Data transmission – 2021 IGCSE 0478

1. Nov/2021/Paper_11/No.3

Five statements are given about the error-checking methods checksum, check digit and parity check.

(a) Tick (✓) to show whether each statement applies to checksum, check digit or parity check. Some statements may apply to more than **one** error-checking method.

Statement	Checksum (✓)	Check digit (✓)	Parity check (✓)
uses an additional bit to create an odd or even number of 1s			
checks for errors on data entry			
compares **two** calculated values to see if an error has occurred			
will **not** detect transposition errors			
sends additional values when data is transmitted from a computer to another			

[5]

(b) Identify **one** other error-checking method.

..... [1]

2. Nov/2021/Paper_12/No.3

(a) **Six** statements are given about methods of data transmission.

Tick (✓) to show if each statement applies to serial simplex, parallel simplex, parallel half-duplex or serial duplex data transmission. Some statements may apply to more than **one** data transmission method.

Statement	Serial simplex (✓)	Parallel simplex (✓)	Parallel half-duplex (✓)	Serial duplex (✓)
bits are transmitted along a single wire				
data is transmitted in both directions				
it is only suitable for distances less than 5 metres				
bits from the same byte are transmitted one after the other				
data may **not** arrive in the correct sequence				
data is transmitted in both directions, but only **one** direction at a time				

[6]

(b) A Universal Serial Bus (USB) connection can be used to transmit data from a mobile device to a computer.

Give **three** benefits of using a USB connection for this purpose.

Benefit 1 .....

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Benefit 2 .....

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Benefit 3 .....

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[3]

3. Nov/2021/Paper_13/No.3

Five statements are given about error-checking methods.

(a) Tick (✓) to show whether each statement applies to Automatic Repeat reQuest (ARQ), check digit or checksum. Some statements may apply to more than **one** error-checking method.

Statement	ARQ (✓)	Check digit (✓)	Checksum (✓)
checks for errors on data entry			
uses a process of acknowledgement and timeout			
compares **two** calculated values to see if an error has occurred			
may resend data until it is confirmed as received			
checks for errors in data after transmission from a computer to another			

[5]

(b) Identify **one** other error-checking method.

..... [1]

4. Nov/2021/Paper_13/No.4c

Frederick prints a document that he has typed.

The printer begins to print the document, but then a message is displayed on Frederick's computer to say that the paper has jammed.

(a) Describe the role of an interrupt in generating a message on the computer that the paper has jammed.

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..... [4]

(b) Give **two** other examples of when an interrupt signal could be generated.

1 .....

2 .....

[2]

(c) The type of data transmission between the computer and the printer is serial half-duplex data transmission.

(i) Describe how data is transmitted using serial half-duplex data transmission.

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..... [4]

(ii) Explain why the data transmission needs to be half-duplex rather than simplex.

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..... [2]

5. Nov/2021/Paper_13/No.7d

Julius creates a computer application that calculates how many years it will take to pay for a house.

(a) Julius uploads his application to his website for people to download. Before he uploads the application, he translates the code using a compiler.

Explain why Julius uses a compiler, rather than an interpreter, to do this.

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..... [4]

(b) Julius also creates videos to explain how to use the application that he has created. He reduces the file size of the videos using lossless compression.

(i) Describe how lossless compression reduces the file size of the video.

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..... [3]

(ii) State why Julius uses lossless compression, rather than lossy compression.

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..... [1]

(c) Julius wants to distribute his application to a wider audience. He is considering distributing it as freeware or free software.

(i) Describe freeware and free software.

Freeware .....

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Free software .....

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[4]

(ii) Julius also considers distributing a trial version of the application.

Identify the type of software he could use to distribute his application as a trial version.

..... [1]

(d) Julius makes sure that all data transmission to and from his website is secure.

One way a user can check if his website uses secure data transmission is to check its certificate.

Give **two** other ways that a user can identify if his website uses secure data transmission.

1 .....

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2 .....

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[2]

6. Nov/2021/Paper_13/No.9

A parity check is used to check for errors after transmission on the **four** given binary values.

All **four** values are transmitted and received correctly.

Identify whether each 8-bit binary value has been sent using odd or even parity by writing odd or even in the type of parity column.

Binary value	Type of parity
10011001	
01111110	
11100000	
00111001	

[4]

7. June/2021/Paper_11/No.8

Four 7-bit binary values are transmitted from one computer to another. A parity bit is added to each binary value creating 8-bit binary values. All the binary values are transmitted and received correctly.

(a) Identify whether each 8-bit binary value has been sent using odd or even parity by writing odd or even in the type of parity column.

8-bit binary value	Type of parity
01100100	
10010001	
00000011	
10110010	

[4]

(b) An error may **not** be detected when using a parity check.

Identify why an error may **not** be detected.

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(c) The data is sent using parallel half-duplex data transmission.

(i) Describe how data is sent using parallel half-duplex data transmission.

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..... [4]

(ii) State **two** drawbacks of using parallel data transmission.

Drawback 1 .....

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Drawback 2 .....

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[2]

8. June/2021/Paper_13/No.6

Four 7-bit binary values are transmitted from one computer to another. A parity bit is added to each binary value creating 8-bit binary values. All the binary values are transmitted and received correctly.

(a) Identify whether each 8-bit binary value has been sent using odd or even parity by writing odd or even in the type of parity column.

8-bit binary value	Type of parity
01111100	
10010000	
10011001	
00101001	

[4]

(b) The 8-bit binary value 10110001 is transmitted and received as 10110010

A parity check does **not** identify any errors in the binary value received.

State why the parity check does **not** identify any errors.

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(c) The data is sent using serial duplex data transmission.

(i) Describe how data is sent using serial duplex data transmission.

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(ii) State **one** drawback of using serial data transmission, rather than parallel data transmission.

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