EE122 Fall 2000 Midterm 2

Question 1: Multiple choice

There are 5 questions in this part of the exam. You are asked to **circle the most appropriate answer** for each question. No mark is given to incorrect answers.

1. (4 points) Minimum packet length
   What is the reason for the restriction on the minimum packet length in the Ethernet

   a. To make sure that a valid packet is not mistaken for a collision fragment.
   b. To make it easier to process the frame
   c. To make sure the Ethernet bus is long enough
   d. To have better link utilization
2. (4 points) ATM
   ATM allows a host ot establish multiple virtual circuits to a given destination. The main reason for doing so is that

   a. The quality of the service of each virtual cicuit can be controlled independently
   b. Load can be balanced among switches in the network
   c. The network is more reliable to the users
   d. All of the above
3. (3 points) Socket
   Before a connectin-oriented server can respond to its client, it has to get itself ready by performing a number of tasks in teh following order:

   a. create a socket, establish a listen queue for connections, bind a port to the socket, accept a connection.
   b. create a socket, bind a port to the socket, establish a listen queue for connections, accept a connection.
   c. establish a listen queue for connection, create a socket, bind a port to the socket, accept the connection
   d. establish a listen queue for connections, accept a connection, create a socket, bind a port to the socket.
4. (4 points) Routing
   The main reson for using path-vector routing is

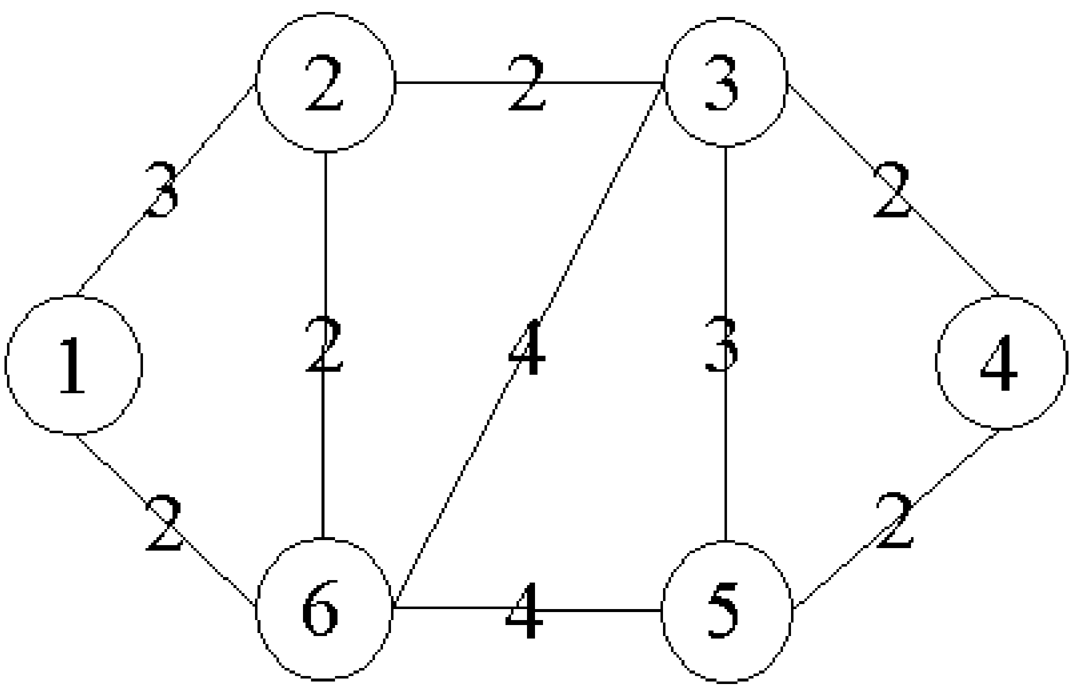
   a. It is simpler
   b. It uses less network resources
   c. It prevents looping
   d. None of the above

5. (4 points) RPC
   In SUN RPC, the role of the portmapper in a host is

   a. to make the system more secure.
   b. to keep track of all RPC services running in the host.
   c. to provide a common presentation between clients and server.
   d. to make sure that an RPC service is always available.

Question 2: Routing

Using Dijkstra algorithm to find the shortest paths between the source node 1 to all other destination nodes for the following network.



Show details of all steps in the calculation.

Show the resultant tree of shortest paths at node 1.

Show the routing table for node 1

Question 3: LAN

A token ring network has been configured to operate with four priority classes: 0, 2, 4, and 8, with 8 the highest priority. After a period of inactivity when no transmission occurs on successive rotations of the token, three stations generate frames to send as follows. Assuming that the token holding time is just long enough for a station to send one frame.

- Station 1: 2 frames of priority 4
- Station 6: 1 frame of priority 8
- Station 20: 1 frame of priority 2

Assuming the order of stations on the ring is in increasing numerical order and that Station 1 receivs the token first with a zero priority and reservation fields, trace the state of the priority and reservation fields during the next 6 rotations of frames/tokens around the ring.

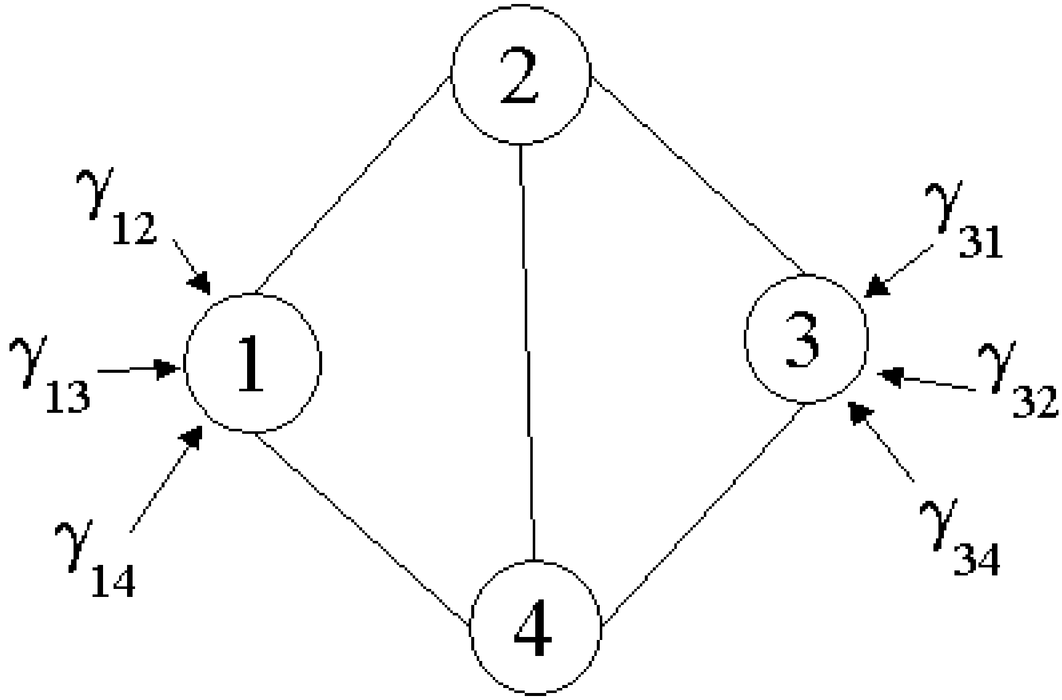
Question 4: Queueing Networks

a. Draw the state transition diagram for the !birth-deat! queueing system with states S_0, S_1, ... , S_k,...... The average customer arrival rate to state k is λ_k, the average customer departure rate from the state k is μ_k. Write down

   - the equilibrium equation for the system
   - the boudary condition equation, and
   - the probability constraint equation

   Solve this set of equations for P_0, and P_k

b. For the network shown in the figure below, computer the mean packet delay time, T42 on link42 (**link from node 4 to node 2**). The average packet length is assumed to be 1500 bytes. The network can be modled as a network of M/M/1 queues. Assuming the capacity of each link is C = 144 Kbits per second.



Destination -> Source	**Node 1**	**Node 2**	**Node 3**	**Node 4**
Node 1		Link 12	Link 12 Link 23	Link 14
Node 2	Link 21		Link 23	Link 24
Node 3	Link 34 Link 42 LInk 21	Link 32		Link 34
Node 4	Link 42 Link 21	Link 42	Link 43	

The traffic requierment matrix γ_{ij} is described by the following matrix. All elements are in packets per second.

	6	5	6
2		5	8
6	5		4
2	2	9	