Technical Test for Senior Full Stack Developer Position at Libellule Monde

Please complete the following tasks clearly, concisely, and thoroughly. Provide your solutions along with explanations.

Task 1: Coding Challenge

Problem Statement: Write a function in your preferred programming language that takes an array of integers and returns the two numbers from the array whose sum is closest to zero.

- **Input:** `[-8, 4, 5, -10, 3]`
- **Expected Output:** `[-8, 5]`

Include:

- Your complete solution code.
- Time and space complexity analysis.

Task 2: System Design

Design a high-level architecture for a scalable web application to support millions of users concurrently. Provide:

- An architecture diagram (can be a sketch).
- Brief descriptions of each component in your system.
- Explanation of scalability, fault tolerance, and security considerations.

Task 3: Code Review and Optimization

Analyze the following pseudocode and describe at least three significant improvements you'd make:

```
function processOrders(orders) {
  for i from 0 to orders.length - 1 {
    order = orders[i];
    total = 0;
    for j from 0 to order.items.length - 1 {
      total = total + order.items[j].price;
    }
    saveOrder(order.id, total);
  }
}
```

Provide clear explanations for each suggested improvement and how it benefits the overall efficiency and maintainability.

Task 4: Cloud Architecture and DevOps

You have been asked to build and deploy a microservices-based application in a cloud environment (AWS, Azure, or GCP).

Describe and/or include:

- A high-level deployment architecture diagram.
- CI/CD pipeline setup for deployment automation.
- How you'd implement logging, monitoring, and auto-scaling.
- A secure authentication mechanism for APIs.

Bonus:

- Infrastructure Code (IaC): Provide a small example using Terraform, AWS CloudFormation, or similar.
- Containerization: Explain how you would use Docker and orchestrate services with Kubernetes or a managed alternative.

Submission Instructions:

- Submit your solutions clearly formatted as a PDF or markdown document.
- Provide concise and precise explanations for each task.
- Include your code in a clean and readable format.
- You can also create a Git Repo and share it with me

Good luck!