KLE Technological University
Creating Value
Leveraging Knowledge

2019

NEWSLETTER

SCHOOL OF COMPUTER SCIENCE

"No one whistles a symphony...
It takes a whole orchestra to play it"

VISION

The KLE Tech School of Computer Science will excel and lead in education, research and innovation in computing and information technology, contributing to the evolving needs of the world we live in.

1. STUDENTS ACHIEVEMENTS
2. STAFF ACHIEVEMENTS
3. ACTIVITIES CONDUCTED BY THE ASSOCIATION
4. WORKSHOPS AND SEMINARS
5. ARTICLES

ASES
Association Of Computer Science & Engineering Students

HOD'S MESSAGE

It gives me a immense pleasure to welcome all the students and faculty to the academic year 2018-19. It has been an eventful semester for members of the School of Computer Science & Engineering, KLE Technological University, Hubballi.

It is an exciting & challenging time at School, as we are in midst of a journey towards making a mark as one of the top universities in engineering education.

The objective of the newsletter is to bring to you all, the report of all the exciting academic & co-curricular activities.

I would like to thank all my colleagues & students for their contributions towards the newsletter.

Dr. Meena S. M

Head of SoCSE

STUDENTS ACHIEVEMENTS

Kiran Akadas and Manas Kumar

Won 4th place in International Cyber security Data Mining Competition 2018

Kiran Akadas and Manas Kumar

were among top 10 teams in ACCS Design Challenge 2018 held in IIIT Bangalore for WiFi communication with advanced encryption standard on ARM cortex M3 1768 embedded board.

Vinuta S. Lakkamannahalli

Won Silver Medal in 10 meter Air Rifle Open Sight Junior Women: United India Games Association

Keerthan Ugrani :

Winners of 8th International Symposium on Embedded System and System Design competition held in Kochi(CUSAT), Kerala.

Sindhu Hegde

Awarded 'Best Outgoing Student' of KLE Technological University 2018-19.

Sheetal U

Awarded 'Best Organiser Student' of KLE Technological University.

STAFF ACHIEVEMENTS

PhD Awardees

Name of staff		Area	Topic
P.G. SUNITHA HIREMATH		Computer Networks, Data Analytics	A middleware modelling for hybrid mobile ad hoc networks
JAYALAXMI G.N.		Wireless Mesh Network	Efficient delay and throughput routing protocol for wireless mesh and Adhoc network
SUJATHA C		Image and Video processing	Temporarily scalable summarization of surveillance video using GMM
SUVARNA G. KANAKARADDI		Artificial Intelligence, Data Science	Application of Fuzzy logic to natural language understanding.
SHANKAR GANGISETTY		Data Science, Artificial Intelligence	Representation and Analysis of 3D Point Cloud Data
SHANTALA .GIRADDI		Image Processing	Automated detection of diabetic retinopathy

WORKSHOPS & SEMINARS

1. Workshop on C – 4th August, 2018

Resource Person: Mr. Prakash Hegde and Team

This workshop helped the 2nd year students brush up on the most accepted language in the IT industry and laid strong roots to help them understand Data Structures. The active participation from the faculty and the students towards the path of learning was appreciated.

2. System Admin – 17th, 18th September, 2018

Resource Person: Babasaheb Pinjar and Avinash Bendigeri

This workshop helped students on topics related to System Administration in Python, and were explained how to up-keep, configure and operate reliably the multi-user computers such as servers.

3. Deep learning workshop on HPC – NVIDIA Server – 5th December, 2018

Resource Person: Dr. S.R. Chikkerur and Team

The goal of this workshop was to leverage deep neural networks (DNN) - specifically convolutional neural networks (CNN) - within the deep learning work flow to solve a real-world image classification problem using NVIDIA DIGITS on top of the Caffe framework and the MNIST hand-written digits dataset. In this session, students learnt how to:

- Architect a Deep Neural Network to run on a GPU
- Manage the process of data preparation, model definition, model training and troubleshooting
- Object Detection with DIGITS
- On completion of which, students were able to use NVIDIA DIGITS to architect, train, evaluate and enhance the accuracy of CNNs on their own image classification application.

WORKSHOPS & SEMINARS

4. Python Workshop – 6th October, 2018

Resource Person: Mr. Moula Hussain

This workshop focused on building a strong base for students of 3rd year so as to help them utilise the knowledge of python in some of the emerging fields of the industries like Machine learning and Artificial Intelligence.

5. MEAN Stack – 23rd and 24th March, 2019

Resource Person: Mr. Om Prakash

The workshop focused on introducing the concept of NoSQL databases, overview of MongoDB, CRUD operations with the mongo shell, MongoDB and Web applications. This was hosted by the Web Technologies team for the students of 3rd year, to have an industry level glimpse of Web development. The workshop helped us build interesting industry projects that were submitted to Transil Technologies.

INDUSTRY INTERACTION SESSIONS

1. Mr. Raju Koodli , Google

Date: 7th August, 2018

The session enlightened students on how to prepare for Tech Giants in the IT sector like Google and also expressed his thoughts on Entrepreneurship and start-ups. The speaker has 20+ years of experience in various industries like NOKIA, INTEL, CISCO and currently he is a X-functional leader and staff in GOOGLE.

2. Augmented Reality - Dr. Parag Chaudhury, IIT Bombay

Date: 2nd February, 2019

The talk introduced augmented reality (AR). The talk emphasised on uses of AR in various settings, from home to the industry; how content is displayed for AR and what impact does it have on technologies involved in the process. Dr. Chaudhary gave a briefly touch upon the problems of tracking (from computer vision) and rendering (from computer graphics) to get a sense of what is required to create engrossing augmentations. Augmented reality depends on computer vision algorithms that can parse and make sense of the real world, and computer graphics algorithms that can enrich the real world with virtual augmentations.

INDUSTRY INTERACTION SESSIONS

3. Massively scalable Wi-Fi Systems - Mr.Pravin Bhagwat, CTO, Mojo Networks

Date: 16th February, 2019

Mr. Pravin Bhagwat (PhD) is a Founder at AirTight Networks, Inc and serves as its Chief Technology Officer. Mr. Bhagwat is a wireless networking pioneer and an accomplished researcher. He has 13 years of leading edge research and development experience in wireless and mobile networking and leads technology development and research at AirTight Networks. He spoke about how Mojo network functions, and how the company evolved to become a support the revolutionising "Jio - wave".

4. Anatomy of Routers - Amit Kumar Shah – Tech lead , Cisco Systems

Date: 12th April,2019

The session walked into the details of how production grade routers/switches are designed. It presented specific examples of why custom hardware is needed for building commercial routers. It also covered the different physical form factors that routers are deployed in the real world. The course also brushed on how a typical networking ASIC looks like.

5. Talk by Star aluminous – Sri Umesh Vaidyamath

Date: 22nd March, 2019

Mr. Umesh Vaidyamath CEO of INSZoom interacted with students of our college about how he started the company and guided it through the highs and lows and survived the severe recession. He ignited the entrepreneurial thoughts in the minds of the audience and explained how important it is to identify and address social problems.

COMPETITIONS/ HACKATHONS

1. INSZoom Hackathon – 11th August, 2018

INSZoom – a global leader in immigration services, organised its yearly,24 hour hackathon named – "INSZoom Hackathon 2018 edition 02" in collaboration with at KLE Technological University on 11th of August, 2018. As many as 100 students participated in this event, to create solutions for the immigration industry. Participants were asked to build solutions for challenges of Online Document Management, Online PDF Management, Web Scraping and Address Intelli-sense for enhancing the online immigration case management experiences for offline customers.

Winners: Team - Preeti Pardeshi, Himanshu Goyal, Sindhu Hegde and Veeresh Karikai.

2. HackWithInfy - 2018

#HackWithInfy is a contest for all engineering students across India who is graduating, to inculcate the culture of rapid problem-solving and innovative thinking from early on. The event was held on 18th August, 2018 and turned out to be a great success as many of our students took active participation in it.

Winners: Anup Patil and Prajwal Maganurmath were offered jobs at a post of Specialist Programmer – Global delivery with a package of 8 LPA.

COMPETITIONS/ HACKATHONS

3. Regional Coding Contest by Samsung – 29th September, 2019

Samsung Research team and KLE Technological University joined hands to stage the Regional Coding Contest, on the online platform – CodeChef. The event was an 8 hour long coding session involving multiple stages where students had a chance to face basic, advanced and professional level challenges from Data Structures and Algorithms.

Winners: Kiran Akadas and Manas Kumar bagged 3rd prize and were awarded with a cash prize of Rs 8000/-

4. SIH – 2019

Smart India Hackathon 2019 is a nationwide initiative to provide students a platform to solve some of pressing problems we face in our daily lives, and thus inculcate a culture of product innovation and a mind-set of problem solving. The KLE Technological University had an opportunity to host this event in their campus at our department, where bubbling ideas that were turned into realistic prototypes were exhibited. Various colleges of the respective zones across India , presented their prototypes and were evaluated for their selections into the further rounds of the event.

ERROR_404: Velalla Vineeth Kumar, Shantika Naik ,Shriya P.,Deepti Hegde , Dikshit Hegde from our university, won the 1st prize in the problem category of HCL Technology Ltd., Software and bagged a cash prize worth Rs. 1,00,000/-

"Talent wins games, but hard work and intelligence win championships"

COMPETITIONS/ HACKATHONS

3. Inscribe – Technical Paper presentation

Inscribe is a prestigious national level paper presentation event conducted by Robert Bosch, India every year. The paper presentation competition was held on 25th October, 2018 based on management, software technology and electronic technology.

The team consisting of Vanishree K, Shreyanka S and Vinuta S L guided by Mr. Prakash Hegde participated and presented a paper on "Conversational Artificial Intelligence". They won the title of 2nd runner-up in the mega-event and were awarded with certificates of appreciation.

4. Informatica Hackathon – 5th April, 2019

In this codethon, our students participated to show their prominence on typical computer science subjects like Operating Systems, DBMS and many more. About 125 students participated in the contest. The Hackathon was split into 3 sessions – an Ice Breaker session, a technical session, and a written test.

The winners of this hackathon –

1st prize: Shreyanka S.

2nd prize: Navya Telang

3rd prize: Tanmayi Kamat

5. TCS TechBytes

This event is an initiative to help students understand technology better. The process helped them enhance their lateral thinking process and inculcate the spirit to compete and excel. The quiz would serve as an alternative platform to enhance awareness and confidence level of the aspiring engineers while bringing them in sync with the current developments in the technology domain through an interactive and engaging quiz platform. "TCS TechBytes" strives to provide a better understanding of IT, as technology today is an enabler in diverse fields – like engineering, medicine, law, sports, science, movie, music, government, automobile and telecommunication.

Winners: Abhishek Sawant and Namitha Rayangoudar – 5th place.

PAPER PRESENTATIONS

by M.Tech students

Sl.No	Name of Student	Title of Paper	Conference
1.	Unnati Koppikar, Shobha Hiremath, Akshata Shiralkar, Akshata Rajoor Vishwanath P Baligar	IoT based Smart Attendance Monitoring System using RFID	First IEEE International Conference on Advances in Information Technology at AIT, Chikmagalur .
2.	Pooja BL, Annapurna Kattimani Raksha Nidavani, Harshita Kanamadi, Vishwanath P Baligar	Smart Security System for Invasion Detection	First IEEE International Conference on Advances in Information Technology at AIT, Chikmagalur.
3.	Asfia Khan, Bhagyashree Hanamshetti, Meghadarshini Hiremath, Keerti Akkur and Vishwanath Baligar	IoT based Wireless Electronic Notice Board	First IEEE International Conference on Advances in Information Technology at AIT, Chikmagalur.
4.	Akshaya Kulkarni, Amit Potdar, Suresh Hegde and Vishwanath Baligar	RADAR based Object Detector using Ultrasonic Sensor	First IEEE International Conference on Advances in Information Technology at AIT, Chikmagalur.
5.	Amulya D, Deepa Malimath, Keerthi Lotlekar Namita Kanthi,and Vishwanath Baligar	SMART DOOR USING IOT	First IEEE International Conference on Advances in Information Technology at AIT, Chikmagalur.

ARTICLES

Monte Carlo Methods in Science and Engineering

Dr. P. S. Hiremath
KLE Technological University

1. Introduction

The computational algorithms based on repeated random sampling to obtain numerical results form a broad class of methods termed as **Monte Carlo methods**, or **Monte Carlo experiments.** The underlying concept is to make use randomness to solve physical and mathematical problems that might be deterministic in principle, but often difficult or impossible to use other approaches. Monte Carlo methods are mainly used in three classes of problem classes, namely, optimization, numerical integration, and generating samples from a probability distribution. In principle, Monte Carlo methods can be employed to solve any problem that admits a probabilistic interpretation.

Monte Carlo methods, typically, follow a particular pattern: (i) Define a domain of possible inputs, (ii) Generate inputs randomly from a probability distribution over the domain, (iii) Perform a deterministic computation on the inputs, and (iv) Aggregate the results.

For example, the value of π can be estimated by using a Monte Carlo method: (a) Draw a square, then inscribe a quadrant within it, (b) Uniformly scatter a given number of grains over the square, (c) Count the number of grains inside the quadrant, (d) The ratio of the inside-count and the total-sample-count is an estimate of the ratio of the two areas, π/4. Multiply the result by 4 to estimate π.

In this procedure, the domain of inputs is the square with the quadrant inscribed in it. We generate random inputs by scattering grains over the square and then perform a computation on each input (test whether grain falls within the quadrant). Aggregating the results yields our final result, the estimation of π. There are two important points. First, if the grains are not uniformly distributed, then the approximation will be poor. Second, there are a large number of grains. The approximation is generally poor if only a few grains are randomly placed in the whole square. On average, the approximation improves as more grains are placed.

Monte Carlo methods require large set of random numbers, and it stimulated the development of pseudorandom number generators.

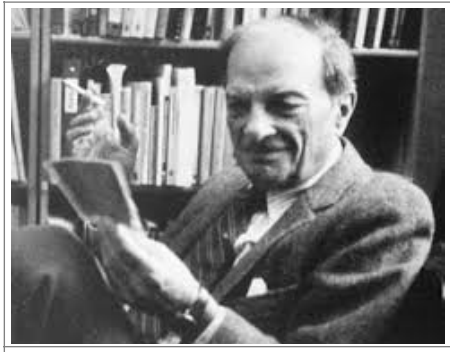
2. Historical background

Early methods of simulations tested a well understood deterministic problem and statistical sampling was selected in order to estimate uncertainties in the simulations. Monte Carlo simulations inverted this approach, solving deterministic problems using a probabilistic analog.

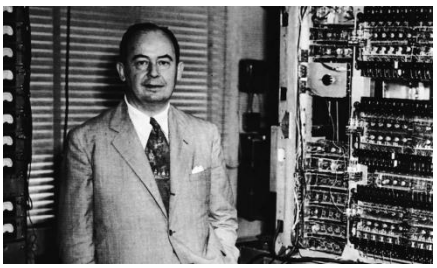
An early variant of the Monte Carlo method can be seen in the Buffon's needle experiment, in which π can be estimated by dropping needles on a floor made of parallel and equidistant strips. In the 1930s, Enrico Fermi, a well known nuclear physicist, first experimented with the Monte Carlo method while studying neutron diffusion, but did not publish anything on it.

In the late 1940s, the modern version of the Monte Carlo method was conceived by Stanislaw Ulam, while he was working on nuclear weapons projects at the Los Alamos National Laboratory. Immediately after Ulam's breakthrough, John von Neumann understood its importance and programmed the ENIAC computer to carry out Monte Carlo calculations. Being secret, the work of von Neumann and Ulam required a code name. Nicholas Metropolis, who was a colleague of von Neumann and Ulam, suggested using the name Monte Carlo, which refers to the Monte Carlo Casino in Monaco where Ulam's uncle would borrow money from relatives to gamble.

ARTICLES



Stanisław Marcin Ulam (13 April 1909 – 13 May 1984) was a Polish scientist in the fields of mathematics and nuclear physics. He participated in the Manhattan Project, originated the Teller–Ulam design of thermonuclear weapons, discovered the concept of cellular automaton, invented the Monte Carlo method of computation, and suggested nuclear pulse propulsion. In pure and applied mathematics, he proved some theorems and proposed several conjectures. When he was convalescing from illness in a hospital, he conceived the concept of Monte Carlo simulation experiments and shared with John von Neumann during their work in Manhattan Project, which led to its application in modeling neutron diffusion problem and then to preparation of hydrogen bomb.



John von Neumann (December 28, 1903 – February 8, 1957) was a Hungarian-American mathematician, physicist, computer scientist, and polymath. Von Neumann was generally regarded as the foremost mathematician of his time and said to be "the last representative of the great mathematicians"; a genius who was comfortable integrating both pure and applied sciences. He is credited with the design of modern computer architectures, popularly known as von Neumann architectures. His last work, an unfinished manuscript written while he was in hospital, was later published in book form as The Computer and the Brain.

Monte Carlo (literally "Mount Charles") is situated on a prominent steep slope at the base of the Maritime Alps along the French Riviera in the country Monaco. At the western end is the world-famous Place du Casino, the gambling center which has made Monte Carlo famous for its casinos and fashion world.

Nicholas Metropolis, who was a colleague of von Neumann and Ulam, suggested using the name Monte Carlo (as code word for their secret work on simulation studies on neutron diffusion problem), which refers to the Monte Carlo Casino in Monaco where Ulam's uncle would borrow money from relatives to gamble.

Monte Carlo methods formed the core of the simulation studies required for the Manhattan Project, though severely hampered by the limitations of computational tools at the time. In the 1950s, they were used at Los Alamos for early work relating to the development of the hydrogen bomb, and became popularized in the fields of physics, biology and operations research. Two major organizations, namely, Rand Corporation and the U.S. Air Force, took responsibility for funding and disseminating information on Monte Carlo methods during this time, and in the process found a wide range of applications in many different fields.

The use of Sequential Monte Carlo in advanced signal processing and Bayesian inference is more recent. It was in 1993, that Gordon et al., published in their seminal work the first application of a Monte Carlo resampling algorithm in Bayesian statistical inference. The authors named their algorithm 'the bootstrap filter', and demonstrated that in comparison with other filtering methods, their bootstrap algorithm does not require any assumption about the state-space or the noise of the system. Another pioneering article in this field of Genshiro Kitagawa is on a related "Monte Carlo filter". The articles by Pierre Del Mora and Himilcon Carvalho, Pierre Del Moral, André Monin and Gérard Salut on particle filters are published in the mid-1990s. Particle filters were also developed in signal processing in the early 1989-1992 by P. Del Moral, J.C. Noyer, G. Rigal, and G. Salut in the LAAS-CNRS in a series of restricted and classified research reports with STCAN (Service Technique des Constructions et Armes Navales), the IT company DIGILOG, and the LAAS-CNRS (the Laboratory for Analysis and Architecture of Systems) on RADAR/SONAR and GPS signal processing problems. These Sequential Monte Carlo methodologies are modeled as an acceptance-rejection sampler equipped with an interacting recycling mechanism. From 1950 to 1996, all the publications on Sequential Monte Carlo methodologies including the pruning and resample Monte Carlo methods introduced in computational physics and molecular chemistry, present natural and heuristic-like algorithms applied to different situations.

3. Monte Carlo method and Monte Carlo simulation

According to Sawilowsky , a simulation is a fictitious representation of reality, a Monte Carlo method is a technique that can be used to solve a mathematical or statistical problem, and a Monte Carlo simulation uses repeated sampling to obtain the statistical properties of some phenomenon (or behavior). This distinction is illustrated by the following examples:

Simulation: To simulate the tossing of a coin, draw one pseudo-random uniform variable from the interval [0,1]: If the value is less than or equal to 0.50 designate the outcome as heads, but if the value is greater than 0.50 designate the outcome as tails. This is a simulation, but not a Monte Carlo simulation.

Monte Carlo method: Pouring out a box of coins on a table, and then computing the ratio of coins that land heads versus tails is a Monte Carlo method of determining the behavior of repeated coin tosses, but it is not a simulation.

Monte Carlo simulation: Drawing a large number of pseudo-random uniform variables from the interval [0,1] at one time, or once at a large number of different times, and assigning values less than or equal to 0.50 as heads and greater than 0.50 as tails, is a Monte Carlo simulation of the behavior of repeatedly tossing a coin.

The characteristics of a high-quality Monte Carlo simulation are: (a) the (pseudo-random) number generator has certain characteristics, e.g., a long "period" before the sequence repeats, (b) the (pseudo-random) number generator produces values that pass tests for randomness, (c) there are enough samples to ensure accurate results, (d) the proper sampling technique is used, (e) the algorithm used is valid for what is being modeled, and (f) it simulates the phenomenon in question.

4. Applications

Monte Carlo methods are especially useful for simulating phenomena with significant uncertainty in inputs and systems with a large number of coupled degrees of freedom. Areas of application include:

Physical sciences: Monte Carlo methods are very important in computational physics, physical chemistry, and related applied fields, and have diverse applications from complicated quantum chromodynamics calculations to designing heat shields and aerodynamic forms as well as in modeling radiation transport for radiation dosimetry calculations.

Engineering:

Monte Carlo methods are widely used in engineering due to the interactive, co-linear and non-linear behavior of typical process simulations occurring in process design. Some of the examples are,

i. In microelectronics engineering, Monte Carlo methods are applied to analyze correlated and uncorrelated variations in analog and digital integrated circuits.

ii. In geo statistics and geo metallurgy, Monte Carlo methods underpin the design of mineral processing flow sheets and contribute to quantitative risk analysis.

iii. In wind energy yield analysis, the predicted energy output of a wind farm during its lifetime is calculated giving different levels of uncertainty.

iv. Impacts of pollution are simulated; diesel compared with petrol.

v. In fluid dynamics, in particular rarefied gas dynamics, where the Boltzmann equation is solved for finite Knudsen number fluid flows using the direct simulation Monte Carlo method in combination with highly efficient computational algorithms.

vi. In autonomous robotics, Monte Carlo localization can determine the position of a robot. It is often applied to stochastic filters such as the Kalman filter or particle filter that forms the heart of the SLAM (simultaneous localization and mapping) algorithm.

vii. In telecommunications, when planning a wireless network, design must be proved to work for a wide variety of scenarios that depend mainly on the number of users, their locations and the services they want to use. Monte Carlo methods are typically used to generate these users and their states. The network performance is then evaluated and, if results are not satisfactory, the network design goes through an optimization process.

viii. In reliability engineering, Monte Carlo simulation is used to compute system-level response given the component-level response. For example, for a transportation network subject to an earthquake event, Monte Carlo simulation can be used to assess the k-terminal reliability of the network given the failure probability of its components, e.g. bridges, roadways, etc.

Climate change and radioactive forcing: The Intergovernmental Panel on Climate Change relies on Monte Carlo methods in probability density function analysis of radioactive forcing, e.g. aerosol forcing and total anthropogenic forcing. for some forcing mechanisms: ozone, land use, solar, etc.

Computational biology: Monte Carlo methods are used in various fields of computational biology, e.g. Bayesian inference in phylogeny, studying biological systems such as genomes, proteins, membranes.

Computer graphics: Path tracing, occasionally referred to as Monte Carlo ray tracing, renders a 3D scene by randomly tracing samples of possible light paths. Repeated sampling of any given pixel will eventually cause the average of the samples to converge on the correct solution of the rendering equation, making it one of the most physically accurate 3D graphics rendering methods in existence.

AI for games: Monte Carlo methods have been developed into a technique called Monte-Carlo tree search that is useful for searching for the best move in a game. Possible moves are organized in a search tree and a large number of random simulations are used to estimate the long-term potential of each move. A black box simulator represents the opponent's moves.

Design and visuals: Monte Carlo methods are also efficient in solving coupled integral differential equations of radiation fields and energy transport, and thus these methods have been used in global illumination computations that produce photo-realistic images of virtual 3D models, with applications in video games, architecture, design, computer generated films, and cinematic special effects.

Search and rescue: The US Coast Guard utilizes Monte Carlo methods within its computer modeling software SAROPS in order to calculate the probable locations of vessels during search and rescue operations. Each simulation can generate as many as ten thousand data points that are randomly distributed based upon provided variables.[88] Search patterns are then generated based upon extrapolations of these data in order to optimize the probability of containment (POC) and the probability of detection (POD), which together will equal an overall probability of success (POS). Ultimately this serves as a practical application of probability distribution in order to provide the swiftest and most expedient method of rescue, saving both lives and resources.

Finance and business: Monte Carlo simulation is commonly used to evaluate the risk and uncertainty that would affect the outcome of different decision options. Monte Carlo simulation allows the business risk analyst to incorporate the total effects of uncertainty in variables like sales volume, commodity and labor prices, interest and exchange rates, as well as the effect of distinct risk events like the cancellation of a contract or the change of a tax law.

Mathematics: In general, the Monte Carlo methods are used in mathematics to solve various problems by generating suitable random numbers and observing that fraction of the numbers that obeys some property or properties. The method is useful for obtaining numerical solutions to problems too complicated to solve analytically. The most common application of the Monte Carlo method is Monte Carlo integration, numerical optimization (e.g. travelling salesman problem), and inverse problems.

ARTICLES

Beauty of MATHEMATICS!

- Vaishakh Nargund

Mathematics is one of them! Give respect, take respect policy holds damn good for this. Love it unconditionally and it will love you back still more.

Our life is so similar to this beautiful polyhedron called bucky helix. Made up of several tetrahedrons (moments) connected internally in an unexpected way. Each and every pattern of the tetrahedrons is never the same until infinity (every moment of our life is unique in its own way). Each and every tetrahedron's centroids form a straight line (each and every moment's focus is SUCCESS).

Have you all ever wondered that Indians knew the value of pi upto almost 15 decimals long back. It is proved so in the form of a beautiful shloka on Lord shri krishna!

गोपीभाग्य मधुव्रातः श्रुंगशोदधि संधिगः |

खलजीवितखाताव गलहाला रसंधरः ||

Following is the coding for all of the consonants.

क ख ग घ ङ

1 2 3 4 5

च छ ज झ ञ

6 7 8 9 0

ट ठ ड ढ ण

1 2 3 4 5

त थ द ध न

6 7 8 9 0

प फ ब भ म

1 2 3 4 5

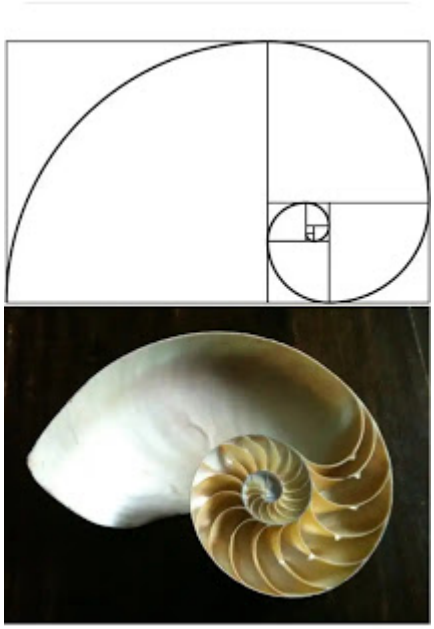
य र ल व श ष स ह क्ष

1 2 3 4 5 6 7 8 9

So substituting all the respective codes in the shloka we get

ARTICLES

3.14315942672378979323846264338327 8
which is not exactly equal to the value of pi but very much near to it!
Golden ratio and fibonacci series!
The two numbers are said to be in the *golden ratio* iff their ratio is same as the ratio of their sum to the largest of the two.
It is nearly equal to 1.618.
Fibonacci series is a series of numbers where the next number is obtained by addition of the previous two numbers. They go hand in hand because the ratio between the two consecutive numbers of fibonacci series approaches golden ratio.
Golden spiral - A logarithmic spiral whose growth factor is golden ratio, ie a golden spiral gets wider by a factor of golden ratio for it's every quarter turn.



The most wonderful concepts which go hand in hand! The golden ratio is considered to be as the fingerprint of god, because any point you go in the universe you will definitely find the relationship of that point with golden ratio.
All the constituents of the universe have a relation with either golden ratio or fibonacci series Plants and trees have a great relationship with this ratio. The number petals, seeds follow fibonacci series. The size of the each and every flower gives a golden spiral. The pines and pinecones on the pineapple represent fibonacci series and trace golden spiral.
The square of sum of radii of earth and moon and the square of radius of earth are said to be in golden ratio.

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The direction traced by the hurricane currents is said to be a golden spiral always.
Each and everybody's face in this world fits in a golden spiral with left eye as the centre. The shape of our ears traces a golden spiral. The side view of our face traces the golden spiral with ear as the centre.
The nut shells found on the snails are the best examples for golden spiral.
Like these, there are never ending applications of this beautiful concept!
Lastly I want to end this blog post by a shloka -

ॐ पूर्णमदः पूर्णमिदं पूर्णात्पुर्णमुदच्यते
पूर्णस्य पूर्णमादाय पूर्णमेवावशिष्यते ॥

ॐ शान्तिः शान्तिः शान्तिः ॥

The concept of infinity explained beautifully in yajurveda!
That, infinity divided by any of the numbers results infinity and infinity subtracted from infinity remains infinity!
Concern of the shloka is that the infinity symbolises knowledge over here! *Knowledge divided and distributed but still the seek for it should never go down!*
Thank you!

THE TEAM

Editor in-chief : Dr. Shantala Giraddi

Co-Editor : Mr. Aanand Meti

STUDENT TEAM

1. Abhishek Sawant
2. Vineet Kavishetti
3. Prathamesh Kulkarni

DESIGNED BY GURUVASANTH BHAVIKATTI