Guide2Code - Python Programming Roadmap

🔷 Phase 1: Beginner Level

📌 Topics to Learn:

1. Introduction to Python (Installation, IDEs, Syntax)
2. Variables & Data Types (int, float, str, list, tuple, dict, set)
3. Operators (arithmetic, relational, logical, bitwise)
4. Control Statements (if-else, match-case)
5. Loops (for, while, break, continue)
6. Functions (parameters, return values, recursion)
7. Strings & String Manipulation
8. Lists, Tuples, Dictionaries, and Sets
9. File Handling (reading, writing, appending files)
10. Exception Handling (try-except blocks)

🚀 Beginner Project Ideas:

- **Calculator** – Perform basic arithmetic operations
- **Student Grade System** – Calculate and display student grades
- **Dice Roller** – Generate random dice roll outputs
- **Number Guessing Game** – User guesses a number, program gives hints
- **Age Calculator** – Calculate age based on date of birth
- **Temperature Converter** – Convert Celsius ↔ Fahrenheit

🔷 Phase 2: Intermediate Level

📌 Topics to Learn:

1. Object-Oriented Programming (Classes, Objects, Inheritance, Polymorphism)
2. Modules & Packages (importing and creating modules)
3. Regular Expressions (pattern matching, re module)
4. Database Handling with SQLite & MySQL (CRUD operations)
5. APIs and Web Requests (requests module)

6. Multi-threading & Concurrency
7. Data Structures (stacks, queues, linked lists, graphs)
8. Debugging & Logging in Python

🚀 **Intermediate Project Ideas:**

- 📚 **Library Management System** – Manage books, borrowers, and returns
- 📞 **Contact Management System** – Store, edit, and delete contacts
- 📧 **Email Sender** – Automate sending emails using SMTP
- 📝 **To-Do List App** – Manage and store tasks
- 🔎 **Web Scraper** – Extract information from websites using BeautifulSoup
- 🎮 **Simple Game (Tic-Tac-Toe, Snake Game)** – Create interactive games

🔷 **Phase 3: Advanced Level**

📌 **Topics to Learn:**

1. Advanced OOP Concepts (Metaclasses, Decorators, Magic Methods)
2. Networking in Python (Sockets, Client-Server Communication)
3. Automation with Python (Scripting, Web Automation with Selenium)
4. Data Analysis & Visualization (Pandas, Matplotlib, Seaborn)
5. Machine Learning & AI (Scikit-Learn, TensorFlow, PyTorch)
6. Web Development with Django & Flask
7. Cybersecurity & Ethical Hacking with Python (Penetration Testing, Cryptography)
8. Blockchain Development with Python

🚀 **Advanced Project Ideas:**

- 🌎 **Weather Forecast App** – Fetch and display live weather data
- 💬 **Chat Application** – Real-time chat using sockets
- 🏢 **Stock Price Predictor** – Use machine learning to predict stock trends
- 🛒 **E-commerce Website** – Build a functional shopping platform with Django
- 🔍 **AI-Powered Chatbot** – Automate customer support using NLP
- 📹 **Face Recognition System** – Detect and recognize faces using OpenCV