YILDIZ TECHNICAL UNIVERSITY
FACULTY of ELECTRICAL & ELECTRONICS ENG. / DEPT. of COMPUTER ENGINEERING

Student Name Surname:	**Number:**			**Signature:**	
Course: BLM3033 Gr1 & Gr2	**Date/Time: 07/06/2022 13:00**			**Duration: 75 min.**	
Exam. Type: Final	**MidT 1 ☐**	**MidT 2**	**MakeUp**	**Final ☒**	**MUFinal**
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Q1) As a mobile node gets farther and farther away from a base station, what are two actions that a base station could take to ensure that the loss probability of a transmitted frame does not increase? **(20p)**

A1) a) Increasing the transmission power b) Reducing the transmission rate

Q2) What does it mean that a mobile device is said to be "roaming?" **(10p)**

A2) A device is said to be roaming if it is connected to a cellular network other than its home network.

Q3) Suppose nodes A, B, and C each attach to the same broadcast LAN (through their adapters). If A sends thousands of IP datagrams to B with each encapsulating frame addressed to the MAC address of B, will C's adapter process these frames? If so, will C's adapter pass the IP datagrams in these frames to the network layer C? How would your answers change if A sends frames with the MAC broadcast address? **(20p)**

A3) C's adapter will process the frames, but the adapter will not pass the datagrams up the protocol stack. If the LAN broadcast address is used, then C's adapter will both process the frames and pass the datagrams up the protocol stack.

Q4) Consider the network given in Fig. 1. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing and filling a table similar to Table 1.? **(30p)**

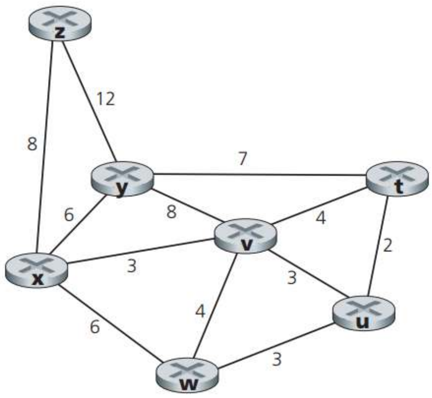

Fig. 1

Table 1.

Step	*N'*	*D(t),p(t)*	*D(u),p(u)*	*D(v),p(v)*	*D(w),p(w)*	*D(y),p(y)*	*D(z),p(z)*
0	x	∞	∞	3,x	6,x	6,x	8,x
1	xv	7,v	6,v	3,x	6,x	6,x	8,x
2	xvu	7,v	6,v	3,x	6,x	6,x	8,x
3	xvuw	7,v	6,v	3,x	6,x	6,x	8,x
4	xvuwy	7,v	6,v	3,x	6,x	6,x	8,x
5	xvuwyt	7,v	6,v	3,x	6,x	6,x	8,x
6	xvuwytz	7,v	6,v	3,x	6,x	6,x	8,x

Hepinize sınavınızda başarılar dilerim.

Q5) We noted that network layer functionality can be broadly divided into data plane functionality and control plane functionality. What are the main functions of the data plane? Of the control plane? **(20p)**

A5) The main function of the data plane is packet forwarding, which is to forward datagrams from their input links to their output links. For example, the data plane's input ports perform physical layer function of terminating an incoming physical link at a router, perform link-layer function to interoperate with the link layer at the other side of the incoming link, and perform lookup function at the input ports.

Q6) Suppose the network layer provides the following service. The network layer in the source host accepts a segment of maximum size 1,200 bytes and a destination host address from the transport layer. The network layer then guarantees to deliver the segment to the transport layer at the destination host. Suppose many network application processes can be running at the destination host.

a. Design the simplest possible transport-layer protocol that will get application data to the desired process at the destination host. Assume the operating system in the destination host has assigned a 4-byte port number to each running application process. **(10p)**

b. Modify this protocol so that it provides a "return address" to the destination process. **(10p)**

c. In your protocols, does the transport layer "have to do anything" in the core of the computer network? **(10p)**

A6) a) Call this protocol Simple Transport Protocol (STP). At the sender side, STP accepts from the sending process a chunk of data not exceeding 1196 bytes, a destination host address, and a destination port number. STP adds a four-byte header to each chunk and puts the port number of the destination process in this header. STP then gives the destination host address and the resulting segment to the network layer. The network layer delivers the segment to STP at the destination host. STP then examines the port number in the segment, extracts the data from the segment, and passes the data to the process identified by the port number.
b)The segment now has two header fields: a source port field and destination port field. At the sender side, STP accepts a chunk of data not exceeding 1192 bytes, a destination host address, a source port number, and a destination port number. STP creates a segment which contains the application data, source port number, and destination port number. It then gives the segment and the destination host address to the network layer. After receiving the segment, STP at the receiving host gives the application process the application data and the source port number.
c)No, the transport layer does not have to do anything in the core; the transport layer "lives" in the end systems..

Hepinize sınavınızda başarılar dilerim.