Smart Bengal Hackathon (SBH-Sr)-2025

Team Name: Crypt-Think

PS No. : SBHRCCIIT033

Area/Theme: Cryptography

Hack-Proof Messages: The Future of Secure Communication

Category: Software

Objective:

- To create a Secure Messaging Application using **Post Quantum Cryptography** (**PQC**) techniques.
- Ensures end-to-end encryption using **optimised AES 256 algorithm** that remains secure against future quantum computer attacks.

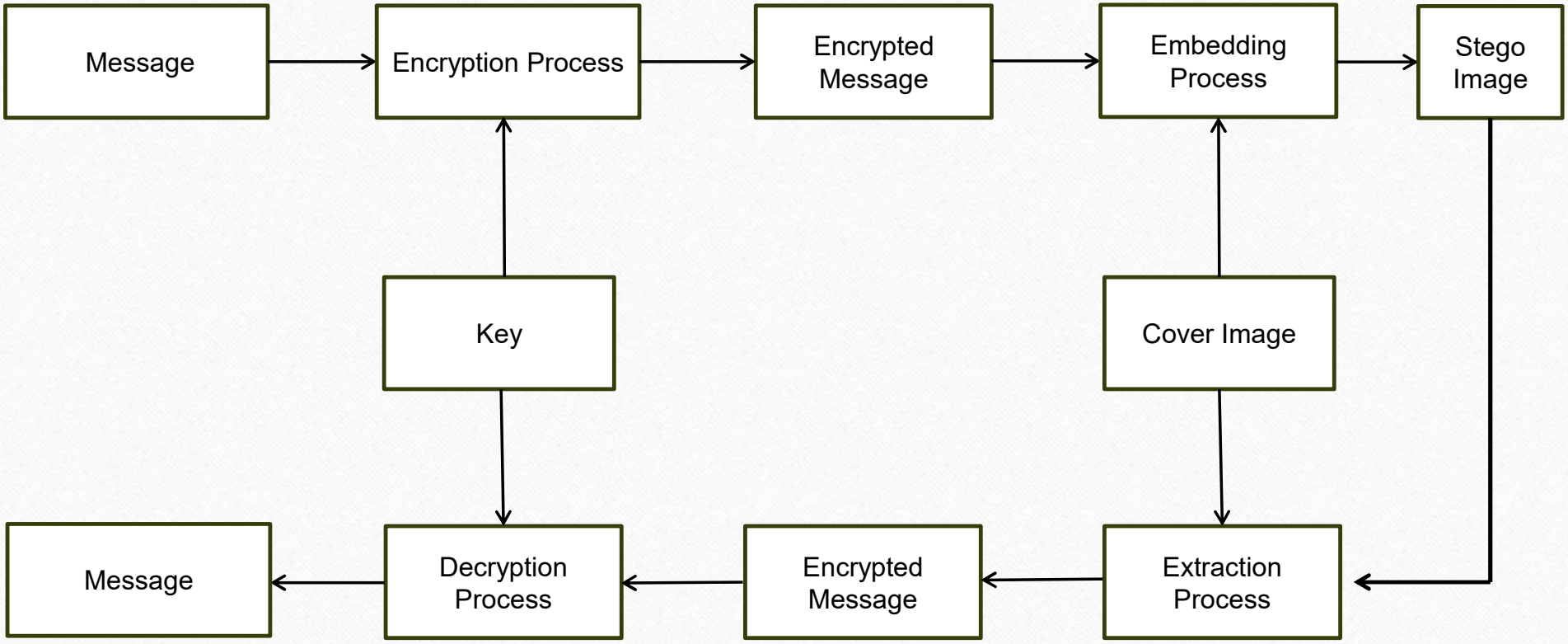
Major Societal Benefit/Target Community:

- **Individuals & Businesses :** Secure messaging platform for personal and professional correspondence.
- **Government & Defense :** Facilitate secure communication, data protection for sensitive information and operations.
- **Healthcare & Finance :** Secure transmission of sensitive data.

Other Application Areas:

- **Cloud Storage Encryption**
- **Secure Internet of Things (IoT) Communications**
- **Blockchain and Cryptocurrency Security**

Block diagram : (Hack-Proof Message)



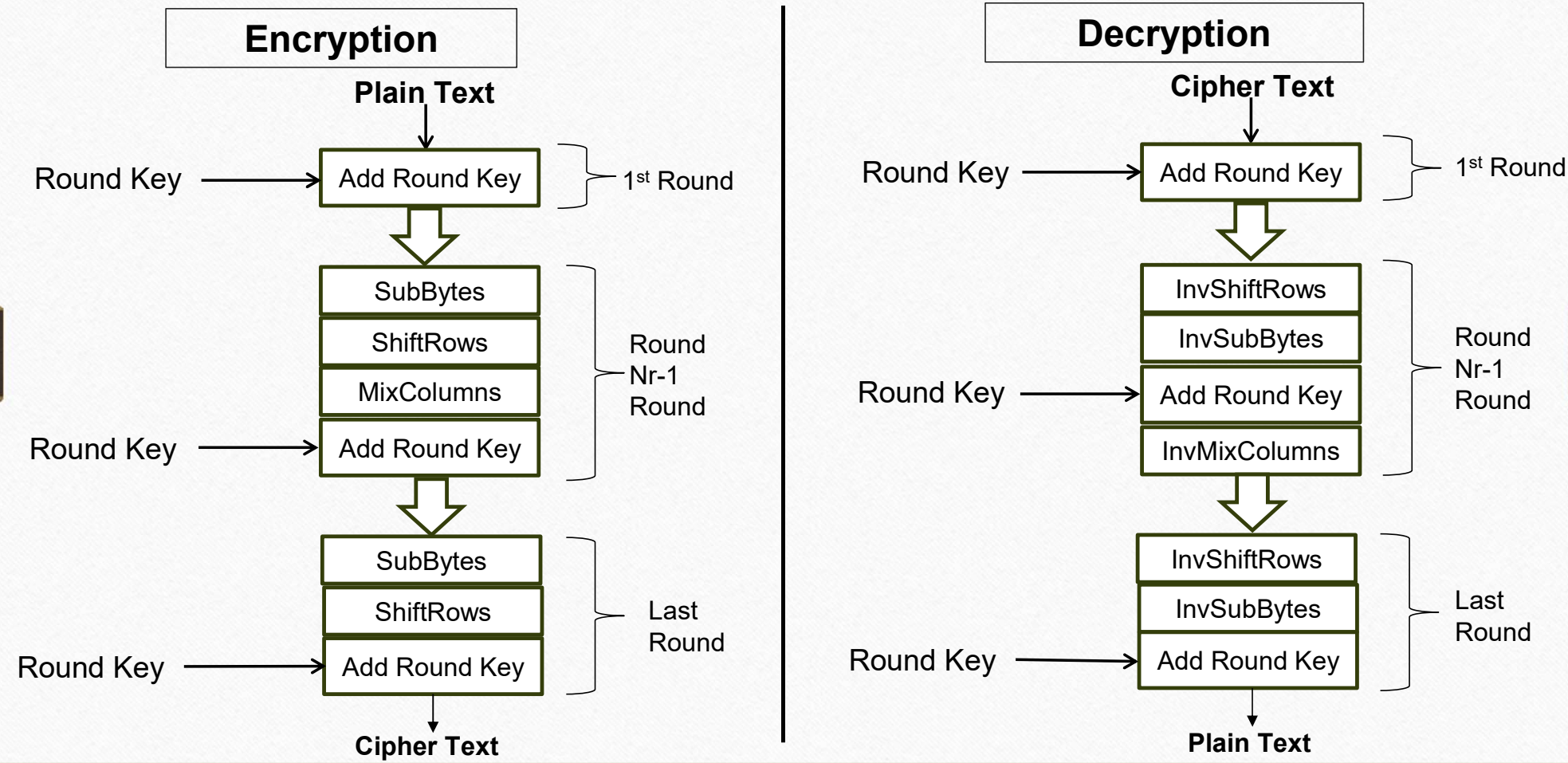
Market/Literature Survey :

- **Existing Platforms :** WhatsApp, Telegram, Signal (uses conventional encryption).
- **Threats :** Quantum computers can break conventional encryption **(RSA & ECC algorithm)** used in messaging platforms.
- **Post Quantum Cryptography (PQC) Adoption : NIST's PQC algorithms** such as **Kyber**, **Dilithium** gaining attraction.
- **References : https://ieeexplore.ieee.org/abstract/document/4682291**

Novelty (comparative study between proposal & survey):

- **Existing Apps :** Uses **RSA & ECC algorithm**, vulnerable to quantum attacks.
- **Our Solution :** Implements **Lattice based encryption** (**Kyber**, **Dilithium**) and **optimised AES 256 algorithm** to prevent quantum decryption.
- **Focus :** Protecting data**,** offering high level privacy by encrypting data using a **256-bit key**.

Data flow diagram: (AES 256 Algorithm)



Component list (if applicable):

NA (Not applicable)

Software used (whether open source, mention):

- **Programming Language:** Python (Backend), JavaScript (Frontend).
- **Libraries and framework:** Flask, FastAPI, Websockets, Open quantum safe(SQS).
- **Database:** Firebase, SQLite.
- **Platform:** Web.
- **Open source:** Yes.

Total price (if applicable):

NA (Not-Applicable).

Features (*highlight keywords*):

- Secure exchange of information.
- No third-party access.
- Fully end-to-end encrypted chats (using **Optimised AES 256 algorithm)**
- Secure against future **Quantum Computer Attacks**.
- Time compatible.
- Multi device support.
- **Opensource** and transparent.
- Cost effective.

Team details

Name	College/ University Name	Department	Degree	Year	Univ Roll No	Position
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Mentor details

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