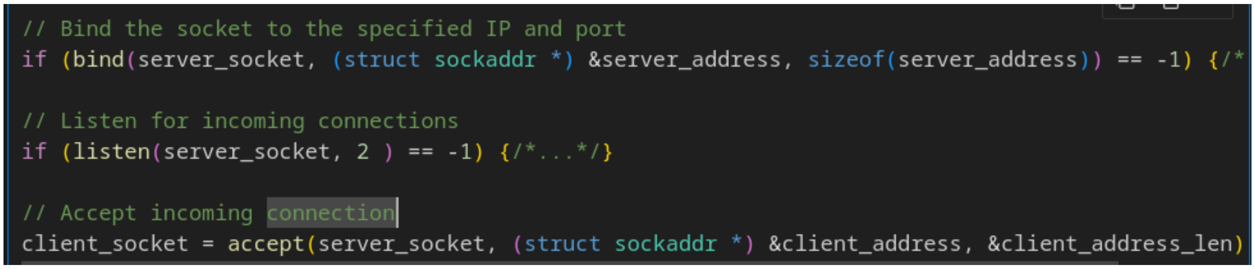
Customized Grading System using Socket Programming

Report

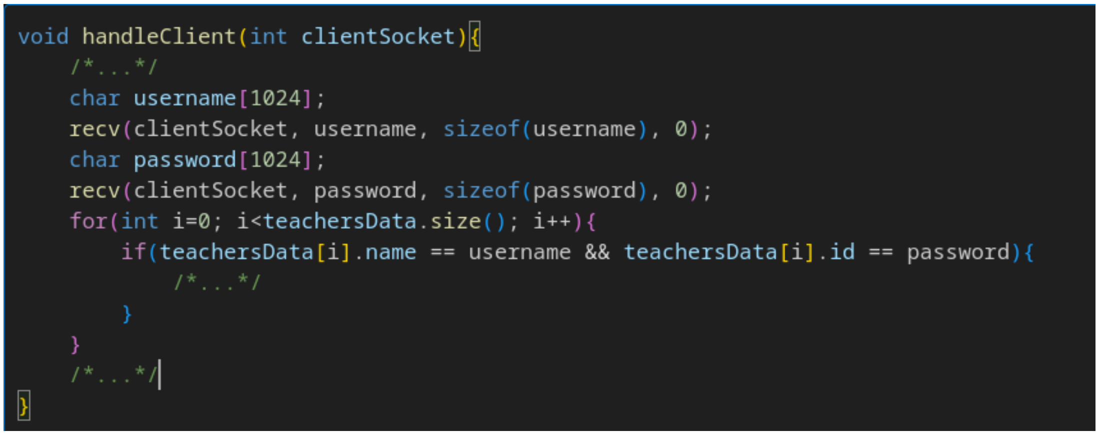
The server and client communicate over a socket connection, and the server handles multiple clients using a fork-based approach.

The server is implemented in the server.cpp file. It starts by binding to a specified IP and port, and then listens for incoming connections. When a connection is accepted, it forks a new process to handle the client.



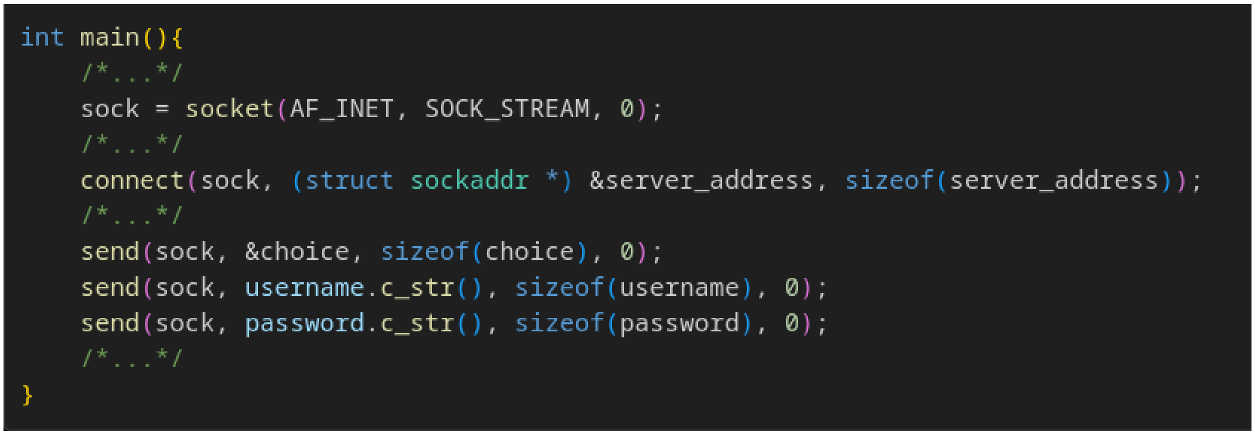
```
// Bind the socket to the specified IP and port
if (bind(server_socket, (struct sockaddr *) &server_address, sizeof(server_address)) == -1) {/*

// Listen for incoming connections
if (listen(server_socket, 2 ) == -1) {/*...*/}

// Accept incoming connection
client_socket = accept(server_socket, (struct sockaddr *) &client_address, &client_address_len)
```

The server uses the handleClient function to interact with the client. This function receives the username and password from the client, checks them against the teachersData vector, and sends a signal back to the client indicating whether the teacher was found.



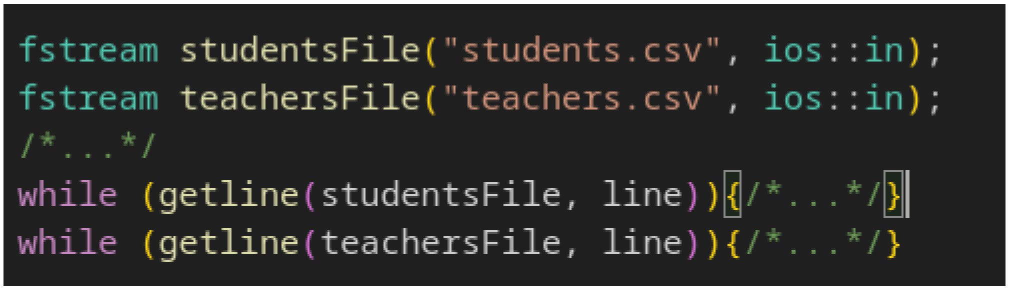
```
void handleClient(int clientSocket){
    /*...*/
    char username[1024];
    recv(clientSocket, username, sizeof(username), 0);
    char password[1024];
    recv(clientSocket, password, sizeof(password), 0);
    for(int i=0; i<teachersData.size(); i++){
        if(teachersData[i].name == username && teachersData[i].id == password){
            /*...*/
        }
    }
    /*...*/
}
```

The client is implemented in the client.cpp file. It creates a socket and connects to the server. It then sends a choice to the server, along with a username and password.

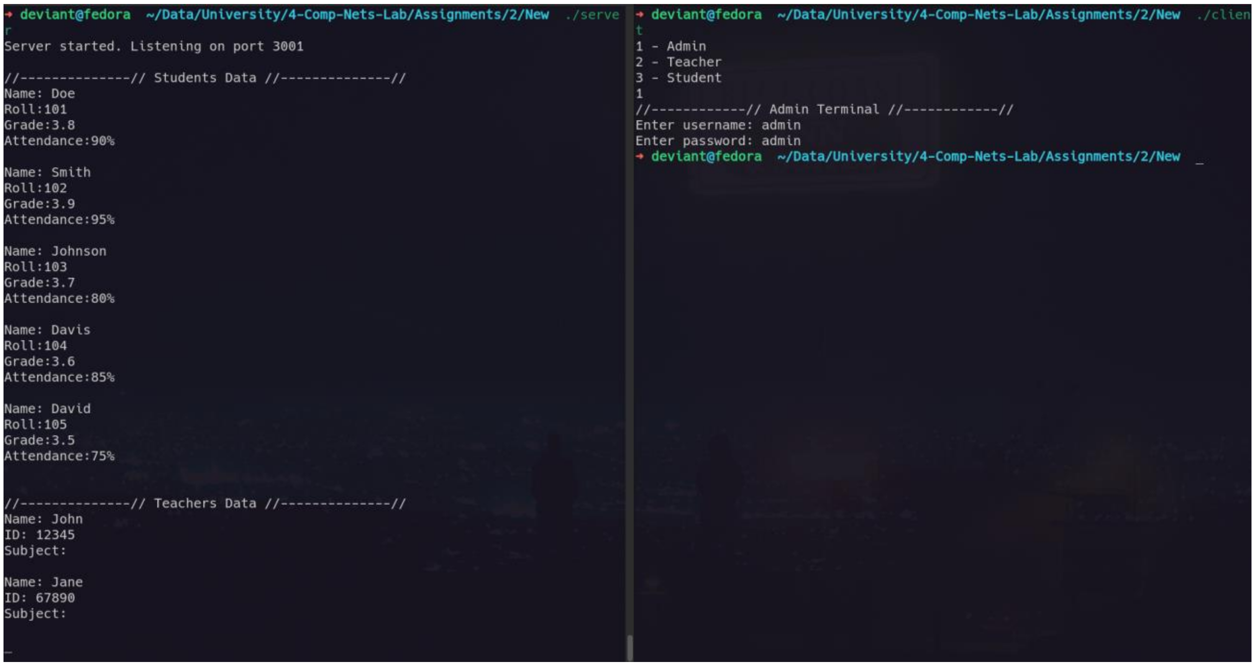


```
int main(){
    /*...*/
    sock = socket(AF_INET, SOCK_STREAM, 0);
    /*...*/
    connect(sock, (struct sockaddr *) &server_address, sizeof(server_address));
    /*...*/
    send(sock, &choice, sizeof(choice), 0);
    send(sock, username.c_str(), sizeof(username), 0);
    send(sock, password.c_str(), sizeof(password), 0);
    /*...*/
}
```

The server and client both use data structures defined in the structs.cpp file. The server reads data from students.csv and teachers.csv files into studentsData and teachersData vectors respectively.

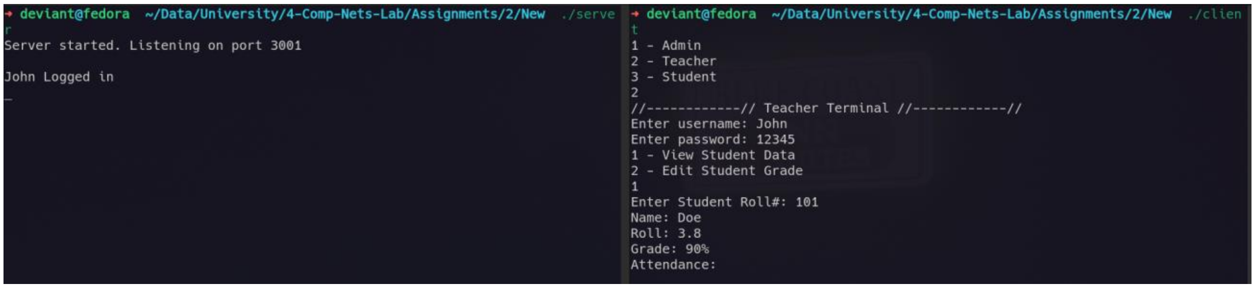


```
fstream studentsFile("students.csv", ios::in);
fstream teachersFile("teachers.csv", ios::in);
/*...*/
while (getline(studentsFile, line)){/*...*/}
while (getline(teachersFile, line)){/*...*/}
```



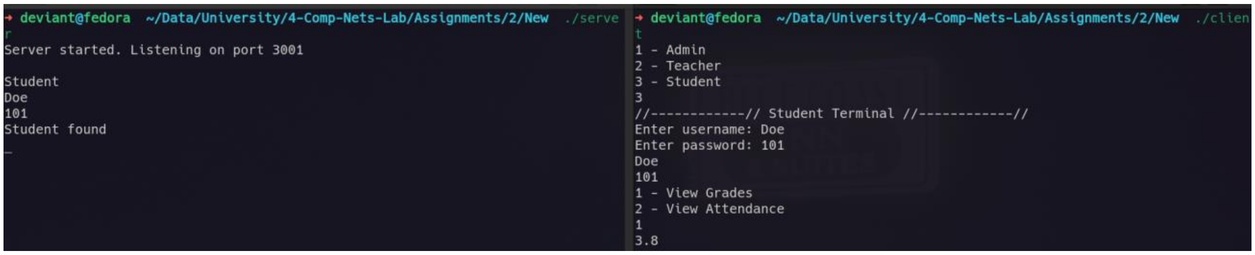
```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./serve
r
Server started. Listening on port 3001

//--------------// Students Data //--------------//
Name: Doe
Roll:101
Grade:3.8
Attendance:90%

Name: Smith
Roll:102
Grade:3.9
Attendance:95%

Name: Johnson
Roll:103
Grade:3.7
Attendance:80%

Name: Davis
Roll:104
Grade:3.6
Attendance:85%

Name: David
Roll:105
Grade:3.5
Attendance:75%


//--------------// Teachers Data //--------------//
Name: John
ID: 12345
Subject:

Name: Jane
ID: 67890
Subject:

_
```

```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./clien
t
1 - Admin
2 - Teacher
3 - Student
1
//------------// Admin Terminal //------------//
Enter username: admin
Enter password: admin
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  _
```



```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./serve
r
Server started. Listening on port 3001

John Logged in
_
```

```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./clien
t
1 - Admin
2 - Teacher
3 - Student
2
//------------// Teacher Terminal //------------//
Enter username: John
Enter password: 12345
1 - View Student Data
2 - Edit Student Grade
1
Enter Student Roll#: 101
Name: Doe
Roll: 3.8
Grade: 90%
Attendance:
```



```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./serve
r
Server started. Listening on port 3001

Student
Doe
101
Student found
_
```

```
➜ deviant@fedora  ~/Data/University/4-Comp-Nets-Lab/Assignments/2/New  ./clien
t
1 - Admin
2 - Teacher
3 - Student
3
//------------// Student Terminal //------------//
Enter username: Doe
Enter password: 101
Doe
101
1 - View Grades
2 - View Attendance
1
3.8
```