AACS2034 Fundamentals of Computer Networks

Tutorial 9: Transport Layer

Q1. Explain **TWO (2)** primary responsibilities of transport layer protocols. *(201605 TAR UC, resit)* (4 marks)

Q2. Compare well-known ports with registered port numbers. *(201609 TAR UC, Main)* (6 marks)

Q3. With reference to Figure 2, express in your own words the meaning of the output labelled A, B, C and D. *(201409 TAR UC, Main)* (4 marks)

```
C:\>netstat

Active Connections

Proto   Local Address    Foreign Address          State
TCP     kenpc:3126       192.168.0.2:netbios-ssn  ESTABLISHED
TCP     kenpc:3158       207.138.126.152:http     ESTABLISHED
TCP     kenpc:3159       207.138.126.169:http     ESTABLISHED
TCP     kenpc:3160       207.138.126.169:http     ESTABLISHED
TCP     kenpc:3161       sc.msn.com:http          ESTABLISHED
TCP     kenpc:3166       www.cisco.com:http       ESTABLISHED

C:\>
```

A B C D

Figure 2: TCP connections running on a networked host

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Q4. Figure 1 is showing an output by using a command prompt of a host.

```
Active Connections

  Proto  Local Address          Foreign Address        State
  X      127.0.0.1:49160        Sas-FoongCK:49161      ESTABLISHED
  X      127.0.0.1:49161        Sas-FoongCK:49160      ESTABLISHED
  X      127.0.0.1:49162        Sas-FoongCK:49163      ESTABLISHED
  X      127.0.0.1:49163        Sas-FoongCK:49162      ESTABLISHED
  X      127.0.0.1:49170        Sas-FoongCK:49171      ESTABLISHED
  X      127.0.0.1:49171        Sas-FoongCK:49170      ESTABLISHED
```

Figure 1: Connection status of a host

(i) What is the command that can be used to have an output of Figure 1? *(201705 TAR UC, resit)* (2 marks)

(ii) What is the protocol name that is labelled as X in Figure 1? *(201705 TAR UC, resit)* (1 mark)

(iii) Provide **TWO (2)** applications or services that are supported by the protocol that you have answered in Question 4 (ii). *(201705 TAR UC, resit)* (2 marks)

(iv) Give **ONE (1)** example of a port number according to Figure 1. *(201705 TAR UC, resit)* (1 mark)

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Q5. During a connection establishment, TCP0 opens a connection using an initial sequence number (ISN) of 4918. The other party, TCP1, opens the connection with an ISN of 24463. In data transfer phase, the TCP0 sends only one segment with data size of 1000 bytes. Then it sends a FIN segment to close the connection.

(i) Draw a three-way handshake diagram to show the values of sequence number and acknowledgment number for the three Transmission Control Protocol (TCP) segments during the connection establishment. *(201703 TAR UC, resit)* (8 marks)

(ii) TCP provides mechanisms for flow control. List and explain the field in TCP header that uses for flow control. *(201703 TAR UC, resit)* (5 marks)

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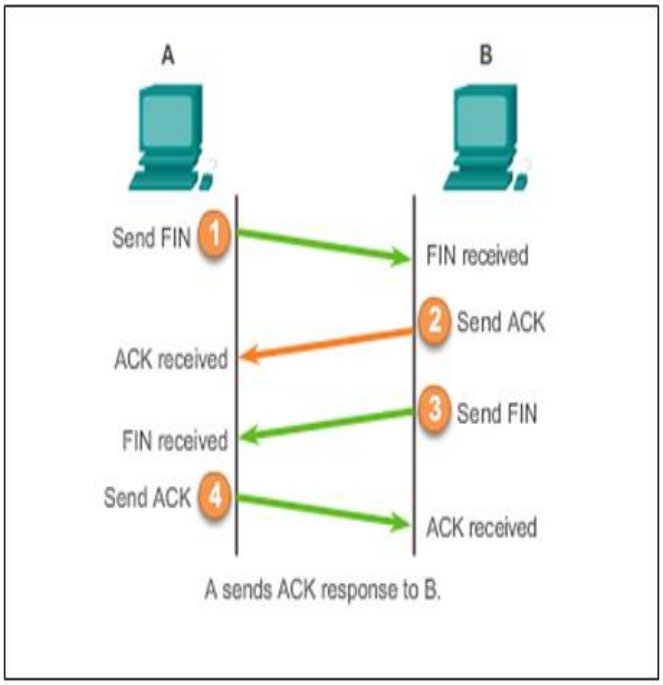
Q6. Briefly describe TWO (2) benefits of using User Datagram Protocol (UDP) as the transport layer protocol. *(201705 TAR UC, resit)* (4 marks)

Q7. Transmission Control Protocol/Internet Protocol (TCP/IP) provides two transport layer protocols, Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

(i) Discuss **TWO (2)** characteristics of UDP. *(201609 TAR UC, Main)* (4 marks)

(ii) With the aid of a diagram, illustrate FOUR (4) steps of TCP termination process. *(201609 TAR UC, Main)* (11 marks)



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Q8. In the transport layer, the main protocols used are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

(i) Compare and contrast these two protocols. You are required to provide FOUR (4) sets of comparisons. *(201703 TAR UC, resit)* (8 marks)

(ii) Give **TWO (2)** applications using TCP protocol and give **TWO (2)** applications using UDP protocol. *(201703 TAR UC, resit)* (4 marks)

Q9. Provide **TWO (2)** reasons why User Datagram Protocol (UDP) is suitable as a transport layer protocol for applications such as online multiplayer gaming. *(201503 TAR UC, resit)* (4 marks)

Q10. Transmission Control Protocol/Internet Protocol (TCP/IP) suite provides two transport layer protocols, Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). (*201709 TAR UC main*)

(i) Provide any **FOUR (4)** comparisons between TCP and UDP. (8 marks)

(ii) Discuss **TWO (2)** advantages of using UDP as compared to TCP. (4 marks)

(iii) State **THREE (3)** applications that uses TCP. (3 marks)