

## Distributed Systems- Assignment 2

(To be done in groups of 3)

### Question

In this assignment, you will develop a **scalable distributed system** that simulates **load balancing** and **fault tolerance** in a client-server architecture. The system should consist of multiple servers and a **load balancer** that evenly distributes client requests among available servers based on their current load. Each server should handle requests from the client and perform a simple task, such as calculating the sum of numbers or handling remote method calls. Implement a **heartbeat mechanism** that allows servers to notify the load balancer of their availability. If a server fails, the load balancer should redirect incoming requests to other active servers.

Additionally, integrate **asynchronous communication** between the client and server to allow non-blocking request handling and improve performance. The system should also have **automatic scaling**, where the number of active servers increases or decreases based on the incoming traffic. For fault tolerance, implement **data replication** to ensure that data is available even if a server goes down. Use **middleware** to facilitate communication between the servers and load balancer, and ensure that your system can handle high traffic efficiently.