Programming Assignment

Due date: Tuesday 10/1/2023 (11:59 PM)

In this assignment, you will implement a video streaming server and client using RTSP/RTP/RTCP. The server will stream a video of MJPEG format, which stores the video as concatenated JPEG images. The server will send the JPEG images to the client at periodic intervals, and the client will display the individual JPEG images as they arrive from the server. A test sequence of 500 JPEG images can be found at the e-learning course website (https://elearning.just.edu.jo).

1. Your code should follow the specification in the Real Time Streaming Protocol (RTSP), RFC 7826, https://tools.ietf.org/html/rfc7826. The client should be able to **play**, **pause**, **reposition**, and **stop** the streamed video file, and the server should respond to the requests accordingly.

2. Your code should follow the specification in the Real-time Transport Protocol (RTP), RFC 3550, http://tools.ietf.org/html/rfc3550. The server should packetize the video data into RTP packets. It should create an RTP packet, set the fields in the **RTP header** and copy the **payload** into the packet. The client should be able to handle the received RTP packets.

3. Your code should follow the specification in the Real-time Transport Control Protocol (RTCP) RFC 3550, http://tools.ietf.org/html/rfc3550. The client and server should be able to send and receive **SR**, **RR**, and **BYE** RTCP packets.

4. To play the video, you should use the "CImg Library" (http://cimg.eu/). An example to play back a sequence of images can be found at the e-learning course website (https://elearning.just.edu.jo). You should use the library **ONLY to play local files** in a certain directory.

5. Your code should be written in C/C++ and run on Linux. **You should NOT use any external code for RTSP/RTP/RTCP; you should write your own code**.

6. Students are required to form a group of three members. Each member will be responsible for one of the following tasks:
    a. Implement the RTP on the client and server side and play the received video.
    b. Implement the RTCP on the client and server sides.
    c. Implement the RTSP on the client and server sides.