2

COMMON ASSESSMENT TASK

Level 2 Digital Technologies and Hangarau Matihiko 2022

91898 Demonstrate understanding of a computer science concept

Credits: Three

Achievement Criteria		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Demonstrate understanding of a computer science concept.	Demonstrate in-depth understanding of a computer science concept.	Demonstrate comprehensive understanding of a computer science concept.

Type your School Code and 9-digit National Student Number (NSN) into the space below. (If your NSN has 10 digits, omit the leading zero.) It should look like "`123–123456789–91898`".

`SchoolCode–YourNSN`–91898

There are three questions in this document. **Choose ONE question to answer.**

You should aim to write **800–1500 words** in total.

Your answers should be presented in 12pt Times New Roman font, within the expanding text boxes, and may include only information you produce during this assessment session. Internet access is not permitted.

Save your finished work as a PDF file with the file name used in the header at the top of this page ("`SchoolCode–YourNSN–91898.pdf`").

By saving your work at the end of the examination, you are declaring that this work is your own. NZQA may sample your work to ensure that this is the case.

INSTRUCTIONS

There are three questions in this assessment, on the topics of:

- Artificial intelligence (page 3)
- Computer security (page 8)
- Complexity and tractability (page 13).

Choose only ONE question to answer. Note that parts (b), (c), and (d) of the question include options for you to choose from.

Read all parts of your chosen question before you begin. Do not repeat information in different parts of the assessment.

EITHER: **QUESTION ONE: Artificial intelligence**

(a) (i) Name a **specific** New Zealand-based company or organisation that uses artificial intelligence.

(ii) How does this organisation use artificial intelligence?

(iii) What are at least TWO advantages of this organisation using artificial intelligence?

(b)   Choose TWO of the following to answer:

- What common issues are found when developing an artificial intelligence solution?
- Give an example of how an artificial intelligence is trained.
- How can you evaluate the effectiveness of an artificial intelligence?

Choice (1) – (copy and paste below)

Response

Choice (2) – (copy and paste below)

Response

(c)   Choose ONE of the following to answer:
- What positive effects might artificial intelligence bring in the future?
- What negative effects are artificial intelligences currently having on people?

You should consider this question in the context of the organisation you wrote about in part (a).

Choice (copy and paste below)

Response

(c)   Choose ONE of the following to answer:
- What positive effects might artificial intelligence bring in the future?
- What negative effects are artificial intelligences currently having on people?

Source (adapted): http://www.differencebetween.net/technology/difference-between-strong-and-weak-ai/

(d)   Choose ONE of the following to answer:

- Organisations have a choice of developing "weak AI" or "strong AI". Explain why an organisation may choose one over the other. What are the risks and opportunities for an organisation changing from "weak AI" to "strong AI"?

OR

- The Turing test originated in 1950. How likely is it that your chosen organisation's artificial intelligence would pass the test?
  Discuss how relevant the test is in evaluating the effectiveness of your chosen organisation's artificial intelligence.

Choice (copy and paste below)

Response

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OR: **QUESTION TWO: Computer security**

(a)　(i)　Name a **specific** New Zealand-based company or organisation that has had **issues** with computer security.

（ii）　What were the issues this organisation had with computer security?

（iii）　What are TWO steps the organisation took to deal with these issues?

OR: **QUESTION TWO: Computer security**

(a)　(i)

(b) Choose TWO of the following to answer:
- What are common issues all individuals or organisations have with computer security?
- What steps can an organisation take to protect its computer security?
- What are the signs an individual might recognise that help them identify they are being targeted by a scammer?

Choice (1) – (copy and paste below)

Response

Choice (2) – (copy and paste below)

Response

(c)   Choose ONE of the following to answer:

- How can the security of computers be protected against future risks?
- What impact do peoples' attitudes and behaviour have on computer security?

You should consider this question in the context of the organisation you wrote about in part (a).

Choice (copy and paste below)

Response

(d)   Choose ONE of the following to answer:

- Operating systems, drivers, software, and firmware all require updates. Discuss the purpose of these different updates in maintaining computer security.
- Organisations commonly have firewalls at the entry point of the internet as well as on individual computers. Discuss why these are needed to maintain computer security.

You should consider this question in the context of the organisation you wrote about in part (a).

Choice (copy and paste below)

Response

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OR: **QUESTION THREE: Complexity and tractability**

(a) (i) Name a common example of complexity and tractability.

(ii) Explain in detail why this is an example of complexity and tractability.

(b) Choose TWO of the following to answer:

- Give a practical example where it would be good for a solution to an intractable problem not to be found.
- Give a practical example where it would be good for a solution to an intractable problem to be found.
- Give a practical example of a mechanism that can be used to partly solve an intractable problem. What are its limitations?

Choice (1) – (copy and paste below)

Response

Choice (2) – (copy and paste below)

Response

(c)   Choose ONE of the following to answer:

- What are some ways that complexity or tractability can be future-proofed?
- What positive or negative effects does the field of complexity or tractability have on people?

Choice (copy and paste below)

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Response

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- What are some ways that complexity or tractability can be future-proofed?
- What positive or negative effects does the field of complexity or tractability have on people?

(d)   Choose ONE of the following to answer:

- A real-world "solution" to an intractable problem, such as route planning, includes a number of additional factors such as one-way streets. Discuss how effective these solutions need to be and how you can measure their effectiveness.

- The "travelling salesman problem" is easy to solve with only a small number of destinations. Discuss why this becomes intractable as more destinations are added.

Choice (copy and paste below)

Response