**Number**  **Title** Algorithms

**Section 1 – Assessment Task Overview and Description**

# Student/ClassDetails

**Full name:** Simon Holt

**Student ID:** 102570136

**Teacher:** Anh Nguyen

**Date / Time started:** Click or tap to enter a date.

By checking the box below, you agree that penalties exist for plagiarized work and that all work submitted is your own. Please refer to the bottom of the document for more information.

I agree and confirm that all work in this assessment is mine

# Tasks

1. A variation of Insertion Sort is Shell Sort. How is it better than Insertion Implement both Insertion and Shell. Use these implementations to sort the 15,000 numbers contained in unsorted\_numbers.csv.

1. Code a linear search and a binary search. From the list that you have sorted search for the following 10 numbers using both types of search.

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| --- | --- | --- | --- | --- |
| 575154 | 182339 | 17132 | 773788 | 296934 |
| 991395 | 303270 | 45231 | 580 | 629822 |

Time/Analyse the searches and compare against the known Big O notation for the Linear and Binary searches.

1. Could Merge Sort be run as a multi-threaded application? Would there be likely to be a performance gain in doing so? Why/Why not?

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Question 1 shell sort is better than insertion sort because instead of moving everything along multiple times like in insertion it sorts smaller portions of the array at a time witch eventually allows for much smaller movements.

Question 2 after timing both search algorithms I was surprised to see that the linear search algorithm found all ten number faster than the binary search algorithm. And it was much faster almost 10 times faster. I believe this might be due to the fact that the binary search algorithm I wrote was finding all 10 numbers on the first pass through.

Th big O notation for the linear search is supposed to be O(n) because of the way that it may have to iterate through the entire list to find what it is looking for wich lines up with what was happening for me. For the binary search the expected is O(log(n)) because of the speed at which it decreases the range it is searching witch seems accurate.

Question 3 merge sort can be run in a multi thread application and due to the way that it splits the array into smaller sections it is actually recommended to use multi thread applications to get the best performance.

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| **Section 2 – Assessment Task Submission Information** | |
| **Submission Details** | **Due date:** |
| 1. The assessment task must be submitted via Canvas or directly to the teacher with an assessment cover sheet. 2. Ensure to include on the front page or in the header or footer of your assessment:    * your name    * student ID    * your teacher’s name    * the unit code/s and title/s    * the assessment task title 3. The program must be observed and checked off during the assessment time 4. Submissions received after the submission date must be approved by your teacher. |

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| --- |
| **Summary of Evidence to be Submitted** |
| • This document with the relevant parts filled in |
| • GitHub link of Source Code in Canvas Comments |
| • |
| • |
| The task will be assessed as satisfactory when all of the required evidence listed has been satisfactorily demonstrated.  \* If applicable, for graded units, the task must be satisfactorily completed before marks will be allocated. Refer to your unit outline for more information. |

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| **Section 3 – Assessment Task Criteria and Outcome** | |
| *All items/criteria must be demonstrated satisfactorily to achieve this task. The items/criteria for this activity will be assessed as S – Satisfactory or US – Unsatisfactory.* | |
| **Items/criteria** | |
| **1.** | Big O notation |
| **2.** | Analysis of search and sort algorithms |
| **3.** | Implementation of search and sort algorithms |
| **4.** |  |
| **5.** |  |
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| **Section 4 – General Assessment Information** | |
| **Decision Making Rules** | Each activity in the assessment task must be satisfactorily completed for the task to be assessed as satisfactory.  Every task must be satisfactorily completed to be assessed as competent in the unit.  *\* For graded units, competence must be demonstrated before a mark can be given.* |
| **Plagiarism** | There are serious penalties for plagiarism that may include repeating a new assessment task or being withdrawn for the unit / course.  Students must ensure that all assessments are their own work (or group work and clearly noted as such).  Please refer to www.swinburne.edu.au/corporate/registrar/plagiarism/index.html |
| **Reasonable Adjustment** | Students may request reasonable adjustment for assessment tasks.  Reasonable adjustment usually involves varying:   * the processes for conducting the assessment (eg: allowing additional time, varying the venue) * the evidence gathering techniques (eg: oral rather than written questioning, use of a scribe, modifications to equipment)   However, the evidence collected must allow the student to demonstrate all requirements of the unit.  If you have any other issue that may impact your ability to undertake the assessment, please discuss with your teacher. |
| **Re-submission**  *(where tasks are not satisfactorily completed)* | Assessment tasks that are not satisfactory can be resubmitted up until the end of the unit as scheduled on the Unit Outline. The timing on this may depend on the equipment required for this assessment task.  Resubmissions received after the scheduled unit end date may not be accepted unless approved by the teacher prior to the end date.  Note: Assessment tasks submitted for the first time after the unit end date as scheduled in the Unit Outline will not be assessed and the student should re-enrol into the unit. |
| **Special consideration** | Students may apply for Special Consideration where personal circumstances have adversely affected their task result or ability to undertake an assessment. A Special Consideration form can be completed prior to, but no later than 3 days after, the date of assessment and submitted to the relevant Manager. |
| **Work Health & Safety** | Activities may require the use of equipment or participation in group exercises. If the teacher identifies any unsafe activity or potentially dangerous situations, the teacher can stop the assessment at any time. |