CS 816 - Software Production Engineering

Mini Project - Scientific Calculator with DevOps

Problem Statement

Create a scientific calculator program with user menu driven operations:

- Square root function - √x
- Factorial function - !x
- Natural logarithm (base - e) ln(x)
- Power function - x^b

DevOps Tool Chain

You can use any set of DevOps tool chains you want, but the pipeline would be the same. The pipeline includes:

1. Using a source control management tool - like GitHub, GitLab, BitBucket etc
2. Testing - test your code using either JUnit, Selenium, PyUnit etc
3. Build - build your code using tool like Maven, Gradle, Ant etc
4. Continuous Integration - Continuously integrate your code using Jenkins
5. Containerize - Containerize your code using Docker
6. Push your created Docker image to Docker Hub
7. Deployment - Do configuration management and deployment using Ansible.
   Using these configuration management tools pull your Docker image and run it on the managed hosts
8. Deploy on your local machine using docker via Ansible
   You can also use Amazon AWS or Google Cloud or some other 3rd party cloud if you prefer.

Submission

- You can create a command line application or web application totally up to you

- You can use any language to implement this project, example - Java, C, Python, C++ and many more

- Create a report explaining each step

- Report includes:

    - What and Why of DevOps?
    - Tools used

- Each step explanation includes:

    - A Brief about step, example Source Control Management and tool used
    - Explain setup to the tool and any configurations that had to be done and attach screenshots of it,
      example GitHub push, commit, Jenkins credential management, Ansible connection settings, and many more
    - Add the commands that were used
    - Explain all the steps done in that tool and attach screenshots of each step, example GitHub Repo creation, Jenkins Pipeline creation and Docker Hub repo creation
    - Add links to your **public** GitHub repo, Docker Hub in report
    - Provide scripts & configuration file like Dockerfile, ansible playbook, Jenkins pipeline script etc
    - Screenshot of the scientific calculator application and its various operations

- Upload the final report with your RollNumber example `IMT2022xxx.pdf`

- Pdf contains **screenshot images**, link to **public Github repo**, **link to dockerhub** etc

- Your project report should be in such a way that a naive person can easily reciprocate those steps and produce the end result

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NOTE:
This project has to be done individually.