Distributed & network programming (2021 Fall)

Lab 02: A client-server calculator app

Innopolis University

Aug 18, 2021

Prof. Shinnazar Seytnazarov

Faculty of Computer Science & Engineering

Introduction

- ❑ **Using UDP sockets write a pair of client-server calculator apps where**
  - the **client app** interactively accepts calculation command from user input, sends it to the server, receives the result from the server, and shows it to the user.
  - the **server app** should correctly process the client's message, perform the calculation, and send back the correct result.
- ❑ **Deadline 2021.08.24 PM11:59**
  - For each day of late submission, 5% will be cut
    - Ex) You submitted the next day after deadline, i.e., a day later, suppose you scored 70%, then your final score will be 65%.

The client app’s features

❑ The client app

- interactively accepts calculation command from user input in following format:

  operator left_operand right_operand.

  - For example: “+ 1 2”, “* 10 7”
- sends the command to the server
- receives the response from the server (ex: “0.5” for “/ 1 2”) and shows it to the user, and asks the user to input another calculation command.
- has enough buffer to receive the server’s response at once
- user should be able to quit using **KeyboardInterrupt** or entering “quit”/“Quit”/“QUIT”, in all cases the app must print smth like “User has quit.” and shut down.

The server app's features

❑ The server app

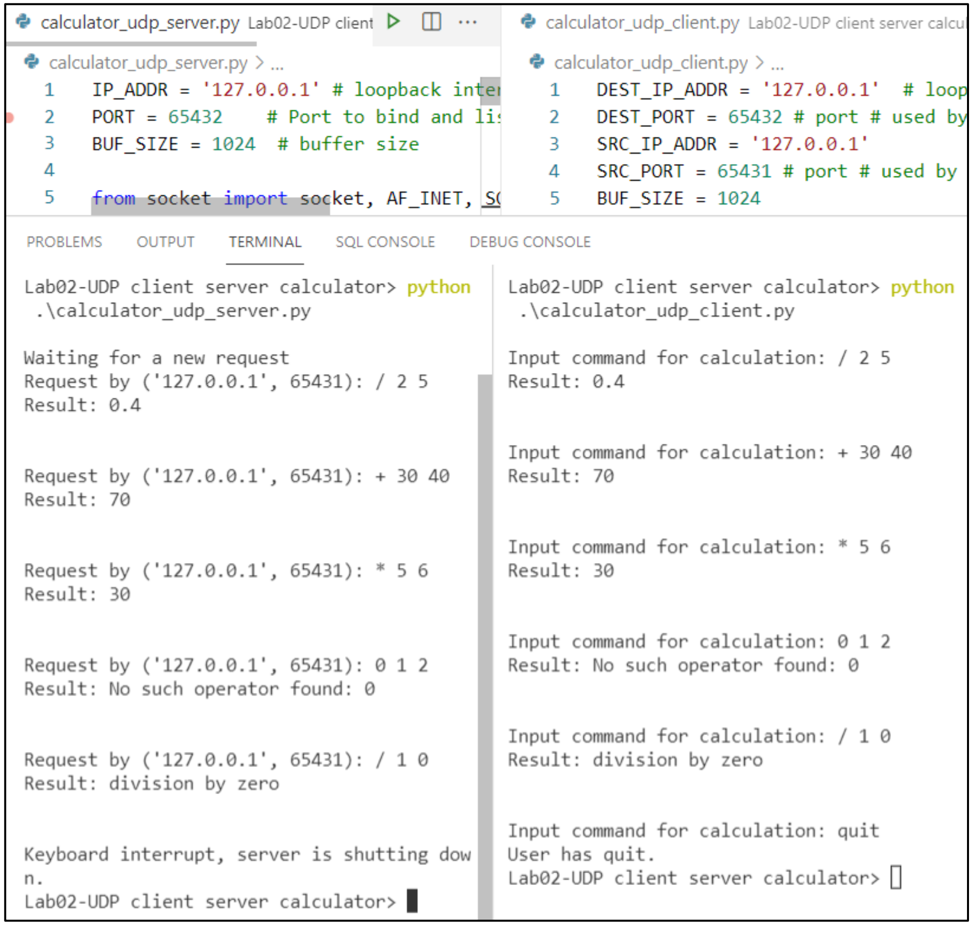
- always ready to receive the commands from clients
- receives the calculation command from the client app in following format

  operator left_operand right_operand

  - For example: "+ 1 2", "* 10 7"
- determines the type of the operation to perform
  - *, /, -, +, >, <, >=, <=.
- determines the type of operands and correctly convert the type
  - int or float
- performs calculation and returns the result to the client
  - if the operation cannot be performed (due to invalid operator or operand), the server should catch the exception and send exception message to the client.
  - you may even need to raise a custom exception

Sample output

- ❑ Your app should calculate for all valid entries as given below.
- ❑ For invalid entries, exception message should be sent by server and printed out by client


calculator_udp_server.py Lab02-UDP client
calculator_udp_client.py Lab02-UDP client server calcu
calculator_udp_server.py > ...
calculator_udp_client.py > ...
PROBLEMS
OUTPUT
TERMINAL
SQL CONSOLE
DEBUG CONSOLE

```
IP_ADDR = '127.0.0.1' # loopback inte
PORT = 65432     # Port to bind and li
BUF_SIZE = 1024  # buffer size

from socket import socket, AF_INET, SO
```

```
DEST_IP_ADDR = '127.0.0.1'  # loop
DEST_PORT = 65432 # port # used by
SRC_IP_ADDR = '127.0.0.1'
SRC_PORT = 65431 # port # used by
BUF_SIZE = 1024
```

```
Lab02-UDP client server calculator> python
 .\calculator_udp_server.py

Waiting for a new request
Request by ('127.0.0.1', 65431): / 2 5
Result: 0.4


Request by ('127.0.0.1', 65431): + 30 40
Result: 70


Request by ('127.0.0.1', 65431): * 5 6
Result: 30


Request by ('127.0.0.1', 65431): 0 1 2
Result: No such operator found: 0


Request by ('127.0.0.1', 65431): / 1 0
Result: division by zero


Keyboard interrupt, server is shutting dow
n.
Lab02-UDP client server calculator> █
```

```
Lab02-UDP client server calculator> python
 .\calculator_udp_client.py

Input command for calculation: / 2 5
Result: 0.4


Input command for calculation: + 30 40
Result: 70


Input command for calculation: * 5 6
Result: 30


Input command for calculation: 0 1 2
Result: No such operator found: 0


Input command for calculation: / 1 0
Result: division by zero


Input command for calculation: quit
User has quit.
Lab02-UDP client server calculator> ▯
```

Any questions?