Guide2Code - Bash Scripting Roadmap 🖥️

🟢 **Phase 1: Beginner Level**

📚 **Topics to Learn:**

1. Introduction to Bash (What is Bash? Why use it?)
2. Basic Shell Commands (ls, cd, pwd, cp, mv, rm, mkdir, rmdir)
3. File Permissions & Ownership (chmod, chown, chgrp)
4. Input & Output Redirection (>, >>, <, 2>, |, tee)
5. Variables & Data Types (String, Integer, Arrays)
6. Conditional Statements (if-else, case)
7. Loops in Bash (for, while, until)
8. Functions in Bash (Defining & Calling Functions)
9. Working with Arguments & User Input ($1, $2, read command)
10. Basic Text Processing (grep, sed, awk, cut, sort, uniq)

🛠️ **Beginner Project Ideas:**

- **Automated Backup Script** – Copy important files to a backup folder
- **Basic System Info Script** – Display system details (CPU, RAM, Disk Usage)
- **User Management Script** – Add, remove, and list users
- **File Organizer** – Sort files into folders based on extensions
- **Simple Calculator** – Perform basic arithmetic operations

🟡 **Phase 2: Intermediate Level**

📚 **Topics to Learn:**

1. Process Management (ps, top, kill, bg, fg, nohup)
2. File & Directory Manipulation (find, locate, tar, zip, unzip)
3. Advanced Text Processing (sed & awk for pattern matching)
4. Working with Cron Jobs & Scheduling (crontab, at, anacron)
5. Logging & Debugging (set -x, set -e, log files)
6. Networking with Bash (ping, netstat, curl, wget, SSH scripting)
7. Advanced Scripting Techniques (trap, signals, subshells)

8. Working with APIs in Bash (curl, jq, JSON parsing)

9. Automation with Bash (Automating system updates, monitoring)

10. Secure Bash Scripting (Avoiding security vulnerabilities)

🛠 **Intermediate Project Ideas:**

- **Log Monitoring Script** – Track system logs and generate reports

- **Automated Server Health Check** – Monitor CPU, RAM, Disk Usage, and alert if high

- **Website Status Checker** – Check if a website is up or down

- **Automated File Transfer Script** – Secure file transfer using SCP/SFTP

- **Database Backup & Restore Script** – Automate MySQL/PostgreSQL backups

🔴 **Phase 3: Advanced Level**

📚 **Topics to Learn:**

1. Writing Daemons & Background Processes in Bash

2. System Hardening & Security Automation with Bash

3. Complex Data Parsing (JSON, XML, CSV)

4. Working with Docker & Kubernetes using Bash

5. Automating Cloud Operations (AWS CLI, Azure CLI, Google Cloud SDK)

6. Interfacing with Other Programming Languages (Python, Perl, etc.)

7. Advanced Regular Expressions & String Manipulation

8. Building CLI Tools with Bash

9. Performance Optimization in Bash Scripts

10. Writing Multi-Threaded Bash Scripts

🛠 **Advanced Project Ideas:**

- **Automated Deployment Script** – Deploy applications to a server with zero downtime

- **Real-Time Log Analyzer** – Monitor logs and trigger alerts in real-time

- **Cloud Resource Manager** – Automate cloud resource creation and deletion

- **Bash-Based Chatbot** – A command-line chatbot using APIs

- **CI/CD Pipeline Automation** – Automate builds, testing, and deployment using Bash

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