Ch9

Security, Privacy and Data Integrity

CHAPTER ASSIGNMENT · 51 MARKS

Name _____ Class _____ No. _____ Date _____

Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from *Computer Science for Cambridge International AS & A Level Coursebook*, 2nd edition, Sylvia Langfield and Dave Duddell (Cambridge University Press), for classroom use.

Tasks and questions from the chapter

DP **Discussion Point:** What data protection laws are in place in your country? Are you familiar with any details of these laws? Data protection normally applies to data stored in computer systems with the consent of the individual. Should these laws be extended to cover storage of data obtained from telephone calls or search engine usage?

Q9.01 **Question 9.01:** Carry out some research to find some examples of how phishing and pharming might be attempted.

DP **Discussion Point:** Major failings of large computer systems are well documented. You could carry out research to find some examples. Find an example of where the crisis was caused by technology failure and a different example where some natural disaster was the cause.

T9.01 **Task 9.01:**

(a) Create an example of a secure password using eight characters (but not one you are going to use).

(b) Assuming that each character is taken from the ASCII set of graphic characters, how many different possible passwords could be defined by eight characters?

(c) Do you think this is a sufficient number of characters to assume that the password would not be encountered by someone trying all possible passwords in turn to access the system?

Q9.02 **Question 9.02:** Assume that the seven bytes shown in Figure 9.04 contain data.

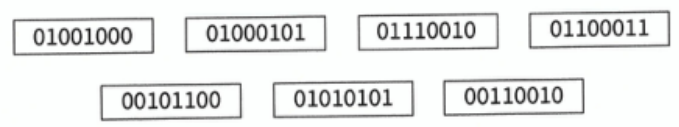


Figure 9.04 Seven bytes to be transmitted

The most significant bit is set to 0 but it is undefined at this stage because a seven-bit ASCII code represents character data. Choose a parity and change the value stored in the most significant bit to match this parity for each byte. Then create the eighth byte that would be used for transmission in a parity block check method.

Q9.03 **Question 9.03:** The eight bytes shown in Figure 9.05 have been received in a transmission using the parity block method. The first seven bytes contain the data and the last byte contains the parity check bits.

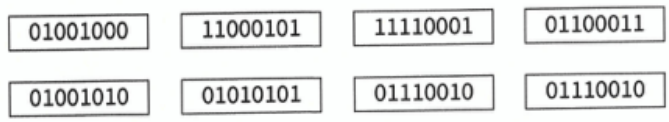


Figure 9.05 Eight bytes received in a transmission

(a) Identify what has gone wrong during the transmission.

(b) What would happen after the transmission is checked?

RP **Reflection Point:** This chapter contains a lot of terminology. It is very easy to get confused about the definitions of the different terms used. Have you considered how you are going to attempt to remember all of the definitions and not get confused?

Exam-style questions

1 (a) It is important that data has integrity.

(i) Identify the missing word in the sentence 'Concerns about the integrity of data are concerns about its .....' [1]

(ii) Validation and verification are techniques that help to ensure data integrity when data is entered into a system. Explain the difference between validation and verification. [3]

(iii) Define a type of validation and give an example. [2]

(iv) Even after validation has been correctly applied data may lack integrity when it comes to be used. Explain why that might happen. [2]

(b) Data should be protected from being read by unauthorised individuals. Explain **two** policies that can be used to provide the protection. [4]

2 (a) Security of data is an important concern for a system administrator.

(i) Identify **three** reasons why data might not be available when a user needs it. [3]

(ii) Describe what could be features of a policy for ensuring data security. [3]

(b) It is important for mission-critical systems that there is a disaster recovery contingency plan in place.

(i) Define what type of disaster is under consideration here. [2]

(ii) Define what will be a major feature of the contingency plan. [2]

(c) Measures to ensure security of a computer system need to be in place on a daily basis if the system is connected to the Internet. Describe **two** measures that could be taken to ensure security of the system. [4]

3 (a) When data is transmitted measures need to be applied to check whether the data has been transmitted correctly.

(i) If data consists of seven-bit codes transmitted in bytes, describe how a simple parity check system would be used. Your account should include a description of what happens at the transmitting end and what happens at the receiving end. [5]

(ii) An alternative approach is to use a checksum method. Describe how this works. [3]

(b) For either of these two methods there are limitations as to what can be achieved by them. Identify **two** of these limitations. [2]

(c) A different method which does not have all of these limitations is the parity block check method. The following diagram represents eight bytes received where the parity block method has been applied at the transmitting end. The first seven bytes contain the data and the last byte contains parity bits.

Byte 1	0	1	0	1	0	0	1	1
Byte 2	1	0	1	1	0	0	0	1
Byte 3	1	1	0	1	0	0	0	0
Byte 4	1	0	0	1	1	1	0	0
Byte 5	1	0	1	1	0	0	1	0
Byte 6	1	0	1	1	0	0	0	1
Byte 7	1	0	1	1	0	0	0	1
Byte 8	0	0	0	1	0	1	0	0

Identify the problem with this received data and what would be done with it by the program used by the receiver. [4]

4 (a) Give the definition of the terms firewall and authentication. Explain how they can help with the security of data. [3]

(b) Describe **two** differences between data integrity and data security. [2]

(c) Data integrity is required at the input stage and also during transfer of the data.

(i) State **two** ways of maintaining data integrity at the input stage. Use examples to help explain your answer. [3]

(ii) State **two** ways of maintaining data integrity during data transmission. Use examples to help explain your answer. [3]

Cambridge International AS & A Level Computer Science 9608 paper 13 Q3 June 2015

5 Verification and validation can be applied during data entry. Describe what is meant by these terms. For each method, explain why it is needed. [4]

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End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/computer-science/as-a-level/security-privacy-integrity/