**深 圳 大 学 实 验 报 告**

**课程名称：­ 计算机网络（Computer Networks）**

**实验名称**： **Transport Layer Assignment**

**学院**： **电子与信息工程学院**

**专业： 电子信息工程**

**指导教师**： **毕宿志**

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**实验时间： 2023 11 20**

**实验报告提交时间： 2023 11 26**

**教务部制**

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| 1. **Purpose of experiment：**   **①Better understand how “Stop-and-Wait Protocol” work**  **②Better understanding of random generation libraries, data statistics**  **③Learn how to programmatically implement the“Stop-and-Wait Protocol”**  **④Provides insight into network communications**   1. **Experimental principle：**   **The principle of the stop and wait protocol is to achieve reliable data transmission through the acknowledgement mechanism between the sender and the receiver**  **Implementation steps of the stop and wait protocol:**  **The sender splits the data into fixed size data frames and sends the first data frame to the receiver. The sender waits for confirmation and, if received, sends the next data frame, otherwise resends the current data frame. The receiver receives the data frame and sends an acknowledgement, then is ready to receive the next data frame. Repeat the above steps until all data frames have been sent and received.**  **8a465f37542a496a872d358e5adbb9b4**  **Figure 1- Flowchart of the stop-and-wait protocol**  **The specific principle:**  **The sender confirms that the data has been received by waiting for a confirmation frame to be received, and if no confirmation frame is received within the timeout period, the sender assumes data loss and resends the same data frame. The receiver informs the sender that the data has been received successfully by sending a confirmation frame. If the receiver fails to receive the data, the confirmation frame is not sent, thus triggering the timeout retransmission mechanism of the sender.**   1. **Content:** 2. **communication in “localhost”:** 3. **Sending 10 packets, packet loss rate is set to 0.5：**      1. **Sending 100 packets, packet loss rate is set to 0.2：**      1. **Sending 100 packets, packet loss rate is set to 0.5：**     **Server:**  **Set the IP address and port number, create a socket, bind the address and port number, and start listening.**  **Receive messages from clients and decompose them;**  **Use if random.random() >= packet\_loss\_rate1: # to simulate the packet loss mechanism**  **Return simulation results;**  **Client:**  **Set the IP address and port number, create the socket, and set the timeout period.**  **Transfer variables to the server, send messages;**  **Accept messages from clients; Calculate the number of packets, packet loss rate, average round trip time, total time;**  **The following is the result of my three rounds of simulated packet loss: (I omit all the accepted content in the middle)**  **Communication with partner:**  **First find the ip address of the partner's computer and connect, and then implement the operation;**     1. **Sending 10 packets, packet loss rate is set to 0.5：**   **微信图片_20231125163601**   1. **Sending 100 packets, packet loss rate is set to 0.2：**   **微信图片_20231125163547**  **③ Sending 100 packets, packet loss rate is set to 0.5：**  **微信图片_20231125163556** |
| 1. **Conclusion and discussion：**   **Conclusion：**  **The stop-and-wait protocol has the following characteristics：**  Advantages: Send multiple frames in a row before waiting for a reply (piggy-back reply is used), sequential acceptance (the throughput of the entire communication is improved due to reduced waiting time)  Disadvantages: low data transmission efficiency, high satellite propagation delay, low communication channel utilization;  **Discussion：**  The function of the stop and wait protocol is not very perfect, and the following improvements can be achieved: Pipelined transmission; Selective retransmission；Sliding window; Timeout retransmission mechanism;  These improvements can improve the efficiency, reliability, and adaptability of data transmission, and make the protocol more adaptable to complex network environments and transmission requirements |
| 指导教师批阅意见：  成绩评定：  指导教师签字：  年 月 日  备注： |

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2、教师批改学生实验报告时间应在学生提交实验报告时间后10日内。