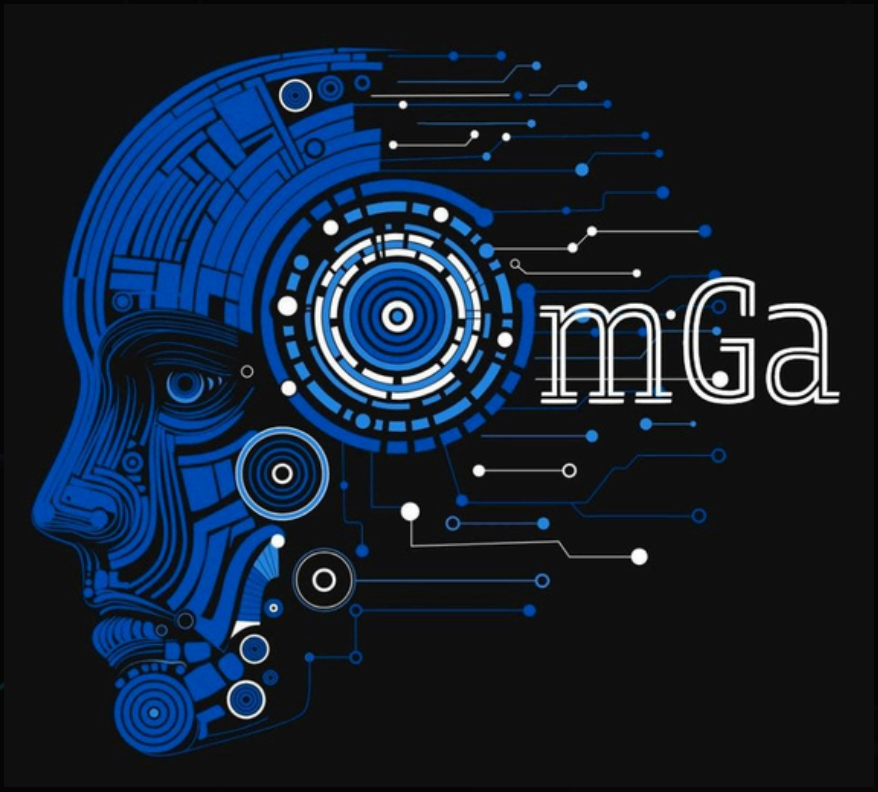
ROADMAP BOOK

oMgA python course



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Python Roadmap

Level 1: Python Basics

Level 2:Object-Oriented Programming (OOP)

Level 3: Data Structures & Algorithms

Level 4: Problem Solving & Algorithms

Level 5: Data Analysis Basics

Level 6: Machine Learning Basics

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Level 1: Python Basics

Goal:

Learn the basics to write simple programs.

Topics:

1. Installing Python and working with VS Code or Jupyter Notebook.
2. Variables (int, float, str, bool).
3. Arithmetic operations (+, -, *, /, //, %).
4. String manipulation (upper(), lower(), strip(), split()).
5. Conditional statements (if, elif, else).
6. Loops (for, while).
7. Lists, Dictionaries, and Sets.
8. Functions (def my_function():).
9. File handling (open(), read(), write()).

Project:

✨ Build an Interactive Calculator or To-Do List App.

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Level 2: Object-Oriented Programming (OOP)

Goal:

Learn OOP concepts to structure code professionally.

Topics:

1. Objects & Classes.
2. Encapsulation.
3. Inheritance.
4. Polymorphism.
5. Special methods (__str__, __repr__).
6. Using libraries like datetime, random, os.

Project:

✨ Develop a Library Management System or Student Management System using OOP.

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Level 3: Data Structures & Algorithms

Goal:

Understand efficient data organization and performance improvement.

Topics:

1. Stack & Queue.
2. Linked Lists.
3. Hash Tables (Dictionaries).
4. Binary Trees.
5. Searching Algorithms (Linear Search, Binary Search).
6. Sorting Algorithms (Bubble Sort, Merge Sort, Quick Sort).

Project:

Create a Queue Management System.

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Level 4: Problem Solving & Algorithms

Goal:

Enhance logical thinking and tackle complex problems.

Topics:

1. Dynamic Programming.
2. Greedy Algorithms.
3. Backtracking.
4. Graphs & Graph Algorithms.
5. Solving challenges on LeetCode, Codeforces, HackerRank.

Project:

Build a Tic-Tac-Toe Game with basic AI.

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Level 5: Data Analysis Basics

Goal:

Learn data analysis using Python libraries

Topics:

1. NumPy: Arrays and numerical operations.
2. Pandas: Dataframes and data manipulation.
3. Matplotlib & Seaborn: Data visualization.
4. Data cleaning and exploration.
5. Reading data from CSV, JSON files.

Project:

✨ Analyze E-commerce Sales Data and create reports.

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Level 6: Machine Learning Basics

Goal:

Understand the fundamentals of machine learning.

Topics:

1. Introduction to Machine Learning.
2. Scikit-Learn and model building.
3. Basic Algorithms:
   - Linear Regression.
   - Classification using KNN & SVM.
4. Text data analysis using NLTK or spaCy.

Project:

✨ Build a Movie Recommendation System.

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