**HND Assignment Brief (RQF)**

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| **Qualification** | BTEC Level 5 HND Diploma in Computing | | |
| **Unit No. and Title** | Unit 20 - Advanced Programming | | |
| **Assignment No./ Title** | Assignment 1 - Object oriented design | | |
| **Learning Aim(s)** | LO1, LO2 | | |
| **Assessor** | Vernon Righelato | | |
| **Issue Date** | 28/02/2020 | **Submission Date** | 27/03/2020 |

**Plagiarism**

Plagiarism is a particular form of cheating. Plagiarism must be avoided at all costs and students who break the rules, however innocently, may be penalised. It is your responsibility to ensure that you understand correct referencing practices. As a university level student, you are expected to use appropriate references throughout and keep carefully detailed notes of all your sources of materials for material you have used in your work, including any material downloaded from the Internet. Please consult the relevant unit lecturer or your course tutor if you need any further advice.

**Student Declaration**

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| **Student declaration**  I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.  Student signature: Aaron Date: 24/03/20 |

**Learning Outcomes and Assessment Criteria**

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|  | Grading Criteria | Met | Grading Criteria | Met | Grading Criteria | Met |
| **LO1** | P1 |  | M1 |  | D1 |  |
| **LO2** | P2 |  | M2 |  | D2 |  |

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| **Assessor Feedback:** | | | | |
| **Grade:** | **Assessor Signature:** | | | **Date:** |
| **Resubmission Feedback:** | | | | |
| **Grade:** | **Assessor Signature:** | | **Date:** | |

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| **Submission Format** | |
| **Task 1:**  A word processed document in google doc format containing all answers to task 1.  **Task 2:**  a)  1 x Draw.io document containing a UML class diagram illustrating the code in appendix B  1 x Draw.io document containing a UML class diagram illustrating the code in appendix C  1 x Draw.io document containing a UML class diagram illustrating the code in appendix D  b)  1 x Draw.io document containing a UML class diagram illustrating a modified version of the diagram for appendix D to show a singleton. | |
| **Unit Learning Outcomes** | |
| **LO1**  Examine the key components related to the  object-oriented programming paradigm,  analysing design pattern types.  **LO2**  Design a series of UML class diagrams. | |
| **Assignment Brief and Guidance** | |
| You have recently joined a software development company in a junior position and have been assigned to help improve the documentation of their in-house software libraries following the resignation of a previous employee.  As a result of weak documentation it has been very difficult for the company to utilise their code in multiple projects and maintenance has been slow.  Your role is to alleviate this situation by starting the development of a reference guide for new employees which will examine the key components of the object oriented programming paradigm in relation to different types of design pattern and produce associated UML class diagrams to accompany already existing code. | |

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| **Task 1:**  Write a report which provides an **examination** of the key features of object oriented programming (OOP), **encapsulation**, **inheritance** and **polymorphism** based on the definitions given in [***appendix A***](https://docs.google.com/document/d/1xhhCxW_tY6bTzSKPw5NXP-ajDcN2axwrU_ySVJ3AUt4/edit?usp=sharing).  Your report should **analyse** how the OOP features relate to the implementation of the following three programming design patterns:   * Singleton pattern * Observer pattern * Model-View-Controller pattern   The report should also include information on the class relationship types (**aggregation, composition**) and how they feature in the implementation of each design pattern as well as how each design pattern listed fits into its designated type (**Creational, Structural or Behavioral**). |

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| **Task 2:**   1. Using the UML tools available at [www.draw.io](http://www.draw.io) create UML class diagrams to represent the code provided in [***appendix B***](https://docs.google.com/presentation/d/1GEPOapxDiNLqRd3OfjfLPFCKZYpPqwbU-75bp4pisOQ/edit?usp=sharing), [***appendix C***](https://docs.google.com/presentation/d/1OnAOXNNp-X427Y2dSXfXUh6FsED-YeIcHGVInqzDrFI/edit?usp=sharing) and [***appendix D***](https://docs.google.com/presentation/d/1CfNBgNZgCnUQgRHtZZTLQ2_3LiCvqAT06bVWB-Em0n8/edit?usp=sharing). 2. The code listing (and UML diagram) for [***appendix D***](https://docs.google.com/presentation/d/1CfNBgNZgCnUQgRHtZZTLQ2_3LiCvqAT06bVWB-Em0n8/edit?usp=sharing) illustrates one of the 23 ‘gang of four’ (GoF) design patterns. Create a UML diagram which modifies this to represent a singleton version of the identified pattern (e.g. if [***appendix D***](https://docs.google.com/presentation/d/1CfNBgNZgCnUQgRHtZZTLQ2_3LiCvqAT06bVWB-Em0n8/edit?usp=sharing) represents an implementation of the observer pattern you will need to create a UML diagram which represents an implementation of a singleton observer). |

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| **Learning Outcomes and Assessment Criteria** | | | |
| **Learning Outcome** | **Pass** | **Merit** | **Distinction** |
| **LO1**  **Examine the key components related to the**  **object-oriented programming paradigm,**  **analysing design pattern types.** | P1  Examine the  characteristics of the  object-oriented  paradigm as well as the  various class  relationships. | M1  Determine a  design pattern from  each of the creational,  structural and  behavioural pattern  types. | D1  Analyse the relationship  between the object-oriented  paradigm and design patterns. |
| **LO2**  **Design a series of UML class diagrams.** | P2  Design and build  class diagrams using a  UML tool. | M2  Define class  diagrams for specific  design patterns using  a UML tool. | D2  Define/refine class  diagrams derived from a given code scenario using a UML tool. |