CPS 472/572: Exam 2 **Name:**_____

Instructor: Dr. Clark March 20, 1996

This test is closed book and closed notes. You may use a calculator. Answer the questions in the space provided. When answering questions, please state any and all assumptions you are making. For questions involving calculation, indicate your final answer by circling it.

Part 1 (12 points)

List and briefly describe four functions that are performed by the transport layer.

Part 2 (6 points)

We say that "IP moves data between hosts and UDP moves data between applications". What is meant by this? How does UDP provide communication between applications?

Part 3 (18 points)

1. When developing a distributed application using UDP, what distinguishes the UDP client from the UDP server?

2. In the UDP server application, how do we determine the IP address of a client in order to send data from the server to the client?

3. When developing a distributed application using TCP, what distinguishes the TCP client from the TCP server?

Part 4 (18 points)

1. How does TCP guarantee the agreement of data sequence numbers in both directions when a connection is established?

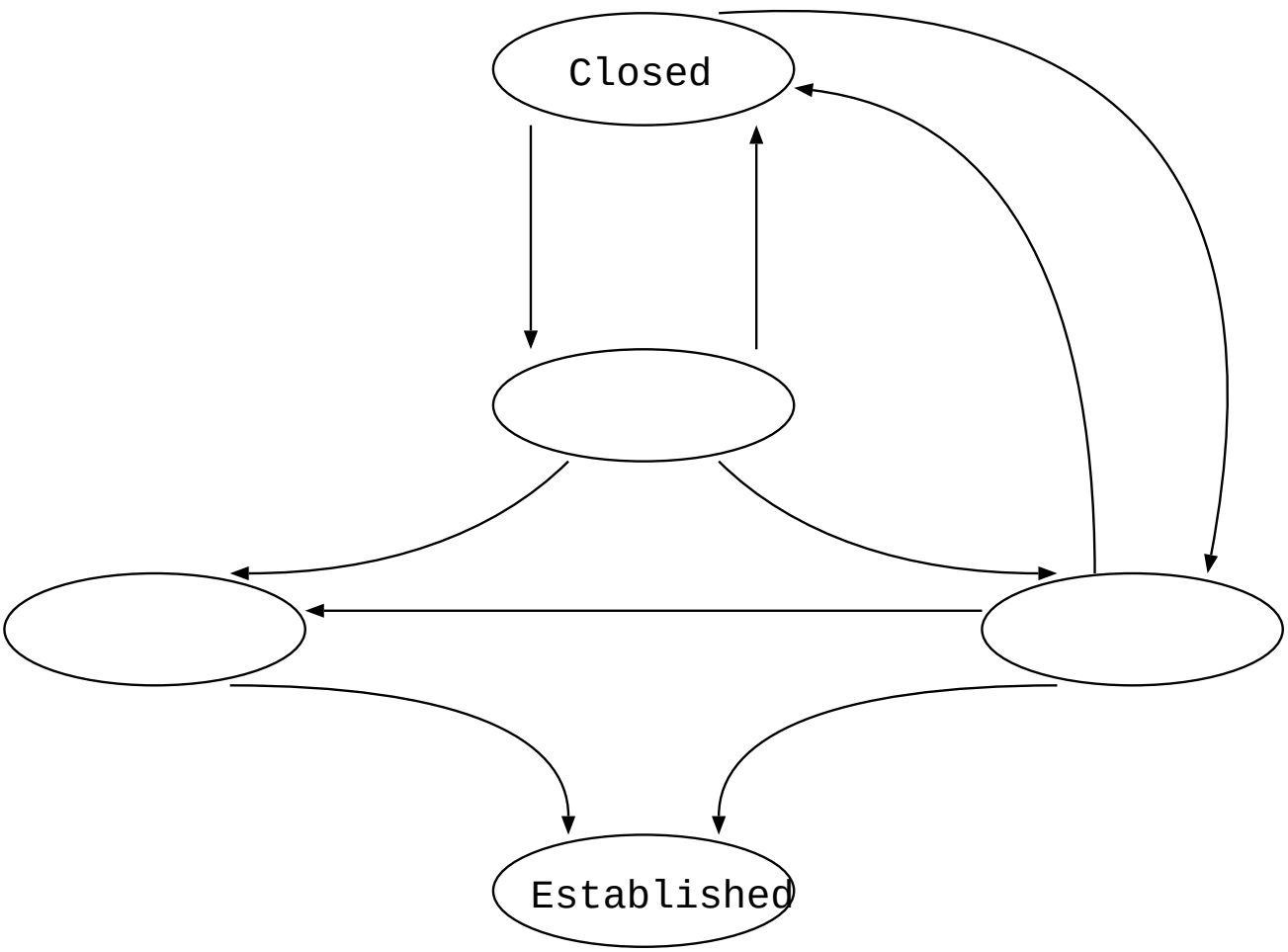
2. Why is this agreement of sequence numbers necessary?

3. When a TCP acknowledgement is lost, does it always result in a retransmission? Why or why not?

Part 5 (22 points)

The following diagram depicts the connection establishment portion of the TCP state transition diagram. Complete the diagram as follows. You do not need to consider the transitions related to closing a connection.

1. Label the three unlabelled states.
2. Label each transition with both the *Causing* and *Resulting* actions.



Part 6 (24 points)

For the following applications, describe the communication architecture that should be employed. Include in your description the transport protocol to be used, which system(s) are designated as clients, which system(s) are designated as servers, what data is to be exchanged and in what direction(s).
Feel free to use diagrams. Make sure you completely describe the communication architecture and state any assumptions you are making about the operating environment.

1. A video telephone that provides video and audio links between two systems.

2. A time of day distribution service where an atomic clock is connected to the network and all network hosts receive periodic time updates from the clock system.