Junior Backend Developer Learning Roadmap

1. Programming Fundamentals

- **Programming Language:** Python / Node.js / Java / Go / PHP (choose one primary language)

2. Internet & Networking Basics

- **Internet Concepts:**
  - What is the Internet?
  - How the Internet works (packets, TCP/IP)
- **Web Communication:**
  - What is HTTP/HTTPS?
  - What is a browser and how does it work?
  - What is DNS?
  - What is a server and how servers respond to requests?
  - Client-Server Architecture
  - Ports, protocols, and basic networking concepts

3. Databases & Data Management

- **Relational Databases (RDBMS):**
  - Database schema design
  - Normalization
  - Basic SQL queries (SELECT, INSERT, UPDATE, DELETE)
  - Joins (INNER, LEFT, RIGHT, FULL)

- **Object-Relational Mapping (ORM):**
  - Learn an ORM for your framework (e.g., Sequelize, TypeORM, SQLAlchemy, Eloquent)
- **NoSQL (Optional / Future Learning):**
  - Basics of document-based databases (MongoDB, Firebase)

4. Backend Development Fundamentals

- **Frameworks & Testing:**
  - Learn backend frameworks(Express.js, Django, Spring, Laravel, etc.)
  - Unit testing & integration testing
  - Debugging & logging best practices
- **Core Backend Concepts:**
  - API development basics

- ○ REST API constraints & best practices
- ○ API documentation (Swagger / Postman)
- ○ Authentication & Authorization (OAuth, JWT)
- ○ Scalable API design

5. Integration & External Services

- **Third-party Services:**
  - ○ Payment gateways, messaging services, cloud APIs
  - ○ Webhooks & event-driven communication

- **Cloud & Server Management:**
  - ○ SSH to remote servers
  - ○ Basic Linux commands & shell scripting
  - ○ Deploy backend applications
  - ○ Environment variables & configuration management

6. Advanced Backend Concepts

- **System Design Basics:**
  - ○ Scalability, availability, and reliability
  - ○ Load balancing & caching strategies
  - ○ Microservices architecture (optional for juniors, but good for future)

- **Security & Best Practices:**
  - ○ API security & encryption
  - ○ Input validation & sanitization
  - ○ Secure authentication & authorization

7. Job Roles in Backend Development

- **Entry-level / Junior Roles:**
  - ○ Junior Backend Developer
  - ○ Backend Developer
  - ○ Fullstack Developer
  - ○ API Developer
- **Intermediate / Specialized Roles:**
  - ○ Microservices Developer
  - ○ Backend Test Engineer
  - ○ Security Engineer (Backend)
  - ○ Database Engineer / DBA
  - ○ Integration Specialist / System Designer

- **Advanced / Cloud & DevOps Roles:**

    - Backend Performance Engineer
    - DevOps Engineer / Site Reliability Engineer
    - Cloud Engineer / Cloud Architect
- **Other Specialized Roles:**
    - Data Analyst
    - Backend Quality Assurance Engineer
    - CMS Developer
    - E-commerce Backend Developer
    - Real-time Backend Developer