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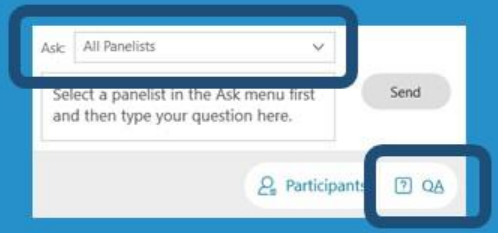
Please ask questions to 'All Panelists'



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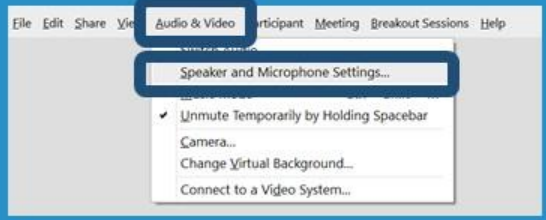

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VCE Algorithmics (HESS) 2023

SAT Training Webinar

February 2023

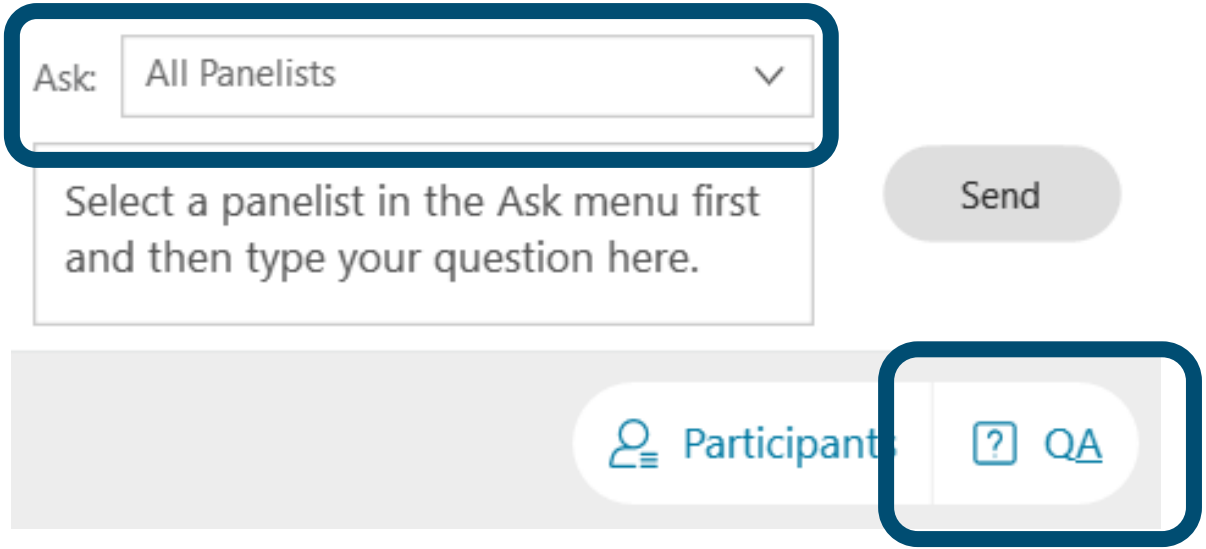
VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

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.

Asking Questions



Purpose of this session

- To provide an overview of the SAT for Unit 3 Outcome 3 and Unit 4 Outcomes 1 and 2
- To unpack the SAT criteria in the 2023 Administrative information for School-based Assessment
- To provide a brief overview of authentication, assessment and marking

Resources

Available on the Algorithmics (HESS) study page:

- Administrative information for School-based Assessment
- Blank Authentication record form
- On-demand videos:
  - Background to the SAT
  - Criteria 1-4
  - Criteria 5-7
  - Criteria 8-10
  - Authentication
  - Administration of the SAT
- Support material

The SAT

Ivan Carlisle and Greg Breese

Resources – Admin info

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VCE Algorithmics (HESS) Administrative information for School-based Assessment in 2023

School-assessed Task

The School-assessed Task (SAT) contributes 20 per cent to the study score.

Teachers will provide to the Victorian Curriculum and Assessment Authority (VCAA) a score against each criterion that represents an assessment of the student's level of performance for Unit 3 Outcome 3 and Unit 4 Outcomes 1 and 2. The recorded scores must be based on the teacher's assessment of the student's performance according to the criteria on pages 8–17. This assessment is subject to the VCAA's statistical moderation process.

The 2023 VCE Algorithmics (HESS) assessment sheet on page 21 is to be used by teachers to record the Unit 3 and Unit 4 SAT scores. The completed assessment sheet for each student's SAT must be available on request by the VCAA.

The mandated assessment criteria are published annually on the Algorithmics (HESS) study page of the VCAA website and notification of their publication is given in the February *VCAA Bulletin*.

Details of authentication requirements and administrative arrangements for School Assessed Tasks are published annually in the *VCE and VCAL Administrative Handbook 2023*.

The Authentication record form on pages 19–20 is to be used to record information for each student and must be made available on request by the VCAA.

The SAT relates to:

- Unit 3 Outcome 3
- Unit 4 Outcome 1
- Unit 4 Outcome 2

Teachers should be aware of the dates for submission of scores into VASS in July and November. These dates are published in the 2023 Important Administrative Dates and Assessment Schedule, published annually on the VCAA website. vcaa.vic.edu.au/pages/schooladmin/admindates/index.aspx

Overview of the School-assessed Task

The table below provides a high-level overview of the recommended sequence of tasks, and their mapping to outcomes, criteria and observations.

Description	Outcome	Observation/ Submission	Criterion
Unit 3			
A real-world/applied problem context is provided to students			
Students specify the problem in precise terms, identifying its salient features and modelling it with ADTs	3	1	1
Students design an algorithmic solution to the problem	3	2	2
Students communicate their algorithmic solution in pseudocode	3	3	3
Students justify their solution	3	4	4
Unit 3 Outcome 3 SAT – Part 1 is submitted			
Unit 4			
Students determine the time complexity of their initial solution	1	5	5
Students explain the consequences of the time complexity of their initial solution	1	6	6
Students design an improved data model and algorithm combination	2	7	8
Students are assessed on the quality of their improved solution	2	8	9
Students determine the time complexity of their improved solution	1	9	5
Students compare the suitability of their solutions	1 and 2	10	7 and 10
Unit 4 Outcomes 1 and 2 SAT – Parts 2 and 3 are submitted			

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 3 Outcome 3 **1. Skills in specifying a problem and modelling its key features.**	• Specifies an algorithmic problem.	Insufficient evidence	Identifies some algorithmic aspects of the real-world/applied problem context.	Outlines some aspects of an algorithmic problem relevant to the real-world/applied problem context.	Formulates an algorithmic problem from the real-world/applied problem context.	Explains how the algorithmic problem is formulated from the real-world/applied problem context.	Provides clear and precise specification of the algorithmic problem, suitably formulated from the real-world/applied problem context.
	• Explains the salient features of the real-world/applied problem.		Lists arbitrarily-selected features of the real-world/applied problem.	Identifies some relevant features of the real-world/applied problem and outlines reasons for their selection.	Describes salient features of the real-world/applied problem and reasons for their selection.	Identifies features of the real-world/applied problem, and by considering their characteristics, chooses a suitable set of features to model.	Identifies a comprehensive range of features of the real-world/applied problem, and by considering their relevant characteristics, selects a suitable set of salient features to model.
	• Models the problem using ADTs		Makes a limited attempt to model the selected features of the problem using ADTs that may not be suitable.	Models some features of the problem using suitable ADTs.	Models the selected features of the problem using a combination of suitable ADTs. Outlines how some features of the problem map to the data model.	Models selected features of the problem using a coherent combination of suitable ADTs. Describes how some features of the problem map to the data model. Describes signatures for some operations of the data model.	Models selected features of the problem using a coherent and fit-for-purpose combination of suitable ADTs. Describes how features of the problem map to the data model. Describes signatures for key operations of the data model.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

About the SAT

School-assessed Task

- The student's level of achievement in Unit 3 Outcome 3, Unit 4 Outcome 1 and Unit 4 Outcome 2 will be assessed through a School-assessed Task.

Contribution to final assessment

- The School-assessed Task contributes 20 per cent to the study score.

The tasks

Outcomes	Assessment tasks
Unit 3 **Outcome 3** Design suitable solutions for real-world problems that require the integration of algorithms and data types, including the communication of solutions and their justification. **Unit 4** **Outcome 1** Establish the efficiency of simple algorithms and explain soft limits of computability. **Unit 4** **Outcome 2** Solve a variety of information problems using algorithm design patterns and explain how heuristics can address the intractability of problems.	The design of a data model and algorithm combination to solve a real-world/applied problem, including: • a specification of the problem • a consideration of multiple solution options • the selection of a suitable, coherent, clear and fit-for-purpose solution **AND** 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. **AND** 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.

Some things to consider

- The SAT is not to be run like a SAC – Students should have several classes a week to work on this and can work on it outside of school time.
- Teachers are to regularly observe student progress and provide feedback in the Authentication record form.
- Teachers need to be aware of the VASS dates for the submission of SAT scores for Unit 3 and Unit 4.
- Teachers should only use the current year's Administrative information for School-based Assessment (SAT criteria – For this year – 2023)

Design intent

- The SAT provides students with the opportunity to apply the algorithmic problem solving process to a real-world/applied problem.
- For the Unit 3 component of the SAT, students are only expected to employ a naïve approach to the problem.
- In Unit 4 students are expected to explicitly consider the efficiency of their solutions.

Principles for problem selection

- Teachers are to provide students with a real-world/applied problem context.
- The problem should be stated in terms that are sufficiently general to allow for individual students to approach it in different ways.
- The problem context should lend to the data modelling and algorithm design approaches studied in Unit 3, but also have the potential to benefit from the advanced algorithm design methods studied in Unit 4.

Example problem context 1

- A take-away delivery service company, that operates exclusively in the Melbourne CBD, employs a number of delivery riders.
- Riders are rostered-on in proportion to the level of demand for deliveries. Riders have capacity to carry upwards of three orders at a time.
- Riders are paid at a rate per kilometre travelled.
- The company requires a program for assigning riders to deliveries that maximises the company's profit.

Example problem context 2

- Bernie is developing a mobile robot for a national park.
- The robot will travel through the park using existing paths and deposit animal food at feeding stations.
- These feeding stations will be changed every season to match the movement of animals during the year.
- Bernie is currently designing the algorithm that the robot will use to select the most efficient path it should take to visit all of the feeding stations while minimising the distance it travels… (Q16, 2018, Algorithmics Exam)

Example problem context 3

A tour guide company is taking guided tours within a theme park. The theme park contains a large artificial island that is surrounded by a narrow moat. There are tourist attractions both on the island and also in the park on the outside of the moat. The tourist attractions have a varying appeal, with some being more valuable than others. There are also a number of bridges that cross the moat and allow bidirectional travel between the inside and outside . Let the moat be divided up into sections. Each section of the moat contains either a bridge or an attraction on one or both sides. Each attraction has a measure of its value to tourists. At the location where the tour starts there is a bridge.

You have been asked to design a new tour that does a loop of the moat. The tour will start on the outside of the moat. The tour is allowed two bridge crossing, once to cross onto the inside of the moat and once to travel back to the outside.

The value of a tour is the sum of the value of each attraction that the tour visits. A tour visits each attraction that it passes on its current side of the moat. Your task is to determine the maximum value of a tour for a given arrangement of attractions and bridges.

Unpacking the criteria
Unit 3 Outcome 1
Criteria 1–4

Overview of the SAT (Unit 3)

Description	Outcome	Observation/ Submission	Criterion
Unit 3			
A real-world/applied problem context is provided to students			
Students specify the problem in precise terms, identifying its salient features and modelling it with ADTs	3	1	1
Students design an algorithmic solution to the problem	3	2	2
Students communicate their algorithmic solution in pseudocode	3	3	3
Students justify their solution	3	4	4
Unit 3 Outcome 3 SAT – Part 1 is submitted			

Criterion 1

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 3 Outcome 3 **1. Skills in specifying a problem and modelling its key features.**	• Specifies an algorithmic problem.	Insufficient evidence	Identifies some algorithmic aspects of the real-world/applied problem context.	Outlines some aspects of an algorithmic problem relevant to the real-world/applied problem context.	Formulates an algorithmic problem from the real-world/applied problem context.	Explains how the algorithmic problem is formulated from the real-world/applied problem context.	Provides clear and precise specification of the algorithmic problem, suitably formulated from the real-world/applied problem context.
	• Explains the salient features of the real-world/applied problem.		Lists arbitrarily-selected features of the real-world/applied problem.	Identifies some relevant features of the real-world/applied problem and outlines reasons for their selection.	Describes salient features of the real-world/applied problem and reasons for their selection.	Identifies features of the real-world/applied problem, and by considering their characteristics, chooses a suitable set of features to model.	Identifies a comprehensive range of features of the real-world/applied problem, and by considering their relevant characteristics, selects a suitable set of salient features to model.
	• Models the problem using ADTs		Makes a limited attempt to model the selected features of the problem using ADTs that may not be suitable.	Models some features of the problem using suitable ADTs.	Models the selected features of the problem using a combination of suitable ADTs. Outlines how some features of the problem map to the data model.	Models selected features of the problem using a coherent combination of suitable ADTs. Describes how some features of the problem map to the data model. Describes signatures for some operations of the data model.	Models selected features of the problem using a coherent and fit-for-purpose combination of suitable ADTs. Describes how features of the problem map to the data model. Describes signatures for key operations of the data model.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 1 – Advice

- Teachers should approve each student's intended approach early in the process.

Questions – Criterion 1

Criterion 2

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 3 Outcome 3 **2. Skills in the design of an algorithm to solve a real-world/applied problem.**	• Considers suitable algorithmic approaches to the problem.	Insufficient evidence	Identifies an algorithm design approach that has some relevance to the problem.	Outlines a few algorithm design approaches that could form the basis of a solution.	Considers relevant characteristics of several algorithm design approaches.	Compares the suitability of some algorithm design approaches to then determine an appropriate approach.	Thoroughly compares the suitability of several algorithm design approaches to then determine the most appropriate approach.
	• Describes the design of an algorithmic solution to the real-world/applied problem.		Identifies some aspects of an algorithm to solve the real-world/applied problem.	Outlines a simple algorithm to solve the problem.	Describes a non-trivial algorithm that solves some aspects of the specified problem.	Describes an algorithm that solves the specified problem and involves some combinations of algorithms or algorithm design patterns.	Clearly explains an algorithm that solves the specified problem and involves combinations or modifications of algorithms or algorithm design patterns.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 2

- Whilst students are expected to consider multiple solution options, they are only expected to design one solution in the Unit 3 component of the SAT.
- Students may for example consider a greedy approach to a problem, but reject it on the basis that a greedy approach will not yield an optimal solution for a particular problem context, and instead opt for a brute force approach.

Questions – Criterion 2

Criterion 3

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 3 Outcome 3 **3. Skills in the communication of an algorithmic solution to a real-world/applied problem.**	• Communicates the algorithmic solution in pseudocode.	Insufficient evidence	Limited elements of the algorithm are expressed in pseudocode. The pseudocode includes some correct initialisation of variables and data structures.	Elements of the structure of the algorithm are expressed in pseudocode. The pseudocode includes the correct use of simple iteration and conditional control structures where appropriate.	The algorithm is expressed in pseudocode such that the structure of the design is apparent. The pseudocode includes the correct use of nested iteration and recursion where appropriate.	The algorithm is expressed in pseudocode that mostly reflects the solution design. Any errors are minor in nature and do not affect the overall structure of the algorithm. There is some attempt to use functional abstractions.	The algorithm is correctly and precisely expressed in pseudocode, which accurately reflects the solution design. A modular approach is employed including the use of ADTs and functional abstractions.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 3

- Formal communication of the algorithmic solution in pseudocode is what is required here.
- Whilst some students may find it beneficial to experiment with their designs in a programming environment, implementing their solutions in code is not a requirement of the SAT.

Questions – Criterion 3

Criterion 4

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 3 Outcome 3 **4. Skills in the justification of an algorithmic solution to a real-world/ applied problem.**	• Justifies a solution to the real-world/applied problem.	Insufficient evidence	Identifies relevant reasons in support of the selection of a solution.	Outlines the rationale for the selection of a chosen solution based on a limited set of merits and limitations.	Justifies the selection of a solution based on its comparative advantages over other approaches.	Justifies the selection of a solution based on arguments relating to its suitability, coherence or fitness for purpose.	Justifies the selection of a solution by clearly demonstrating its suitability, coherence, and fitness for purpose.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 4

- Students are not expected to consider the efficiency of their solution here, as that is part of the focus of the Unit 4 component of the SAT.

Questions – Criterion 4

Unpacking the criteria
Unit 4 Outcome 1 and 2
Criteria 5–10

Overview of the SAT (Unit 4)

Description	Outcome	Observation/ Submission	Criterion
Unit 4			
Students determine the time complexity of their initial solution	1	5	5
Students explain the consequences of the time complexity of their initial solution	1	6	6
Students design an improved data model and algorithm combination	2	7	8
Students are assessed on the quality of their improved solution	2	8	9
Students determine the time complexity of their improved solution	1	9	5
Students compare the suitability of their solutions	1 and 2	10	7 and 10
Unit 4 Outcomes 1 and 2 SAT – Parts 2 and 3 are submitted			

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.**	• 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.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 5

- In applying this criteria, teachers should assess the time complexity analysis performed by students of both their initial and improved solutions.

Questions – Criterion 5

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.**	• 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.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 6

- Given the selection of an appropriate problem context, the initial solutions designed by students will likely have issues of efficiency that they should be appreciating when tackling this part of the SAT.

Questions – Criterion 6

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.**	• Compares whether the solutions will render the problem tractable and the real-world implications of this.	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.
	• Compares the relative efficiency of the solutions with regard to the constraints of the real-world/applied problem context.		Identifies some points of comparison between the algorithmic solutions in terms of their relative efficiency based on their time complexities.	Outlines some points of comparison between the algorithmic solutions in terms of their relative efficiency based on their time complexities and with some consideration of the constraints of the real-world/applied problem.	Describes some advantages and disadvantages of the algorithmic solutions in terms of their relative efficiency based on their time complexities and with consideration of the constraints of the real-world/applied problem.	A well-developed and considered comparison of the relative efficiency of the solutions, with regard to their time complexities and the constraints of the real-world/applied problem.	A precise and comprehensive comparison of the relative efficiency of the solutions, with regard to their time complexities and the constraints of the real-world/applied problem.
		0 ❑	1 ❑ 2 ❑	3 ❑ 4 ❑	5 ❑ 6 ❑	7 ❑ 8 ❑	9 ❑ 10 ❑

Criterion 7

- The evidenced provided by students in relation to this criteria will likely feature in their concluding comparison interwoven with their evidence against criteria 10.

Questions – Criterion 7

Criterion 8

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 **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 ❑

Criterion 8

- This criteria focusses on assessing the application of the knowledge and skills involved in the process of designing an improved solution.

Questions – Criterion 8

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 9

- This criteria focusses on assessing the quality of the improved solution that has been design be the student.

Questions – Criterion 9

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 ❑

Criterion 10

- The evidenced provided by students in relation to this criteria will likely feature in their concluding comparison, interwoven with their evidence against criteria 7.

Questions – Criterion 10

Authentication

Authentication record form

- Required as part of the SAT process
- Must be completed by the teacher and the student at each observation and submission point
- Should not be completed right at the end
- Can be requested by the VCAA

Authentication

Authentication record form: VCE Algorithmics (HESS) 2023

Unit 3 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 1: Specifying and modelling the problem (Criterion 1) Unit 3 Outcome 3 SAT – Part 1 The student specifies the problem and models it using ADTs.	Observed	Observation of the problem specification and modelling process.		
Observation 2: Designing an algorithmic solution (Criterion 2) Unit 3 Outcome 3 SAT – Part 1 The student considers a range of approaches and designs an algorithmic solution to the problem.	Observed	Observation of the design of an algorithmic solution.		
Observation 3: Communicating the algorithmic solution (Criterion 3) Unit 3 Outcome 3 SAT – Part 1 The student communicates their solution in pseudocode.	Observed	Observation of pseudocode.		
Observation 4: Solution justification (Criterion 4) Unit 3 Outcome 3 SAT – Part 1 The student justifies the suitability of their solution.	Observed	Observation of the justification of the solution.		
Submission of Unit 3 Outcome 3 School-assessed Task The student submits the Unit 3 Outcome 3 SAT – Part 1 for assessment.	Submitted	Submission of Unit 3 Outcome 3 SAT – Part 1.		

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

Student signature ..... Date .....

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 .....

Questions – Authentication

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:**	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.	☐	☐	☐	☐	☐	☐
SUBTOTALS	☐	☐	☐	☐	☐	☐

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.

TOTAL SCORE ☐

Marking

- Give yourself enough time for marking
- Consider a staged approach – milestones
- Consider VASS dates when organising your timeline for student observations and milestones for submission of work
  - Unit 3 Outcome 3 (Criteria 1–4) – **Monday 17 July 2023**
  - Unit 4 Outcome 1 (Criteria 5–7) – **Wednesday 1 November 2023**
  - Unit 4 Outcome 2 (Criteria 8–10) – **Wednesday 1 November 2023**

Questions – Assessment

Conclusion

Understanding of:

- the SAT for Unit 3 Outcome 3 and Unit 4 Outcomes 1 and 2
- the SAT criteria in the 2023 Administrative information for School-based Assessment
- authentication, assessment and marking

Contact

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