SDE Assignment 1: Building a Peer-to-Peer (P2P) System
Total Marks: 100

General Instructions

All students have to submit the report and code for the assignment. Put the report (stepwise explain the approach and assumptions you have made, if any) and the code in a folder named **<SDE_A2_YourRollNo>**, create a zip file, and upload it to google-classroom. Share a readme file if required.

1. For regular students: No need to submit any demo/video. You all have to show the demo and explain the approach to the TA. A schedule will be shared soon.

2. For executive students: Put the code, report and recording of the demo in the zip file.

3. Plagiarized submissions will not be evaluated or awarded with an 'F' grade in the course.

Problem Statement

As part of the Software and Data Engineering course, you are expected to design and implement a Peer-to-Peer (P2P) system. In this assignment, you will create a P2P system that allows users to share files directly between their devices without the need for a centralized server. This assignment will help you understand the fundamental concepts of distributed systems, networking, and data management.

Marking Scheme:

1. **System Design (20 points):**

Clearly define the architecture of your P2P system.
Describe how peers will connect, communicate, and share files.
Discuss how you will handle challenges like peer discovery and security.

2. **Implementation (30 points):**

Implement a working P2P system.
Peers should be able to join the network, share files to other peers.
Ensure appropriate error handling and user-friendly interactions.

3. **Efficiency and Scalability (30 points):**

Consideration of system performance as the number of peers increases.
Discussion of strategies to ensure efficient file discovery and download.

4. **User Interface (10 points):**

Create a user interface that allows users to interact with the P2P system.
The interface should facilitate file sharing and downloading.

5. **Follow up Question (10 points):**

Discuss the advantages and challenges of a decentralized P2P architecture compared to a hybrid architecture that involves some centralization.

Disclaimer: You are allowed to use any technology/framework as long as you can justify your choice of the technology/framework in the 5th point above.