Tinkerers' Lab IIT Hyderabad

Bootcamp and Mini-Project

Software Engineering

What is Software Engineering?

Software Engineering is all about designing, building, and maintaining software in a structured and efficient way. It helps create reliable and scalable applications, from simple mobile apps to complex systems. By turning ideas and requirements into practical solutions, software engineering improves performance, security, and user experience across different industries.

Project Overview

You may choose any of the project ideas listed below or propose a project of your own, provided it aligns with the scope and objectives of this initiative. If you decide to work on a project outside the suggested topics, please ensure that it is well-defined, feasible within the given timeframe, and demonstrates meaningful application of relevant concepts and skills.

1. **Local Chat App in React :** Build a real-time chat application using React (frontend) and Node.js with Socket.io (backend). This project helps students understand WebSockets and client-server communication by enabling instant messaging without authentication or a database.

   Bonus: Integrate Firebase to store chat history, so messages remain even after a refresh.

2. **URL Shortener :** Build a simple URL shortener using React (frontend) and Node.js with Express (backend). Users can enter a long URL, and the app will generate a short link that redirects to the original URL.

   Bonus: Store shortened URLs using MongoDB or Firebase for persistence.

3. **Codeforces Clone:** Build a simple coding challenge platform inspired by Codeforces, using React (frontend) and Node.js with Express (backend). Users can view problems, submit solutions, and get basic correctness feedback.

   Bonus: Add a leaderboard and integrate a code execution API for real-time evaluation.

Mentors

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Materials & Resources

- **Frontend Development (Choose your Framework)** :
  - ReactJS :
    - Recommended Resources:
      - Meta's Updated ReactJS Documentation : This meticulously crafted documentation provides detailed explanations for all concepts.
    - Tutorials:
      - React Tutorial for Beginners
      - Learn React With This One Project
  - React Native: If you're familiar with React JS, this transition will be seamless.
    - Recommended Resources:
      - React Native Documentation
      - Beginner-friendly tutorial
  - NextJS:
    - Recommended Resources:
      - Next.js Documentation
      - Tutorials: Learn Next.js 13 With This One Project
  - Flutter :
    - Recommended Resources: Flutter Documentation
    - Tutorials:

- Flutter Tutorial For Beginners in 3 Hours
- Flutter Tutorial For Beginners [2024] | Flutter App Development
- Course For Beginners | Edureka

- **Back-End Development** :
  - Node.js and Express.js :
    - Recommended Resources : Node.js Documentation
    - Tutorials : Node.js and Express.js - Full Course
  - Go Programming language:
    - Recommended Resources : Go Documentation
    - Tutorials : Go Tutorial for Node Developers
  - Python for Backend :
    - Recommended Resources : Django Documentation
    - Tutorials : Python Backend Development

- **Additional Learning Options:**
  - Git and GitHub:
    - Recommended Resources:
      - Short tutorial on Git and GitHub
      - Downloads and Documentations of Git

Submission

You may submit your work via GitHub, Google Drive, or any other suitable platform. Please ensure that your code is well-structured, properly documented, and follows best practices for readability and maintainability.

Documentation:
Along with your submission, include a **Report or README** that provides an overview of the project, including:

- **Why did you choose the project?**
- Your key learnings and insights from working on the project.
- Any challenges faced and how they were addressed.

- Instructions on how to set up and run the project.
- Dependencies or prerequisites required.

If there are any additional considerations (e.g., dataset usage, API keys, or deployment instructions), please include them in the documentation.

Note: Sessions will be conducted to explain the concepts.