**ASSIGNMENT 1 BRIEF**

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| **Qualification** | **BTEC Level 5 HND Diploma in Business** | | |
| **Unit number** | Unit 19: Data Structures and Algorithms | | |
| **Assignment title** | Examine and specify ADT and DSA | | |
| **Academic Year** |  | | |
| **Unit Tutor** |  | | |
| **Issue date** |  | **Submission date** |  |
| **IV name and date** |  | | |

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| **Submission Format:** |
| *Format:* The submission is in the form of an individual written report and a presentation. 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 assignment in due date and in a way requested by the Tutors. The form of submission will be a soft copy in PDF posted on corresponding course of <http://cms.greenwich.edu.vn/>  *Note:* The Assignment *must* be your own work, and not copied by or from another student or from  books etc. 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 know how to reference properly, and that understand the guidelines on plagiarism. *If you do not, you definitely get fail* |
| **Assignment Brief and Guidance:** |
| **Scenario**: You work as in-house software developer for Softnet Development Ltd, a software body-shop providing network provisioning solutions. Your company is part of a collaborative service provisioning development project and your company has won the contract to design and develop a middleware solution that will interface at the front-end to multiple computer provisioning interfaces including SOAP, HTTP, JML and CLI, and the back-end telecom provisioning network via CLI .  Your account manager has assigned you a special role that is to inform your team about designing and implementing abstract data types. You have been asked to create a presentation for all collaborating partners on how ADTs can be utilised to improve software design, development and testing. Further, you have been asked to write an introductory report for distribution to all partners on how to specify abstract data types and algorithms in a formal notation.  **Tasks**  **Part 1**  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. Two sorting algorithms. 3. Two network shortest path algorithms.   **Part 2**  You will need to provide a formal written report that includes the following:   1. Explanation on how to specify an abstract data type using the example of software stack. 2. Explanation of the advantages of encapsulation and information hiding when using an ADT. 3. Discussion of imperative ADTs with regard to object orientation. |

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| Learning Outcomes and Assessment Criteria | | |
| Pass | Merit | Distinction |
| **LO1** Examine abstract data types, concrete data structures and algorithms | | **D1** Analyse the operation, using illustrations, of two network shortest path algorithms, providing an example of each. |
| **P1** Create a design specification for data structures; explaining the valid operations that can be carried out on the structures.  **P2** Determine the operations of a memory stack and how it is used to implement function calls in a computer. | **M1** Illustrate, with an example, a concrete data structure for a First In First out (FIFO) queue.  **M2** Compare the performance of two sorting algorithms. |
| **LO2** Specify abstract data types and algorithms in a formal notation | | **D2** Discuss the view that imperative ADTs are a basis for object orientation and, with justification, state whether you agree.vi |
| **P3** Using an imperative definition, specify the abstract data type for a software stack. | **M3** Examine the advantages of encapsulation and information hiding when using an ADT. |

P1:

1. Create a design specification for data structures
   1. What is ADT?
   2. How to implement ADT?
2. explaining the valid operations that can be carried out on the structures.
   1. What Common Operations Can Be Carried Out on the ADT
   2. Get an example about an implement ADT: Linked List. All of the set of operations And the main to show the result.

P2:

1. Determine the operations of a memory stack
   1. What is a stack? Definition, operation, exception.
   2. How to implement stack? How many ways to do this?
      1. More details about the way you choose.
2. how it is used to implement function calls in a computer.
   1. What is a function call in a computer? How does it work?
   2. How can stack work in Function Calls? ((with illustration).

M1:

1. Introduce about queue:
   1. What is a queue?
   2. Which operations on a queue
   3. Queue exceptions | Pros and Cons of Queue
   4. Applications of Queue
2. How to implement a queue?
3. Show an illustration of using a queue | Code

M2:

1. What is sorting algorithms? Classify them.
2. Briefly describe two sorting algorthim you compare, show the implementation and comparion.

D1:

1. What is the shortest path problem?
2. Analyze and illustrate two shortes path algorithms. (algorithm and illustration)

D2:

Discuss about the state: “imperative ADTs are a basis for object orientation”. Expain your opinion.