COMP6008 DATA STRUCTURES AND ALGORITHMS

Summary

Title	Assessment 3 – Benchmarking algorithm efficiency
Type	Presentation
Due Date	Friday 7 October 11:59 pm AEST (start of Week 7)
Length	20 minutes
Weighting	20%
Academic Integrity (See below for limits of use where GenAI is permitted)	You **may use** GenAI tools to get some ideas for your presentation. However, you **MUST NOT** generate a presentation. Please refer to the **Academic Integrity section** below to see what you can and cannot do with the GenAI tools.
Submission	A word document submitted to Turnitin using the provided template.
Unit Learning Outcomes	This assessment maps to the following ULO: 1. ULO3: demonstrate an understanding of algorithm design techniques for efficiency and/or clarity

Rationale

Data structures and algorithms are fundamental skills for computer scientists. The ability to apply common data structures and design efficient algorithms to solve real-world problems often indicates a difference between computing and IT graduates. This assessment aims to assess students' ability to design and benchmark algorithms for efficiency. It addresses unit learning outcomes 3 and relates to modules 4, 5, and 6.

Task Description

This assessment consists of a presentation on benchmarking the efficiency of common sorting algorithms. It extends tasks 6 and 7 of Assessment 2 – Designing efficient algorithms. It gives students the opportunity to demonstrate their understanding of relating algorithm complexity to practical algorithm efficiency through the design of experiments and analysis of results.

Task Instructions

Each student records a presentation video of up to 20 minutes using VoiceThread. A recorded presentation should show your face, and if you used GenAI in this assessment, explain how you used it and how it assisted you in preparing your presentation.

In particular, your presentation must:

- Explain why a hybrid sort algorithm combining quicksort and insertion sort can theoretically improve the quicksort and under what circumstances such a hybrid sort algorithm performs the best.
- Explain the rationale behind the experiment you designed to find out the optimal partition limits for different list sizes.
- Discuss your findings on the optimal partition limits.

- Explain the rationale behind the experiment you designed to benchmark the performance of different sorting algorithms for different input sizes.
- Discuss your findings on the benchmarking experiment and comment on whether Barack Obama's answer was right or not.
- Reflect on the highlights of what you have learned from this unit and their potential benefits to your future career.

Resources

Use the following resources to support you when working on this assessment.

- Unit Modules 4-6 on Blackboard
- The reference books

Referencing Style Resource

NA

Task Submission

When you complete the assignment, you are required to upload your presentation video to VoiceThread submission portal titled *Assessment 3: Benchmarking algorithm efficiency* in the **Assessments Tasks and Submission** section on the Blackboard COMP6008 site.

Resubmit policy: This assessment is not eligible for a re-submit.

Academic Integrity

At Southern Cross University, academic integrity means behaving with the values of honesty, fairness, trustworthiness, courage, responsibility and respect in relation to academic work.

The Southern Cross University Academic Integrity Framework aims to develop a holistic, systematic and consistent approach to addressing academic integrity across the entire University. For more information, see: SCU Academic Integrity Framework

NOTE: **Academic Integrity breaches include** unacceptable use of generative artificial intelligence (GenAI) tools, the use of GenAI has not been appropriately acknowledged or is beyond the acceptable limit as defined in the Assessment, poor referencing, not identifying direct quotations correctly, close paraphrasing, plagiarism, recycling, misrepresentation, collusion, cheating, contract cheating, fabricating information.

At SCU the use of GenAI tools is acceptable, *unless it is beyond the acceptable limit as defined in the Assessment Item by the Unit Assessor*.

GenAI May be Used

Generative artificial intelligence (GenAI) tools, such as ChatGPT, **may be used** for this assessment task. If you use GenAI tools, you must use these ethically and acknowledge their use. To find out how to reference GenAI in your work, consult the referencing style for your unit via the Library referencing guides. If you are not sure how to, or how much, you can use GenAI tools in your studies, contact your Unit Assessor. If you use GenAI tools without acknowledgment, it may result in an academic integrity breach against you, as described in the Student Academic and Non-Academic Misconduct Rules, Section 3.

You **may use** Generative Artificial Intelligence (GenAI) tools, such as ChatGPT or Copilot, for this assessment task **to get some ideas for your presentation**. Think of it as a tool – a quick way to access information – or a (free) tutor to answer your questions. However, just as if you Googled something, you still need to evaluate the information to determine its accuracy and relevance. ***If you have used a GenAI tool in this assessment, you must document how you used it and how it assisted you in completing the assessment task***. ***Failing to do that will be subject to an academic integrity investigation***.

You **cannot use AI to generate a presentation**. You need to put your own effort into building the presentation to demonstrate the required skills. Refer to assessment information in the Assessment Tasks and Submission area for details.

Special Consideration

Please refer to the Special Consideration section of Policy.
https://policies.scu.edu.au/document/view-current.php?id=140

Late Submissions & Penalties

Please refer to the Late Submission & Penalties section of Policy.
https://policies.scu.edu.au/view.current.php?id=00255

Grades & Feedback

Assessments that have been submitted by the due date will receive an SCU grade. Grades and feedback will be posted to the 'Grades and Feedback' section on the Blackboard unit site. Please allow 7 days for marks to be posted.

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Assessment Rubric

Note: The number of criteria used will vary depending on the complexity of the assessment task. Typically, 4–5 criteria are used.

Marking Criteria and % allocation	High Distinction (85–100%)	Distinction (75–84%)	Credit (65–74%)	Pass (50–64%)	Fail 0–49%
Criterion 1: Theoretical analysis of hybrid sort **ULO**: 3 **Percentage**: 30%	• Theoretical analysis of why hybrid sort improves quick sort is sound. • Circumstances where hybrid performs best are explained correctly and clearly.	• Theoretical analysis of why hybrid sort improves quick sort is mostly correct. • Circumstances where hybrid performs best are explained, but they are not entirely correct.	• Theoretical analysis of why hybrid sort improves quick sort is mostly correct. • Circumstances where hybrid performs best are missing.	• Theoretical analysis of why hybrid sort improves quick sort is partially correct. • Circumstances where hybrid performs best are missing.	No or little theoretical analysis is provided.
Criterion 2: Experiment of optimal partition limits in hybrid sort **ULO**: 3 **Percentage**: 30%	• Rationale behind the experiment is sound and explained clearly. • Experimental findings are thoroughly discussed.	• Rationale behind the experiment is sound and explained mostly clearly. • Experimental findings are mostly thoroughly discussed.	• Rationale behind the experiment is sound but explanation is not clear. • Experimental findings are discussed but not thoroughly.	• Rationale behind the experiment is explained, but it is not entirely correct. • Experimental findings are sparsely discussed.	No or little discussion of rationale or findings is provided.
Criterion 3: Benchmarking experiment of sorting algorithms **ULO**: 3	• Rationale behind the experiment is sound and explained clearly.	• Rationale behind the experiment is sound and	• Rationale behind the experiment is sound but	• Rationale behind the experiment is explained, but it is	No or little discussion of rationale or findings is provided.

Percentage: 30%	• Experimental findings are thoroughly discussed. • Obama's answer is correctly commented.	explained mostly clearly. • Experimental findings are mostly thoroughly discussed. • Obama's answer is correctly commented.	explanation is not clear. • Experimental findings are discussed but not thoroughly. • Obama's answer is commented but not entirely correctly.	not entirely correct. • Experimental findings are sparsely discussed. • Obama's answer is not commented.	
Criterion 4: Reflection on learned skills **ULO**: 3 **Percentage**: 30%	• Highlights of skills learned from this unit are clearly reflected. • The potential benefits of these skills to future career are thoroughly discussed.	• Highlights of skills learned from this unit are reasonably reflected. • The potential benefits of these skills to future career are reasonably discussed.	• Highlights of skills learned from this unit are reflected at a superficial level. • The potential benefits of these skills to future career are sparsely discussed.	• Highlights of skills learned from this unit are reflected. • The potential benefits of these skills to future career are not discussed.	No or little reflection is provided.

Description of SCU Grades

High Distinction:

The student's performance, in addition to satisfying all of the basic learning requirements, demonstrates distinctive insight and ability in researching, analysing and applying relevant skills and concepts, and shows exceptional ability to synthesise, integrate and evaluate knowledge. The student's performance could be described as outstanding in relation to the learning requirements specified.

Distinction:

The student's performance, in addition to satisfying all of the basic learning requirements, demonstrates distinctive insight and ability in researching, analysing and applying relevant skills and concepts, and shows a well-developed ability to synthesise, integrate and evaluate knowledge. The student's performance could be described as distinguished in relation to the learning requirements specified.

Credit:

The student's performance, in addition to satisfying all of the basic learning requirements specified, demonstrates insight and ability in researching, analysing and applying relevant skills and concepts. The student's performance could be described as competent in relation to the learning requirements specified.

Pass:

The student's performance satisfies all of the basic learning requirements specified and provides a sound basis for proceeding to higher-level studies in the subject area. The student's performance could be described as satisfactory in relation to the learning requirements specified.

Fail:

The student's performance fails to satisfy the learning requirements specified.