17/06/2019

Lecture 03 tutorial: Link layer

During tutorials prepare a short report of your activities and show it to your tutor.

Study the following **questions** and verify the correctness of the **answers** if given.
Be aware that the exam question might be directly related to the tutorial questions.

Q1: Refer to slides 39 – 44 and the **clause 40.3.1.3** from the IEEE 802.3 standard available on **Moodle** and describe the PCS transmit function.

- Convert the last character of your Chinese name (not the surname) into the quinary symbols. Use GBK encodings.
- You might like to start writing equations for the convolutional encoder (slide 43)
- **E-mail the results of conversion to me**. It might be a good exam question.

Q2: Compare briefly the structure of the link and physical layers for Gigabit Ethernet – IEEE802.3 (slide 36), WiFi – IEEE802.11 (slide 5) and LTE (slide 6)

Q3: Consider the Ethernet frame and explain how the type/length field is interpreted.

(slides 10, 11, 12)

Q4: Explain how the MAC addresses are interpreted.

(slides 13, 14)

Q5: Consider the FCS of the 802.3 standard. (slide 15)

a. Compare 802.3 FCS generator with the 802.11 FCS
b. Compare it with the LTE FCS

Q6: What are the differences between the **category** 5, 5e and 6 cables.

Q7: Describe basic functions of the hub and repeater.

Q8: With reference to the CSMA/CD flowchart, explain how the CSMA/CD protocol works. Itemize your answer.

(Slides 22, 23)

Q9: Explain the difference between the Ethernet hub and the switch.

Q10: Do we need the CSMA/CD protocol in Switched Ethernet and if yes, why?

Q11: What is inside the switch forwarding table and how its content is updated?

(Slides 28, 29)

Q12: Describe three modes of operation of the Ethernet switch.

(Slide 30)

Q13: With reference to slide 31, show switch forwarding tables in the switches S1, S2, S3, S4

(Slide 33)

Q14: A difficult question that we will answer next week, but you can think about it:

Since the data field has variable length, how the hardware knows where is the CRC/FCS field? In other words what is the length of the Ethernet frame?
Check any Ethernet frame from the Tutorial 1.

Q15: A rather difficult question. **Study** the Clause 126.3 (Physical Coding Sublayer) in the 802.3 standard (5GBASE-T_Amendment7 on Moodle).
Explain how bits are converted into symbols. Follow the explanation given in slides **40-44**
Email your answer to me.