# PROJECT BRIEF

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| **Student Name/ID Number:** |  |
| **Unit Number and Title:** | **Unit 19: Data Structure & Algorithms** |
| **Academic Year:** | **2023 – 2024** |
| **Unit Assessor:** |  |
| **Project Title:** |  |
| **Issue Date:** |  |
| **Submission Date:** |  |
| **Internal Verifier Name:** |  |
| **Date:** |  |

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| **Submission Format:** |
| *Format:*   * The submission is in the form of an individual written report. This should be written in a concise, formal business style using single spacing and font size 12. You are required to make use of headings, paragraphs and subsections as appropriate, and all work must be supported with research and referenced using the Harvard referencing system. Please also provide a bibliography using the Harvard referencing system.   *Submission*   * Students are compulsory to submit the project in due date and in a way requested by the Tutor. * The form of submission will be a soft copy posted on <http://cms.greenwich.edu.vn/>. * Remember to convert the word file into PDF file before the submission on CMS.   *Note:*   * The project *must* be your own work, and not copied by or from another student. * If you use ideas, quotes or data (such as diagrams) from books, journals or other sources, you must reference your sources, using the Harvard style. * Make sure that you understand and follow the guidelines to avoid plagiarism. Failure to comply this requirement will result in a failed project. |
| **Unit Learning Outcomes:** |
| **LO1** Examine abstract data types, concrete data structures and algorithms  **LO2** Implement complex data structures and algorithms. Assess the effectiveness of data structures and algorithms |
| **Project Brief and Guidance:** |
| **Project scenario**  Imagine that you are working for a software company and have joined the Online Bookstore project, which has recently implemented a new order processing system in order to enhance efficiency. The system involves the use of various data structures and algorithms like: stack, queue, sorting, and searching to manage customer orders.  When a customer places an order on the website, the order details are collected and stored in a queue data structure. Each order is represented as an object containing information like customer name, shipping address, and a list of books with their quantities. Once the availability of all books in an order is confirmed, the list of books in the order is sorted based on some criteria (e.g., book title, author name). This sorting process can be implemented using a sorting algorithm like: insertionsort, selectionsort, quicksort or mergesort, … Customers can track their orders using a search algorithm. A search function allows them to input their order number or any other relevant information, and the system quickly locates and displays the current status of their order  You will need to prepare a presentation on how to create a design specification for data structures, explaining the valid operations that can be carried out on the structures using the example of:   1. A stack ADT, a concrete data structure for a First In First out (FIFO) queue. 2. Sorting algorithms. 3. Searching algorithms.   The team needs to write a report of the implementation of the data structures like: queue, stack, sorting, searching algorithms, and how to measure the efficiency of related algorithms. The report should also evaluate the use of ADT in design and development, including the complexity, the trade-off and the benefits |

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| **Learning Outcomes and Assessment Criteria:** | | | |
| Learning Outcome | Grade: 5 - 6 pts | Grade: 7 - 8 pts | Grade: 9 - 10 pts |
| **LO1** Examine abstract data types, concrete data structures and algorithms | **Task 1.** Create a design specification for data structures explaining the valid operations that can be carried out on the structures. | **Task 3.** Demonstrate how the implementation of an ADT/algorithm solves a well-defined problem. | **Tasks 4.** Critically evaluate the complexity of the implemented ADT/algorithms |
| **LO2** Implement complex data structures and algorithms and assess the effectiveness of data structures and algorithms | **Task 2.** Implement a complex ADT and algorithm in an executable programming language to solve a well-defined problem |