VCE Algorithmics (HESS) School-assessed Task
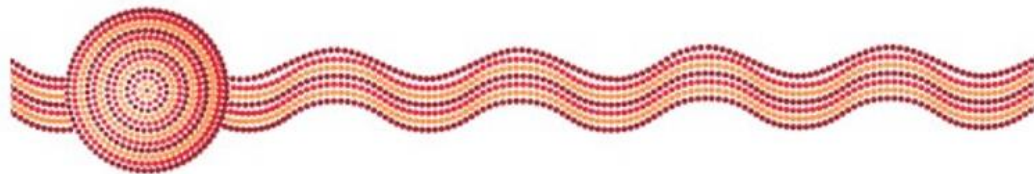
Video 4
Unit 4 Outcome 2
SAT Criteria 8–10

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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.

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SAT Criteria 8–10

Phil Feain

Digital Technologies Curriculum Manager

VCAA

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Outline of presentation

- Nature of task
- SAT Criteria 8–10
- Authentication
- Assessment

Nature of task

Unit 4 Outcome 2

On completion of this unit the student should be able to solve a variety of information problems using algorithm design patterns and explain how heuristics can address the intractability of problems.

Nature of task

Nature of task

A design of an improved data model and algorithm combination to solve the applied problem, including:

- the selection of an efficient, coherent and fit-for-purpose solution

- a time complexity analysis

- a comparison to the original solution.

Unpacking the criteria
Criteria 8–10

Scope of task

Criterion 8

Design of an improved solution

Criterion 8 assesses students' skills in the design of an improved data model and algorithm combination. Students are to apply the knowledge and skills from Unit 4 Outcome 2 to select and design an improved algorithmic solution. This may include combining or modifying Unit 4 course algorithms. Students should discuss the rationale underpinning their data model and algorithm design decisions and precisely describe their designs.

The word range for this task is approximately 200–400 words.

The evidence from this task is observed through Observation 7 and assessed through Criterion 8.

Criterion 8

VCE Algorithmics (HESS): School-assessed Task 2023								
Assessment Criteria	Indicators	Levels of Performance						
		Not shown	1–2 (very low)	3–4 (low)	5–6 (medium)	7–8 (high)	9–10 (very high)	
Unit 4 Outcome 2 **8. Skills in the design of an improved data model and algorithm combination.**	• Describes the design of an improved algorithmic solution to the real-world/applied problem.	Insufficient evidence	Identifies an algorithm design approach and describes limited aspects of a design for an improved data model and algorithm combination.	Describes an algorithm design approach and specifies the overall structure of a design for an improved data model and algorithm combination.	Designs an improved data model and algorithm combination that considers advanced algorithm design approaches and provides a clear description of the solution.	Designs an improved data model and algorithm combination utilising advanced algorithm design approaches and/or sophisticated combinations or modifications of algorithms. Clearly describes the solution, communicating the algorithm in pseudocode.	Designs an improved data model and algorithm combination utilising advanced algorithm design approaches and/or innovative combinations or modifications of algorithms. Succinctly and precisely describes the solution, communicating the algorithm in pseudocode.	
		0 ☐	1 ☐ 2 ☐	3 ☐ 4 ☐	5 ☐ 6 ☐	7 ☐ 8 ☐	9 ☐ 10 ☐	

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Criterion 9

Design of an improved solution

Criterion 9 assesses students' skills in advanced algorithmic problem-solving. Students are assessed on the quality of their improved designs based on the solution's coherence, efficiency and fitness for purpose.

The evidence from this task is observed through Observation 8 and assessed through Criterion 9.

Criterion 9

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 2 9. Skills in advanced algorithmic problem-solving.	• Quality of the improved solution.	Insufficient evidence	The improved solution exhibits limited advantages over the initial solution with regard to its efficiency, coherence and fitness for purpose.	The improved solution exhibits some advantages over the initial solution with regard to its efficiency, coherence and fitness for purpose.	The improved solution exhibits a range of advantages over the initial solution with regard to its efficiency, coherence and fitness for purpose.	The improved solution exhibits many advantages over the initial solution with regard to its efficiency, coherence and fitness for purpose.	The improved solution exhibits considerable advantages over the initial solution with regard to its efficiency, coherence and fitness for purpose.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 10

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.

Students should submit their completed Unit 4 Outcomes 1 and 2 School-assessed Task work.

Criterion 10

		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 2 **10. Skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose.**	• Compares algorithmic solutions in terms of their coherence and fitness for purpose.	Insufficient evidence	Identifies some points of comparison between the algorithmic solutions to the real-world/applied problem.	Outlines some points of comparison between the algorithmic solutions based on their design features or fitness as solutions to the real-world/applied problem.	Describes some points of comparison between the algorithmic solutions based on their design features and fitness as solutions to the real-world/applied problem.	Compares the algorithmic solutions based on their design features, coherence and fitness as solutions to the real-world/applied problem, including the identification of their similarities and differences.	Comprehensively compares the algorithmic solutions based on their design features, coherence and fitness as solutions to the real-world/applied problem, including the thorough identification of their similarities and differences.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

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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 complexty of their Unit 3 Outcome 3 solution.	Observed	Obervation 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

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:	Not Shown (0)	Very Low (1–2)	Low (3–4)	Med (5–6)	High (7–8)	Very High (9–10)
1. Skills in specifying a problem and modelling its key features						
2. Skills in the design of an algorithm to solve a real-world/applied problem.						
3. Skills in the communication of an algorithmic solution to a real-world/applied problem.						
4. Skills in the justification of an algorithmic solution to a real-word/applied problem.						
5. Skills in determining the time complexity of algorithms.						
6. Understanding of the consequences of an algorithm's time complexity on its real-world application.						
7. Skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem.						
8. Skills in the design of an improved data model and algorithm combination.						
9. Skills in advanced algorithmic problem solving.						
10. Skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose.						

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

TOTAL SCORE

Review of presentation

In this video we looked at:

- Nature of the task

- SAT Criteria 8–10

- Authentication

- Assessment

Contact

- **Phil Feain – Digital Technologies Curriculum Manager (VCAA)**

- **Ph: (03) 9059 5146**

- **Philip.Feain@education.vic.gov.au**

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