**IMPROVED HOT THOMAS POTATO (90% ACCURACY)**

**STILL READ YOUR NOTES!!!!  
  
Question 1:**  
You are a lead architect tasked with designing a distributed system for a global company. Answer the following questions to demonstrate your expertise in distributed systems and their architectures:

a. Define a distributed system with the context of modern enterprise applications. Explain how scalability and fault-tolerance enable business continuity and growth, using a real world example such as a cloud based e-commerce platform (10 marks)  
b. Evaluate the client-server architecture for a high-traffic financial services application, discussing its benefits  
c. Analyze the challenges of data consistency in a globally distributed system, such as a multi-region cloud services. (10 marks)

**Question 2:**  
In the context of communications in distributed systems, answer the following questions to show your understanding of Inter-Process Communication (IPC), Message-Oriented Communication, and Web Services/APIs:  
a. Explain the differences between Remote Procedure Calls (RPC) and Message Queues in distributed systems. (10 marks)  
b. Design a communication architecture for a distributed inventory management system that integrates REST-based web services with a Publish-Subscribe System. (10 marks)

**Question 3:**  
Compare and contrast Crash Failures and Byzantine Failures in distributed systems. Explain their impact on system availability and describe one fault tolerance that can mitigate such type of failure.

**Question 4:**  
a. Compare and contrast Strong Consistency and Eventual Consistency in distributed systems. Explain their tradeoffs in terms of performance, scalabity, and availability

b. Describe and one replication strategy. (Master-Slave, Multi-backup, or Quorum-based) that is best suited for each consistency model, providing a specific example of a distributed system scenario where each would be applied and justifying your choice

**Question 5:**  
Design a distributed file system for a multinational corporation with offices in three regions (e.g., North America, Europe, Africa) that uses a Quorum-based Replication Strategy to manage file replication for departmental data (e.g., HR, Finance).