

# LABWORK 1: TCP File Transfer

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## I. Protocol Design

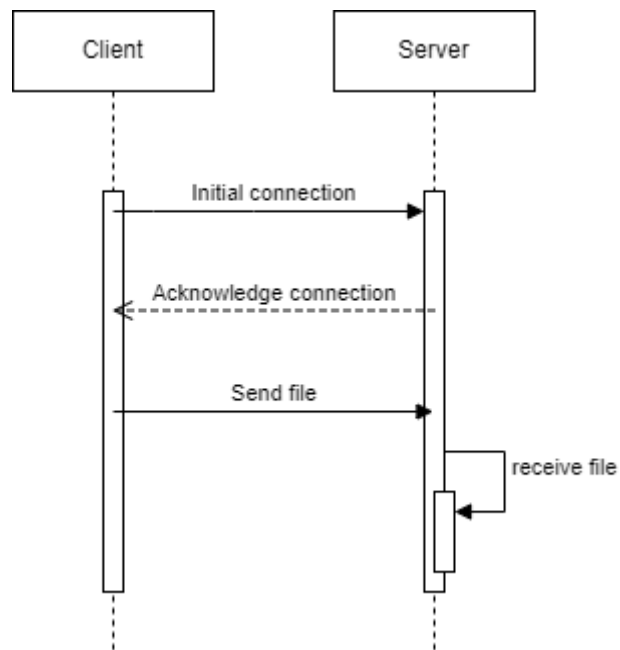


Figure 1. Protocol Design

## II. System Organization

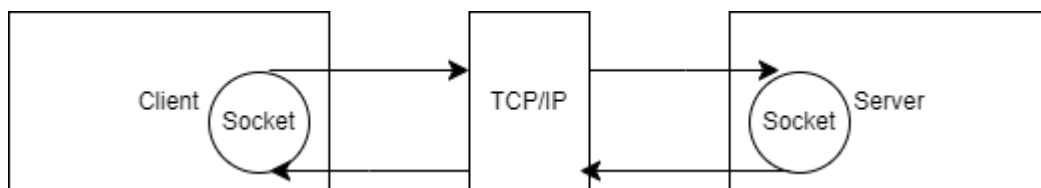


Figure 2. System Architecture

### III. File Transfer

The server opens and creates a “receive\_file.txt” to store the contents of the file received from the client. Then it uses “recv(new\_socket, buffer, BUFFER\_SIZE, 0)” to receive the file from client through socket. Finally, by using “fwrite(buffer, sizeof(char), bytes\_received, received\_file)”, the received data is written into the “receive\_file.txt” created earlier.

```
while (1) { // Keep the server running indefinitely
    if ((new_socket = accept(server_fd, (struct sockaddr *)&address, (socklen_t *)&addrlen)) < 0) {
        perror("accept");
        exit(EXIT_FAILURE);
    }

    // File receiving logic
    FILE *received_file = fopen("received_file.txt", "wb");
    if (received_file == NULL) {
        perror("File cannot be opened");
        exit(EXIT_FAILURE);
    }

    ssize_t bytes_received;
    while ((bytes_received = recv(new_socket, buffer, BUFFER_SIZE, 0)) > 0) {
        fwrite(buffer, sizeof(char), bytes_received, received_file);
    }

    printf("File received successfully.\n");

    fclose(received_file);
    close(new_socket);
}

close(server_fd);

return 0;
}
```

*Figure 3. Receive file in server side*

After the server is opened, the client starts and establishes the connection with the server. Then, it opens the file that we want to send is “test.txt” by using “fopen("./test.txt", "rb)”. Next, the data in the file is read and the number of bytes is stored in “bytes\_read”. After the “read” process is finished, the data is sent over the socket (sock) using the “send” function.

```
// File to send
FILE *file_to_send = fopen("./test.txt", "rb");
if (file_to_send == NULL) {
    perror("File cannot be opened");
    exit(EXIT_FAILURE);
}

ssize_t bytes_read;
while ((bytes_read = fread(buffer, sizeof(char), BUFFER_SIZE, file_to_send)) > 0) {
    send(sock, buffer, bytes_read, 0);
}

printf("File sent successfully.\n");

fclose(file_to_send);
close(sock);

return 0;
}
```

*Figure 4. Send file in client side*