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PROJETO DA DISCIPLINA REDES DE COMPUTADORES

MACEIÓ - AL
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CHAT DE BATE-PAPO: SIMULAÇÃO

Trabalho de Redes de Computadores
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1 INTRODUÇÃO

O projeto visa demonstrar a implementação e aplicação de um sistema de rede usando *socket* e *thread*. Neste projeto foi desenvolvido um servidor-cliente TCP/IP que tem por objetivo permitir a troca de mensagens entre diferentes usuários, em diferentes dispositivos.

2 FUNCIONALIDADES

As funcionalidades da aplicação giram em torno dos conceitos de **socket** e **thread**: com o primeiro (socket) viabilizamos ponto de comunicação entre diferentes dispositivos através de conexão socket e com o segundo (thread) possibilitasse que novas conexões sejam estabelecidas sem interromper o fluxo de dados entre os usuários(clientes).

- O servidor se instala numa porta e espera alguém se conectar;
- O cliente se conecta usando IP + Porta;
- Conexão estabelecida, é solicitado que o usuário digite seu username;
- Uma vez escolhido um username válido a aplicação de mensageria é iniciada;
- Encerra-se o chat digitando */close* no terminal.

A aplicação simula um sistema de mensageria onde diferentes usuários podem se comunicar de forma ininterrupta, simultânea e sem perda de dados.

3 O QUE PODERIA SER IMPLEMENTADO A MAIS?

- Troca de mensagens entre usuários específicos de modo privado;
- Apagar mensagens enviadas;
- Remover usuário do servidor;
- Criação de uma interface.

4 DIFICULDADES ENCONTRADAS

Nesta seção são apresentadas as dificuldades encontradas

5 CÓDIGO FONTE

CLIENTE

```
#!/usr/bin/env python3

import socket
import threading
import time
import sys
import os

#####
#                                     Defining functions
import os

def clear_terminal():
    os.system('cls' if os.name == 'nt' else 'clear')

def get_nickname():
    """
        gets into a loop until it gets a valid nickname and then
returns it
    """
    while True:
        nickname = input("nickname: ")
        if (3 <= len(nickname) <= 10):
            return nickname
        else:
            clear_terminal()
            print("The nickname is invalid. try again.\n")
            time.sleep(2)
            clear_terminal()

def nickname_setter():
    global stopping_thread
```

```

global client_socket

while not stopping_thread:
    nickname = print("Enter a nickname between 3 and 10
characters:\n")
    try:
        nickname = get_nickname()
        client_socket.send(f"{nickname}".encode("utf-8"))

        response = client_socket.recv(1024).decode("utf-8")

        if (response == "FALSE"):
            clear_terminal()
            print("This nickname already exists. Try another one!")
            time.sleep(2)
            clear_terminal()
        else:
            clear_terminal()
            break
    except:
        print("An unexpected error has occurred. Connection
closed!")

        client_socket.close()
        stopping_thread = True
        break

def message_send():
    global stopping_thread
    while not (stopping_thread):
        print("\n")
        message = input()
        try:
            client_socket.send(message.encode("utf-8"))
            if (message.lower() == r"/close" or
message.lower().startswith(r"/close")):
                stopping_thread = True
                break
        except:
            print("An unexpect error has occured. Closing
connection!\n")

```

```

        client_socket.close()
        stopping_thread = True

def message_recv():
    global stopping_thread
    while not (stopping_thread):
        try:
            message = client_socket.recv(2048).decode("utf-8")

            print(f"{message}\n")
        except:
            print("An unexpect error has occured. Closing
connection!\n")
            client_socket.close()
            stopping_thread = True

#####
#####

"""
    set the port number and the server address
"""
server_address = "192.168.0.110"
server_port = 12345
stopping_thread = False

"""
    Create the client socket and connects it to the server
"""
client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

try:
    client_socket.connect((server_address, server_port))
    print(f"Connected to {server_address} : {server_port}\n")
except socket.error as msg:
    print(f"Connection error. {msg}\n")

```

```
        sys.exit()

nickname_setter()
msg = client_socket.recv(1024).decode("utf-8")
print(f"{msg} Type '/close' to leave the chat.\n")
rcv_thread = threading.Thread(target=message_rcv)
send_thread = threading.Thread(target=message_send)

rcv_thread.start()
send_thread.start()

while True:
    if not (stopping_thread):
        pass
    else:
        client_socket.close()
        sys.exit(
            "Connection closed!\n"
        )
```


SERVIDOR

```
#!/usr/bin/env python3

import socket
import threading
import os

#####
#                               Defining functions
#####

def clear_terminal():
    os.system('cls' if os.name == 'nt' else 'clear')

def broadcast_msg(message, clientSender):
    """
        send the message received from clientSender to all the clients
on the server
        except for the clientSender himself
    """
    for client in clients_sockets:
        if (client != clientSender):
            client.send(message.encode("utf-8"))

def recv_message(client):
    """
        recieve the message from anyone who is in the chat,
        verify if it's the key message to exit the chat and if not,
send it to everybody
        if it is, remove the user from the chat group
    """
    global stop_threading

    while (not stop_threading):
        # client_indexing = clients_sockets.index(client)
        # nickname = clients_nicknames[client_indexing]
        try:
            message = client.recv(2048).decode("utf-8")

            client_indexing = clients_sockets.index(client)
            nickname = clients_nicknames[client_indexing]
```

```

        if message == "/close":

            # client_indexing = clients_sockets.index(client)
            # nickname = clients_nicknames[client_indexing]

            print(f"{clients_addresses[client_indexing]} has been
disconnected\n")

clients_addresses.remove(clients_addresses[client_indexing])
clients_sockets.remove(client)
clients_nicknames.remove(nickname)

msg = (f"{nickname} disconnected!")

broadcast_msg(msg, client)
client.close()
stop_threading = True

        break
    else:
        msg = f"{nickname}: {message}\n"
        broadcast_msg(msg, client)
except:

    client_indexing = clients_sockets.index(client)
    nickname = clients_nicknames[client_indexing]

    print(f"An unexpect error has occured at the rcv msg!
Closing connection at {clients_addresses[client_indexing]}")
    clients_sockets.remove(client)
    clients_nicknames.remove(nickname)

clients_addresses.remove(clients_addresses[client_indexing])
    broadcast_msg(f"{nickname} has been disconnected")

    client.close()
    stop_threading = True

```

```
#####
```

```

"""
    define the port and the host ip to send it to any connection in
the network
"""

port = 12345
host = "0.0.0.0"

"""
    Define 4 lists to be managed by the threading and a flag to stop
some processes
"""
clients_sockets = []
clients_nicknames = []
clients_addresses = []
nicknames = []

stop_threading = False

"""
    creates the server socket and binds it to the host and the port
previously defined
"""
server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
server_socket.bind((host, port))
server_socket.listen()
print(f"server listening at port: {port}...")

while True:
    client, address = server_socket.accept()
    print(f"A connection has been established with {str(address)}\n\n")

    while True:
        try:
            nickname = client.recv(1024).decode("utf-8")

            if (nickname in clients_nicknames):
                client.send("FALSE".encode("utf-8"))

```

```

        else:
            client.send("TRUE".encode("utf-8"))
            break
    except:
        print("An unexpect error has occured! Closing connection")
        client.close()
if (clients_sockets):
    msg = f"{nickname} joined the chat group!\n"
    broadcast_msg(msg, client)
    client.send(f"Welcome to the group chat {nickname}!".encode("utf-8"))

clients_nicknames.append(nickname)
clients_addresses.append(address)
clients_sockets.append(client)

    client_thread = threading.Thread(target=recv_message,
args=[client])
    client_thread.start()

```