

DESIGN FILE

Title and Authors

- Phase: Phase 1b - UDP-based File Transfer System
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Purpose of The Phase

This phase implements a UDP-based file transfer system that is designed for efficient and seamless data transmission. The system provides a user-friendly GUI for easy usage by users to send and receive files over the network using UDP sockets.

Code Explanation

Project Architecture

This project follows the RDT 1.0 (Reliable Data Transfer Protocol 1.0) model, assuming a completely reliable communication channel without error, loss, or duplication.

Code Structure

The system consists of two main components:

1. UDP File Sender - Allows the user to select and send a BMP file.
2. UDP File Receiver - Listens for incoming packets and reconstructs the file.

FSM Representation of RDT 1.0

1. Sending Side (FSM - rdt1.0: sending side)

- The sender stays in the "Wait for call from above" state, meaning it can accept new data.
- When data arrives from the application layer:
 1. Calls `rdt_send()` to initiate the transmission.
 2. Reads and chunks the selected BMP file using `make_pkt(file_path)`.
 3. Sends packets one by one using `udt_send(sock, packet)`.
 4. After all packets are sent, transmits an end-of-file signal (`b"END"`).

2. Receiving Side (FSM - rdt1.0: receiving side)

- The receiver remains in the "Wait for call from below" state, ready to accept new packets.
- Upon packet arrival:
 1. Calls `rdt_rcv(packet)` to receive it.
 2. Extracts data using `extract(packet, data)`.
 3. Stores received data in a BMP file using `deliver_data(data)`.
 4. Displays real-time updates via GUI.

3. Limitations of RDT 1.0

- Works only on an error-free channel.
- Does not handle packet loss, corruption, or duplication.
- Lacks error detection and retransmission mechanisms.
- Practical implementations employ RDT 2.0 and RDT 3.0, which include acknowledgments, error checking, and retransmissions.

Graphical User Interface (GUI) Implementation

- The application provides a Tkinter-based GUI for user interaction.
- The sender allows users to browse and send BMP files.
- The receiver displays status messages indicating file reception progress.

FSM Diagrams



a. rdt1.0: sending side

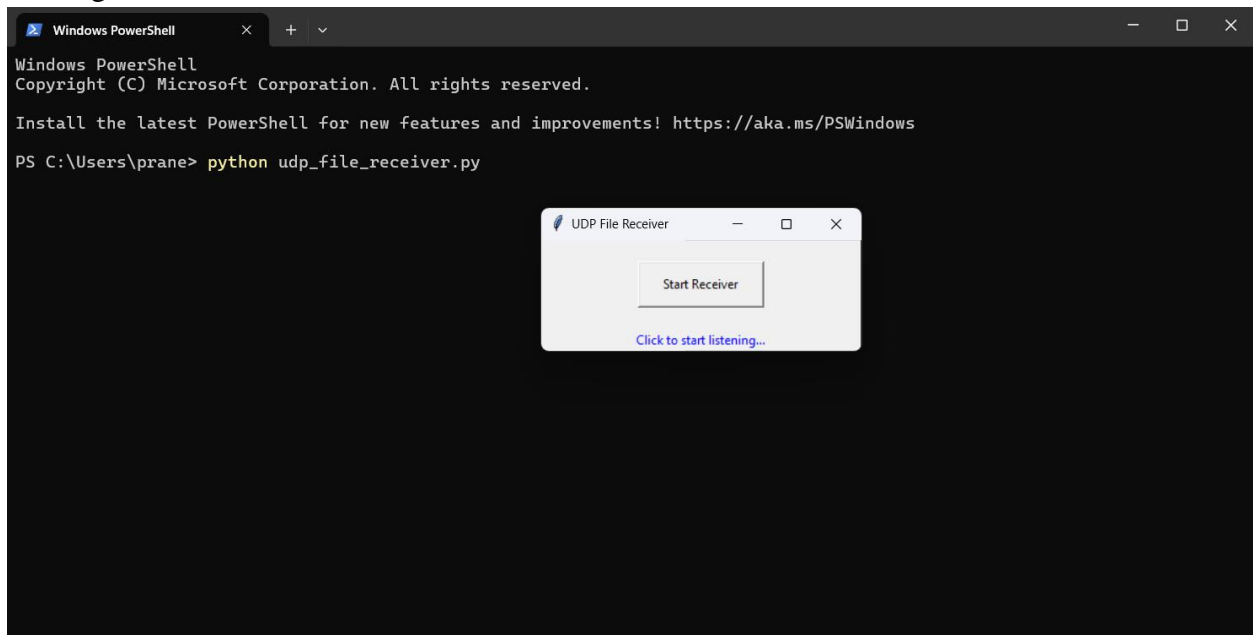


b. rdt1.0: receiving side

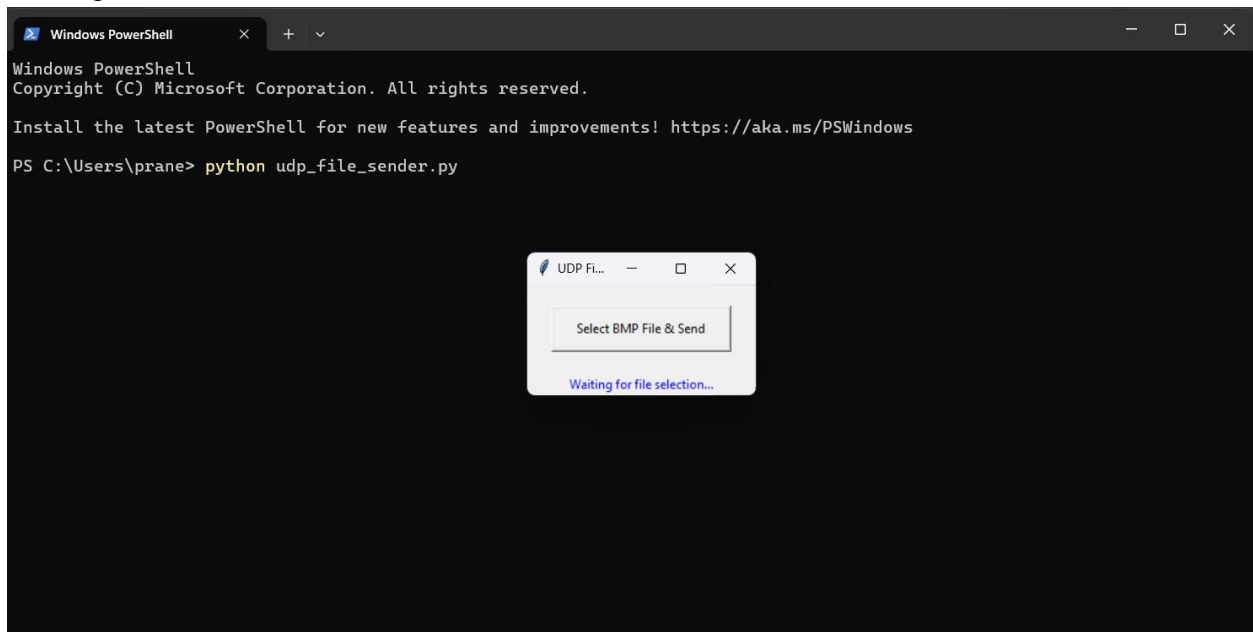
Execution Example

The following snapshots illustrate key moments during execution:

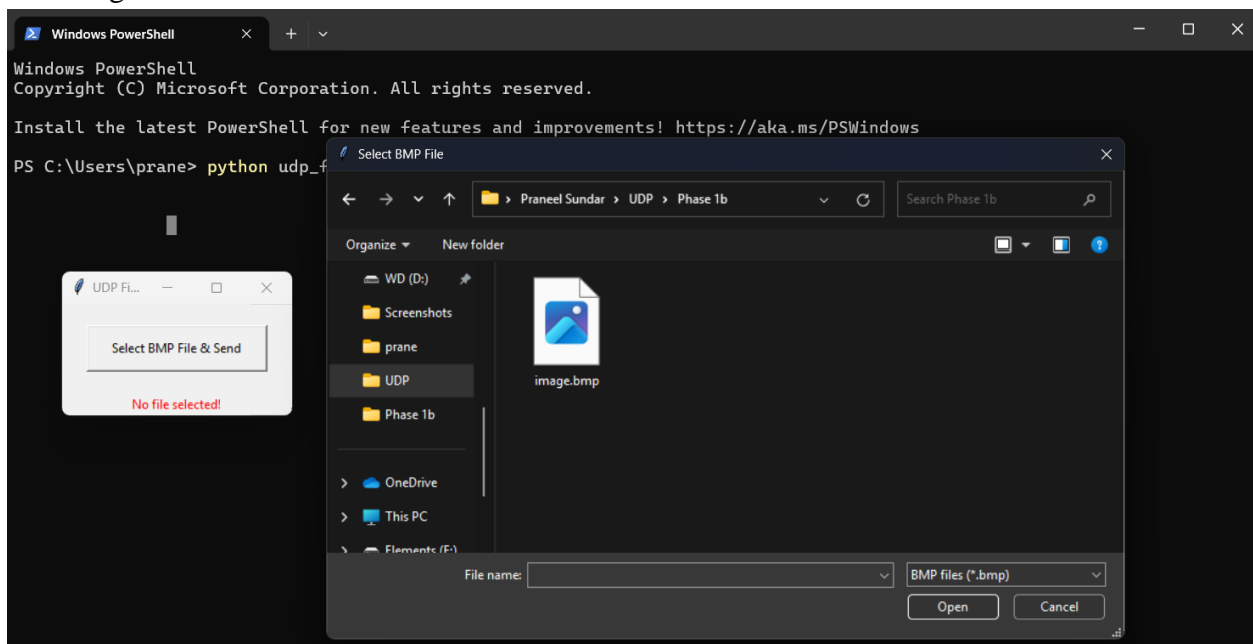
Starting the receiver--



Starting the sender--



Selecting a BMP file—



- Transferring the fileThe sender transmits packets over UDP

Successful file reception—

