In today's digital economy, privacy in financial transactions has become a significant concern. Traditional cash transactions provide anonymity, with neither party revealing sensitive details such as identity or account information. However, in digital payment systems, particularly those utilizing UPI or similar platforms, transaction logs retain sensitive information about both the sender and the receiver, such as account numbers and transaction history. This compromises user privacy and raises concerns about data security.

The challenge is to develop a system for anonymous digital payments that mimics the privacy of cash transactions while maintaining the convenience and security of current digital payment platforms. In this system, transactions should only be executed if the sender has a sufficient balance, but neither the sender nor the receiver should have access to each other's sensitive details, such as UPI information or transaction history. Instead, only the necessary transaction information, such as the amount and transaction status, should be logged.

This solution must balance privacy with regulatory and security requirements, preventing malicious behavior such as fraud or money laundering. Additionally, the system should integrate seamlessly with existing financial infrastructure, be user-friendly, and offer robust protection against misuse.

Key objectives include:

User Privacy: Ensure that neither party in a transaction can access the other’s sensitive details without compromising the security or validity of the transaction.

Transaction Integrity: Ensure that transactions only proceed when the sender has sufficient balance while maintaining anonymity.

Fraud Prevention: Implement mechanisms to prevent abuse, fraud, or illegal activities while respecting user privacy.

To achieve some of the above objectives, design a cryptographic protocol. You may use privacy-enhancing technologies like Secure Multi-Party Computing and Zero-Knowledge Proofs. However, you can use any other method to achieve the above objectives.