**BTEC Assignment Brief**

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| **Qualification** | | Pearson BTEC Level 3 National Extended Diploma in Computing  Pearson BTEC Level 3 National Diploma in Computer Science |
| **Unit number and title** | | **Unit 16: Object-oriented Programming** |
| **Learning aim(s)** (For NQF only) | | **B:** Design object-oriented solutions to identified problems  **C:** Develop object-oriented solutions to identified problems |
| **Assignment title** | | Programming portfolio |
| **Assessor** | |  |
| **Issue date** | |  |
| **Hand in deadline** | |  |
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| **Vocational Scenario or Context** | | You are a junior employee at a small software development company. Your company has been invited by a local college to give a guest lecture on programming.  Your supervisor has asked you to develop a portfolio of computer programs using C#. You have been provided with a list of problems and have been asked to design and develop solutions to each. The completed portfolio will be used to demonstrate object-oriented programming concepts during the visit.  The two problems you have been asked to deal with are:  **Problem 1:** A Todo list. This can be limited in scope as regards functionality provided it implements at least   * Creation and deletion of tasks * Tracking done state and allowing tasks to be set to complete * Supporting title, description, due date, completed with description and due date being mutable (note also requirement to change completion status above) * Displaying a list of tasks * Toggling whether all tasks or only incomplete tasks are displayed   This program is primarily intended to demonstrate a GUI, alongside some or all of the other features listed below. The GUI may be implemented as a native desktop app (e.g. using WPF) or using HTML/CSS for the presentation layer (e.g Blazor) provided all the features to be demonstrated can be seen in the portfolio.  Problem 2: The college Library needs to add all its books to a new index system. This requires a solution that will automatically read book details (title, author, publisher, publication date) from a stored CSV file (no headings, records like “Python in Easy Steps, Mike McGrath, In Easy Steps Limited, July 2013", and generate unique index reference before writing it to a new CSV file. e.g., "XA00079, Python in Easy Steps, Mike McGrath, In Easy Steps Limited, July 2013". There should be a separate class responsible for allocating serial numbers through implementation of an interface to allow alternative implementations later.  This program is primarily intended to demonstrate data and file handling.  Between the two programs you must demonstrate:   1. classes and objects in use (encapsulation) 2. inheritance (of any type) 3. polymorphism (of any type) 4. method overloading/overriding (constructors count) |
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| **Task 1** | | **Design, develop and evaluate**  You are to design, develop and evaluate each problem described in the portfolio.  Produce designs for each problem in the portfolio.  You will:   * Produce a definition statement to include a summary of the problem to be solved, its complexity, any constraints, the intended users, and the required interactivity with a use case diagram (research). Keep this concise. * Produce a data dictionary detailing any data structures, control structures, data storage that will be used in your program as well as any pre-defined code and assets you will include in your solution *as needed, show judgment in what is helpful.* * Construct algorithm designs using such things as pseudo code, flowcharts, or sequence and activity diagrams to model the processing, validation and error handling of your solution *as needed, show judgment in what is helpful.* * Produce aesthetic designs for those problems requiring a graphical user interface * Develop test plans with test data to ensure functionality and usability of your solutions, your test plans will be implemented during the development stages * Review your designs others to identify areas of your designs to be refined and assist in making decisions going forward and to infer alternative design ideas   Following the design stage, you will develop the programs. You will implement the programs to provide the functionality required for each solution. You will:   * Select appropriate object-oriented principles and features to be applied in your solution * Implement the program code, ensuring that your code is commented throughout and utilises appropriate use of data types, variables, constants arithmetic and logical operators, subroutines, and file handling * Implement a graphical user interface ensuring that all user-initiated events are fully functional * run your test suites to generate error reports and areas for improvement * review your programs and obtain feedback from others to identify areas of your programs to be refined * re-code as required to optimise your programs to provide the best possible quality for each solution   You will then evaluate your final products covering how the decisions from all stages of the design and development process have ensured that each solution produced, in comparison to other viable solutions, resulted in programs that fully meet the requirements and the impact these processes had on the effectiveness of the development of the final outcomes.  You also need to show how you have taken individual responsibility and effectively managed yourself while completing this assignment. You need to show how you have:   * planned and managed your time and met targets. * reviewed and responded to outcomes including the use of feedback from others |
| **Checklist of evidence required** | | You should include:   * All your design documents such as, diagrams, pseudo-code, and illustrations. * Records of review discussions, including what was discussed and the decisions that were made * Test plans including what will be tested and the methods used * Program code * Program files (your working programs) * Test logs showing the results of your tests * Error reports showing what went wrong and how it was fixed * Optimisation logs showing what was improved * Your evaluation of the development and the completed programs * Documentation which demonstrates that you have shown individual responsibility and effective self-management |
| **Criteria covered by this task:** | | |
| Unit/Criteria reference | To achieve the criteria, you must show that you are able to: | |
| 16/BC.D2 | Evaluate the impact of methodologies used to plan, develop, and refine object-oriented program solutions | |
| 16/BC.D3 | Demonstrate individual responsibility, creativity and effective self-management in the design, development, and review of the object-oriented programs | |
| 16/B.M2 | Justify design decisions, explaining how they will meet the client's needs and be fit for purpose | |
| 16/C.M3 | Produce optimised object-oriented programs and graphical user interface solutions that meet client requirements | |
| 16/B.P3 | Produce designs for object-oriented programs to solve different problems, which provide an appropriate solution for the client | |
| 16/B.P4 | Review the plans for object-oriented programs with others to identify and inform refinements to produce a design | |
| 16/C.P5 | Produce object-oriented programs and graphical user interface solutions that meet program designs | |
| 16/C.P6 | Test object-oriented programs for functionality, usability, stability, and performance | |
| 16/C.P7 | Review the extent to which the programs meet client requirements | |
| **Sources of information to support you with this Assignment** | |  |
| **Other assessment materials attached to this Assignment Brief** | |  |