Project: Implementing P2P File Sharing Software

Due Date: 18 April 2025

Objective

Work as a group of two students.The goal of this project is to develop a simple peer-to-peer (P2P) file-sharing application. This software will allow multiple users to share files without relying on a centralized server, similar to protocols used in BitTorrent or Gnutella.

Technical Requirements

- **Peer Discovery:** Implement a mechanism for peers to discover each other.
- **Indexing and Searching:** Maintain a list of available data on each peer.
- **Data Transfer Mechanism:** Peers should be able to request and download data from other peers.
- **Concurrency and Threading:** Implement multi-threading to handle multiple connections simultaneously.
- **Chunked File Transfer:** Implement file transfer in chunks.
- **Verifying File Integrity:** Implement a verification mechanism that checks if the downloaded file was corrupted or not.
- **User Interface:** A basic command-line or graphical interface.

[See this link if you want to see how BitTorrent works](#)

[This is another useful link](#)

Instructions

1. **Programming Language:**
   a. You must use **Python** to implement your code (Useful link: https://www.python.org)
   b. Follow the PEP 8 coding guidelines for writing clean and professional Python code. (Here is a link: https://peps.python.org/pep-0008/)
   c. Use `git` for version control of your code
2. **Code Documentation and Comments:**
   a. Properly comment your code to make it clear and understandable

      b. Generate a PDF documentation for your code using a tool like Sphinx that automatically generates it for you. (see this link: https://www.sphinx-doc.org/en/master/). There are other tools that provide similar functionality (i.e. automatically generates documentation for you). You can use any of them if you dont like sphinx

3. **What to Submit:** There should be just one submission per group. All files must be submitted in a **single zip file**. Name the zip file <firstname>_<lastname>_project.zip (replace <firstname> and <lastname> with your name). The zip will have **atleast the following files**:

      a. **Python code**: Python files containing the code you wrote

      b. **Requirements File**: Submit a `requirements.txt` file listing all the Python dependencies required to run your code. (See this link: https://www.geeksforgeeks.org/how-to-create-requirements-txt-file-in-python/)

      c. **Readme**: A `README.md` file that clearly explains: 1- How to compile and run your code. 2- Examples of command-line usage

      d. **Report (PDF)**: The report must be in pdf format. Make sure to include names and rit emails for each student in your group

      e. **Code Documentation**: It must be in PDF format. Use a tool like Sphinx to automatically generate documentation. You can use any other similar tool if you want.

      f. **GIT Log**: Use Git for version control and make commits at appropriate points during development. Submit a git log file showing the commit history. This file should be name `revisions.txt`