Network Programming
Assignment 3

Submission Instruction:
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- Due date: May 25, 2022
- File format: Compress the following files in a zip format
    (1) solution.py (2) Execution results (file name and format: output.pdf).
- zip file name: {student ID}.zip (e.g., 123456789.py)
- Example File tree
    - 123456789.zip
        - problem1_server.py
        - problem1_client.py
        - problem2_server.py
        - problem2_client.py
        - output.pdf

- There will be a deduction of points (up to 50%) if you do not follow the above instruction.

Evaluation Criteria:
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- Your codes will be cross-checked with others to detect copying, and you will get zero points under such circumstances.
- Your codes will be evaluated based on programming style (organization, comments, readability), program function (completeness), documentation (demonstration, exception handling), etc.

Inquiries:
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- Send inquiries to the TA: Ankit Kumar Singh (ankit@soongsil.ac.kr).

Some Suggestions to solve the problem:

- Read the submission instructions carefully (Incorrect submission format may lead to deduction of points).

- Read textbook chapters 7, and 8.
- Read problem statements 2-3 times to understand.
- After following the given above suggestions don’t solve your problem or doubt send an inquiry to TA.

Questions:
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[Total: 10 points]

Problem Statements:

1. **(5 points)** Write a Python script to create an async Server using python *socket standard library and asyncio library to develop a game "Guess the number."*

The game will follow as:
1. Establish the connection between client and server.
2. The client will request to start the game by sending the first request as "start".
3. The server will choose a random number between 1 to 10.
4. Inform the client and ask them to guess a number between 1 to 10.
5. The client will send a guessed number as a request to the server.
6. The client will have only 5 attempts to guess the correct number.
7. The client will only win if he guesses the correct number within 5 attempts and loses the game.
8. The client will request to end the game by sending the request as "end".
9. The client will request the server to close the connection by sending the request as “close”

Conditions:
1. Develop the server by using asyncio so the server can handle multiple users.

The exchange of messages between server and client during the game will follow the following conditions and message text based on the difference of actual number with server and guessed number by client:

x = randomly chosen number by the server for every game for every user.
guess = number guessed by a client

conditions and messages:
(x = guess) -> "Congratulations you did it."

(x > guess) -> "You guessed too small!"
(x < guess) -> "You Guessed too high!"

2. **[5 points] PUB/SUB**

Develop a publisher-subscriber application in which the server can publish news on various categories and the client can subscribe to any one category.

Notes:

1. The server(Publisher) will be creating news for three categories[**sports, technology, science**] using random strings for news and can associate it with either category and then publish the news of each category.
2. The client can subscribe to one news topic. Accordingly, messages from the server are read and printed.
3. Use Zero Message Queue(zmq) python library