DevOps Roadmap for Beginners

1. Prerequisites: Basics of Programming & OS

Before diving into DevOps, it's crucial to have a basic understanding of:

- **Operating Systems**: Linux (Ubuntu, CentOS) and basic shell scripting.
- **Programming**: Basic knowledge of Python, Bash, or Go (optional but useful).
- **Networking**: Understanding of TCP/IP, HTTP/HTTPS, DNS, Load Balancers.
- **Version Control**: Git & GitHub/GitLab.

2. Understanding DevOps Concepts

DevOps is not just tools; it's a **culture**. Learn about:

- **CI/CD Pipelines**
- **Infrastructure as Code (IaC)**
- **Monitoring & Logging**
- **Microservices & Containers**
- **Cloud Computing Basics (AWS, Azure, GCP)**

3. Version Control System (Git & GitHub)

Skills to Learn:

- Git Commands (clone, commit, push, merge, rebase, pull)
- Branching strategies (Git Flow, Feature Branching)
- Pull Requests & Code Reviews

4. Continuous Integration (CI) & Continuous Deployment (CD)

CI/CD automates code building, testing, and deployment.

Popular CI/CD Tools:

- Jenkins
- GitHub Actions
- GitLab CI/CD
- Harness

5. Build Automation & Dependency Management

- **Tools**: Maven, Gradle, NPM, Pip (for Python), msbuild (.net)
- **Understanding Artifacts**: JAR, WAR, Docker Images

6. Containerization & Orchestration

Containers help in deploying applications quickly and efficiently.

Tools to Learn:

- **Docker** (Learn Dockerfile, docker-compose, and container networking)
- **Kubernetes** (Learn kubectl, helm, and K8s architecture)
- **Docker swarm –** to manage docker containers , native tool
- **Argocd** - To manage app deployment using K8S

7. Infrastructure as Code (IaC)

Instead of manually setting up servers, automate them.

Popular Tools:

- **Terraform** (Infrastructure as Code)
- **Ansible** (Configuration Management)

8. Cloud Computing

DevOps engineers often work with **Cloud Providers**.

Popular Cloud Services:

- **AWS** (Amazon Web Services) - EC2, S3, Lambda, VPC
- **Azure** - Virtual Machines, App Services, AKS
- **GCP** (Google Cloud) - Compute Engine, Cloud Run, GKE

9. Monitoring & Logging

Ensuring application health with logging & monitoring.

Popular Tools:

- **Monitoring**: Prometheus, Grafana, Datadog, New Relic
- **Logging**: ELK Stack (Elasticsearch, Logstash, Kibana), Fluentd

10. Security & Compliance in DevOps

- **Container Security**: Aqua Security, Trivy
- **Secrets Management**: HashiCorp Vault
- **Cloud Security**: AWS IAM, Azure Security Center

Project Ideas:

- Deploy a full-stack app with CI/CD

- Automate infrastructure with Terraform
- Set up monitoring for a web app