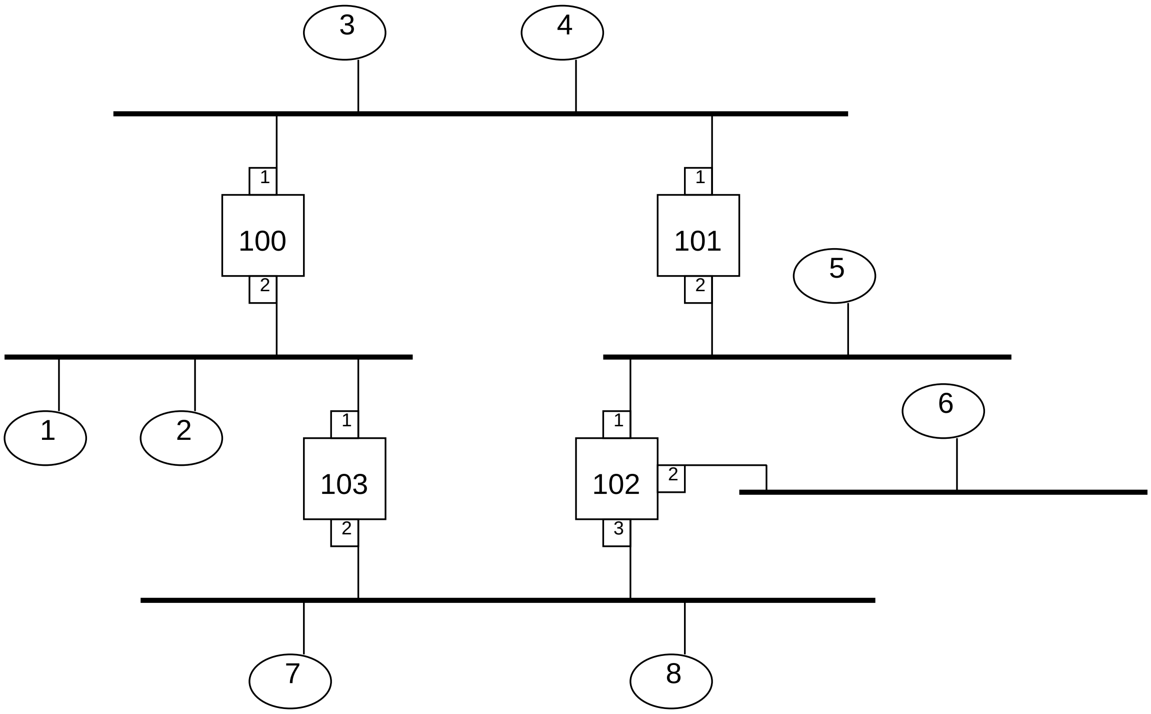
CPS 472/572: Homework 1 **Due Wednesday January 22, 1996**

1 Question 1: Transparent Bridging

The following diagram depicts a network with five LAN segments, eight end-hosts and four *transparent learning bridges.*



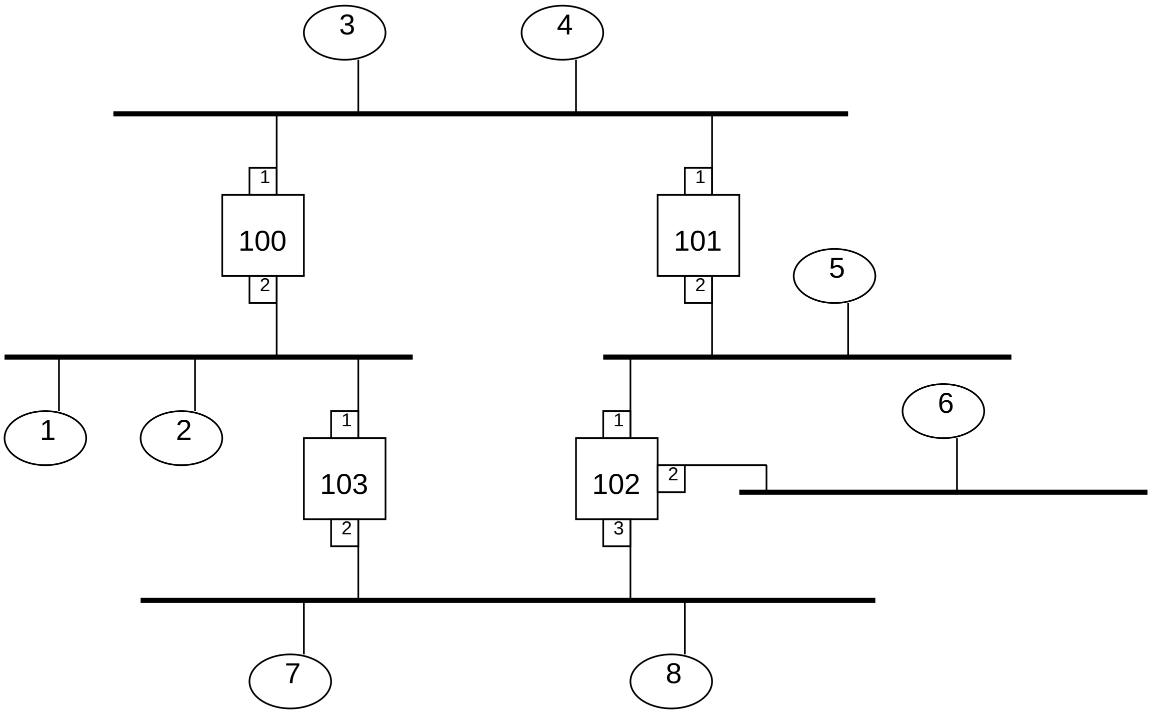
1. Show the spanning tree that would be established for this network assuming that all links and bridges are operational.

2. Assume that the bridges were just turned on and that the forwarding tables are all empty. The first message sent is a message from station 1 to station 5. On which LAN segments will this message be sent? How many total copies of the message are created? Show the forwarding tables for each bridge *after* the message is sent.

3. The second message sent is a message from station 4 to station 1. On which LAN segments is this message sent? How many copies of the message are created? Show the forwarding tables for each bridge *after* the message is sent.

2 Question 2: Source Routing Bridges

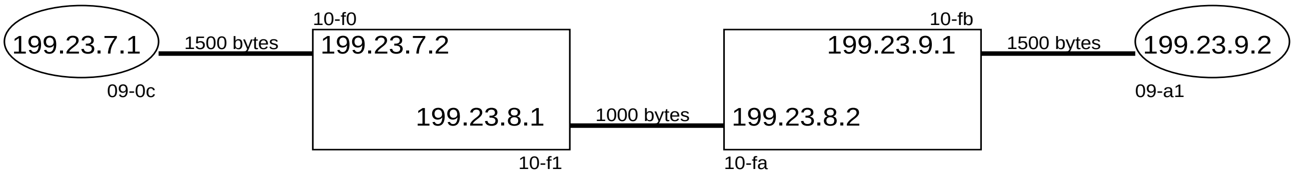
The bridges on this network have now been replaced with the *source routing* variety. Using the spanning tree determined in question one, answer the following questions.



1. Show the frames generated when station 1 sends a message to station 5. Assume that no other messages have been sent and therefore 1 does not know the route to 5. What is the total number of frames that are carried on each portion of this network so that this message can be delivered? Compare this to the number of frames generated using transparent bridging to send the same message.

3 Question 3: Internet Protocol

The following diagram depicts two end hosts connected via two routers and three distinct LAN segments. The IP address of each interface is given. We wish to send 2,000 bytes of data from host *199.23.7.1* to host *199.23.9.2*. The problem is that this amount of data won't fit in a single frame of the LAN segments. Each segment has a Maximum Transfer Unit (MTU) as indicated.



You are to show the fragmentation that occurs when carrying out the desired communication. Do this by drawing the headers for the datagrams that will be sent on each of the LAN segments in order to transfer this message. Refer to the IP header description in your book and your class notes. You should also include the CSMA/CD frame (using 2-byte addresses) as part of the data transferred on the link. Once you give one of the frames you may describe the differences only for the additional frames as long as you are complete in your descriptions.