Activity 5.1 – Learning Highlights

Performance and Scalability

Performance goals are established through quantitative measures like response times, loading time, and transactions per second. Scalability focus on ensuring systems can handle increased loads by using tools such as load testing and stress testing.

Bottleneck Identification and Monitoring

Monitoring tools are essential in understanding how systems behave under load. They help spot bottlenecks, whether it's the CPU, memory, disk usage, or network traffic. Once you know what's slowing things down, you can justify things like algorithms or optimize database performance to make everything run smoother.

Optimization Techniques

- **Database Optimisation:** Implement indexing on frequently queried columns to speed up data retrieval.
- **Caching Strategy**: Introduce a distributed caching system like Redis or Memcached to store session data and frequently accessed read-only content.
- **Code Profiling and Refactoring**: Use code profiling tools like VisualVM to identify hot spots and refactor those sections of code for better performance.
- **Content Delivery Network (CDN):** Implement a CDN to cache static content at edge locations closer to users.
- **Concurrency Optimisation:** Apply asynchronous programming patterns and use a message queue to handle requests.