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CMPE 156 - FTP Project Assignment 5

Theory:

The submitted client and server implement a File Transfer Protocol application. As per the project guidelines, they are able to execute the following functions :

- Exchange PORT n1,n2,n3,n4,n5,n6 command at the start of each connection.
- Client able to send ls <path/argument> to execute the command on the server side.
- Client able to send get <filename> and the put <filename> to exchange files between client and the server.

IMPLEMENTED FILE TRANSFER PROTOCOL:

- The original protocol consists of 2 channels. One is the control channel where the request messages, their acknowledgements and interrupts are communicated. The second channel is the DATA channel which is used for transfer of data/files between the client and the server.
- The standard ports used for FTP are 21 for listening port on control channel and port number 20.
- The implemented protocol also consists of creating 2 channel by calling two different sockets for each channel. Since the port numbers are reserved, the project consists of a valid listening port entered by the user and the data channel port used is 2565.
- The PORT command is used to inform the server about the IP and about the receiving port of the client. This is used to send back or receive the data/files required.
- Original protocol sends a port command for every instruction. The implemented project just uses it once at the beginning and then the same information is stored and used.

Design and Workflow of Code:

The program follows the workflow mentioned below:

- The server is started with its listening port. It waits for the client.
- The client is started with providing the server IP and port number to connect to.
- As soon as this control channel is established between the two, the PORT command is passed from the client side. This informs the server about the data channel port being used by the client on the mentioned IP address.
- The *PORT n1,n2,n3,n4,n5,n6* command is decoded on the server side as following:
    - n1,n2,n3,n4 means the client's IP is n1.n2.n3.n4
    - n5,n6 means the port number is calculated as (n5*256)+n6
- Then the client processes user input for various commands entered. Consider the case of ls command for proceeding with the workflow.
- When ls command is entered, the first thing is checked is the syntax. If it is an invalid command, the user is notified and asked to enter a valid command with proper syntax.

- After checking the syntax, the command is sent via the pre established control channel to the server and the client waits for acknowledgement. The server checks for the validity and sends back the acknowledgement.
- After this process, both the server and client establish a new data channel for transfer of files/data.
- This is done by creating a new socket for the same. After the data channel function is over, this socket is closed and the channel is terminated. This means a new data channel is created for each new instruction as per the protocol requires.
- This process continues till the quit command is encountered and then the complete termination of the server and client is executed.

Error Checking:

The following cases are checked for errors in the application:

a. The port number / IP is not mentioned in starting the client or the server appropiately.
b. Error in binding, accepting and listening in the socket creation process.
c. Error in reading from file pointer.
d. Error in connecting to a server.
e. Writing and reading from the server.
f. Syntax errors in input commands.
g. Error in creating the control and data channels.
h. Errors in sending the files/data.
i. Handles only 1024 sized files. Limited buffer size.

How to run the code:

Please refer README.txt