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VOL II

INDEX

1	*5G technology*	*Compiled By – Puskar Patile* *MSc 1st Semester CSIT*	3
2	*Zeno's paradox of the tortoise and the achilles*	*Compiled By – Lailin Pradhan* *Department Of Mathematics*	5
3	*How to begin a fresh start as a programmer*	*Compiled By – Jai Shree* *BSc 6th CSIT*	7
4	*Brain tumor classification using machine learning*	*Compiled By Bhushan Kashyap* *MCA 4th Semester CSIT*	8
5	*Golden ratio*	*Compiled By DUSMANT NAIK* *Department Of Mathematics*	11
6	*0!*	*Compiled By Manisha Choudhary* *Department Of Mathematics*	14
7	*Evolution Gym Shapes New Robot Body and Brain*	*Compiled By – SIMRAN JHA* *MCA 1st Semester CSIT*	15
8	*Home Smart Home*	*Compiled By Tushar Kashyap* *MSc 1st Semester CSIT*	16
9	*List of Achievement from CSIT*		17
10	*List of Achievement from MATHEMATICS*		18
11	*Editorial Members*		20

5G TECHNOLOGY

Compiled By – Puskar Patile
MSc 1st Semester CSIT

What is 5G?

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices. 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. Higher performance and improved efficiency, empower new user experiences and connect new industries

5G vs 4G

5th generation of wireless networks addresses the evolution beyond mobile internet to massive IoT (Internet of Things) between 2019-2020. The main evolution compared with today's 4G and 4.5G (aka LTE advanced, LTE-A, LTE+ or 4G+) is that, beyond data speed improvements, new IoT and critical communication use cases will require a new level of improved performance.

- For example, low latency provides real-time interactivity for services using the cloud: this is key to the success of self-driving cars
- 5G vs 4G also means at least x100 devices connected. 5G must be able to support 1 million devices for 0.386 square miles or 1 km.
- Also, low power consumption is what will allow connected objects to operate for months or years without the need for human assistance.

How fast is 5G?

- 5G speed tops out at 10 gigabits per second (Gbps).
- 5G is 10 to x100 faster than what you can get with 4G.

What makes 5G faster?

According to communication principles, the shorter the frequency, the larger the bandwidth.
The use of shorter frequencies (millimetre waves between 30GHz and 300GHz) for 5G networks is why 5G can be faster.

This high-band 5G spectrum provides the expected boost not only in speed but also in capacity, low latency, and quality.
However, 5G download speed may differ widely by area.
According to the February 2020 issue of Fortune Magazine, average 5G speed measures done in Q3/ Q4 2019 range from:

220 Megabytes per second (Mbps) in Las Vegas, 350 in New York,380 in Los Angeles 450 in Dallas, to 550 Chicago, and over 950 in Minneapolis and Providence approximately. That's 10 to 50 times more than 4G LTE.

Relation between 5G and satellites?

5G satellite communication "directly from the sky to the device" will soon become a reality.

5G coverage of the Earth, in addition to the terrestrial mobile 5G networks.
Specifically, with space-based systems, 5G will offer higher accessibility, reliability, and resilience, along with broadcasting and multi-broadcasting capabilities.

We expect 5G to support a wide variety of applications (e.g., agriculture, logistics, public safety) so that everybody in the world can be connected.

New 5G Phones - 5G for All?

you will need to get a new smartphone that supports 5G if you want to use the 5G network. For example, smartphones powered by the Snapdragon 5G Mobile Platforms are 5G compatible. 5G Launch Date In India-DoT confirmed in a press release that 5G services will be available in up to 13 cities across the country in 2022, including Delhi, Gurugram, Bengaluru, Kolkata, Chandigarh, Jamnagar, Ahmedabad, Chennai, Hyderabad, Lucknow, Pune, and Gandhi Nagar. The three largest telecommunications providers- Jio, Airtel, and Vi (Vodafone Idea) have already set up 5G test sites in these cities.

The Indians are expected to get 5G network connectivity next year. Prime Minister Narendra Modi could launch a 5G network on India's 75th Independence Day, according to a new report. The government said that the 5G network would launch around August next year, and PM Modi could release it on August 15th. "The biggest surprise at launch will be that you will find a lot of Indian technology, in the form of hardware or software. As you know India is very strong in software, many technologies will depend on it.

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ZENO'S PARADOX OF THE TORTOISE AND THE ACHILLES

Compiled By – Lailin Pradhan
Department Of Mathematics

We often study about series of real numbers which are convergent, means we are adding infinite terms and getting a finite value. In this article we are Going to see a motivating paradox. This was a paradox given by the ancient Greek philosopher 'Zeno'. Zeno is known for his different paradoxes and this is one of them.

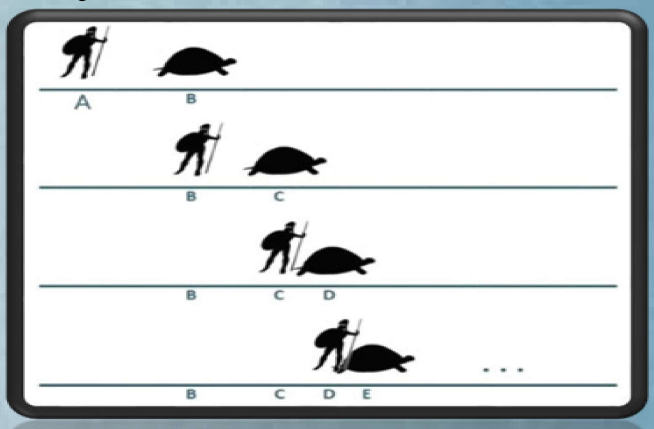
The paradox is like this:

One day Achilles who was the famous Greek athlete known for his fast running, was challenged by the tortoise for a race. The tortoise claimed that he would win the race if Achilles give him a small head start (means if Achilles is starting the race from point A then tortoise will start the race from point B a little farther). Achilles laughed at it and agreed for the proposal of a head start of 10 meters for the tortoise. Achilles told that he would easily overtake the tortoise in a very little time, as he was a very fast runner. But, on the contrary tortoise said "Achilles! You are not going to win the race; I can prove it to you by a simple argument." Achilles asked "how?"

Tortoise said "If I start 10 meters ahead of you then by the time you reach the position Where I initially started, I would have travelled a further small distance. And then again by the time you reach the point where I was last time, I would have again travelled a further small distance. And every time you reach the point where I was, I will continue to move even just an infinitesimal distance further forward than you. In fact you will never be able to overtake me." And so you can never catch up" the tortoise said sympathetically Achilles could not find a way to counter him. "You are right" said Achilles sadly and conceded the race.

Is Achilles going to lose the race? And that's the paradox.

If we think in a certain way the tortoise was right, but in our actual life we see similar situations but the result differs from the argument of tortoise. For example, we see that a car which is traveling faster than another car can easily overtake after traveling some distance. So, what is the "flaw in the logic?" What is the solution to it?



To solve this we need to construct this problem in a mathematical manner. In ancient time the Greek did not have the mathematical way to solve these kind of problems.

For this, let Achilles starts from point *A* and the tortoise starts 10 meters ahead i.e., from point *B*. To keep it simple assume that Achilles is 3 times faster than the tortoise. So by the time Achilles reaches the point *B*, the tortoise travels the distance of one third of 10 meters i.e. reaches at point *C*. And again by the time Achilles reaches the point *C* the tortoise travels the distance (10/3)/3 = 10/9 meters and reaches to point *D*, and the process continues.

So we add up all the distances covered by the Achilles. Let the sum of all the covered distance be denoted by S.

$S = 10 + 10/3 + 10/9 + 10/27 + \ldots\ldots\ldots$
$= 10 (1 + 1/3 + 1/9 + 1/27 + \ldots\ldots\ldots\ldots)$
$= (10/3)(3 + 1 + 1/3 + 1/9 + \ldots\ldots\ldots\ldots)$
$= (10/3)(3 + S/10)$

This implies, $3S = 30 + S$

Hence $S = 15$

So the Achilles Would have been overtaken the tortoise after 15 meters.

The logic of the tortoise looks fair but the surprising thing is the nature of that Infinity. Because although there is an infinite number of steps those infinite number of steps are combined in a Finite distance. At first this may seem impossible: adding up an infinite number of positive distances should give an infinite distance for the sum. But it doesn't – in this case it gives a finite sum; indeed, all these distances add up to 15. So in 15 meters Achilles is going to overtake the tortoise but according to the argument it's going to take him an infinite number of steps in order to do that. That is why the task looks impossible which is actually possible. So, what the paradox shows is that we can have infinite partitions of something which can be bounded. And we can get the idea of convergent series as well.

HOW TO BEGIN A FRESH START AS A PROGRAMMER

Compiled By – Jai Shree
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Nobody becomes good in something without hard work and efforts, My self Jaishree, I have been coding from last 4 years. And sometimes I feel like, I don't know anything about it. And somedays when I get the output, I feel great. Depends on the learning curve. For eg,
I have taken courses on udemy , udacity , coursera etc.

I have tried multiple languages (python,C++, C, JAVA, JAVASCRIPT, PHP etc).

I was not noob, but was a beginner to be considered I have planned my journey to be proficient in programming. I just make sure, I keep on learning something new every day. Coding is hard, but anybody can learn to code by just being consistent. As a newbie, I always used to search for good mentor who could direct me the path, but eventually lockdown happened and I had to surf everything by my own on google. So here I am the senior I always wanted a junior.

First of all, "Hello world" to all the students, and specially to those who are nervous about starting their new journey via Computer secience to the booming IT sector. Just to direct you one of the paths which made me confident in programming, first is that be efficient at it, I preferred to do these:

Asking:
Asking other programmer their view on the same problem.

Checking:
Checking if their code is better than me.
Checking google for any problem.

Asking:
If the code is better, then ask some more questions related to the problem, if any, and other codes from other programmers and see their practice to be a pro.

And along with it one should never lose the track of PATIENCE and PRACTICE.

There comes a lot of bugs when doing coding. You get disappointed with your own work, but that's an important part of becoming a pro programmer. Need to have patience. Most importantly start with the oldest language, yes! you heard it right never ever start your learning with the easiest programmin language, try to start with C/C++/JAVA, then Brush-up your Data structures and algorithm in java, some honorable mentions are online website, Tutorials point, w3school etc., these websites will have your back as a learner or even for working professionals. And after learning a language and DSA, you will be confident and would also have strengthen your logics, but that's not the end, now you need to try to solve as many programming questions in leetcode, codechef or hacker rank or any competitive coding sites you prefer. Here, now you are perfectly ready to jump into any domain like android or web developer, designer, etc. with all the basic things you need, now think of what you are interested in and choose a good course enroll and start working on your domain, try to do internships just after you are done with the project works.

Thank you for reading this far,
keep learning, keep growing.

BRAIN TUMOR CLASSIFICATION USING MACHINE LEARNING

Compiled By Bhushan Kashyap
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Machine Learning :-

"The field of study that gives computer the ability to learn without being explicitly Programmed"
- Arther Samual (1959)

WHAT IS CLASSIFICATION ?

Classification is a process of categorizing a given set of data into classes. Classification is the process of predicting the class of given data points. Classes are sometimes called as targets/ labels or categories.

WHAT IS TRAINING AND TESTING?

There are two basic steps for using the classifier: training and Testing. Training is the process of taking content that is known to belong to specified classes and creating a classifier on the basis of that known content. Testing is the process of taking a classifier built with such a training content set and running it on unknown content to determine class membership for the unknown content. Training is an iterative process whereby you build the best classifier possible, and classification is a one-time process designed to run on unknown content.

WHAT IS BRAIN TUMOR ?

A brain tumor is a mass or growth of abnormal cells in your brain. A Brain tumor is considered as one of the aggressive diseases, among children and adults. Brain tumors account for 85 to 90 percent of all primary Central Nervous System (CNS) tumors. Every year, around 11,700 people are diagnosed with a brain tumor. A brain tumor can form in the brain cells (as shown), or it can begin elsewhere and spread to the brain. As the tumor grows, it creates pressure on and changes the function of surrounding brain tissue, which causes signs and symptoms such as headaches, nausea and balance problems. Brain tumor dataset taken from kaggle data repository.

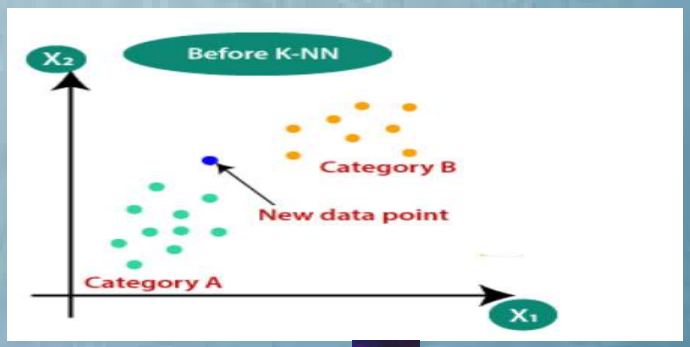
WHY DO WE NEED BRAIN TUMOR CLASSIFICATION ?

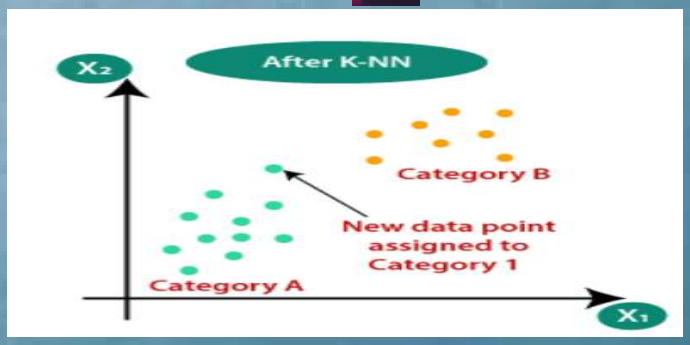
Brain Tumor image classification is an important part of medical image processing. It assists doctors to make accurate diagnosis and treatment plans. Magnetic resonance (MR) imaging is one of the main imaging tools to study brain tissue.

Used Classification Algorithms

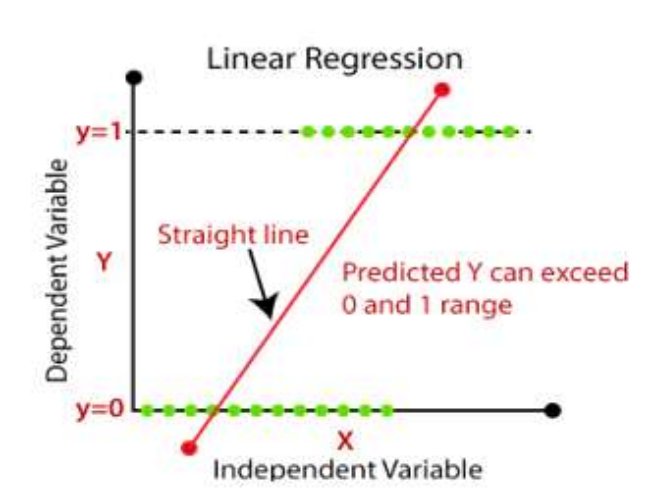
1. K-Nearest Neighbour

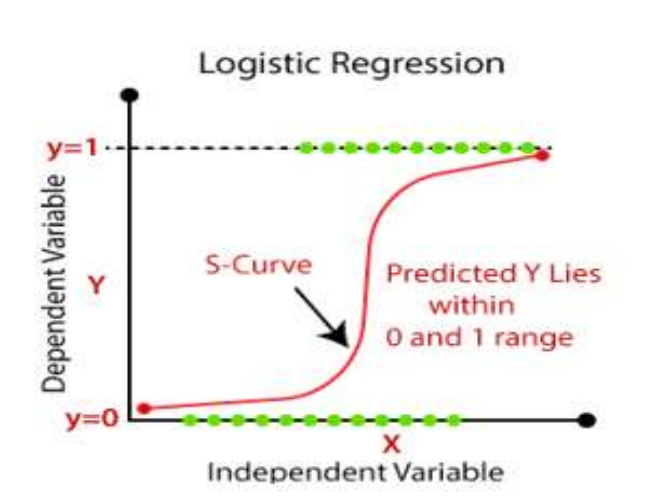
KNN finds nearest points of new data based on Euclidean distance .New data is assigned to the class whose points are more.



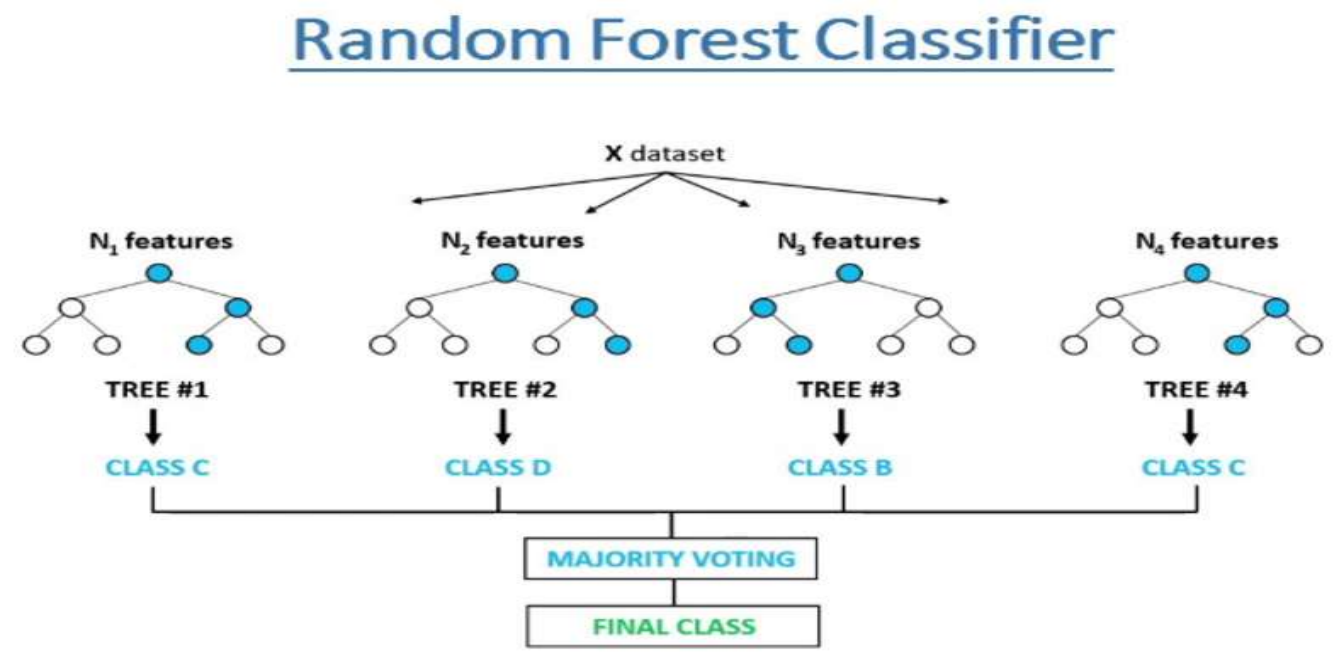


2. Logistic Regression Algorithm :- Logistic regression uses an equation as the representation, very much like linear regression. Input values (x) are combined linearly using weights or coefficient values (referred to as the Greek capital letter Beta) to predict and output value (y).





*3.**Random Forest :-*** Random forest is a supervised learning algorithm. random forest builds multiple decision trees and merges them together to get a more accurate and stable prediction.



CLASSIFICATION STEPS AND WORKING:-

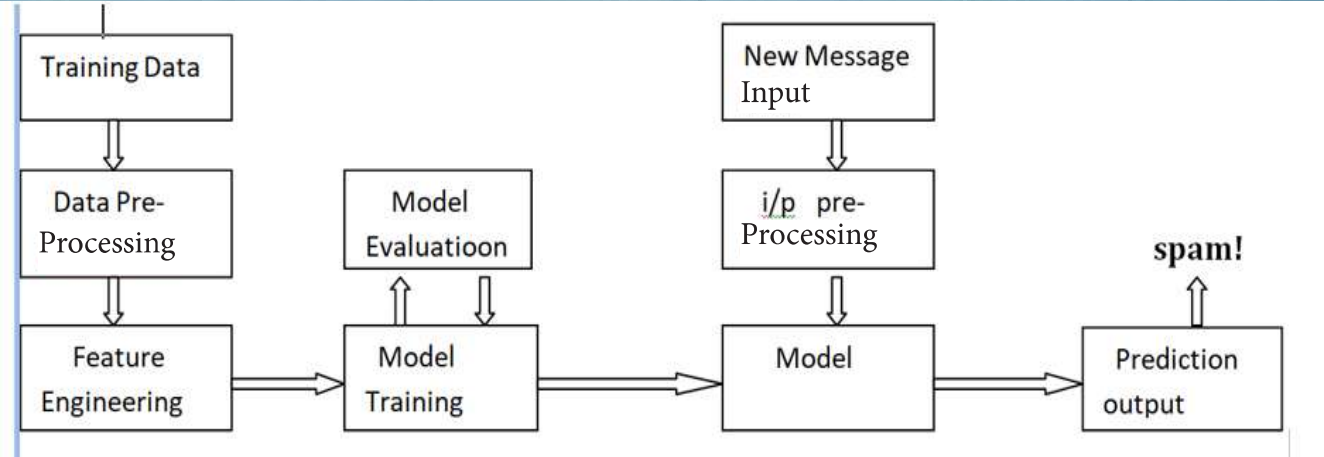


Table-I : Confusion Matrix

Model	Confusion Matrix
KNN	[[6, 0], [0, 5]]
Logistic Regression	[[6, 0], [0, 5]]
Random Forest	[[6, 0], [0, 5]]

Table-II : Accuracy of testing dataset

Model	Accuracy	Precision	Recall	F1-score
KNN	100%	100%	100%	100%
Logistic Regression	100%	100%	100%	100%
Random Forest	90%	92%	92%	91%

Confusion Matrix

Confusion matrix gives us a matrix as output and describes complete performance of the model.

Accuracy

Machine learnig model accuracy is the measurement used to determine which model is best at identifying relationship and patters between variables in a dataset based on the input or training, data.

Precision

It is also an indicator for the quality of a positive prediction made by model.It is the ratio of number of true positives and number of total positive predictions.

Recall

Recall literally how many of the true positive were recalled (found), i.e. how many of the correct hits were also found.

F1-Score

F1 score is one of the most important evaluation metrics in machine learning . It elegantly sums up the predictive performance of a model by combining two otherwise competing metrics – precision and recall.

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- S Deepak, PM Ameer - Computers in biology and medicine, 2019 - Elsevier

GOLDEN RATIO

Compiled By DUSMANT NAIK
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Introduction:

The Golden ratio is a mathematical ratio. It is generally found in Art, Music, Animals, Plants, Humans, Nature, Maths etc. Golden ratio is $\frac{1+\sqrt{5}}{2}$. It is also called golden mean, golden cut, golden number or phi i.e., ϕ.

Derivation:

The quantities *a* and *b* are said to be in golden ratio ϕ if $\frac{a+b}{b}=\frac{a}{b}=\phi$, a > 0, b > 0. To determine the value of ϕ, we calculate the following as

$$\begin{aligned}&\frac{a+b}{a}=\frac{a}{b}\\ \Rightarrow\ &1+\frac{b}{a}=\frac{a}{b}\\ \Rightarrow\ &1+\frac{1}{\phi}=\phi\\ \Rightarrow\ &\phi^2-\phi-1=0\\ \Rightarrow\ &\phi=\frac{1+\sqrt{5}}{2}.\end{aligned}$$

Approaches from Fibonacci sequence:

We can find the Golden ratio ϕ as the limit of ratio of successive terms of the Fibonacci sequence. We consider the Fibonacci sequence as

$$F_1=1, F_2=1, F_{n+2}=F_{n+1}+F_n\ ,\forall\ n\in N\Rightarrow 1,1,2,3,5,8\ldots\ldots \textit{So } \phi \textit{ is } \lim_{n\to\infty}\frac{F_{n+1}}{F_n}$$

Let us calculate the value of ϕ. So for this we have to prove some requirements.

Take $G_n=\frac{F_{n+1}}{F_n}$ be the sequence of ratios of consecutive Fibonacci numbers, then

1. $F_n.F_{n+2}-F^2{}_{n+1}=(-1)^{n+1}, \forall n\in N,$
2. $\{G_{2n}\}$ is a decreasing sequence and bounded below,
3. $\{G_{2n-1}\}$ is an increasing sequences and bounded above,
4. The sequence G_n converges and $\lim_{n\leftarrow\infty} G_n=\frac{1+\sqrt{5}}{2}$

Proof:

1) We will proof it by mathematical induction. We have

$F_n.F_{n+2}-F_{n+1}^2=(-1)^{n+1}\ \forall n\in N, At\ n=1, F_1.F_3-F_2^2=(-1)^{1+1}\Rightarrow 1=1.$

Let us assume that it is true for n = k for k $\in$ N.

Now to show that it is true for $n=k+1, F_{k+1}\cdot F_{k+3}-F_{k+2}^2=(-1)^{k+2}$

$$\begin{aligned}F_{k+1}\cdot F_{k+3}-F_{k+2}^2&=F_{k+1}\cdot(F_{k+2}+F_{k+1})-F_{k+2}^2\\&=F_{k+1}^2-F_{k+2}(F_{k+2}-F_{k+1})\\&=F_{k+1}^2-F_{k+2}F_k\\&=(-1)^{k+2}.\end{aligned}$$

So, this relation holds.

2) Now to show that G_{2n} is a decreasing sequence.

$$\begin{aligned} G_{2n} - G_{2n+2} &= \frac{F_{2n+1}}{F_{2n}} - \frac{F_{2n+3}}{F_{2n+2}} \\ &= \frac{F_{2n+1}F_{2n+2} - F_{2n+3}F_{2n}}{F_{2n}F_{2n+2}} \\ &= \frac{F_{2n+1}(F_{2n+1} + F_{2n}) - F_{2n}(F_{2n+2} + F_{2n+1})}{F_{2n}F_{2n+2}} \\ &= \frac{F^2_{2n+1} - F_{2n}F_{2n+2}}{F_{2n}F_{2n+2}} \\ &= \frac{(-1)[F_{2n}F_{2n+2} - F^2_{2n+1}]}{F_{2n}F_{2n+2}} \\ &= \frac{(-1)^{2n+2}}{F_{2n}F_{2n+2}} \\ &= \frac{1}{F_{2n}F_{2n+2}} > 0. \end{aligned}$$

$So, G_{2n} > G_{2n+2}, \forall\ n \in N. Hence, G_{2n}$ is a decreasing squesnce. Now to show that it is bounded below, $G_{2n} = \frac{F_{2n+1}}{F_{2n}} = \frac{F_{2n} + F_{2n-1}}{F_{2n}} = 1 + \frac{F_{2n-1}}{F_{2n}} > 1, \forall\ n \geq 1. So, G_{2n}$ is bounded below by 1.

3) Now to show that G_{2n-1} is an increasing sequence.

$$\begin{aligned} G_{2n+1} - G_{2n-1} &= \frac{F_{2n+2}}{F_{2n+1}} - \frac{F_{2n}}{F_{2n-1}} \\ &= \frac{F_{2n+2}F_{2n-1} - F_{2n}F_{2n+1}}{F_{2n+1}F_{2n-1}} \\ &= \frac{F_{2n-1}(F_{2n+1} + F_{2n}) - F_{2n}(F_{2n} + F_{2n-1})}{F_{2n+1}F_{2n-1}} \\ &= \frac{F_{2n-1}F_{2n+1} - F^2_{2n}}{F_{2n+1}F_{2n-1}} \\ &= \frac{(-1)^{2n}}{F_{2n+1}F_{2n-1}} \\ &= \frac{1}{F_{2n+1}F_{2n-1}} > 0, \forall\ n \epsilon N \end{aligned}$$

So $G_{2n+1} - G_{2n-1} > 0$. Hence G_{2n-1} is an increasing sequence. Now to show that it is bounded above.

$$G_n = \frac{F_{n+1}}{F_n} = \frac{F_n + F_{n-1}}{F_n} = 1 + \frac{F_{n-1}}{F_n} \leq 2, \forall n \geq 2.$$

So the sequence G_n is bounded above. So every sub sequence is bounded above.
So G_{2n-1} is also bounded above by 2.

4) By monotone convergence theorem both complementary sub-sequences are monotone and bounded. So, they are convergence. Suppose $G_{2n} \to l$ and $G_{2n-1} \to m$. Now, we have to proof that $l = m$. So, for this

$$\begin{aligned} G_{2n} - G_{2n-1} &= \frac{F_{2n+1}}{F_{2n}} - \frac{F_{2n}}{F_{2n-1}} \\ &= \frac{F_{2n+1}F_{2n-1} - F^2_{2n}}{F_{2n}F_{2n-1}} \\ &= \frac{(-1)^{2n}}{F_{2n}F_{2n-1}} = \frac{1}{F_{2n}F_{2n-1}} \end{aligned}$$

Since, F_n is an unbounded and increasing sequence. So, we can make the denominator of the preceding

fraction arbitrarily large and consequently $G_{2n} - G_{2n-1}$ arbitrary small. Let l, m are two different limits and

$$\epsilon = |l - m|. \text{ Since, } G_{2n} \to l \Longrightarrow \exists\, n_1 \in N \text{ s.t } |G_{2n} - l| < \frac{\epsilon}{3}, \forall\, n \geq n_1.$$

$$\text{Similarly, } G_{2n-1} \to m \Longrightarrow \exists\, n_2 \in N \text{ s.t } |G_{2n-1} - m| < \frac{\epsilon}{3},$$

$$\forall\, n \geq n_2 \text{ and } \exists\, n_3 \in N \text{ such that } |G_{2n} - G_{2n-1}| < \frac{\epsilon}{3}, \forall\, n \geq n_3.$$

Let $N = \max\{n_1, n_2, n_3\}$,

then $\epsilon = |l - m| = |l - G_{2n} + G_{2n} - G_{2n-1} + G_{2n-1} - m|$

$\leq |l - G_{2n}| + |G_{2n} - G_{2n-1}| + |G_{2n-1} - m| < \frac{\epsilon}{3} + \frac{\epsilon}{3} + \frac{\epsilon}{3} = \epsilon,$ which is a contradiction. This shows that the complementary sub-sequences G_{2n} and G_{2n-1} are convergent at the same point. So, the sequence G_n will converge. $G_n = \frac{F_{n+1}}{F_n} = \frac{F_n + F_{n-1}}{F_n} = 1 + \frac{F_{n-1}}{F_n} = 1 + \frac{1}{G_{n-1}}$

$$\Rightarrow G_n = 1 + \frac{1}{G_{n+1}}.$$

$$\text{Let } \lim_{n\to\infty} G_n = k. \text{ So } \lim_{n\to\infty} (1 + \frac{1}{G_{n+1}}) \Rightarrow k = 1 + \frac{1}{k}$$

$$\Rightarrow k^2 - k - 1 = 0$$

$$\Rightarrow k = \frac{1 + \sqrt{5}}{2}$$

So, the sequence Gn is convergent and converge to $\frac{1 + \sqrt{5}}{2}$.

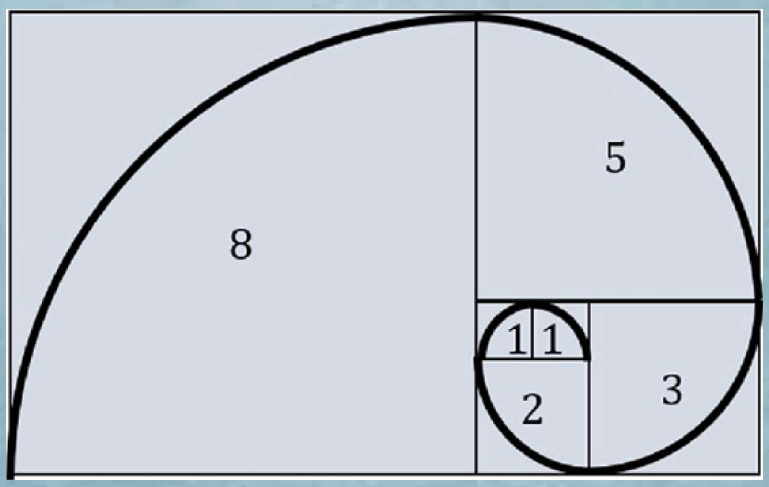

Figure: Golden Spiral

It is interesting to note that the Fibonacci sequence associated to Golden spiral. We have the Fibonacci sequence as 1,1,2,3,5,8, ...The spiral found in Architecture, Nature, Music etc.

According to the 'Golden Ratio' measurements Bella Hadid has a face that is 94.35 percent perfect. She is the worlds beautiful women as per science.

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0!

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Mathematics

It is the incredible area of knowledge, which includes the study of such topics as numbers, great combination of numbers, thrilling ideas and tempting questions.

I think that the Maths is exciting as it reveals the fact which is least expected or not expected. Recently I came to know the story of 0!. This may not sound very interesting question but believe me we will be in love with maths once we will come to know about this simple yet not so simple question.

So this exclamation looking symbol is a Mathematical operation factorial which means to multiply a series of descending natural numbers.

For example 5! =5*4*3*2*1 = 120

Now we take it as a fact that 0! = 1 but what`s funny is that how can we decrease a number till 1 which is already less than 1.

So to decode this let us all do a mental exercise.

So let`s calculate what is 6!, 5!, 4!, 3!, 2!, 1!.-

So 6! = 6*5*4*3*2*1=720
5! = 5*4*3*2*1 = 120
4! = 4*3*2*1 = 24
3! = 3*2*1
2! = 2*1
1! = 1

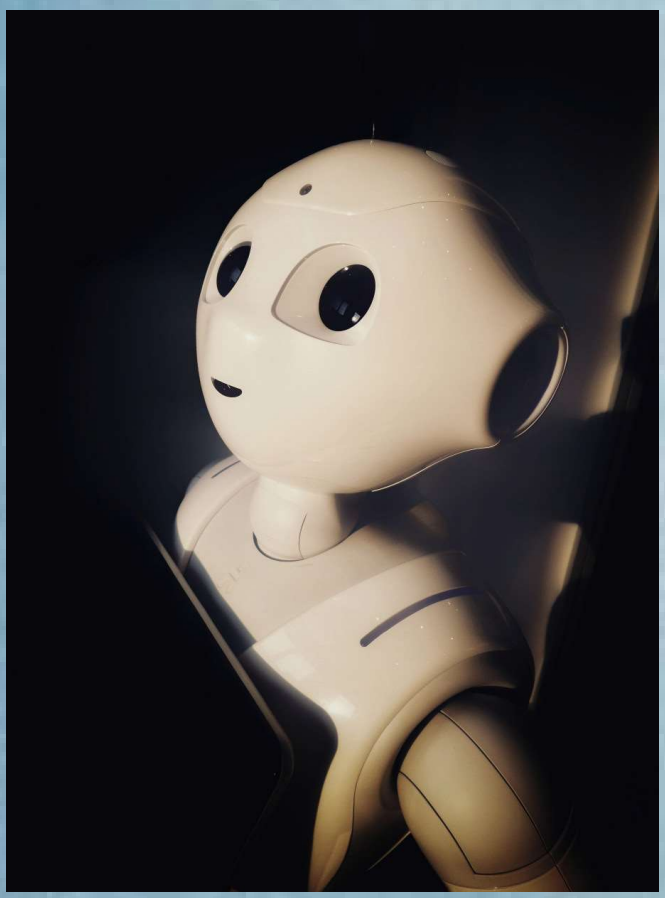
Now if we look into this 5! Is nothing but 6!/6 and 4! Is 5!/5. Similarly 2!= 3!/3 and 1!= 2!/2 and if we move towards 0! Then we get it as 1!/1 i.e. 1. This is how unexpectable that multiplying nothing we get 1. Isn't it beautiful?

Biblography: Wikipedia

EVOLUTION GYM SHAPES NEW ROBOT BODY AND BRAIN

Compiled By SIMRAN JHA
MCA 1st Semester CSIT

Robotics are often Copy nature Create a humanoid robot for housework, a worm-style machine for crawling tunnels, and a four-legged gimmick that looks like a cheetah for running and jumping. However, they usually first design an animal-like robot body and then train AI to control it. However, in living things, the body and brain evolve together to tackle complex tasks. That's why some researchers borrow pages from nature playbooks to design intelligent and adaptable robots.



In the latest example, an evolutionary robotologist at the Massachusetts Institute of Technology created a virtual environment in which algorithms can design and improve both the physical shape of soft robots and their controllers to evolve at the same time. In this digital space Evolution gym The algorithm can develop robots for more than 30 different tasks such as block hauling and pushing, backflip, barrier scaling, shaft climbing, and more. When MIT researchers used their own algorithms in their programs, the software developed robots that were more effective than humans for all assignments.

"The future goal is to perform every task and say,'Design the best robot to complete this task,'" said Jagdeep Bhatia, an undergraduate student at MIT's Institute for Computer Science and Artificial Intelligence. He presented his research at a conference on neural information processing systems on December 9th.

Evolution Gym relies on two algorithms to bounce the results back and forth. First, the design optimization algorithm "generates a bunch of random robot designs," says Bhatia. The algorithm combines up to 100 individual building blocks to create each soft robot. Building blocks are rigid or flexible and can move vertically or horizontally. The design of these patchwork then moves on to control optimization algorithms. This algorithm creates a "brain" for each robot, allowing it to perform specific tasks. This controller calculates the timing and amount of activation of each block (for example, the distance and frequency at which the horizontal moving blocks operate), and all work together to move the robot as needed. The various bot designs then try the tasks assigned to them in the Evolution Gym, the control optimization algorithm measures their performance, and the score is returned to the design algorithm.

Enter the principle of evolution. Design algorithms discard non-conforming configurations and "maintain the most fitted designs and make minor changes to see if they perform even better," says Bhatia. This continues, the robot moves from the design algorithm to the controller algorithm, tests it in the Evolution Gym environment, and returns to the design algorithm again until the system converges to the highest score. This process gives you the design and control to perform the task, or the optimal combination of body and brain.

HOME SMART HOME

Compiled By Tushar Kashyap
MSc 1st Semester CSIT

Ooo, Something's different Here

What do I mean by Smart?,

Ok let me tell you a story. Imagine you're an employee of an IT company. And It's 10 O'clock in the morning and you hear a voice saying "Wake Up Sir, You're late for Office, Again". Guess who it is, it's your Home Automation System(You can call her "Alexa" By the way). You rushed out of your bed and you see your Coffee has been prepared and ready to drink. Then you freshen up and now you're walking down the stairs while your car drives itself out of the garage right in front of your doorstep, SURPRISE. And then as you're making yourself comfortable at your back seat while your car is on its way to your Office(Still driving itself). And your Automation System(Also "Alexa") can tell your boss that you're stuck in the traffic so your boss won't get all worked up.

Well this is not just a Smart Home it's a Smart Car, Smart City. you get the idea. And it's possible by IoT(Internet of Things).

The Concept of IoT is to interconnect all of your devices and communicate with each other. So Alexa, Your Car, Your Coffee Machine, Your Phone all communicating with each other to provide you the best experience possible.

Sounds like a Sci-fi Movie right? But trust me it can become a reality. There's already IoT Devices exist that can turn your home into a Smart Home. Like Smart Surveillance System that you can fully control with your phone, then there's Smart Lock, Smart Light, Smart Air Conditioner, and heck there's also a device that can open your window curtains in the mornings.

IoT can really help in many fields like:

1. Electrical Grid Industry, Autonomous Machine that can reduce human labor.
2. Smart Cities, Driverless cars are possible with smart cities.
3. Health care, Your doctor can monitor your health all the time and can warn you when there's a problem.

But it's not that simple!

Just like Uncle Ben And Aunt May(In No Way Home) told us, "With great power comes great responsibility."

IoT has Some real Issues, like if machines become autonomous there'll be more unemployment. And what if someone else who is not your doctor will have your health related details. And let's not talk about what will happen when all cars in the city will get hacked at the same time. Terrifying.

And there's already many cases of people's home surveillance cameras being hacked. A family was being watched through Nest Security Camera(reported by CBS Chicago). Creepy right?

Ok, So IoT is dangerous then why even is it a thing?

Well, it's dangerous for now and until someone finds a way to fill the gap for security. IoT is the Future.

And Google(Nest), Amazon(Ring), Microsoft-(Azure IoT) all these big companies are already working on IoT. As for now there are more than 12 billion active IoT devices and it is estimated that we will have 30 billion active devices by 2025(data by www.statista.com).

Some people argue that with block-chain technology we can secure IoT devices. I personally am really fascinated about the IoT, I want IoT to become a Real Deal.

LET'S HOPE FOR THE BEST.

List of Achievers from CSIT

VEENA SHUKLA From Bsc Cs Hons Vi Semester.
1.First in School level (School of mathematical and Computational Science)
2.Second in University level
3.First in Zonal level (including all Central University of India)
- And got selected for National level National Environment Youth Parliament 2022 which is going to be held on 16th April 2022 in Parliament of India.

Tannu Kumar Soni
UGC-NET & JRF December 2020 & June 2021

DURGA
UGC-NET December 2020 & June 2021

Vimal Dungdung
UGC-NET December 2020 & June 2021

Bhupendra Kumar Dewangan
JRF & Ugc-Net December 2020 & June 2021
Gold Medal Msc Computer Science
Persuing For Higher Marks (2022)

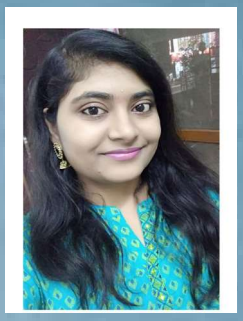
Manikant mahto
Placement in InerBizz (2022)

Abhishek Patel
Placement in InerBizz **(2022)**

List of Achievers from MATHEMATICS

Himanshu Chandrakar
CSIR NET 2021-JRF, AIR 150

Dusmant Naik
CSIR NET 2021-JRF, AIR 207



Gunjan Dewangan
GATE 2022, AIR 1389
CSIR NET 2021- LS, AIR 82

Salina Patra Cleared NET(LS)
AIR- 85 and GATE 2022 AIR-1461

Salina Patra Clearing NET(LS)
AIR- 85 and GATE 2022 AIR-1461

Pankaj Yadav Cleared CSIR Net (Air 91) And Gate (Air 2131)

Veena Behra
GATE 2022, AIR 413

Ayush Choubey
GATE 2022, AIR 1259

Akash Pradhan
GATE 2022, AIR 2723

Sheetal Prasad Thawait
IIT JAM 2022- AIR 343

Rudradev Dansena
IIT JAM 2022- AIR 913

Manisha Choudhary
IIT JAM 2022- AIR 1221

List of Achievers from MATHEMATICS

Bhavishya Kumar Dewangan

- Guru Ghasidas swarn mandit padak for highest score in all exams (2020).
- Vishwavidyalaya Gold Plated Medal .
- Late smt.Kishori devi Late Shri Murlidhar Pateriya Memorial Gold Plated Medal for getting First position in merit list of M.Sc. (Mathematics) 2020.

Shreya Mishra

- Vishwavidyalaya Medal for securing highest marks in Bsc Mathematics Hons.
- Guru Ghasidas medal for security highest marks in all departments of University.

Shreyan Sharma

- Vishwavidyalaya Medal for securing highest marks in Bsc Mathematics Hons.

EDITORIAL MEMBERS