

VCE Algorithmics (HESS) School-assessed Task

Video 3

Unit 4 Outcome 1

SAT Criteria 5–7

Acknowledgement of Country

The VCAA respectfully acknowledges the Traditional Owners of Country throughout Victoria and pays respect to the ongoing living cultures of First Peoples.



VCE Algorithmics (HESS) School-assessed Task

Video 3

Unit 4 Outcome 1

SAT Criteria 5–7

Phil Feain

Digital Technologies Curriculum Manager

VCAA

Outline of presentation

- Nature of task
- SAT Criteria 5–7
- Authentication
- Assessment
- Issues identified after marking Unit 4 Outcome 1

Nature of task

Unit 4 Outcome 1

On completion of this unit the student should be able to establish the efficiency of simple algorithms and explain soft limits of computability.

Nature of task

Nature of task

A formal time complexity analysis of the designed algorithm for the applied problem and an explanation of the consequences of these results on the algorithm's real-world application.

Unpacking the criteria

Criteria 5–7

Scope of task

Criterion 5

Formal analysis

Criterion 5 assesses students' skills in determining the time complexity of algorithms. Students are to determine the time complexity of the initial algorithmic solution that they developed as part of Unit 3 Outcome 3.

The word range for this task is approximately 100–200 words.

Full working of time complexity calculations should also be included.

The evidence from this task is observed through Observation 5 and assessed through Criterion 5.

Criterion 5

Further formal analysis

Criterion 5 assesses students' skills in determining the time complexity of algorithms. Drawing on their Unit 4 Outcome 1 knowledge and skills, students are to determine the time complexity of the improved algorithm that they designed as part of Unit 4 Outcome 2.

The word range for this task is approximately 100–200 words.

Full working of time complexity calculations should also be included.

The evidence from this task is observed through Observation 9 and assessed through Criterion 5.

Criterion 5

VCE Algorithmics (HESS): School-assessed Task 2023

Assessment Criteria	Levels of Performance						
	Indicators	Not shown	1–2 (very low)	3–4 (low)	5–6 (medium)	7–8 (high)	9–10 (very high)
Unit 4 Outcome 1 5. Skills in determining the time complexity of algorithms.	<ul style="list-style-type: none"> Analyse the time complexity of the initial algorithmic solution. 	Insufficient evidence	Identifies the time complexity of some operations within the algorithm.	Identifies the time complexity of some control structures or non-constant-time sequences of operations within the algorithm. Combines time complexity terms by applying some appropriate logic.	Identifies essential elements of the algorithm that contribute to its time complexity. Combines time complexity terms by applying appropriate logic.	Analyses the time complexity of a sophisticated algorithm, that involves functional abstraction and/or recursion, by identifying the time complexities of a broad range of pseudocode elements and logically combining these to produce an overall result.	Analyses the time complexity of a sophisticated algorithm, that involves functional abstraction and/or recursion, by identifying the time complexities of a broad range of pseudocode elements and logically combining these to produce a tight upper-bound of the algorithm's time complexity.
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Criterion 6

Formal analysis

Criterion 6 assesses students' understanding of the consequences of an algorithm's time complexity on its real-world application. Students are to explain the consequences of their initial algorithmic solution's time complexity on its real-world application, including a thorough discussion of practical input sizes and its suitability to the problem's requirements.

The word range for this task is approximately 100–200 words.

The evidence from this task is observed through Observation 6 and assessed through Criterion 6.

Criterion 6

VCE Algorithmics (HESS): School-assessed Task 2023

Assessment Criteria	Levels of Performance						
	Indicators	Not shown	1–2 (very low)	3–4 (low)	5–6 (medium)	7–8 (high)	9–10 (very high)
Unit 4 Outcome 1 6. Understanding of the consequences of an algorithm's time complexity on its real-world application.	<ul style="list-style-type: none"> Explains the consequences of an algorithm's time complexity on its real-world application. 	Insufficient evidence	Briefly describes how an algorithm's running time would grow as its input size increases.	Describes how an algorithm's running time would grow as its input size increases, based on an understanding of its time complexity.	Explains some consequences of an algorithm's time complexity on its real-world application, based on how the algorithm's running time would grow as its input size increases.	Explains the consequences of an algorithm's time complexity on its real-world application, including a discussion of practical input sizes and its suitability to the problem's requirements.	Clearly and precisely explains the consequences of an algorithm's time complexity on its real-world application, including a thorough discussion of practical input sizes and its suitability to the problem's requirements.
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Criterion 7

Comparison

Criterion 7 assesses students' skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem. Criterion 10 assesses students' skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose. Students draw on Unit 4 Outcomes 1 and 2 to compare the suitability of their developed solutions.

The word range for this task is approximately 400–600 words.

The evidence from this task is observed through Observation 10 and assessed through Criterion 7 and 10.

Criterion 7

VCE Algorithmics (HESS): School-assessed Task 2023										
Assessment Criteria	Levels of Performance									
	Indicators	Not shown	1–2 (very low)	3–4 (low)	5–6 (medium)	7–8 (high)	9–10 (very high)			
Unit 4 Outcome 1 7. Skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem.	<ul style="list-style-type: none"> Compares whether the solutions will render the problem tractable and the real-world implications of this. Compares the relative efficiency of the solutions with regard to the constraints of the real-world/applied problem context. 	Insufficient evidence	Identifies some points of comparison between the algorithmic solutions in relation to whether they would render the problem tractable.	Outlines some points of comparison between the algorithmic solutions in relation to whether they would render the problem tractable.	Describes some points of comparison between the algorithmic solutions in relation to whether they would render the problem tractable.	A comparison of whether the solutions would render the problem tractable and a discussion of the relevant implications of this to their potential application to the problem.	A comprehensive comparison of whether the solutions would render the problem tractable and a thorough discussion of the relevant implications of this to their potential application to the problem.			
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Authentication

Authentication

Authentication record form: VCE Algorithmics (HESS) 2023

Unit 4 School-assessed Task

This form must be completed by the class teacher. It provides a record of the monitoring of the student's work in progress for authentication purposes. This form is to be retained by the school and filed. It may be collected by the VCAA as part of the School-based Assessment Audit.

Student name Student No

School Teacher:

Component of School-assessed Task	Date observed and submitted	Teacher comments	Teacher's initials	Student's initials
Observation 5: Determining time complexity (Criterion 5) Unit 4 Outcome 1 SAT – Part 2 The student determines the time complexity of their Unit 3 Outcome 3 solution.	Observed	Observation of analysis of time complexity of their initial solution		
Observation 6: Time complexity implications (Criterion 6) Unit 4 Outcome 1 SAT – Part 2 The student explains the consequences of the time complexity of their Unit 3 Outcome 3 solution.	Observed	Explanation of consequences of the time complexity of their initial solution.		
Observation 7: Design of an improved algorithmic solution (Criterion 8) Unit 4 Outcome 2 SAT – Part 3 The student designs an improved algorithmic solution.	Observed	Observation of the documented design process and solution.		
Observation 8: Algorithmic problem-solving (Criterion 9) Unit 4 Outcome 2 SAT – Part 3 The quality of the student's improved solution.	Observed	Observation of the quality of the improved design.		
Observation 9: Further formal analysis (Criterion 5) Unit 4 Outcome 1 SAT – Part 2 The student analyses the time complexity of their improved algorithmic solution.	Observed	Observation of analysis of the time complexity of an improved solution.		
Observation 10: Comparison of solutions (Criteria 7 & 10) Unit 4 Outcomes 1 and 2 SAT – Parts 2 and 3 The student compares the suitability of their solutions.	Observed	Observation of comparison the initial and improved solutions.		
Submission of Unit 4 Outcomes 1 and 2 School-assessed Task The student submits the Unit 4 Outcomes 1 and 2 SAT – Parts 2 and 3 for assessment.	Submitted	Submission of Unit 4 Outcomes 1 and 2 SAT – Parts 2 and 3.		

I declare that all resource materials and assistance used have been acknowledged and that all unacknowledged work is my own.

Student signature Date

Assessment

Assessment

2023

Victorian Certificate of Education Algorithmics (HESS) Assessment Sheet School-assessed Task

STUDENT NAME

This assessment sheet will assist teachers to determine their score for each student. Teachers need to make judgments on the student's performance for each criterion. Teachers will be required to choose one number from 0–10 to indicate how the student performed on each criterion with comments, as appropriate. Teachers then add the subtotals to determine the total score.

STUDENT NUMBER

ASSESSING SCHOOL NUMBER

Criteria for the award of grades

The extent to which the student demonstrates:

- Skills in specifying a problem and modelling its key features
- Skills in the design of an algorithm to solve a real-world/applied problem.
- Skills in the communication of an algorithmic solution to a real-world/applied problem.
- Skills in the justification of an algorithmic solution to a real-world/applied problem.
- Skills in determining the time complexity of algorithms.
- Understanding of the consequences of an algorithm's time complexity on its real-world application.
- Skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem.
- Skills in the design of an improved data model and algorithm combination.
- Skills in advanced algorithmic problem solving.
- Skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose.

Not Shown
(0) Very Low
(1–2) Low
(3–4) Med
(5–6) High
(7–8) Very High
(9–10)

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Performance on Criteria: Teacher's Comments
You may wish to comment on aspects of the student's work that led to your assessment.

If a student does not submit the School-assessed Task at all, N/A should be entered in the total score box.

SUBTOTALS

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TOTAL SCORE

Issues identified after marking Unit 4 Outcome 1

Issues identified after marking Unit 4 Outcomes 1 and 2

If the formal time complexity analysis of the designed algorithm for the applied problem in Unit 4 Outcome 1 is incomplete or contains significant errors, students have the opportunity to make adjustments to their analysis. Teachers can provide feedback on the quality of the analysis but the adjustments must be student initiated, not teacher directed. The modified analysis is not reassessed. However, this opportunity prevents negative consequential effects for the third part of the School-assessed Task in Unit 4 Outcome 2.

Review of presentation

In this video we looked at:

- Nature of the task
- SAT Criteria 5–7
- Authentication
- Assessment
- Issues identified after marking Unit 4 Outcome 1

Contact

- **Phil Feain – Digital Technologies Curriculum Manager (VCAA)**
- **Ph: (03) 9059 5146**
- **Philip.Feain@education.vic.gov.au**

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