

Assessment Schedule – 2023**Digital Technologies and Hangarau Matihiko: Analyse an area of computer science (91908)****Assessment Criteria**

Achievement	Achievement with Merit	Achievement with Excellence
<p>Analysing an area of computer science involves explaining:</p> <ul style="list-style-type: none"> • the key aspects of the computer science area • relevant algorithms or other mechanisms behind the area • how the area is used, is implemented, or occurs, giving examples • key problems or issues related to the area and how these have been or may be addressed. 	<p>In-depth analysis of an area of computer science involves:</p> <ul style="list-style-type: none"> • providing a detailed explanation of how the technical capabilities and limitations of the area relate to humans, giving examples • comparing and contrasting different perspectives on the area. 	<p>Critically analysing an area of computer science involves:</p> <ul style="list-style-type: none"> • drawing insightful conclusions about the computer science area.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 2	3 – 4	5 – 6	7 – 8

Evidence

N1	N2	A3	A4	M5	M6	E7	E8
<p>Makes relevant comments in some parts of the response, but not enough to holistically show understanding.</p> <p>Responses are mostly incorrect.</p>	<p>Makes relevant comments in some parts of the response, but not enough to holistically show understanding.</p> <p>Some responses may be incorrect.</p>	<p>Explains:</p> <ul style="list-style-type: none"> • key aspects of the chosen computer science area • relevant algorithms or mechanisms that support the area • how the area is used or implemented, or occurs, giving examples • key problems or issues related to the area, and how these have been, or may be, addressed. <p>Some aspects of the response may be partial or weak.</p>	<p>Explains:</p> <ul style="list-style-type: none"> • key aspects of the chosen computer science area • relevant algorithms or mechanisms that support the area • how the area is used or implemented, or occurs, giving examples • key problems or issues related to the area, and how these have been, or may be, addressed. 	<p>Explains, in detail, how the technical capabilities and limitations of the computer science area relate to humans, giving examples.</p> <p>Compares and contrasts different perspectives on the area.</p> <p>Some aspects of the response may be partial or weak.</p>	<p>Explains, in detail, how the technical capabilities and limitations of the computer science area relate to humans, giving examples.</p> <p>Compares and contrasts different perspectives on the area.</p>	<p>Draws insightful conclusions about the computer science area, which may include:</p> <ul style="list-style-type: none"> • connections • implications • justified predictions • suggested improvements • justified generalisations • high-level thinking. <p>Some aspects of the response may be partial or weak.</p>	<p>Draws insightful conclusions about the computer science area, which may include:</p> <ul style="list-style-type: none"> • connections • implications • justified predictions • suggested improvements • justified generalisations • high-level thinking.

N0 = No response; no relevant evidence.

QUESTION ONE: Computer Graphics

Task part	Achievement	Achievement with Merit	Achievement with Excellence
(a) (i)	Explains raster and vector graphics. Makes links to the case study.	Explains, in detail, the difference between raster graphics and vector graphics. Makes links to the case study.	
(ii)	Explains 3D graphics rendering and 2D graphics rendering. Makes links to the case study.	Explains, in detail, how 3D graphics rendering differs from 2D graphics rendering. Makes links to the case study.	
(b)	Identifies an appropriate algorithm / mechanism underpinning computer graphics and explains how it is used. Clearly links the computer science to implementation and identifies and explains problems.		
(c)	Correct calculation. <i>See appendix.</i>		
(d)	Explains the differences between key concepts (scaling and rotation <i>OR</i> translation).	Explains, in detail, how the technical components / key concepts of computer graphics work, identifying the differences between them.	
(e)	Explains how translation values work in computer graphics, with an example.	Explains, in detail, how translation values in computer graphics are applied to a real-world scenario. <i>Clearly explains and applies knowledge and skills to an unfamiliar context.</i>	Draws insightful conclusions in discussion about how translation values in computer graphics are applied to a real-world scenario. Justifies the information used to arrive at conclusions. Demonstrates critical consideration of computer science concepts, including relevance and depth of understanding.
(f) (i)	Table correctly filled in. <i>See appendix.</i>		
(ii)	Correct line plotted. <i>See appendix.</i>		
(g)	Explains how the technical components of computer graphics could continue to change.	Explains, in detail, how the technical components of computer graphics will continue to change, and how these changes will affect people. <i>Clearly explains and applies knowledge to an unfamiliar context.</i>	Draws insightful conclusions in discussion about how the field of computer graphics will continue to change, and how these changes will affect people. Justifies the information used to arrive at conclusions. Demonstrates critical consideration of computer science concepts, including relevance and depth of understanding.

QUESTION TWO: Big Data

Task part	Achievement	Achievement with Merit	Achievement with Excellence
(a)	Explains the 3 V's of big data and provides an example of each from the case study.	Explains, in detail, the 3 V's of big data and provides an example of each from the case study.	
(b) (i)	Explains some of the challenges of analysing data. Makes links to the 3 V's and the case study.	Explains, in detail, the challenges of analysing data. Makes links to the 3 V's and the case study.	
(ii)	Explains how challenges can be addressed in the analysis of the case study data.	Explains, in detail, how challenges can be addressed in the analysis of the case study data.	
(c)	Explains potential ethical concerns which need to be considered when using big data to make predictions or recommendations.		
(d) (i)	Explains the difference between structured and unstructured data.	Explains, in detail, the difference between structured and unstructured data. Clearly explains and applies knowledge and skills to an unfamiliar context.	
(ii)	Explains how the differences impact the methods used to process and analyse the data.	Explains, in detail, how the differences impact the methods used to process and analyse the data.	Draws insightful conclusions in discussion about how the differences impact the methods used to process and analyse the data. Justifies the information used to arrive at conclusions. Demonstrates critical consideration of computer science concepts, including relevance and depth of understanding.
(e) (i)	Explains how techniques such as machine learning can be applied to large datasets to uncover patterns / insights.	Explains, in detail, how techniques such as machine learning can be applied to large datasets to uncover patterns / insights.	
(ii)	Explains possible challenges in using machine learning on big data based on the case study provided.	Explains, in detail, the possible challenges in using machine learning on big data based on the case study provided. Clearly explains and applies knowledge and skills to an unfamiliar context.	
(f)	Explains how data in different types and formats can be processed and analysed.	Explains, in detail, how data in different types and formats can be processed and analysed. Makes links to the case study.	

Task part	Achievement	Achievement with Merit	Achievement with Excellence
(g)		Explains, in detail, the current and future implications of big data, including positives and negatives, and the effects the implications could have on people.	Draws insightful conclusions in discussion about the current and future implications of big data, including positives and negatives, and the effects the implications could have on people. Justifies the information used to arrive at conclusions. Demonstrates critical consideration of computer science concepts, including relevance and depth of understanding.

QUESTION THREE: Network communication protocols

Task part	Achievement	Achievement with Merit	Achievement with Excellence
(a)	Explains what the internet protocol suite is and identifies the purpose of the four abstraction layers. Makes links to the scenario.	Explains, in detail, what the internet protocol suite is, as well as the purpose of the four abstraction layers. Makes links to the scenario.	
(b)	Explains which two layers are the most relevant to the live chat feature <i>OR</i> video streaming.	Justifies, in detail, why the two layers are the most relevant for the live chat feature <i>OR</i> video streaming by comparing them with the other layers.	
(c)	Correctly identifies which code snippet is UDP and which is TCP. Explains why.	Explains, in detail, why each layer is categorised as UDP / TCP.	
(d) (i)	Explains what a TCP handshake is.		
(ii)	Explains the exchange of messages that occurs during the handshake.		
(e)	Describes how the TCP verifies the integrity of the header and data in a packet. Explains how the mechanism works. <i>OR</i> Describes a TCP checksum. Explains how the TCP checksum can protect against all types of data corruption / tampering.	Clearly describes how the TCP verifies the integrity of the header and data in a packet. Explains, in detail, how the mechanism works. <i>OR</i> Describes a TCP checksum. Explains, in detail, how the TCP checksum can protect against all types of data corruption / tampering.	
(f) (i)	Explains what the HTTP protocol <i>OR</i> the internet relay chat protocol is used for.	Explains, in detail, what the HTTP protocol <i>OR</i> the internet relay chat protocol is used for.	
(ii)	Identifies two requests and explains how the HTTP protocol <i>OR</i> the internet relay chat protocol could handle each of them. One explanation might be weak.	Identifies two requests and explains, in detail, how the HTTP protocol <i>OR</i> the internet relay chat protocol could handle each of them.	
(g) (i)	Explains how network control protocols are used to manage and control the communication between devices and gateways in IoT networks.	Explains, in detail, how network control protocols are used to manage and control the communication between devices and gateways in IoT networks.	
(ii)	Explains the positive and negative impacts on people of network communication protocols managing the communication between devices and gateways in IoT networks.	Explains, in detail, the positive and negative impacts on people of network communication protocols managing the communication between devices and gateways in IoT networks.	Draws insightful conclusions in discussion about the positive and negative impacts on people of network communication protocols managing the communication between devices and gateways

Task part	Achievement	Achievement with Merit	Achievement with Excellence
			in IoT networks. Justifies the information used to arrive at conclusions. Demonstrates critical consideration of computer science concepts, including relevance and depth of understanding.

Appendix

Paper A: Computer Graphics

Task part	Evidence																																				
(c)	Point K → J = (9,-2) Point F → G = (9,1) Point C → D = (9,4)																																				
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Paper B: Computer Graphics

Task part	Evidence																																				
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