Exp 1: To understand Dev-Ops: Principles, practices & DevOps Engineers Role & Responsibilities

What is DevOps?

→ Dev-Ops is a collaborative approach where teams work together to build & deliver secure software efficiently. It combines software development (dev) & operations (ops) to accelerate delivery through automation, collaboration, fast feedback & iterative improvement. Built on Agile methodology, Dev-Ops creates a culture of accountability for business outcomes.

Core principles:

- Develop & test in production like environments
- Deploy builds frequently
- Continuously validate operational quality.

Key Practices:

* **Continuous development**: This is the phase that involves planning & coding, versioning & managing builds of the software application functionality. Eg: git, github, maven.

* **Continuous testing**: It contains executing automated tests, continuously & repeatedly against the code base & various deployment

environments. It is a software testing methodology which focuses on achieving continuous quality & improvement.

eg: Apium, Bamboo, Jira.

* <u>Continuous Integration</u>: Continuous integration refers to the build & unit testing stages of the software release process. Every revision that is committed triggers an automated build & test.
- Improve developer productivity.
- find & address bugs quicker
- Deliver updates faster.

* <u>Infrastructure Management</u>: Without automation, building & maintaining large-scale modern IT systems can be a resource - extensive undertaking & can lead to increased risk due to manual error. Configuration & resource management is an automated method for maintaining computer systems & software in a known, consistent state.

* <u>Configuration Management</u>: Infrastructure as code is the practice of describing all software runtime environment & networking setting & parameters in simple textual format, that can be stored in your version control system (VCS) & versioned and on request. These text files

are called manifests & are used by DevOps tools to automatically provision & configure build servers, testing, staging & production environments

⊕ DevOps Engineer Role

- A DevOps engineer manages a company's infrastructure, bridging development & operations.

- **Facilitator of collaboration.**
  - Bridge the gap between development, operations & QA teams to streamline communication & workflows.

- **Automation specialist.**
  - Automate repetitive tasks like testing, deployment & monitoring to improve efficiency & reduce human errors.

- **Continuous Integration & continuous Delivery.**
  - Design, implement & maintain CI/CD pipelines to enable faster, reliable & repeatable software releases.

- **Infrastructure as Code (IAC)**
  - Use tools like Terraform, Ansible or Cloud Formation to define & provision infrastructure through code.

- Monitoring & Incident Management:
  - Set up monitoring systems to track applications performance & troubleshoot issues in real time.
  - Ensure systems are resilient & downtime is minimized.

Responsibilities:
1. Collaboration & Planning:
   - Work with development & ops team to plan & design scalable solutions.
   - Participate in sprint planning & retrospective meetings

2. Configuration Management:
   Use tools like puppet, Chef or Ansible to manage server configurations & ensure consistency.

3. Pipeline Management:
   Maintain CI/CD pipelines to ensure seamless builds, test & deployment workflows.

4. Monitoring & logging:
   Implement monitoring tools like prometheus, Grafana or Splunk to track system health & performance.

5. Support & troubleshooting:
   Respond to incidents & resolve production issues promptly.
   - Identify root causes of failures & implement fixes.