Name	Title	Abstract
ABDULLAH AHMEDANI	Code Ant: Operation Biryani	In Code Ant - Operation Biryani, I will explain the technical concept of Ant Colony Optimization (ACO), a nature-derived algorithm for the shortest path and optimization problems. For demonstration, I will stage a short live act in the class where 2 classmates will play the role of "ants" trying to find the fastest way to the designated biryani point by taking a different way. The one who will return earlier will by default be assumed to have left a stronger pheromone trail. I will choose that path in the next round, as would be the practice of real ants reinforcing the efficient routes used. Finally, I will explain in detail how the ACO algorithm works in computing: how pheromone levels are updated, how ants probabilistically choose paths, and how over time this converges to the optimal solution for the system. All of it will be presented with nice illustrations, examples, and analogies so that even non-technical classmates will easily understand and enjoy the whole thing.
ABDUR REHMAN NASIR	Amortized Analysis: Why and where it might be more beneficial to use over Big O analysis	Since some people might ask "Why must check a single units cost when we can just look at the big picture and be done with it?", I thought that explaining why Amortized analysis is useful in certain scenarios as a way to expand the mind set of finding and identifying particular pain points in an algorithm so that it can be addressed without having to make a new algorithm altogether. This would be the creative potential, digger deeper and finding out particular cost-heavy operations and addressing them. The technical concept I plan to explain is how to reduce the cost of the algorithm by reducing the frequency of expensive operations
AFAF IRFAN	The difference between encryption and hashing and how they are used in information security	so i will start with the defination of both the creative part will be a scenario of a class room where there is a quiz happening in the first slot and a student from that slot will put the answers in a stationary box for his friend encryption will ensure that only he can read it the concept of keys will be used for hashing concept of a literal fingerprint will be used
ALI DETHO	Bellman-Ford Algorithm : Chasing deals, dodging scams.	The Bellman-Ford Algorithm is a method used to find the shortest path in a graph, even when some roads have negative weights. In my creative explaination, I will use the analogy of a traveler trying to find the cheapest route to his home after an unexpected journey.
ALI SIDDIQI	Kolmogorov’s Secret Recipe: Measuring Complexity by Simplicity	Kolmogorov Complexity is a concept from algorithmic information theory that measures the complexity of a string based on the length of the shortest possible program (in a fixed programming language) that outputs it. In other words, it formalizes the idea of how “compressible” or “random” a piece of information truly is. I will explain Kolmogorov Complexity through the lens of everyday messages — particularly using the analogy of writing birthday cards. By comparing repetitive, meaningful, and random-looking messages, I will show how something that looks complicated may actually be simple if it can be described in a short way — and vice versa. The goal is to build an intuitive understanding of how we can define complexity mathematically through minimal description, and how this leads to surprising consequences like uncomputable randomness.

ALINA SIDDIQUI	Greedy Algorithms — "The Candy Jar Dilemma"	Technical Concept: I will be explaining Greedy Algorithms, a fundamental concept in algorithm design. Greedy algorithms work by making the locally optimal choice at each step, with the hope that these choices will lead to a globally optimal solution. While they are simple and efficient for certain problems (like activity selection or coin change with standard denominations), they don't always guarantee the best outcome in every scenario. Creative Aspect: To explain this concept, I will use the analogy of a candy jar at a family gathering. I'll ask the audience to imagine they can only pick one candy at a time from a mixed assortment and always pick the one that looks best at that moment — just like a greedy algorithm. I'll use real or illustrated candy props with hidden "value" labels to demonstrate how this greedy choice can lead to suboptimal results. This playful and familiar scenario will make the concept accessible and relatable to a non-technical audience.
ALINA ZINDANI	"The Heist Code: How Criminals Keep It Real"	Technical Concept: In cryptography, a message authentication code (MAC), sometimes known as an authentication tag, is a short piece of information used for authenticating and integrity-checking a message. In other words, it is used to confirm that the message came from the stated sender (its authenticity) and has not been changed (its integrity). The MAC value allows verifiers (who also possess a secret key) to detect any changes to the message content. (Wikipedia) Brief Description & Creative Aspect: I'll use an analogy called "The Signature You Can't Fake" to convey the idea of Message Authentication Codes (MACs). Two Robbers in a high-stakes heist who distribute written instructions over public channels. They employ a special system of folds, ink markings, and scribbles that operate as secret "signature patterns" because their communications could be intercepted or altered. These patterns vary based on the specifics of the message and a shared rule that only they are aware of. The markers no longer match if even a single word is changed. This creative framing reflects the way MACs function in cybersecurity: the code that is linked to the message is dependent on both the content and a shared key, allowing authenticity to be confirmed and detect tampering without hiding the actual message.
ARBAZ ASIF	Pirate's Pipeline: Cracking the Code of Treasure Traffic	In Pirate's Pipeline: Cracking the Code of Treasure Traffic, I will explain the technical concept of network flow algorithms, focusing on the Ford-Fulkerson method and the Max-Flow Min-Cut Theorem. Using a creative pirate-themed narrative, the audience will follow a crew of pirates attempting to transport treasure from their island (source) to a hidden port (sink) through a network of sea routes with limited capacities. The pirates intuitively apply augmenting paths and backtracking—mirroring how Ford-Fulkerson handles residual networks. The concept of a min-cut is brought to life as the critical bottlenecks that determine the success or failure of their plunder

AREEBA FATIMA	Decoding the Unoriginal Originals	This presentation will explore rolling hash and its role in detecting subtle plagiarism. This will focus on how machines identify content that seems original but closely mirrors existing work, "Unoriginal Originals", where only slight modifications are made to the text.The rolling hash algorithm scans large texts efficiently by generating hash values for small text segments (or windows) and "rolling" through the content. This helps detect patterns and similarities, even when the text isn't an exact match, making it ideal for plagiarism detection. The creative angle treats the rolling hash as a "silent reader" with an exceptional memory, able to recognize when "new" content isn't truly original, offering way to detect similarities.
AZKA AQEEL	You Can't Ctrl+C a Qubit"	Technical Concept: The No-Cloning Theorem in Quantum Computing Description: In classical computing, data can be copied freely — your files, emails, and backups all depend on this. But in quantum computing, a core rule called the No-Cloning Theorem says you can't copy an unknown quantum state. This breaks a basic idea in computer science: that copying information is always possible. It has big implications for quantum memory, encryption, and how we design quantum systems. Creative Aspect: To demonstrate this, I'll conduct a short in-class activity — for example, asking a volunteer to copy a hidden drawing, a folded origami shape, or a whispered sentence, without full access to the original. These will mimic the challenge of copying a quantum state without observing it. Through this hands-on example, I'll connect the class experience to why "Ctrl+C" doesn't work in quantum computing, and how quantum systems solve this using error correction and entanglement.
BILAL AHMED		
FARIS EJAZ	Algorithmic Bias in AI: What are the causes and how to mitigate it	Technical Concept: Algorithmic Bias – Systematic errors in AI systems that lead to unfair or discriminatory outcomes. Causes: Bad Training Data & Bad Algorithmic Design Choices Mitigations: Diverse and Representative Data, BIAS Detection: Impact assessment, Transparent AI & Diverse Engineers: different perspectives to mitigate biases Creative Approach: I will explain this complex technical issue through an interactive storytelling format, comparing AI decision-making to a biased "recipe" that keeps producing flawed dishes. The audience will follow these steps: The Bad Recipe (Training Data Bias) – How skewed ingredients (data) ruin the dish (AI decisions). Wrong labels on spices (data). The Miswritten Instructions (Algorithm Flaws) – How a chef's unconscious mistakes (coding errors) worsen outcomes. The Never-Ending Spice Loop (Feedback Loops) – How reusing bad outputs as inputs makes bias stronger over time. The Taste Test (Bias Mitigation) – How diverse chefs (engineers), better ingredients (data), and recipe reviews (audits) fix the dish.

FATIMA HASNAIN	Flavors of Inference: A Culinary Journey with the EM Algorithm	Description: This presentation introduces the Expectation-Maximization (EM) algorithm, a technique for parameter estimation with incomplete data. The process is illustrated through a culinary metaphor, where inference is likened to a chef refining a recipe based on taste. This creative approach aims to make the E-step and M-step more intuitive. Technical Concept: Expectation-Maximization (EM) Algorithm. Creative Element: Culinary metaphor to explain iterative inference.
FATIMA JAWAID	“Tiny Bag, Big Decisions”	For this creative explanation, I propose to explain the Knapsack Problem, a classic optimization problem in computer science and algorithm design. The technical concept revolves around selecting the most valuable combination of items that can be carried within a fixed capacity — a problem that becomes exponentially complex as the number of items increases. It belongs to a class of problems known as NP-complete, and is often approached using dynamic programming techniques. To make this technical idea relatable and engaging, I will frame it through a fun, everyday scenario: packing a very small but trendy handbag for a night out. With limited space and a long list of “must-have” items (lip gloss, pepper spray, charger, perfume, etc.), the challenge becomes one of value versus size. This relatable dilemma will serve as the metaphor for the computational problem. I will explore how seemingly trivial choices mimic complex algorithmic trade-offs — and how even something as simple as choosing between two lipsticks can be modeled by formal logic and solved through dynamic programming. The aim is to keep the audience engaged through humor, fashion-forward visuals, and real-world relatability while subtly introducing the depth and difficulty of combinatorial optimization.

FIZA HUSSAIN	The Enigma Machine: How a Typewriter Tried to Keep Secrets	The technical concept I propose to explain is the Enigma machine, an encryption device used by Nazi Germany during World War II to send secret military messages. The machine was designed to scramble letters in a message so that it looked like complete nonsense unless you had the exact settings to decode it. Cracking the Enigma was one of the most important breakthroughs of the war and helped lay the foundation for modern computing and cybersecurity. Creative Aspect: To make this concept easy to understand for a non-technical audience, I will explain the Enigma machine by comparing it to a fancy typewriter with a mind of its own. Instead of diving into complex electrical circuits or math, I’ll use everyday analogies such as: A lock with changing keys to explain encryption. Matching pairs of socks to show how plugboards scrambled letters. Rotating dials like combination locks to describe the machine’s rotors.□ This will be presented as a simple story: Imagine you're trying to send a secret message to your friend, but someone might be listening. The Enigma machine helps you hide the message—I'll show how it worked, why it seemed unbreakable, and how brilliant people eventually figured it out using logic and clever problem-solving. By using comparisons to common objects and scenarios (like sending secret notes in class or solving a puzzle box), the audience will be able to grasp the basic idea of encryption and understand why the Enigma was such a big deal—without needing any background in math or technology.

FIZZA ZEHRA	The Reduction Riddle: Why Breaking Encryption Is As Hard As Solving a Puzzle	In this interactive presentation, I will demonstrate a fundamental security proof technique in cryptography known as “security by reduction.” The core idea is that if someone were capable of breaking our encryption scheme—by inverting it without the key—they would also be capable of solving a notoriously hard mathematical problem, such as factoring large numbers (as used in RSA) or solving discrete logarithms (as in Diffie-Hellman). This reduction technique, a cornerstone in modern cryptographic proofs, assures us that breaking the encryption is essentially as hard as solving a problem that has challenged researchers for decades.The presentation begins with an engaging analogy: envisioning the encryption process as a complex maze with many branches. I will introduce a puzzle – essentially a combinatorial challenge that is demonstrably difficult to navigate without a special “key.” The audience will be shown a visual timeline or flowchart, in which one branch illustrates the encryption process, and an alternate branch represents the difficulty of solving the puzzle. This setup underscores the point that if an adversary claims they can decrypt the message without the key, they would, in effect, have found a shortcut through the maze every single time, a feat which defies our current understanding of computational hardness.Throughout the demonstration, I will pose thought-provoking questions to the audience, such as “What if someone claims they can decrypt without the key?” By doing so, I will invite them to consider the implications of such an ability. I will then explain in plain language that if such an algorithm existed—one that could reliably invert the encryption—it could be transformed into an algorithm that solves the hard mathematical puzzle. This connection illustrates that the encryption scheme’s security is not just an arbitrary claim, but a rigorous, formal guarantee grounded in extensive research and the inherent difficulty of the underlying mathematical problems.Without delving into dense equations or technical minutiae, this demonstration will effectively serve as a conceptual “proof” that the encryption scheme is robust. By reducing the problem of breaking the encryption to solving a hard problem, I will show the audience, through intuitive reasoning and interactive elements, why it is accepted that these schemes are secure. The overall narrative will be both engaging and intellectually satisfying, bridging the gap between theoretical cryptography and an accessible, non-technical explanation.

HAMNA INAM ABRO	The Halting Problem’s Cousin: Why Perfect Tile Sets Are a Myth	The topic: Reducing the TILES problem to HALT problem : Using the Turing machine for HALT-TM as a subroutine in the Turing Machine for TILES-TM to show that if HALT were decidable then so would be TILES. The technical concept: Turing-reducibility The Halting Problem (HALT-TM): This is the problem of determining, given a Turing machine and an input, whether the machine will eventually halt (finish computation) or run forever. No algorithm can solve this problem for all possible inputs and Turing machines. The Tiling Problem (TILES):Given a finite set of colored tiles C (1×1 squares with colored edges), determine if it can fill any n×n square for every positive integer n, where: Tiles must snap together (matching colors on adjacent edges) Tiles cannot be rotated Each tile type can be used unlimited times Every n×n square must be perfectly fillable with tiles from set C The Reduction: My presentation will demonstrate how the TILES problem can be Turing-reduced to HALT. I'll show how to construct a Turing machine for TILES-TM that uses HALT-TM as a subroutine. If we had a magical algorithm that could solve the halting problem (HALT-TM), we could use it to build another algorithm that solves the tiling problem (TILES-TM). Since we know HALT-TM is undecidable, this proves TILES must also be undecidable. Creative aspect: possible use of animations + might use paper/board drawings + analogies
HUSSAIN ABBAS	Godel incompleteness	Explore what godel expressed in his incompleteness theorem and make it understandable to a layman. highlighting his findings and developments
HUZAIFA AHMED KHAN	API (Application Programming Interface)	Technical Concept: An API is a way for two programs to talk to each other. It lets one app ask another for data or to do something, like getting weather updates or logging in with Google. Brief Description: I will explain what an API is, how it works using requests and responses, and give a simple example like using a weather API to get today’s forecast. Creative Aspect: I'll use a basic “restaurant” analogy on the board or paper: the customer is the user, the waiter is the API, and the kitchen is the server. It’s a simple and clear way to show how APIs work
KANZA SAUD	The Birthday Paradox (Cryptographic Collisions)	Brief description: - Discuss the idea of hash collisions due to the pigeonhole principle, an infinite number of possible inputs and a finite number of hash values. - Potential risks proposed in cryptographic applications. - Explaining the Birthday Paradox as a famous probability problem suggesting two out of 23 people in a group having chance > 50% of sharing same birthday. - Mathematical Proofs and explanations. - Connections with Cryptographic Collisions. - Discussing Birthday Attack. Technical Concept: Cryptographic Collisions & Probabilities Potential Creative Aspect: Animations, Using the Birthday Paradox, Story, Simplified Mathematical Proof, Real World Connections

MAHAM JUNAID	Lottery Ticket Hypothesis	In this presentation, I will explain the Lottery Ticket Hypothesis, an interesting idea in neural networks. It suggests that inside big, complicated neural networks, there's actually a much smaller network — like a hidden "winning ticket" — that can do just as well on its own if trained properly. This is surprising because it means we might not need such large networks after all, and we can save time and resources by finding these smaller parts. For the creative part, I will compare this to winning a lottery: out of millions of tickets, only a few are winners. Similarly, out of all the possible connections in a neural network, only a small set is truly important. I will use simple visuals and fun storytelling to show how this works, and explain in an easy way how researchers "find" these winning tickets inside neural networks. I'll also connect this to what we've learned in DAA by talking a bit about the algorithms used to discover these smaller networks.
MAHNOOR ADEEL	"I just want ATTENTION!!"	I'm working on a creative explanation of the self-attention mechanism in ML by relating it to how we scroll through social media. The idea is to use this everyday behavior to intuitively explain how transformer models assign importance to different parts of a text sequence.
MARYAM IHSAN	File Carving and Signature Analysis in Digital Forensics	In this creative explanation, I will break down the technical process of file carving, a forensic technique used to recover deleted or fragmented files from digital storage. The core concept involves using file signatures, unique identifiers embedded in file types, to locate and reconstruct files without relying on the file system's metadata. I will explain how forensic tools identify these signatures and use them to locate the start and end of fragmented files, allowing investigators to reconstruct them and recover lost or hidden evidence. The creative aspect of this presentation will focus on demonstrating how this technique works in practice, using visual examples to show the step-by-step process of recovering data and highlighting the challenges involved, such as dealing with file fragmentation and avoiding false positives. The technical concept being explained is file carving and signature analysis in the context of digital forensics.
MINAHIL SIDDIQ		
MUHAMMAD AHSANUDDIN AHMED	Dijkstra's Algorithm	I will be explaining Dijkstra's Algorithm, a classic graph-based algorithm used to find the shortest path from a source node to all other nodes in a weighted graph. It is commonly applied in network routing, GPS navigation systems, and other scenarios where optimal pathfinding is crucial. Creative Aspect: To make the explanation engaging and accessible for a non-technical audience, I will present the algorithm through the lens of a food delivery scenario in a city. The city will be modeled as a map with interconnected locations (nodes), and the roads between them will have different travel times (edge weights). I will narrate the story of a food delivery rider attempting to deliver an order in the shortest possible time, making real-time decisions to avoid longer routes or traffic delays. Through this analogy, I will highlight how Dijkstra's Algorithm systematically explores all possible routes, always choosing the next most promising (least-cost) option until it reaches the destination. Visual aids such as a simplified city map and delivery route diagrams will be used to make the process intuitive and memorable.

MUHAMMAD BILAL ADNAN	Genetic Algorithms	Genetic Algorithms are a type of optimization technique inspired by the process of natural selection, where a population of candidate solutions evolves over time through operations like selection, crossover, and mutation to find optimal or near-optimal answers to complex problems.
MUHAMMAD HAARIS	"Rubik's Cube Quest for God's Number: Super Flips, Algorithmic Symmetry, and the Shift from Brute Force to Optimized Computation Tightening the Bounds"	In my presentation, I'll discuss the 45-year mathematical journey behind the Rubik's Cube, which led to the discovery of God's Number in 2010—proving that any configuration of the cube can be solved in a maximum of 20 moves. A key milestone in this process was the superflip, a unique state where all edges are flipped, requiring exactly 20 moves, and helping to refine the bounds on the number of moves. With 43 quintillion possible configurations, early attempts like Morwen Thistlethwaite's 52-move algorithm used divide-and-conquer strategies to reduce complexity. The final breakthrough involved distributed computing, which split the problem into 55 billion parts and leveraged symmetry and optimization to confirm that no configuration exceeds 20 moves. I'll also touch on the use of algorithmic techniques like graph traversal, heuristic pruning, and metric flexibility, which are still relevant in fields like AI and cryptography. This journey blends brute force with elegant problem-solving, offering timeless lessons in tackling complex challenges.
MUHAMMAD HAMMAD KHAN	Reservoir Sampling	Reservoir Sampling is an algorithm used to randomly select one item from a stream of unknown number of items, where you cannot store all items in memory and we need to ensure that after the full stream of items is processed, each item has an equal probability of being selected.
MUHAMMAD HAMZA MOOSANI	he Mathematics of Endless Scrolling: How Markov Chains Explain Instagram Reels Spirals	This explanation will explore how Markov Chains, a concept from probability theory, can be used to model the way Instagram Reels recommends content. Each content category can be thought of as a "state," and the system suggests the next video based only on the current state not the full viewing history. Over time, this creates a pattern where users transition from one topic to another in ways that may feel random but are actually quite structured. The explanation will highlight how some topics are more "sticky" than others and how users often end up deep in specific content spirals.Technical Concept: The technical focus will be on Markov Chains, specifically:The idea of discrete states (content categories)Probabilistic transitions between states based only on the current stateThe concept of stationary distributions and how certain states become more likely over timeHow some states can be "sticky" or absorbing, making it hard for the user to move away from certain content typesCreative Aspect: The concept will be explained through a simple narrative following a fictional user moving from one content topic to another. A hand-drawn or minimal visual (like a content transition diagram) will be used to represent how these changes happen. The goal is to make the abstract idea of Markov Chains feel intuitive and relatable by tying it to the everyday experience of scrolling through Reels

MUHAMMAD IBRAHIM FARID	The Fairy That Can’t Be Caught – A Tale of the Halting Problem	Technical Concept: The Halting Problem In this presentation, I will creatively explain the Halting Problem using the metaphor of a magical fairy who reads stories and vanishes if she gets bored. When handed a paradoxical story that contradicts her own predictions, she becomes trapped — symbolizing how self-referential programs cause logical contradictions for any algorithm trying to determine their behavior. The concept is framed as a fairy tale involving a whimsical character — a storytelling fairy — who represents a hypothetical halting detector. □ The idea seems better in my head may not be able to explain here and hopefully till the actual presentation day its more refined
MUHAMMAD MAAZ SIDDIQUI	The P vs NP of Machine Learning: Can a Model Be Trained in Polynomial Time?	The P vs NP problem is one of the most famous unsolved questions in computer science. It asks - Can problems that are easy to verify also be easy to solve? Applying this to machine learning, we explore whether we can train machine learning models (which are complex) in a reasonable amount of time or if they will always require exponentially growing amounts of time to solve as data increases. Creative aspect: We frame this race as a puzzle-solving challenge. For P problems, the human can solve the puzzle in no time, while for NP problems, the machine has to go through an increasingly huge number of steps to find the answer, which becomes exponentially harder as the puzzle (or dataset) grows. This metaphor highlights the challenge of machine learning: Can we train models efficiently, or are we stuck with slow, frustrating growth as data increases?
MUHAMMAD SAAD ALI		
MUHAMMAD USMAN MUHAMMAD SHAFI		
OMAR ASHRAF KHAN	The Impossible Guest List: Outsmarting Infinity	Description: I plan to explain Cantor’s Diagonalization Argument, a proof technique that shows how some infinities are uncountably larger than others. It’s famously used to prove that no list can capture all possible infinite sequences or real numbers. Creative Aspect: I’ll frame this concept as an infinite party guest list, where each guest has a unique endless code. By flipping digits along the diagonal of this list, I’ll create a new “impossible guest” not on the list — revealing the paradox of infinity. □

RAFSHA .	Blueprints Over Bullets: The Heist Logic of Dynamic Programming	I will explain Dynamic Programming (DP)—a smart way to solve complex problems by breaking them down, reusing results, and avoiding repeated work. Key ideas I'll cover: Optimal Substructure – solving smaller parts helps solve the full problem Overlapping Subproblems – same tasks appear again and again Memoization – save answers to avoid repeating work Tabulation – build answers step by step from the ground up State Transition – each decision depends on earlier choices I'll also show how brute force—trying every possible way—is slow and inefficient, while DP gives faster, smarter solutions. Creative Approach: To make these concepts clear and fun, I'll explain them like a heist movie, inspired by Money Heist. Each DP idea will be shown through scenes involving the crew. For example: Planning infiltration = breaking the big problem into smaller ones Repeated alarm patterns = overlapping subproblems Learning fastest routes = memoization Solving tasks in sequence = tabulation Code Cracking Scene: The Professor hacks a security system using Edit Distance DP. He compares two passcodes and finds the minimum changes needed—insert, delete, or replace characters—to match the target. This shows how each step builds on
SAHIL KUMAR	P vs NP problem	Creative angle: A detective can check clues really fast (like verifying a puzzle), but finding the clues in the first place is hard. One day, someone claims to find all the clues instantly… Idea conveyed: P vs NP – is finding a solution as easy as verifying one?
SANA ARSHAD	stable marriage problem (gale-shapley algorithm)	ill be explaining the gale-shapley algorithm which is responsible for making stable pairs , proving that its always possible to pair them up without any rogue pairs , ill be using the stable marriage problem to creatively explain it .

SHAHZAIN ALI KHAN	Monte Carlo Integration	Technical Concept: I will be explaining Monte Carlo Integration, a probabilistic technique used to estimate definite integrals, particularly effective in high-dimensional spaces where traditional methods like trapezoidal or Simpson's rule become inefficient or infeasible. The method relies on random sampling and statistical averaging to approximate the area under a curve or within a region. Creative Aspect: I am still thinking but a raw idea is that, I'll use an interactive analogy involving dart throwing at abstract-shaped dartboards, visualizing how randomness can surprisingly lead to precise results. I'll also contrast it with traditional methods to highlight why Monte Carlo shines in high dimensions. The aim is to turn a dry numerical method into a concept students can visualize, relate to, and remember long after the class is over.
SHARJEEL CHANDNA		
SYED AMMAR ALI ZAIDI	"Exploring the Use of Randomized Algorithms in Cryptography and Security."	Randomized algorithms are a powerful class of algorithms that leverage randomness as a key part of their process to solve problems more efficiently than deterministic algorithms. This project will explore the concept of randomized algorithms and their practical applications in cryptography and security. Specifically, it will focus on how these algorithms are utilized in cryptographic encryption methods, primality testing, and secure key generation. The discussion will cover both Monte Carlo and Las Vegas algorithms, explaining their differences in terms of correctness and efficiency. The project will demonstrate how these algorithms provide solutions for computationally difficult problems while ensuring robust security features. Additionally, it will examine the role of randomization in public-key cryptography and secure multiparty computation. To make the topic more engaging and interactive, I will develop an interactive cryptographic demo where users can input simple messages and see the encryption and decryption process using randomized algorithms in real time. This demo will show how random keys are generated, and viewers will be able to visualize how randomness influences encryption strength and efficiency. Through this hands-on experience, viewers will gain a deeper understanding of the vital role that randomness plays in making cryptographic systems both secure and computationally efficient.
SYED MUHAMMAD ABDULLAH SHABBIR	Dijkstra's Shortest Path Algorithm	Imagine you're a tourist in a new city with lots of places to visit and roads connecting them. Each road takes a certain amount of time to travel. You want to get from your hotel to a museum in the shortest time possible, not necessarily the shortest distance, but the fastest route.
SYED MUHAMMAD HUSSAIN		
SYED MUHAMMAD ROOHALLAH NAQVI	Zero knowledge proofs	
SYED MUHAMMAD SAQLAIN		
SYEDA ZEHRA IMAM		short explanation:

TALHA SHAHID	Infinitely Equal: 0.999... = 1	
UMAIMA RAHEEL	The Royal Puzzle: Prince Hanoi’s Tower Quest [tower of Hanoi problem	
UMAR HUSSAIN		
WASI TAHIR KHAN		You look at all the places you can reach directly from your hotel and note the travel time.
ZAINAB REHMAN	The Great Eid Dinner Save.	
ZEHRA AHMED	“The Group Project You Didn’t Want” – A Guide to Surviving with Fewer Fights	
Aaraiz Masood	The Math Hack That Gets You Home	
Abdul Nafay		You pick the one that’s closest in time and then see what places you can reach from there.
Abdul Rafay	Mo's Magical	
Abdul Wasay Imran	A mathematical approach to generating any type of image of anyone: An introduction to diffusion-based image generation	
Abdullah Iqbal	Network Flow: Mapping the Highways of Efficiency	Network flow algorithms, such as the Ford-Fulkerson method, optimize the movement of "traffic" (e.g., data, resources, or goods) through a network of interconnected "roads" (edges) with limited capacity. This proposal visualizes the algorithm as a city planner designing highways to maximize throughput while respecting bottlenecks. Key Analogies: Graph as a Transportation Network: Nodes = Cities or intersections. Edges = Roads with traffic limits (capacities). Flow = Vehicles or units moving from a source (e.g., factory) to a sink (e.g., market). Ford-Fulkerson as a Traffic Engineer: Augmenting Paths: Detecting alternate routes (even backward paths) to reroute flow and avoid congestion. Residual Networks: Updating road capacities dynamically after each route adjustment. Max-Flow Min-Cut Theorem: Identifying critical bottlenecks (min-cut) that limit overall throughput.

Abdullah Khalid	The difference between encryption and hashing and how they are used in the field of information security.	At every step, you update your knowledge about the fastest way to reach each place.
Abdullah Rehman	Title: The Journey of Packet & Protocol	
Abdus Samad Khalid		
Agha Salik Ali	Trust Me—But I Won't Tell You Why	
Ahmed Murtaza	Whispers in the Proof: Unveiling the PCP Theorem	You never go backward as once you've found the fastest way to a place, you mark it as done.
Aleena Meraj	Moravec's Paradox: Why are machines so smart yet so	
Ameera Ali	The Amazing World of Gumball —	
Ansh Dev Udassi	Discrete fourier transform	
Anushe Ali	Season to Perfection: A Chef's Guide to Gradient Descent	Eventually, you find the fastest route to the museum
Ashal Khan	Karachi Traffic: When the City Chokes — A Story of Bottlenecks and Flow	I plan to explain how traffic congestion in Karachi can be understood using the Max-Flow Min-Cut Theorem from graph theory, by modeling the city's road network as a system of roads (edges) and intersections (nodes). This approach allows us to analyze the movement of traffic from residential areas to commercial zones and identify critical roads (bottlenecks) that limit the overall flow of vehicles. The Max-Flow Min-Cut Theorem helps determine the maximum flow of traffic and pinpoint the smallest set of roads whose congestion would severely impact the city's traffic. The creative aspect lies in applying this complex concept to real-life Karachi traffic, using familiar local roads such as Shahrah-e-Faisal and NIPA. By doing so, I will demonstrate that traffic issues often arise from a few overburdened roads rather than the sheer number of cars. This approach grounds an abstract mathematical theorem in a practical, everyday problem, making it easy to understand for a general audience without the need for technical jargon or equations.
Asna Farooqui		
Farah Inayat	Amortized Analysis – "The Shopping Cart Theory	I will be explaining the concept of Amortized Analysis, a technique used in algorithm design to understand the average cost of operations over time, rather than focusing on the worst-case cost of individual operations. To explain amortized analysis creatively, I will use a grocery store analogy. The story will involve two shoppers: one who returns their cart after every item (representing consistently expensive operations), and another who returns it only once after collecting everything (representing an operation with occasional high costs but low average cost). This analogy will help illustrate how seemingly inefficient steps can actually be efficient when analyzed over time.

Fatima Naeem	The Secretary Problem: What to Do When You Need to Pick One	Brief Description: I will reason out the Secretary Problem, one of the problems in theoretical computer science and mathematics related to optimal stopping theory. The problem involves an employer who wishes to hire the best secretary (or candidate) from n applicants, each of whom is interviewed one by one in a random order. A decision to either hire or reject the candidate has to be made right after the interview, and no recalling of previous candidates is allowed. The main idea that I will have from this is the optimal stopping rule that, quite expectably, proposes the best strategy is to let the first 37% of candidates go and hire the next one who is the best among all previous ones, even if the best one appeared earlier. Creative Aspect: In order to explain it differently, without using lots of technical terms, I will describe the explanation as if a game show hired contest looking for "The perfect Assistant". The head of the family has no regard for entertainment and proceeds to conduct a series of overly caricatured slides of the interviews, refusing to accept great candidates at first but ultimately struggling with regrets to come the final decision.
Fatima Shahid	The Candy Grab: A Visual Analogy for Greedy Algorithms	In this creative explanation, I will use a playful candy-collecting scenario at a birthday party to explain the concept of Greedy Algorithms. The explanation will be structured as a stick-figure comic or slideshow, where different kids use different strategies to grab candy from multiple bowls. The focus will be on one kid who always chooses the bowl with the most candy — representing the greedy approach — and how this compares to another kid who tries to plan ahead for the best long-term gain. This analogy will be used to introduce the idea of greedy decision-making in theoretical computer science, its strengths, and its limitations. I will briefly relate it to real-world algorithmic applications like the Activity Selection Problem, Coin Change, and Minimum Spanning Trees. The final presentation will include simple visuals and narration, aimed at a smart non-technical audience. The goal is to make the idea of greedy algorithms intuitive, memorable, and fun.

Hamna Usman	To Halt or Not to Halt	The Halting Problem is a fundamental concept in computer science that asks whether it's possible to create an algorithm that can determine, for any given program and input, whether the program will eventually halt (finish running) or continue running forever. The problem was proven by Alan Turing to be undecidable, meaning no such universal algorithm can exist. This concept reveals the inherent limits of computation and is a cornerstone in the study of computability theory, highlighting that some problems are inherently unsolvable by machines. To make the Halting Problem more relatable, I'll use the metaphor of overthinking loops—like when you endlessly replay a conversation or decision in your mind, trying to predict an outcome that never fully resolves. Just like these mental loops, where we can't always know when they'll end, the Halting Problem shows that some programs (like some of our thoughts) can run forever without ever reaching a conclusion. This creative approach connects a complex theoretical idea to a common experience, helping make the abstract concept more intuitive and engaging.
Ikhlas Ahmed Khan	Rain in Code	In this project, I will show how to create a rain effect using code. I'll explain step by step how we use loops, arrays, and simple object-oriented programming to make many raindrops fall and move on the screen. The creative part is how we turn a real-life scene like rain into a relaxing visual using just code. It's a fun way to learn how code can bring simple animations to life
Itbaan Safwan	Perlin Noise : Evolving Nature using Randomness (may change the title later)	Perlin noise was one of the foundational algorithm for procedural generation for example terrains in games like minecraft etc. the creative aspect i want to bring is to explain the algorithm without using complicated mathemetical equtaions but instead try to bring self intuition for the algorithm using visual understanding
Izma Khan	The Slowpoke Wins the Loop!	Technical Concept: This presentation explains Floyd's Cycle Detection Algorithm, a method for detecting cycles in linked lists or graphs using two pointers (the tortoise and the hare). It contrasts this efficient approach with the brute-force method, which uses more memory and is less optimal. Creative Aspect: The explanation will be presented in an unboxing style, where I'll introduce the tortoise (the algorithm) and the hare (brute-force) as competitors in a race, highlighting how the slowpoke tortoise wins using fewer resources. The presentation will be humorous and engaging, making the concept fun and easy to understand.
Juweriya Bint Nasir	How to Search Smarter and Sort Faster	I will explain the technical concepts behind various searching and sorting algorithms. The creative aspect of my presentation is using simple real-life examples to show where these algorithms can be applied, which is something I found really interesting when I first learned them. These algorithms aren't just abstract computer science concepts; they can be used to solve everyday problems.

Kisa Fatima	Real or Cake? Decoding GANs	Technical Concept: Generative Adversarial Networks (GANs) consist of two neural networks: a Generator that creates fake data and a Discriminator that tries to detect if the data is real or fake. The Generator improves by learning from the Discriminator's feedback until the fakes are indistinguishable from real data. Creative Aspect: The presentation will start with a "Real or Cake?" game, where the audience guesses whether an object is real or a cake. This mirrors how GANs work, with the Generator creating realistic fakes and the Discriminator detecting them. The cake analogy makes the technical concept of GANs fun and relatable.
Laiba Sajid	The Halting Problem	I will explain the Halting Problem, a concept from theoretical computer science which proves that no algorithm can universally determine whether any given program will stop or run forever. This problem is the notion of undecidability. Since formal proof cannot be used, I ll use some sort of story building or can use 'fictional program prediction machine' that tries to judge whether a set of instructions will ever stop running. When it's asked to predict its own behavior, it runs into a paradox and crashes.
Maheen Muhammad Rizwan	Butterfly Scouts: The Search for the Sweetest Flower	Description of the Topic: The topic I propose to explain is the Butterfly Optimization Algorithm (BOA), a nature-inspired optimization technique that mimics the behavior of butterflies as they search for the best flowers in a field. BOA is a population-based algorithm, where each butterfly represents a potential solution to an optimization problem. The fragrance of the flower represents the quality of the solution, and butterflies are drawn to the stronger scents, which correspond to better solutions.In the algorithm, each butterfly explores the problem space, adjusting its position based on its own best solution (personal best) and the best solution found by the group (global best). Over time, the butterflies collectively converge toward the optimal solution, just as they would eventually flock around the sweetest, most fragrant flower in the field.Creative Aspect: To make this concept relatable, I will explain it through a fun, creative analogy where butterflies are searching for the most fragrant flowers. Each butterfly starts by exploring randomly, discovers flowers with different scents (solutions), and then adjusts its flight pattern based on both its own best-find and the best finds of others. As more butterflies share their discoveries, they collectively hone in on the best flower (optimal solution).
MUDDASIR JAVED	Do two people have the exact same amount of hair?	I'll explain that two people can have exact amount of hair. Then I'll connect it to the pigeonhole principle and finally I'll close it down by converging it all to hashing especially collision. This is tentative though
Muhammad Annas Shaikh	Cellular Automata: Game of Life or Death	Cellular Automata, like Conway's "Game of Life," uses a grid of cells that evolve based on simple rules. Each cell's state is determined by its neighbors, leading to complex patterns over time. The technical concept involves simulating life-like processes, but the creative aspect comes from the unexpected, intricate patterns that emerge, making it a blend of logic and creativity.

Muhammad Hashir Ilyas	"فوٹان کی شرارتیں: کوانٹم چابی کی پوشیدہ دنیا"	We will be focusing on one of the protocols used in Quantum Key Distribution (QKD), explaining how quantum behaviors of subatomic particles such as superposition and entanglement are exploited to create a secure communication channel between two parties. As part of our presentation, we plan to create a small interactive game that will demonstrate how the selected QKD protocol operates in practice. This game will allow users to simulate the process of key distribution, showing how quantum states are used to securely exchange information. Through this, we will highlight the key advantages of QKD, particularly its ability to detect eavesdropping, a feature that classical key distribution methods cannot provide.
Muhammad Ibrahim Ayoubi	handshake protocol	I propose to creatively explain the TCP three-way handshake. I'll explain it with an example which Is like real life example and applicable to most people's life. This will make it easy to understand to layman as well. Making this fundamental networking concept engaging for non-technical audiences while ensuring uniqueness.
Muhammad Ibrahim Iqbal	The Web's Hidden Power: How Markov Chains Decide Who's #1	Technical Concept: In this presentation, I'll be explaining how Markov Chains are used in the PageRank algorithm to rank web pages based on their transition probabilities. The core idea is that web pages are treated as states in a Markov process, and the importance of each page is determined by the probability of navigating to that page from other pages, which depends on the links between them. Creative Aspect: To make the topic more engaging, I'll use a superhero analogy. The web pages are like superheroes in a Marvel-style universe. Some heroes (web pages) are more connected and have stronger alliances (links), while others are more isolated. I'll explain how Markov Chains are like a superhero's network of allies that influences their power ranking, with the idea that more important pages (like Iron Man or Captain America) are linked by many other powerful pages. The creative hook is that we'll see the web as a battlefield where pages fight for their rank and reputation based on their connections, just like superheroes fight for recognition in the Marvel universe. This is tentative to my understanding as of now.
Muhammad Imad Raza	"فوٹان کی شرارتیں: کوانٹم چابی کی پوشیدہ دنیا"	We will be focusing on one of the protocols used in Quantum Key Distribution (QKD), explaining how quantum behaviors of subatomic particles such as superposition and entanglement are exploited to create a secure communication channel between two parties. As part of our presentation, we plan to create a small interactive game that will demonstrate how the selected QKD protocol operates in practice. This game will allow users to simulate the process of key distribution, showing how quantum states are used to securely exchange information. Through this, we will highlight the key advantages of QKD, particularly its ability to detect eavesdropping, a feature that classical key distribution methods cannot provide.
Muhammad Jawad Maqsood	Depth First Search(DFS)	I will use the maze problem and the concept of stacks in it.
Noor Un Nisa Shaukat	How the Internet Works: The Postal System of the Digital World	demonstrating how data is sent over the internet in packets, how they are labelled and how post office routes them.

Qamar Raza	Eulers Path : Explained using the The Königsberg Bridge Problem	The topic is Eulers Path and how it laid the foundations for graph theory. For that, I would have to explain what is a graph and what are the vertices and edges. I plan to use the Königsberg Bridge Problem to explain the vertices and edges using the analogy of islands and bridges and then explain the rules regarding Euler's Path. (I AM ASSUMING NO ONE HAS TAKEN THIS TOPIC. IN CASE SOMEONE ELSE HAS TAKEN it, I PLAN TO SWITCH TO SOMETHING ELSE.)
Ramail Khan	I Know That You Know That I Know: Understanding the Minimax Algorithm	I plan to explain the Minimax Algorithm, a key strategy in game theory and artificial intelligence, used primarily in two-player turn-based games like chess or tic-tac-toe. The algorithm works by assuming both players act optimally: one tries to maximize their own score while the other tries to minimize it. It recursively explores possible future game states and selects the move that leads to the best guaranteed outcome. The creative aspect of my explanation will be to frame this back-and-forth decision-making process in a relatable, simplified scenario—such as a rivalry, a competition, or a game-like interaction. The exact theme is still undecided, but the explanation will focus on dramatizing the logic of anticipating an opponent's responses and thinking multiple steps ahead. Through humor, role-play, or light storytelling, I'll aim to make the concept of "thinking ahead by assuming your opponent is also thinking ahead" intuitive and memorable for a non-technical audience.
Rohan Riaz	MLFQ	Ill be explaining the multilevel feedback queue, this is used to schedule processes in an operating system. i will be making use of an analogy involving a family having many children of different ages. this fanily has recenty bought a new computer. ill be working on this using either animation or making use of actors that i will bring in to make it easier to work in real time.
Saad Imam	How are folders/files compressed into zip files?	I chose data compression because a lot of people (tech and non-tech) use the windows compress to zip feature. An example is of submitting assignments on LMS. My aim was to pick a concept that is used regularly but not a lot of people are aware of its complexity. The creative part, as far as I have come up with, is to explain the compression using an analogy with packing stuff inside a suitcase. The idea will definitely need refinement, and I will discuss with Dr.Jibran and get his opinion on it.
Saad Thaplawala		
Safwan Adnan	Hilbert's Hotel – "The Hotel with Infinite Rooms… and No Vacancy"□	Hilbert's Hotel is a thought experiment that illustrates the strange and counterintuitive nature of infinity. Proposed by the mathematician David Hilbert, it imagines a hotel with infinitely many rooms, all of which are occupied — yet it can still accommodate new guests, even infinitely many more.This paradox showcases the difference between finite and infinite sets, introduces the concept of countable infinity, and sparks a deeper understanding of set theory and the strange rules that govern the infinite.
Saim Wajid	How to predict computer generated random numbers	Will use Javascript v8 to show that there is a methid to RNG and how they are not really random due to the random number generator having to take a seed that can be accessed outside. Due to the compiler using a pre-coded series of xor operations and functions, we can effectively replicate it and predict the random number

Sameed Ahmad	Bloom Filter in 5 Minutes	A Bloom Filter is a data structure used to quickly test whether an element is a member of a set. It is known for its efficiency in both time and space. However, the trade-off is that it can produce false positives, meaning it might occasionally tell you an item might be in the set, even though it isn't. This makes it useful in scenarios where a definite "no" is more important than a definite "yes". To make the concept memorable and easy to understand, the creative aspect involves using a concert ticket checker analogy. In this analogy, the Bloom Filter is compared to a security guard using a wristband with a set of lights that indicate if a ticket is valid.
Shaikh Muhammad Sharjeel	The Gödel Leap	I plan to explain the concept of Gödel's Incompleteness Theorem and how it has been used by thinkers like Roger Penrose to argue that human consciousness, and possibly free will, cannot be fully captured by algorithmic or computational models. The creative aspect will involve using an intuitive analogy (to be decided) to illustrate the idea of a "Gödel Leap": a moment where a person seems to reach a truth or make a decision that goes beyond logic or rules, suggesting a process outside the bounds of formal computation.
Shazain.	The Frog that Forgor	I'll explain Markov chains - a math concept where the next step depends only on the current state like a forgetful chef who only remembers the last order they made. Using an analogy of a frog who only remembers the last lilypad he jumped from, I'll show how this 'memoryless' idea powers weather forecasts, text predictions, and even Google's algorithm. I'll simulate the frog's journey live with coin flips (heads=tiny hop, tails=big leap), showing how randomness creates predictable long-term patterns - without touching graph theory or encryption.
Simra Sheikh	Exploring Context Free Grammars and the Sapir Whorf Hypothesis	I'm combining our theoretical CS concepts on formal language theory - which involves studying grammars (like regular languages and context-free grammars) and parsing algorithms - with a linguistic idea known as the Sapir-Whorf hypothesis. In our field, we look at how a formal grammar precisely defines the structure of a language and determines what strings it accepts, which is a fundamental concept for things like compilers and interpreters. On the linguistic side, the Sapir-Whorf hypothesis states that the structure of our language can actually influence the way we think. My explanation will draw an analogy between these two domains. Just as a computer's processing is shaped by the formal rules defined in its grammar, our cognitive processes might be influenced or even constrained by the grammatical structures of our natural language. I also intend to use Arrival as an example to build on my idea. As we discussed, I have narrowed my focus to context-free grammars and their recursive properties. By concentrating on CFGs, I can highlight how recursive rules build hierarchies and generate complex structures from simple principles, thereby affecting the behavior of parsing algorithms. This mirrors how variations in natural language grammar might influence cognition. While I did find literature on both formal language theory and the Sapir-Whorf hypothesis separately, I couldn't find any concrete existing literature that directly links these two domains and am still on the hunt for it.
Syed Baryal Shah	Diffie-Hellman Key Exchange	I will explain how two people can agree on a secret over a public channel using the Diffie-Hellman Key Exchange. The creative element is a paint mixing analogy, where mixing colors represents combining public and private information to form a shared secret that outsiders can't reverse.

Syed Muhammad Deebaj Haider Kazmi	Bounded Volume Hierarchy	I will explain Bounding Volume Hierarchy (BVH), a spatial data structure used to efficiently perform intersection queries in 3D scenes — most notably in ray tracing. As of now, I plan to use simple visual animations to simulate how BVH narrows down search space using bounding boxes, which will make the explanation very intuitive.
Syed Rafay Ahmed	Cellular Automata	For my presentation, I will explain the concept of cellular Automata, which are simple systems made up of grids of cells that follow basic rules. Even though each cell only interacts with its neighbors, these small actions can lead to surprisingly complex patterns over time. I'll use examples like Conway's Game of Life, Rule 30 and 110 to show how this works, and I'll relate it to real-world things like how fire spreads, how sand flows, or how patterns form in nature. To make it fun and easy to understand, I'll use visuals and interactive demos so everyone can see how simple rules can create fascinating results. The technical aspect I want to explain is how cells or small items on a low level can seem seemingly meaningless but on a larger scale but prove to show something remarkable, creating similarities to binary logic as a whole.
Syed Saadan Uddin	Karger's Min-Cut: Surviving Rishtedari Politics at a Karachi Wedding	I will be explaining Karger's Min-Cut algorithm, which is a randomized algorithm used to compute the minimum cut of an undirected graph — essentially, finding the smallest set of edges that, if removed, would split the graph into disconnected parts. Though it's a complex algorithm involving random choices and edge contractions, it beautifully solves important problems in network reliability, circuit design, and clustering. Creative Aspect: To make this algorithm relatable and entertaining, I will present it through the lens of a typical Karachi wedding scene, where the 'nodes' are family members from different sides, and the 'edges' represent rishtedari (family ties), gossip channels, or shared plates of biryani. The goal: How to survive the shaadi by carefully "cutting" the rishtedari drama channels to avoid unnecessary clashes between family factions, while keeping the biryani line intact! I will use humor, common desi wedding references (like the phupho-chachi politics, table-hogging uncles, and chai break alliances), and visual metaphors to explain the technical details in a lighthearted and accessible way.
Syed Shayan Hussain		
Tooba Iqbal Aswani		
UMER AHMED		

YUMNA MASOOD	Are Computers Autistic?	Computers are powerful but socially clueless. They are extremely and sometimes frustratingly logical, literal, and rule-based. They don’t “get” emotions or jokes, sarcasm or dark humor, social cues or indirected contexts. They only do exactly what they’re told and nothing more, nothing less. Here comes in the Rule-Following vs. Generalization concept. They don’t generalize unless they’re explicitly trained to do so. Even then, accuracy is off by miles. Even human on the autism spectrum are capable of learning and generalizing over contexts. They can be trained to learn and respond to social cues, understand humor and adapt faster. Computers remain rigid and context-blind unless heavily engineered otherwise. Question is whether or not are computers socially challenged in a way that’s similar to humans on autism spectrum? □ Some other Technical Concepts Applied: 1. Symbolic Reasoning and Formal Logic Computers process everything through precise, unambiguous logic if mood == "sad": play_song("sad.mp3") This kind of system is rigid and fails to make guesses or even intuit meaning from vague, indirect and emotionally flexible input. 2. The Frame Problem If a robot is asked to "fetch the coffee mug," it needs to understand not only what a mug is, but also: Which object in the room is the mug? Is it OK to move the book blocking it? Is someone already using it? Additional axioms are required to make inferences about the environment (for example, that a mug cannot change position unless it is physically moved). [1] 3. Natural Language Processing (NLP) and Ambiguity Computers (using NLPs) predict a term by predicting the next or previous terms and ignore the underlying context of the whole scenario. They can mimic conversations and even paraphrase things but cannot interpret meaning out of them. For example:
Zain Mufti	Harry Packet and the Tiny Tunnels	I will be talking about packet fragmentation and avoiding tiny fragmentation attack. The creative aspect to explaining it would be in form of story telling in close analogy to Harry Potter to add the fun element along with easy understanding.
Zain Mufti	The Internet’s Popularity Contest: How Google Decides Who Wins	I will explain how Google ranks billions of websites in response to a simple search query, using a technical concept known as PageRank. PageRank is a mathematical algorithm based on probability and linear algebra, specifically using matrices to model how pages link to each other. To make this concept accessible to a non-technical audience, I’ll creatively frame it as a “popularity contest”, where websites vote for each other through links.
Zainab Hasan	Heart in Code	In this presentation, I will show how to draw a heart shape using code and math. I’ll explain how parametric equations and basic programming logic are used to plot points and form the shape. The creative part is turning a mathematical formula into a visual heart using code, combining both math and art in a fun way.

Zara Masood	The Secretary Problem : What to do when u need to pick one	I propose to explain the Secretary Problem, a classic concept from theoretical computer science and decision theory. It deals with the challenge of selecting the best option (like a job candidate or a romantic partner) from a sequence, where each must be accepted or rejected immediately, and decisions are final. The optimal solution involves observing and rejecting the first ~37% of options to get a benchmark, then selecting the next one that is better than all previously seen. This is known as the 37% Rule, and it balances risk and timing in decision-making. To illustrate the concept, we will perform a short skit where the main character must choose from a series of candidates without knowing what comes next. Through dramatic timing, humorous interactions, and visual cues, the skit will demonstrate the emotional tension of making decisions under uncertainty, helping the audience intuitively grasp the logic and power of the optimal stopping rule.
Zuha Aqib	P VS NP Problem	P VS NP problem i will be showing how to solve a jigsaw puzzle
Zuhair Farhan	Sports Team Elimination through Network Flows	I plan on covering and explaining Network Flows, and the max-flow min-cut theorem inshaAllah. The way I intend to make it "creative" is explaining it through sports! Specifically, determining what teams and/or players are eliminated from a tournament or championship. It's more popularly known as the Baseball Elimination problem from research, but I have seen it being adopted for other sports in a few places as well. This will hopefully be simple yet engaging enough for "Social Science and BBA students", as most people are fans or casual watchers of sports or esports. In addition, it will also (hopefully) express the importance and significance of Network Flows in practical scenarios.