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Higher National Certificate/Diploma in

Computing

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| Student Name/ID Number |  |
| **Unit Number and Title** | **19: Data Structures & Algorithms** |
| Academic Year |  |
| Unit Tutor |  |
| **Assignment Title** | **Assignment 2** |
| **Issue Date** |  |
| Submission Date |  |
| IV Name & Date |  |

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| **Submission Format** |
| The submission is in the form of document:  A formal individual written report (saved in PDF format). 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. The recommended word limit is 2,000–2,500 words, although you will not be penalised for exceeding the total word limit. |

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| **Unit Learning Outcomes** |
| **LO1** Implement complex data structures and algorithms  **LO2** Assess the effectiveness of data structures and algorithms |
| **Assignment Brief and Guidance** |
| (Continued from the Assignment 1)  For the middleware that is currently developing, one part of the provision interface is how message can be transferred and processed through layers. For transport, normally a buffer of queue messages is implemented and for processing, the systems requires a stack of messages.  The team now has to develop these kind of collections for the system. They should design ADT / algorithms for these 2 structures and implement a demo version with message is a string of maximum 250 characters. The demo should demonstrate some important operations of these structures. Even it’s a demo, errors should be handled carefully by exceptions and some tests should be executed to prove the correctness of algorithms / operations.  The team needs to write a report of the implementation of the 2 data structures 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 | | |
| Pass | Merit | Distinction |
| **LO1** Implement complex data structures and algorithms | | D3 Critically evaluate the complexity of an implemented ADT/algorithm |
| **P4** Implement a complex ADT and algorithm in an executable programming language to solve a well defined problem.  P5 Implement error handling and report test results. | M4 Demonstrate how the implementation of an ADT/algorithm solves a well-defined problem |
| LO4 Assess the effectiveness of data structures and algorithms | | D4 Evaluate three benefits of using implementation independent data structures |
| P6 Discuss how asymptotic analysis can be used to assess the effectiveness of an algorithm  P7 Determine two ways in which the efficiency of an algorithm can be measured, illustrating your answer with an example. | M5 Interpret what a trade-off is when specifying an ADT using an example to support your answer |