinning through the air before landing in your hand this is called Quantum superposition in Quantum mechanics. These superpositions can

get entangled with those of other things, implying that their eventual outcomes will be mathematically connected this phenomenon is called Quantum entanglement, even though we don't know what they are yet. The complicated mathematics underpinning these unsettled states of entangled 'spinning coins' may be input into unique algorithms to solve issues that would take a traditional computer a long time to solve may be years or they just can't solve them. These algorithms might be used to solve complicated mathematical problems and generate difficult-to-crack security codes.

Big Tech companies using Quantum Computing

IBM: -

IBM's full quantum stack allows to fully explore quantum solutions at unmatched fidelity and scale. They are in production scale and offer business solutions through their Quantum systems



GOOGLE : -

New technology and there is no name of google it can't happen, they too built quantum computers and they are pretty good at it. Google recently achieved "Quantum Supremacy" in Quantum computing filed that is another major milestone in entire quantum computing filed.

Conclusion: -

From above points we can say that there is a growing need for computational resources and this need can be fulfilled with quantum computers. Quantum computers are now being heavily used in finding protein structure which helps scientists in analyzing and discovering new drugs. They are exceptionally good at calculation usually combinatorics problems (everyone's favorite "travel-salesman problem" and problems similar to it) and yet they are not good at solving some problems. And at the end I will say that we have to adopt ourselves to the change in nature and we must welcome the change.

SPECIALLY ABLED CHILDREN

BY SNEHA

CAN YOU WRITE WITH YOUR FEET?
CAN YOU PAINT WITH YOUR MOUTH?
CAN YOU SWIM WITHOUT ANY LIMBS?

So, what did you observe in these types of people, did you notice their special ability or disability.

Let's have an-heart to look at the person and not their disability. They don't look normal and ordinary but they have special skills which are extraordinary. Then why doubt their potential just by looking at them.

These are so many achievers who are inspirable for these specially abled children. We can take few people as an example They are

1. HELLLEN KELLER - The first deaf-blind person to receive BA degree, learnt five different languages also she is an author of the book "The story of my life"
2. STEPHEN HAWKING - Renowned physicist and cosmologist having ALS.
3. SUDHA CHANDRAN - Indian classical dancer with a Jaipur foot.
4. SRIKANTH BALLA – First international blind student at MIT also they have even involved in sports, this year (2021) for India they won so many medals.

What can we learn from them?

They teach us that

- Happiness is a state of mind, not the state of body.
- Patience can get you through almost anything.
- ·You cannot judge a person just by their looks.

Right of persons with disability act in 2016 has increased the list of disabilities from 7 to 21 types.1.67% of Indian population has disability and according to 2011 census around 78 lakh children have disability in India which is 1.7% of total child population and one-third of most disabilities are preventable.

Most government and non-government sources say that causes of disability are heredity, birth defects, lack of care during pregnancy and few more. Though there is no cure for heredity disability but it can be prevented by taking special care during pregnancy.

Children with disability in India are provided with special care and beneficiary like free books, scholarships, uniform and other learning materials, special schools with vocational training facilities have allotted. we should be proud that our college JSSTU is providing the best education for the specially abled children and helping to create their future.

Indian government has initiated that all government aided educational institution and other government aided educational institution shall reserve a maximum 3% rate for specially abled children and 4% quota in government jobs for person with disability as specified.

We salute them for their effort we all need to accept that disability can occur to anyone and it is not always bad be miss with.

Life is too short

Embrace it with

Whatever you have.

“Don’t cry over missing limb, but decide to make every limb count”

FLYING COFFINS

BY DARSHA SOROKHAIBAM

You sense a tingling feeling, it cannot be seen yet but you can tell it is coming from afar. The sound gets closer and closer and before you know it, your heart skips a beat as the source of the sonic boom passes by in under a second from above you.

Machines that soar the sky, the idea kickstarted by the Wright brothers, started as a simple “sustained and controlled heavier-than-air powered flight” over time developed into various versions. One of them being, Fighter Aircrafts. With the entree of World War 1, fighter airplanes were first used for artillery spotting (scout planes). Humans, with our natural tendency to weaponize, soon realized that airplanes could be armed and used for combat. Since then, there was no looking back.

The most operated and used aircraft by the Indian Air Force is the Mig-21 Bison. A little introduction to the most-produced supersonic jet aircraft in aviation history, MikoyanGurevich MiG-21, is a supersonic jet fighter and an interceptor aircraft. It has a fuselage (main body section of an aircraft) resembling the shape of a pencil. The aircraft's simple controls, engine, weapons, and avionics are typical Soviet-era military designs. There are several Mig-21 variants, which is a story for another day, but the version inducted by the Indian Air Force is the Mig-21 Bison in the year 1963 .and Over 1200 fighters and over 874 variants have been inducted. The Mig-21 was under the spotlight in the 1971 war for the liberation of Bangladesh. Three Mig-21 squadrons, flown by professionals took part in counter-air, escort, and close air support tasks demonstrating its highly effective short-range, precision attacks. During the period, it was the most advanced aircraft which received a lot of positive feedback from the pilots of the time. Unfortunately, this is not the case anymore.
According to Wikipedia, a news article discusses current or recent news of either general interest (i.e. daily newspapers) or of a specific topic (i.e. political or trade news magazines, club newsletters, or technology news websites).

A few news headlines which depict its repeated failures

- "IAF group captain killed in MiG-21 Bison crash in Gwalior"
- "IAF's MiG-21 Fighter Jet crashes near Rajasthan's Suratgarh, Pilot ejects safely"
- "IAF's MiG-21 crashes after a bird hit in Rajasthan's Bikaner, pilot ejects"

With each headline, the outrage against the neglected conditions of the aircraft would roar. The widely popular movie, "Rang de Basanti" brought to light the loss of many young pilots and the political games involved (which I will not touch in this article *tsk tsk*) It fiercely portrayed the emotions and turmoils faced by the families of victims of Mig-21 aircrafts. The "Bison" upgrade was launched in the 1990s in an attempt to modernize the aircraft. New features were being introduced such as the capability to fire medium-range-air-to-air missiles. Coming on to the harsh reality faced by the pilots who have boarded this aircraft, over 180 IAF pilots (and 40 civilians) have been killed in Mig-21 accidents since 1970, a minimum of 14 fighters crashing between 2010 and 2013. Out of the 1200 Mig fighters introduced, more than 840 aircrafts built between 1966 and 1984 were lost to crash accidents. The bitter grief attached to the continuous series of accidents led to "flying coffins" being coined. The Mig-21 Bison forms the bulk of the fighter aircraft in the IAF's inventory. IAF had to keep its MiG-21 fleet flying longer than it would have liked because of the delay in the induction of new fighters.

In picture;a Mig-21 "Missing Man" formation led by then IAF chief, BS Dhanoa to pay tribute to the martyrs of the Kargil war

The LCA program (Light combat Aircraft) began in the 1980s in an attempt to replace the aging Mig-21 fighters. It was officially named 'Tejas' in 2003, which is the second supersonic jet produced by Hindustan Aeronautics Limited (HAL). There are mixed reviews for the Tejas fighter, some putting forward that it is not a match for modern-day fighters even though it is a proven improved version of the Mig-21. The CEMILAC (Centre of Military Airworthiness and Certification) confirmed Tejas as a multirole fighter with capabilities beyond visual range air to air and air to ground attack capabilities and longer endurance during mid-air refueling. In terms of Kinematics, Tejas has a significant edge over the venerable Mig-21 as it shows much more maneuverability, flexibility, and better climb rate compared to the vintage Mig-21. The cockpit layout of Mig-21 and its external view have always been viewed as a comprehensive nightmare for the pilot.

Due to the low-level ejections with its CK ejection seat, it is very dangerous when the jet is flying at 300kmph leading to many unsuccessful ejections, and sadly, deaths. Mid-air collisions, engine flame-outs, bird strikes can cause botched missions. Tejas has one too many pilot-friendly features like a Digital Fly-by-Wire Control System which makes it easier to handle the aircraft, a glass cockpit along a Mk 16LG ejection seat (basically provides an easier and safer ejection method). In every aspect, Tejas outperforms the Mig-21. In 2008, the Hawk Mk. 132 was inducted for a similar purpose as Tejas. Finally, in 2016, the much-awaited Rafale deal was signed between India and France for 36 Rafale multi-role fighter jets in fly-away condition.

And for a change, India chose Dassault(a French Aerospace company) over the traditional Russian Mig. This deal is the biggest-ever procurement made by our country with the Rafales having various India-specific modifications, namely- 10-hour flight data recording, infra-red search, and tracking systems among others. Currently, about 54 Mig-21s are in active service with the Indian Air Force. IAF pilots undergo rigorous selection and training to protect our skies.

And to rightly quote,

"Flying is more than a sport and more than a job; flying is pure passion and desire which fills a lifetime"

-Adolf Galland Let it not be cut short by the shortcomings of a veteran aircraft.

A HIGH-LEVEL OVERVIEW OF GIT AND GITHUB

BY DHANYA V HEGDE

So, what exactly is Git and GitHub and why do we use it? Imagine you have a folder or an application and you want to collaborate with other people on that folder or application. In the case of open source, a lot of people can contribute to the same folder.

In another scenario imagine that you added a new feature to your project and your code suddenly stopped running. You wish that you could go back to your previous code before you added that feature.Now is there a way to do that? Yes, definitely there is. Git allows you to save the history of your project.

Git allows you to save the history of your project. So, you can come back to the previous code before you added the feature. In the case of open source, it tells the owner of the project which person made which change at what time etc.

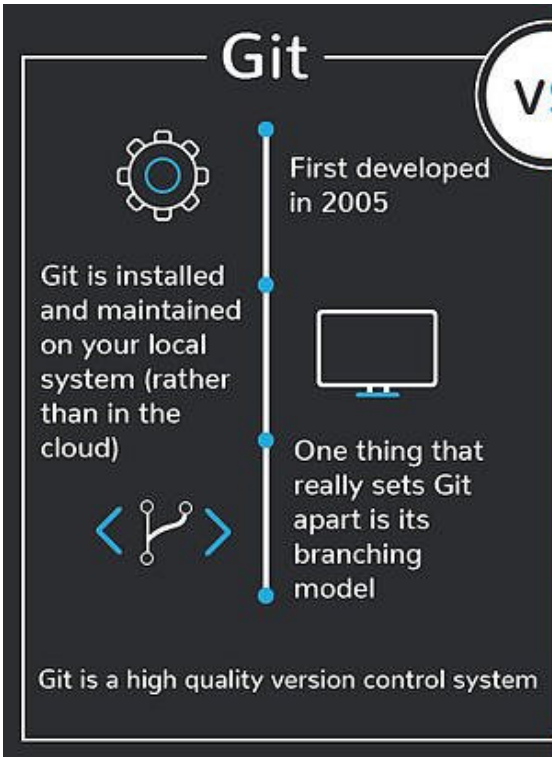
Now, GitHub is a popular platform that allows us to host our repository. Repository is just a folder where all our changes are saved. Git is basically version control and GitHub is a platform that allows us to share, look and contribute to our projects. There are other platforms to host our repositories too like Gitlab and Bitbucket but GitHub is the most popular one and is widely used.

Git Vs GitHub:

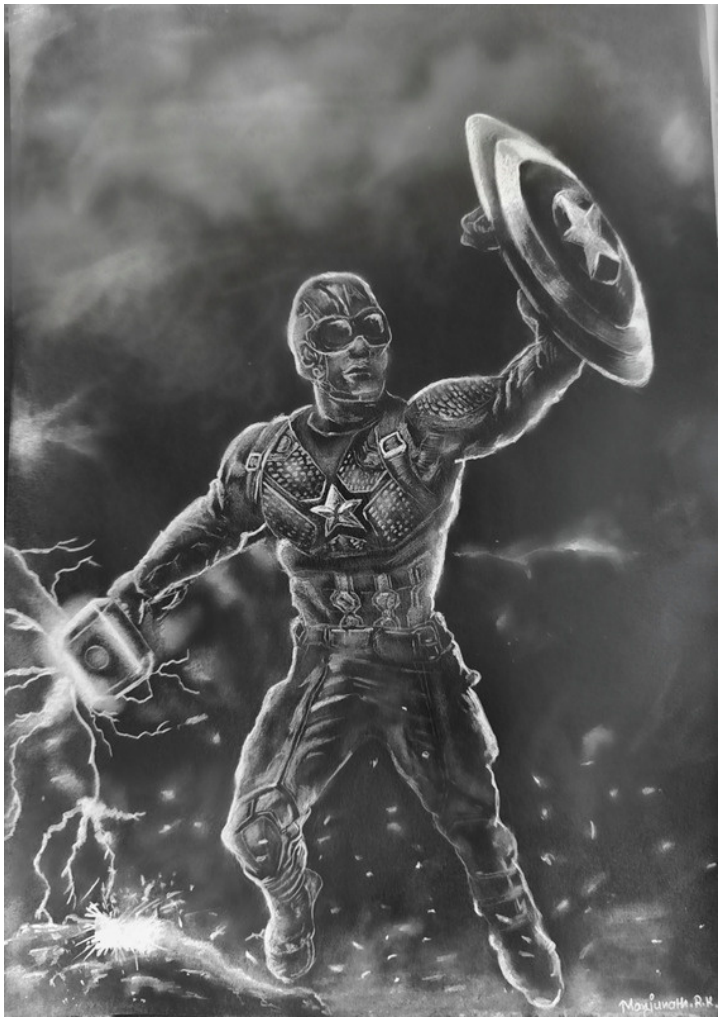
• Git is a local VCS software that enables developers to save snapshots of their projects over time. It's generally best for individual use.

• GitHub is a web-based platform that incorporates git's version control features so they can be used collaboratively

Git	GitHub
1. It is a software	1. It is a service
2. It is installed locally on the system	2. It is hosted on Web
3. It is a command line tool	3. It provides a graphical interface
4. It is a tool to manage different versions of edits, made to files in a git repository	4. It is a space to upload a copy of the Git repository
5. It provides functionalities like Version Control System Source Code Management	5. It provides functionalities of Git like VCS, Source Code Management as well as adding few of its own features



CREATIVE ART



Not Captain America!!

A famous scene from the movie Interstellar "You have to leave something behind to go forward"

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CREATIVE ART

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Warli art

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