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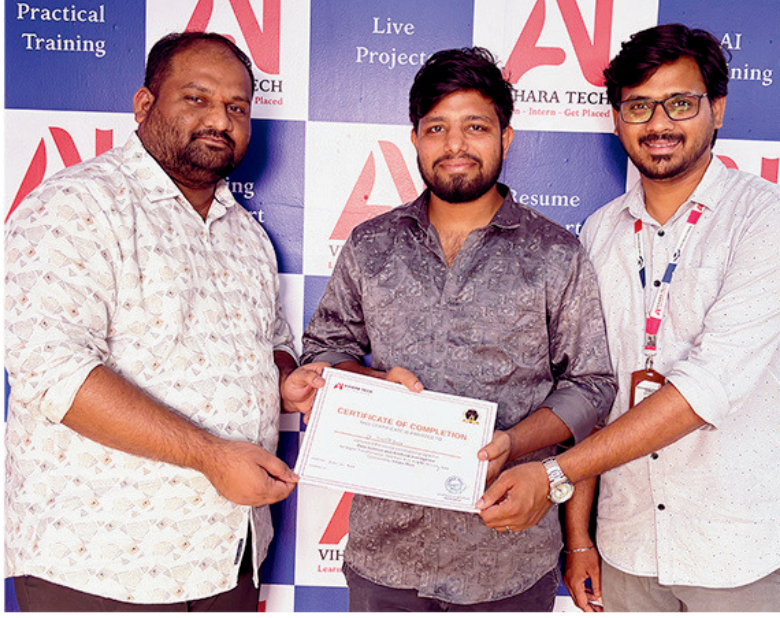
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DATA SCIENCE WITH GEN AI & AGENTIC AI

ComprehensiveCareer-FocusedCurriculum

COURSE MODULES

1. Python Basics
2. Python Intermediate
3. Python Advanced
4. Python Production Level
5. Python Essential Packages
6. Machine Learning
7. Supervised Machine Learning Part 1
8. Supervised Machine Learning Part 2
9. EDA & Data Preprocessing (Feature Engineering & Feature Selection)
10. Unsupervised Machine Learning
11. Power BI
12. SQL
13. Prompt Engineering Fundamentals
14. Advanced Prompt Engineering
15. Prompt Design for Different Use Cases
16. Prompt Optimization & Evaluation
17. Structured Output Generation

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18. Introduction to Generative AI
19. LLM Landscape & Model Selection
20. Embeddings & Vector Representations
21. Vector Databases
22. Introduction to RAG (Retrieval-Augmented Generation)
23. Building a RAG Pipeline
24. Advanced RAG Techniques
25. RAG Evaluation & Optimization
26. RAG Frameworks & Tools
27. Fine-Tuning & Model Customization
28. Introduction to Agentic AI
29. Agent Architecture & Reasoning
30. Tool Calling & Function Calling
31. Memory in AI Agents
32. Multi-Agent Systems
33. Introduction to MCP (Model Context Protocol)
34. Building & Integrating MCP Servers
35. Agentic RAG
36. Agent Orchestration Frameworks
37. Deploying LLM & Agentic Applications
38. AI Safety, Governance & Responsible AI

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1. Python Basics

Topics Covered

- Data types, variables, operators, print formatting
- Python installation (Jupyter, .py, Google Colab)
- Strings
- List, tuple, sets, dictionary

2. Python Intermediate

Topics Covered

- Conditional statement (if / else / elif)
- Control statement
- Break
- Continue
- Functions & lambda functions
- List Comprehensions
- Dictionary Comprehensions

3. Python Advanced

Topics Covered

- Error / exception handling, file handling
- JSON, OS, Pickle, Datetime, Copy modules
- OOPs: class, object, constructor
- Inheritance, polymorphism, abstraction, encapsulation

4. Python Production Level

Topics Covered

- Process & multiprocessing
- Multithreading
- Start, join, kill, terminate

5. Python Essential Packages

Topics Covered

- NumPy
- Pandas
- Data visualization with Matplotlib
- Seaborn

6. Machine Learning

Topics Covered

- Types of ML: supervised, unsupervised, reinforcement learning

7. Supervised Machine Learning Part 1

Topics Covered

- Simple, multiple & polynomial linear regression
- Loss functions: MSE, MAE, RMSE
- Optimizers: gradient descent, L1/L2 regularization
- Mini Project 1: Developing a regression model to find car cost status

8. Supervised Machine Learning Part 2

Topics Covered

- KNN, Logistic Regression, Naive Bayes, Decision Tree
- Ensemble: Random Forest, Gradient Boosting, AdaBoost, XGBoost
- Support Vector Machine (SVM)
- Mini Project 2: Finding the best regression line using gradient descent optimizers

9. EDA & Data Preprocessing (Feature Engineering & Feature Selection)

Topics Covered

- Handling missing values & categorical data
- Normalization, standardization & scaling
- Feature creation, selection, encoding, splitting & crossing
- Polynomial features, log transformations & date-time feature extraction
- Text feature extraction & image feature extraction
- Filter methods, wrapper methods & feature importance from models
- L1 (Lasso) & L2 (Ridge) regularization, variance thresholding
- Chi-square test & correlation matrix
- Dimensionality reduction (PCA) & outlier handling

10. Unsupervised Machine Learning

Topics Covered

- K-means clustering
- Hierarchical clustering

11. Power BI

Topics Covered

- Power BI Desktop & data modeling
- Visualizations: bar, line, pie, area, scatter plot, bubble chart, treemap, funnel, card, geographic map, filled map, histogram, donut chart
- Model view explanation
- DAX formulas & Power Query

12. SQL

Topics Covered

- SELECT, FROM, WHERE JOINS (inner, left, right, full)
- GROUP BY, HAVING, ORDER BY, aggregate functions (SUM, AVG, COUNT, MIN, MAX)
- Subqueries (nested queries), UNION and UNION ALL
- Views (create, alter, drop) & indexes (create, drop)
- Transactions: BEGIN TRANSACTION, COMMIT, ROLLBACK
- Constraints: PRIMARY KEY, FOREIGN KEY, UNIQUE, CHECK
- DML operations: INSERT, UPDATE, DELETE

13. Prompt Engineering Fundamentals

Topics Covered

- Prompt structure: instructions, context, examples, constraints
- Role-based & system prompting
- Zero-shot, one-shot & few-shot prompting
- Chain of Thought & step-by-step reasoning prompting
- Structured output prompting (JSON, XML, tables)
- Reducing hallucinations & prompt evaluation

14. Advanced Prompt Engineering

Topics Covered

- Chain of Thought (concept)
- Step-by-step reasoning
- Self-reflection prompting
- Structured output prompting

15. Prompt Design for Different Use Cases

Topics Covered

- Content writing
- Coding assistance
- Data analysis
- Research
- Education
- Business automation

16. Prompt Optimization & Evaluation

Topics Covered

- Improving prompt quality
- Reducing hallucinations
- Testing and refining prompts
- Measuring response quality

17. Structured Output Generation

Topics Covered

- JSON generation
- Markdown formatting
- Tables
- CSV
- XML
- Templates

18. Introduction to Generative AI

Topics Covered

- What is Generative AI?
- Traditional AI vs Generative AI vs Agentic AI
- Overview of Large Language Models (LLMs)
- How LLMs are trained: pretraining, fine-tuning, RLHF
- Tokens, tokenization & context window
- Applications and industry use cases of Generative AI

19. LLM Landscape & Model Selection

Topics Covered

- Overview of GPT, Claude, Gemini, LLaMA, Mistral models
- Open-source vs closed-source LLMs
- Comparing model strengths, cost & latency
- Choosing the right model for a task
- API access vs self-hosted deployment

20. Embeddings & Vector Representation

Topics Covered

- What are embeddings?
- Text embedding models (OpenAI, Cohere, Sentence-Transformers)
- Semantic similarity & cosine similarity
- Dimensionality of embeddings
- Use cases: search, clustering, recommendation

21. Vector Databases

Topics Covered

- Why vector databases are needed
- Overview: FAISS, Pinecone, ChromaDB, Weaviate, Qdrant, Milvus
- Indexing strategies (HNSW, IVF)
- Storing, querying & updating embeddings
- Metadata filtering & hybrid search

22. Introduction to RAG (Retrieval-Augmented Generation)

Topics Covered

- What is RAG and why it matters
- RAG vs fine-tuning vs long-context prompting
- RAG architecture: retriever + generator
- End-to-end RAG pipeline overview

23. Building a RAG Pipeline

Topics Covered

- Document ingestion: PDFs, docs, web pages, databases
- Chunking strategies (fixed size, semantic, recursive)
- Embedding generation & storage in a vector DB
- Retrieval: top-k search, similarity thresholds
- Context assembly & prompt injection into the LLM
- Response generation with citations

24. Advanced RAG Techniques

Topics Covered

- Hybrid search (keyword + semantic)
- Re-ranking retrieved results (cross-encoders)
- Query rewriting & query expansion
- Multi-query & HyDE (Hypothetical Document Embeddings)
- Parent-child chunking & hierarchical retrieval
- Contextual compression & summarized retrieval
- Multi-hop RAG for complex questions
- Handling multimodal RAG (text, tables, images)

25. RAG Evaluation & Optimization

Topics Covered

- Evaluation metrics: faithfulness, relevance, groundedness
- RAGAS & other evaluation frameworks
- Detecting and reducing hallucinations in RAG
- Latency & cost optimization
- A/B testing retrieval strategies
- Monitoring & logging RAG pipelines in production

26. RAG Frameworks & Tools

Topics Covered

- LangChain fundamentals & components
- LlamaIndex fundamentals & components
- Building RAG apps with LangChain/LlamaIndex
- Prompt templates, retrievers & chains
- Memory modules for conversational RAG

27. Fine-Tuning & Model Customization

Topics Covered

- When to fine-tune vs use RAG
- Instruction fine-tuning basics
- Parameter-efficient fine-tuning: LoRA, QLoRA
- Fine-tuning with domain-specific datasets
- Evaluating fine-tuned models



28. Introduction to Agentic AI

Topics Covered

- What is an AI agent?
- Agentic AI vs traditional automation vs RAG
- Core components: reasoning, memory, tools, planning
- Types of agents: reactive, deliberative, hybrid
- Real-world examples of agentic systems

29. Agent Architecture & Reasoning

Topics Covered

- ReAct (Reason + Act) framework
- Plan-and-execute agents
- Reflection & self-critique loops
- Chain-of-thought vs tree-of-thought reasoning
- Task decomposition & sub-goal planning

30. Tool Calling & Function Calling

Topics Covered

- What is tool/function calling in LLMs?
- Defining tool schemas (JSON schema)
- Structured function calling with OpenAI/Claude APIs
- Connecting agents to APIs, databases & search engines
- Error handling & retries in tool execution

31. Memory in AI Agents

Topics Covered

- Short-term (context window) vs long-term memory
- Episodic vs semantic memory
- Storing memory in vector databases
- Conversation summarization & memory compression
- Memory retrieval strategies

32. Multi-Agent Systems

Topics Covered

- Single-agent vs multi-agent architectures
- Agent collaboration & communication protocols
- Orchestrator/manager agent patterns
- Role-based agents (planner, researcher, coder, reviewer)
- Frameworks: CrewAI, AutoGen, LangGraph

33. Introduction to MCP (Model Context Protocol)

Topics Covered

- What is MCP and why it was introduced
- MCP vs traditional function/tool calling
- MCP architecture: hosts, clients & servers
- Core concepts: resources, tools, prompts
- How MCP standardizes AI-to-application connections

34. Building & Integrating MCP Servers

Topics Covered

- Setting up an MCP server (Python/Node SDK)
- Exposing tools, resources & prompts via MCP
- Connecting MCP servers to Claude/other LLM clients
- Authentication & permissions in MCP
- Debugging & testing MCP servers
- Real-world MCP integrations (Slack, GitHub, Google Drive, databases)

35. Agentic RAG

Topics Covered

- Combining agentic reasoning with RAG retrieval
- Agent-driven query planning & routing
- Self-correcting retrieval loops
- Tool-augmented agents for dynamic knowledge retrieval
- Multi-source RAG (documents + APIs + databases) via agents

36. Agent Orchestration Frameworks

Topics Covered

- LangGraph for stateful agent workflows
- AutoGen for multi-agent conversations
- CrewAI for role-based agent teams
- Building custom agent orchestration pipelines
- Workflow graphs, state management & conditional routing

37. Deploying LLM & Agentic Applications

Topics Covered

- API design for LLM/agent applications (FastAPI/Flask)
- Containerization with Docker
- Cloud deployment (AWS/Azure/GCP basics)
- Streaming responses & handling concurrency
- Cost management, rate limiting & caching
- CI/CD basics for AI applications

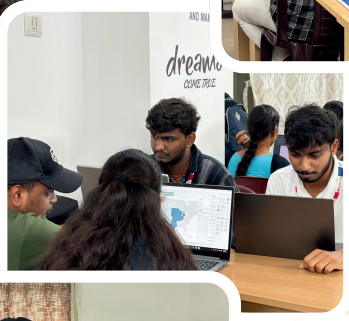
38. AI Safety, Governance & Responsible AI

Topics Covered

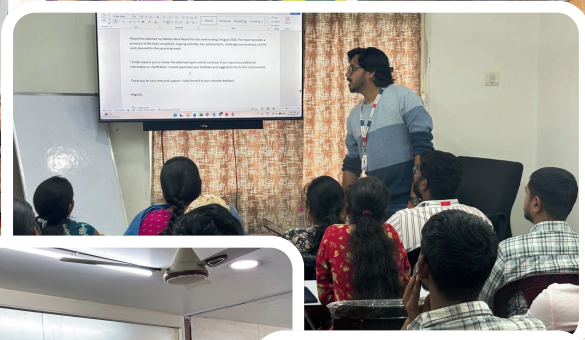
- Prompt injection & jailbreak risks
- Guardrails for RAG and agentic systems
- Data privacy & security in agentic workflows
- Human-in-the-loop design for autonomous agents
- Bias, hallucination & responsible deployment practices



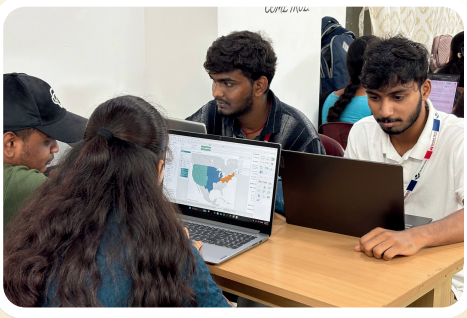

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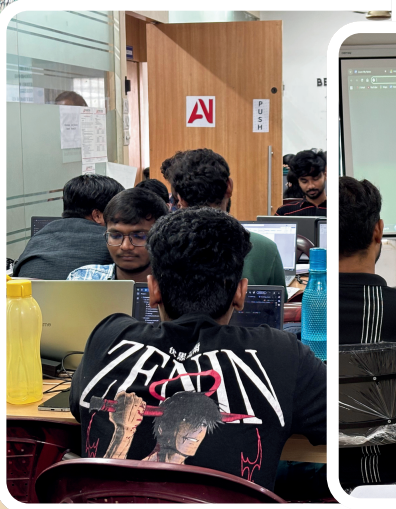
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DO IT



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EXCUSES


RULES OF SUCCESS



WORKING TOGETHER IS
SUCCESS



Google

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WELLS FARGO

Srinivas Reddy 11 lpa



CISCO

Alekhya 5 lpa



DAZN

Venkata 7 lpa



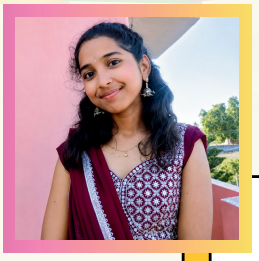
AMD

Mani Kanta 8 lpa



genpact
Transformation

Sandeep 9 lpa



Assimilate

Yamini Kellam 3.2 lpa



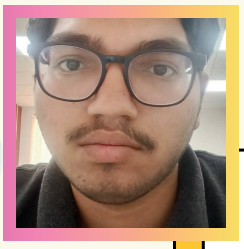
Yubi

Pranavi 4.5 lpa



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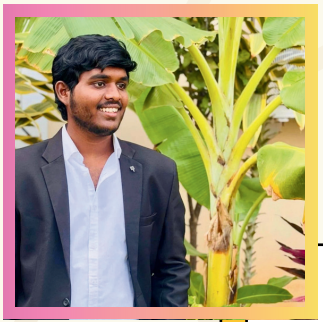
Assimilate

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ZestIOT

Vishwa Teja 9 lpa



Manish 3 lpa



Tiger Analytics

Linagala Poojitha **6.5** lpa



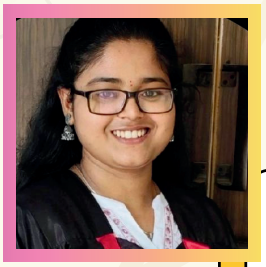
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Shivamani **3.5** lpa



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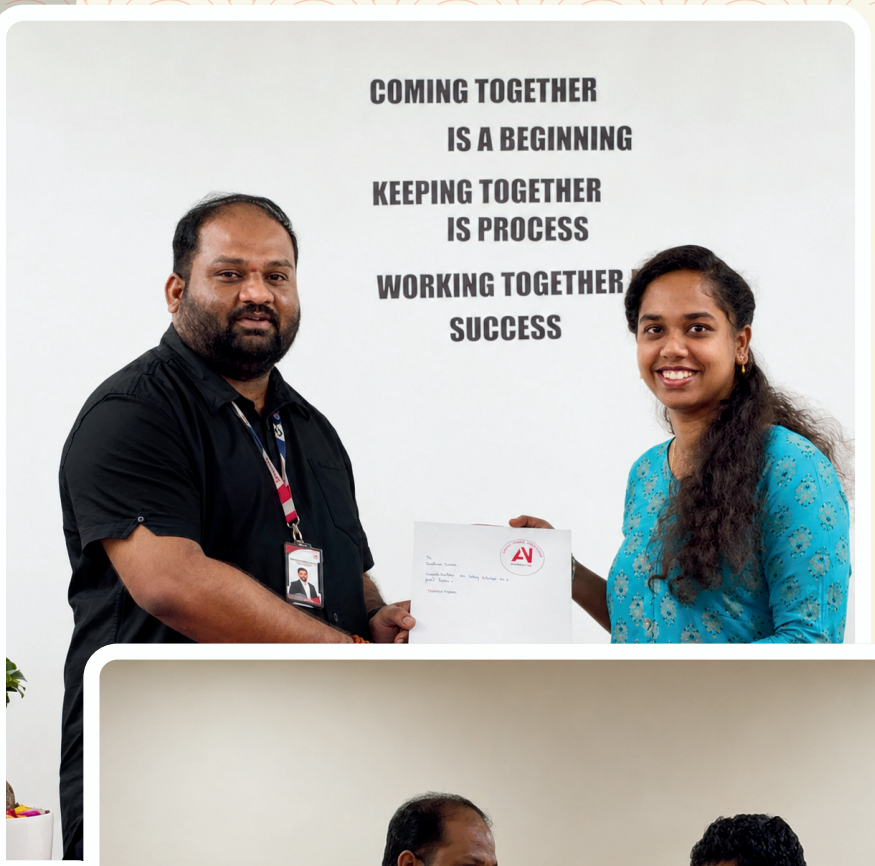
Pathi Pavan **3** lpa



TAIL

Archana **4.5** lpa




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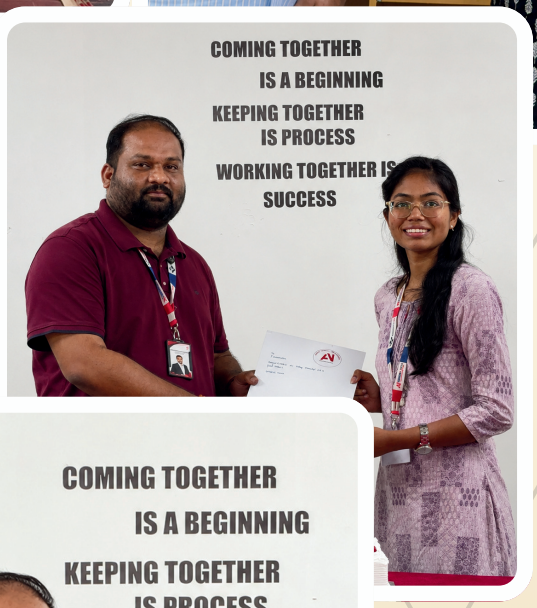

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IS PROCESS
SUCCESS


KEEPING TOGETHER








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Topic

INTRODUCTION

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Amar nath
3 reviews • 0 photos

★★★★★ 13 weeks ago

Very good coaching class all the classes are very easy to understand by the faculty ,faculty also very close to students to monitor the problems and clarify the doubts ,Kamal sir class is very good and exited to learn , thank you .

B

Boppa sharvan
1 review • 0 photos

★★★★★ 6 days ago NEW

I recently joined vihara tech by choosing the course Data Science with GEN-AI to up skill myself and get placed. Here the mentor teaches us every single point regarding the module. They teach us from scratch to advance level to understand more. Everyone here are very friendly and clear the doubts regarding the subject.

S

Sanjay Panga
2 reviews • 0 photos

★★★★★ 5 days ago NEW

Vihara Tech is an outstanding place to learn Data Science! What sets them apart is their complete focus on overall development—including weekly assessments, engaging activities, and mock interviews.
Huge thanks to Kamal Sir for being such an incredible trainer. His technical skills are exceptional, and his ability to connect with and support students makes learning so smooth and enjoyable. I'm grateful for his guidance!



Jaiaditya reddy
6 reviews • 0 photos

★★★★★ 4 days ago NEW

appreciated the hands-on approach, working on real datasets, and the clear teaching of tools like Excel, SQL, Python, and Power BI. The placement support was also highlighted as helpful. The atmosphere here was a pleasant one we can easily concentrate on the work as well

Nishant G
Local Guide • 9 reviews • 2 photos

★★★★★ 16 weeks ago

Staff was excellent, able to understand the topic , value for money, loved the experience.



Pooj Lingala
1 review • 0 photos

★★★★★ 16 weeks ago

This institute stands out for its supportive environment and practical approach to learning.The trainers are knowledgeable,approachable and always ready to help.Unlike other institutes ,it focuses not only on concepts but also on real-world skills and overall development.I had a great learning experience and I would definitely recommend it...



Venkatasai
1 review • 0 photos

★★★★★ 17 weeks ago

appreciated the hands-on approach, working on real datasets, and the clear teaching of tools like Excel, SQL, Python, and Power BI. The placement support was also highlighted as helpful



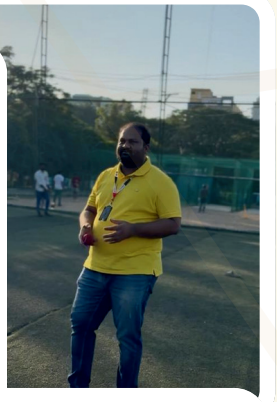
Rishikesh Puppala
2 reviews • 0 photos

★★★★★ 21 weeks ago

Overall, I am very happy with my learning experience and would strongly recommend Vihara Tech to anyone looking to build a career in Data Analytics and AI.


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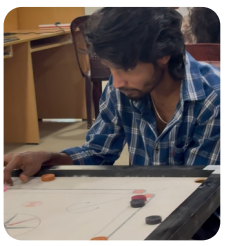






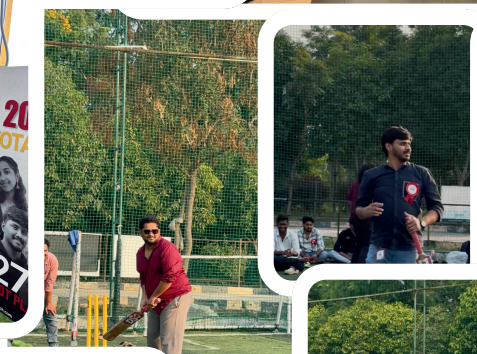






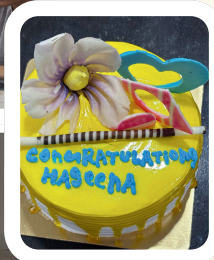



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