**National University of Computer and Emerging Sciences, Karachi  
FAST School of Computing, Spring 2025**

**CS3001-Computer Networks**

## Project Proposal: Implementation of a Peer-to-Peer (P2P) File Sharing System

### 1. Project Title, Group Members, and IDs

* **Project Title:** Implementation of a Peer-to-Peer (P2P) File Sharing System
* **Group Members:**
  + Name: Moosa Memon | ID: 22K-4067
  + Name: Ali Suleman | ID: 22K-4060

### 2. Proposed Project Description

This project aims to develop a **decentralized file-sharing system** that enables users to share files directly with one another without relying on a central server. The system will utilize **peer-to-peer (P2P) networking** to ensure efficient and scalable data exchange. The implementation will be done using **Python/Java**, **Sockets**, and **Flask/Django** for better user management and interaction.

#### Functional Features:

1. **Peer Discovery Mechanism:**
   * Implement a method for peers to find and connect with each other using sockets.
2. **File Sharing and Transfer:**
   * Enable users to upload, request, and download files from peers.
3. **Decentralized Network Architecture:**
   * Ensure data exchange occurs without a central server.
4. **User Authentication & Management:**
   * Implement Flask for managing users and their file-sharing permissions.
5. **File Indexing & Search:**
   * Provide a mechanism to search available files within the network.
6. **Security and Encryption:**
   * Ensure secure file transfer through encryption mechanisms.

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### 3. Plan of Work

#### Week 1: Research and Setup

* Understand P2P networking concepts and related technologies.
* Set up the development environment with necessary tools.

#### Week 2: Peer Discovery & Networking

* Implement socket programming for peer discovery.
* Establish direct communication between peers.

#### Week 3: File Transfer Implementation

* Develop mechanisms for uploading and downloading files.
* Implement Flask-based API for user management.

#### Week 4: Indexing, Search, and Security

* Implement a search feature for file lookup.
* Add encryption and authentication mechanisms.

#### Week 5: Testing and Finalization

* Conduct functional and performance testing.
* Optimize the system and finalize documentation.

### Team Contributions

#### Ali’s Contributions:

* Implement peer discovery and socket communication.
* Develop search and indexing functionalities.

#### Moosa’s Contributions:

* Implement Flask-based user management and API.
* Develop file transfer and encryption mechanisms.

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### 4. References

* [1] Kurose, J. F., & Ross, K. W. (2017). *Computer Networking: A Top-Down Approach*. Pearson.
* [2] Stevens, W. R. (2003). *TCP/IP Illustrated, Volume 1: The Protocols*. Addison-Wesley.
* [3] Beej’s Guide to Network Programming (Online Resource).