**🧭 DevOps Roadmap (Step-by-Step with Topics)**

---

◆ **1. Basics of DevOps**

- What is DevOps?

- Why DevOps is important?

- DevOps lifecycle (Plan → Develop → Build → Test → Release → Deploy → Operate → Monitor)

- Agile vs DevOps

- CI/CD concept

---

◆ **2. Linux & Shell Scripting (Foundational)**

- Basic Linux commands

- File system, Permissions, SSH

- Bash scripting (loops, conditionals)

- Crontab for scheduled tasks

---

◆ **3. Version Control – Git & GitHub**

- Git basics: init, clone, commit, push, pull

- Branching & Merging

- Pull Requests & Collaboration

- Resolving conflicts

- GitHub Actions (basics)

---

◆ **4. Build Tool – Maven**

- pom.xml structure

- Maven lifecycle (clean, compile, package)

- Dependency management

- Running tests using Maven

- Integrating with Jenkins

---

◆ **5. Continuous Integration – Jenkins**

- Jenkins installation

- Freestyle jobs & Pipelines

- Declarative vs Scripted pipeline

- Plugins: Git, Maven, SonarQube, Docker

- Trigger builds using GitHub/Webhooks

---

◆ **6. Code Quality – SonarQube**

- What is code quality?

- Installing SonarQube

- Integrating with Maven

- Jenkins + SonarQube pipeline

- Understanding reports: bugs, code smells

---

◆ **7. Containerization – Docker**

- What is Docker?

- Docker images vs containers

- Dockerfile & docker-compose

- Volumes & Networking

- Uploading images to Docker Hub

---

◆ **8. Container Orchestration – Kubernetes**

- Kubernetes architecture (Master, Worker, etcd)

- Pods, ReplicaSets, Deployments

- Services: ClusterIP, NodePort, LoadBalancer

- Ingress controllers

- ConfigMaps & Secrets

---

◆ **9. Infrastructure as Code – Terraform (Optional but Useful)**

- What is IaC?

- Basic Terraform syntax

- Creating resources (EC2, S3, etc.)

- Managing state

- Integrating with CI/CD

---

◆ **10. Continuous Monitoring**

- **Prometheus**: Metric collection, Alerting

- **Grafana**: Visualizing Prometheus data

- **ELK Stack (Optional)**: Elasticsearch + Logstash + Kibana

---

◆ **11. Testing Frameworks**

- **JUnit** – Unit testing in Java

- **Mockito** – Mocking dependencies

- Integration testing concepts

- Using Maven to run tests

---

◆ **12. Cloud – AWS (Minimum Required)**

- EC2: Deploying apps on virtual machines

- S3: File storage

- IAM: Access control

- RDS: Cloud DB setup

- Elastic Beanstalk (PaaS)

---

◆ **13. Logging – Log4j / ELK**

- Configure logging levels

- Pattern layout

- Sending logs to files, or ELK stack (optional)

---

◆ **14. Bonus Tools (Optional But Advantageous)**

- **Ansible** – Configuration management

- **Nexus/Artifactory** – Artifact repository

- **GitHub Actions** – CI/CD with GitHub

- **Helm** – Kubernetes package manager

---

✅ **Suggested Learning Order for You:**

1. **Git & GitHub**

2. **Maven**

3. **JUnit & Mockito**

4. **Jenkins**

5. **SonarQube**

6. **Docker**

7. **Kubernetes**

8. **Log4j**

9. **AWS Basics**

10. **Prometheus + Grafana**

11. **Terraform / Ansible / Helm (optional)**