

Module Number: SWE5201

Module Name: Advanced Programming

Year/Semester: 2024-25 / Semester 2

Module Tutor/s: TBC

Assessment Number	2
Assessment Type (and weighting)	Report of 2000 words (75%)
Assessment Name	Implementation of Proposed System
Assessment Submission Date	Week 15

### Learning Outcomes Assessed

LO2: Implement algorithms and data structures using advanced programming approaches.

LO3: Apply appropriate refactoring strategies to optimise programmed solutions.

LO4: Implement appropriate testing methodologies for verification and validation.

### Use of Generative Artificial Intelligence (GAI) Applications in this Assessment

AI Status	Application	Notes
Category A	No GAI tool is permitted.	While grammar and/or spell checkers may be used to correct individual words and sentences, the use of GAI is not allowed. This is because the learning outcomes require you to produce original assessment work without any GAI assistance <u>Any GAI generated content which is presented as your own original work and is not acknowledged will be assessed for academic misconduct.</u>

### Assessment Brief

#### Instructions:

1. Written assessments should be word-processed in Arial or Calibri Light font size 12. There should be double-spacing, and each page should be numbered.
2. There should be a title page identifying the programme name, module title, assessment title, your student number, your marking tutor and the date of submission.

3. You should include a word-count (excluding reference list/bibliography, figures, tables and appendices).

Where a word limit is specified, the following penalty systems applies:

- Up to 10% over the specified word length = no penalty
- 10 – 20% over the specified indicative word length = 5 marks subtracted (but if the assessment would normally gain a pass mark, then the final mark to be no lower than the pass mark for the assessment).
- More than 20% over the indicative word length = if the assessment would normally gain a pass mark or more, then the final mark will be capped at the pass mark for the assessment.

4. All written work should be referenced using the standard University of Bolton referencing style– see: [Harvard Referencing \(bolton.ac.uk\)](http://bolton.ac.uk)
5. Unless otherwise notified by your Module Tutor, electronic copies of assignments should be saved as word documents and uploaded into Turnitin via the Canvas class area. If you experience problems in uploading your work, then you must send an electronic copy of your assessment to your Module Tutor via email BEFORE the due date/time.
6. Please note that when you submit your work to Canvas, it will automatically be checked for matches against other electronic information, as well as for hidden text characters and GAI generated text. You will be able to see similarity matches but not currently flags for hidden characters and AI-generated text. The outcomes of Turnitin reports may be used as evidence in an academic misconduct investigation (see Section 14).
7. **Please note that you will only have three attempts to check the similarity of your work. The final attempt will be saved as your final submission.**
8. **Please note that all submissions will be marked anonymously, and you are required to use a front cover sheet for your submission that only includes your college ID. You are not permitted to include your name or any details that reveals your identity. Your submission will be checked prior to marking to ensure it follows this requirement.**

#### 9. **Late work**

Late work will be subject to the following penalties:

- Up to 7 calendar days late = 10 marks subtracted but if the assignment would normally gain a pass mark, then the final mark to be no lower than the pass mark for the assignment.

- More than 7 calendar days late = This will be counted as non-submission and no marks will be recorded.

Late submission of assessments on refer and those which are graded Pass/Fail only, is not permitted unless an extension is approved. See below.

## 10. Extensions

In the case of exceptional and unforeseen circumstances, an extension of up to 14 days after the assessment deadline may be requested using the standard University Extension Request Form. For approval there would need to be an explanation and evidence of relevant circumstances.

Longer extensions for individual assessments, projects and artefacts may be granted, at the discretion of the Programme Leader.

Requests for extensions which take a submission date past the end of the module (normally week 15) must be made using the Mitigating Circumstances procedure.

Some students with registered disabilities will be eligible for revised submission deadlines. Revised submission deadlines for disability adjustments do not require the completion extension request paperwork. However, students should request these in writing in advance.

Please note that the failure of data storage systems is not considered to be a valid reason for an extension. It is therefore important that you keep multiple copies of your work on different storage devices before submitting it.

## 11. Academic Misconduct

Academic misconduct may be defined as any attempt by a student to gain an unfair advantage in any assessment. This includes plagiarism, collusion, commissioning (contract cheating and unauthorised use of GAI) amongst other offences.

In order to avoid these types of academic misconduct, you should **ensure that all your work is your own and that sources and software applications are attributed**. You can also check originality through *Turnitin*.

Please note that penalties apply if academic misconduct is proven. See the following link for further details:

<https://www.bolton.ac.uk/student-policy-zone/student-policies-2024-25/academic-misconduct-regulations-and-procedures-2024-25>

### **Specific Assessment Criteria:**

- Use a range of advanced programming techniques appropriately and correctly to produce a program which performs more efficiently and is easier to debug and maintain.
- Select and implement appropriate testing methodologies to verify program meets requirements.
- Show evidence of knowledge and understanding of relevant advanced programming techniques through practical demonstration of final product and providing a critical reflection.

### **Assessment Brief**

Having successfully designed your intended solution during the first assignment earlier in this module - you are now required to implement and test an application that makes appropriate and correct use of several advanced programming approaches such as:

Object/Relational Mappers, OOP principles, delegates and lambda, Refactoring, Design Patterns, unit testing, exception handling etc.

By making use of such approaches, you are required to use C# and Visual Studio to implement your design.

The program should store data in memory where necessary but should also make appropriate use of database storage as appropriate. Your code must be fully commented and should be free of compilation errors at the point of submission. As well as your source code (LO2), you also need to submit an implementation report which documents the following:

Marking Criteria	Marks
Any significant variations to your original design (as submitted for assignment one) and explanations for those variations.	15
An explanation of the advanced programming approaches you have used and why you feel they led to a better final program.	10
The development/evolution of your solution as you progressed by applying appropriate design pattern(s) and refactoring to your code.	10
The process of and results from testing carried out using an appropriate testing methodology (such as unit testing).	20
Demonstration of the software artefact.	25
Critical reflection of your progress and the learning you gained following the completion of this assignment.	10
Appropriate presentation of the document using suitable headings, sub-headings, page numbers, etc.	5
Evidence of in-text citations and corresponding references using "Harvard style of referencing".	5
<b>Total</b>	<b>100</b>

### **Minimum Secondary Research Source Requirements:**

It is expected that the Reference List will contain between ten and fifteen sources. As a MINIMUM the Reference List should include two refereed academic journals and four academic books.

### **Specific Assessment Criteria:**

(Please note that the General Assessment Criteria will also apply. Please refer to the table appended relevant to the assessment level)

#### **First class (70% and above):**

Students will demonstrate an excellent advanced programming skills in applying their design into a fully working system explaining how it works with clear evidence. Students will provide excellent understanding of refactoring strategies and demonstrate, with clear and relevant evidence, how they have implemented them. Students will also demonstrate a clear understanding of testing strategies and provide a clear justification for implementing their choice of strategies.

Extensive research demonstrating use of a wide range of well selected secondary research sources will be evident. Academic writing style, English and referencing will be excellent.

#### **Upper Second Class 2(1) (60-69%):**

Students will demonstrate a very good, advanced programming skills in applying their design into a fully working system explaining how it works with clear evidence. Students will provide very good understanding of refactoring strategies and demonstrate, with clear and relevant evidence, how they have implemented them. Students will also demonstrate a very good understanding of testing strategies and provide a clear justification for implementing their choice of strategies.

Extensive research demonstrating use of a wide range of well selected secondary research sources will be evident. Academic writing style, English and referencing will be excellent.

#### **Lower Second Class 2(2) (50-59%):**

Students will demonstrate a sound understanding of advanced programming skills and apply a range of such skills into a fully working system explaining how it works with clear evidence. Students will provide sound understanding of refactoring strategies and demonstrate, with clear and relevant evidence, how they have implemented them. Students will also demonstrate a sound understanding of testing strategies and provide a clear justification for implementing their choice of strategies.

Research demonstrating use of a wide range of current secondary research sources will be evident. Academic writing style, English and referencing will be excellent.

#### **Third class (40-49%):**

Students will demonstrate a satisfactory understanding of advanced programming skills and apply a range of such skills into a fully working system explaining how it works with suitable evidence. Students will provide satisfactory understanding of refactoring strategies and demonstrate, with some evidence, how they have implemented them. Students will also

demonstrate a satisfactory understanding of testing strategies and provide some justification for implementing their choice of strategies.

Research demonstrating use of a wide range of current secondary research sources will be evident. Academic writing style, English and referencing will be excellent.

**Fail (39% and below):** Students who do not meet the requirements of a third-class grade will not successfully complete the assessment activity.

#### **Minimum Secondary Research Source Requirements by level:**

**Level HE5** - It is expected that the Reference List will contain between **ten and fifteen sources**. As a **MINIMUM** the Reference List should include **two refereed academic journals and four academic books**

#### **Report formatting requirements:**

- Harvard referencing format must be used to credit secondary research sources. In-text citations. You are expected to include a minimum of 10 sources.
- should be included within your discussion (where relevant) using the author-date format and
- full reference details should be provided which must include a minimum 5-10 sources
- Diagrams should be captioned and discussed in the body of your report
- A table of contents should be included
- Page numbers should be inserted in the centre of the footer
- Your student ID number should be placed in the header of each page
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#### **Late submission**

For late submission, see Assessment Regulations for Undergraduate Programmes:  
<https://www.bolton.ac.uk/wp-content/uploads/2019/09/Assessment-Regulations-for-UndergraduateProgrammes-2019-2020.pdf>

## General Assessment Criteria for Written Assessments

### GENERAL ASSESSMENT GUIDELINES – LEVEL HE5

	<b>Relevance</b> Learning outcomes must be met for an overall pass	<b>Knowledge and Understanding</b>	<b>Analysis, Creativity and Problem-Solving</b>	<b>Self-awareness and Reflection</b>	<b>Research/Referencing</b>	<b>Written English</b>	<b>Presentation and Structure</b>
Class I (Exceptional Quality) <b>85% - 100%</b>	Work is directly relevant and expertly addresses the requirements of the brief.  <b>Learning outcomes are met.</b>	Demonstrates an exceptional breadth and depth of knowledge and understanding of theory and practice beyond the threshold expectation for the level.  Demonstrates sophisticated conceptual understanding of specialised areas.	Presents a perceptive synthesis and critical evaluation of findings' drawing on a broad range of relevant sources in order to draw clear, systematic, justified conclusions. Provides a critical insight and interprets complex matters and ideas comprehensively. Demonstrates creative flair and a high level of originality. Demonstrates exceptional problem-solving skills and initiative.	Provides insightful reflection and critical self-awareness in relation to the outcomes of own work and personal responsibility.	A wide range of contemporary and relevant reference sources selected and drawn upon.  Sources cited accurately in both the body of text and in the Reference List/Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. An exceptionally well written answer with competent spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A wide range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured. Where relevant, effective inclusion of, and reference to, figures, tables and images.
Class I (Excellent Quality) <b>70% - 84%</b>	Work is relevant and comprehensively addresses the requirements of the brief.  <b>Learning outcomes are met.</b>	Demonstrates an excellent breadth and depth of knowledge and understanding of theory and practice for this level.  Demonstrates in-depth understanding of key areas in different contexts.	Presents an excellent appraisal of findings through the critical analysis of information sources. Draws clear, systematic, justified and perceptive conclusions. Demonstrates creative flair, a high level of originality and initiative. Demonstrates a critical understanding of problem-solving approaches and applies excellent problem-solving skills.	Provides excellent reflection and self-awareness in relation to the outcomes of own work and personal responsibility.	A wide range of relevant reference sources selected and drawn upon.  Sources cited accurately in both the body of text and in the Reference List/Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. An excellently well written answer with competent, spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A wide range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured. Where relevant, effective inclusion of, and reference to, figures, tables and images.
Class II/i (Very Good Quality) <b>60% - 69%</b>	Work is relevant and addresses most of the requirements of the brief.  <b>Learning outcomes are met.</b>	Demonstrates a thorough breadth and depth of knowledge and understanding of theory and practice for this level. Demonstrates very good understanding of key areas in different contexts.	Presents a perceptive appraisal of findings through the critical analysis of information. Draws clear, justified and thoughtful conclusions. Demonstrates a very good level of creativity and originality. Demonstrates a critical understanding of problem-solving approaches and applies strong problem-solving skills.	Provides very good reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.	A range of appropriate reference sources selected and drawn upon.  Sources cited accurately in the main both the body of text and in the Reference List/Bibliography.	Writing style is clear and appropriate to the requirements of the assessment. A very well written answer with competent spelling, grammar and punctuation. For example, paragraphs are well structured and include linking and signposting. Sentences are complete and different types are used. A range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Evidence of planning and logically structured in the main. Where relevant, effective inclusion of, and reference to, figures, tables and images.

	<b>Relevance</b> Learning outcomes must be met for an overall pass	<b>Knowledge and Understanding</b>	<b>Analysis, Creativity and Problem-Solving</b>	<b>Self-awareness and Reflection</b>	<b>Research/Referencing</b>	<b>Written English</b>	<b>Presentation and Structure</b>
Class II/ii (Good Quality) 50% - 59%	Work addresses key requirements of the brief. Some irrelevant content.  <b>Learning outcomes are met.</b>	Demonstrates a sound breadth and depth of knowledge and understanding of theory and practice for this level. Demonstrates sound understanding of key areas in different contexts.	Presents a logical appraisal of findings through the critical analysis of information. Draws clear and justified conclusions. Demonstrates creativity and originality. Demonstrates a critical understanding of problem-solving approaches and applies effective problem-solving skills.	Provides valid reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.	Relevant reference sources selected and drawn upon.  Most sources accurately cited both the body of text and in the Reference List/Bibliography.	Writing style is mostly appropriate to the requirements of the assessment. Grammar, spelling and punctuation are generally competent and minor lapses do not pose difficulty for the reader. Paragraphs are structured and include some linking and signposting. Sentences are complete. A range of appropriate vocabulary is used.	The presentational style and layout are correct for the type of assignment. Logically structured in the most part. Inclusion of figures, tables and images but not all relevant or referred to.
Class III (Satisfactory Quality) 40% - 49%	Work addresses the requirements of the brief, although superficially in places. Some irrelevant content.  <b>Learning outcomes are met.</b>	Demonstrates a sufficient breadth and depth of knowledge and understanding of theory and practice for this level.  Demonstrates understanding of a range of key areas in different contexts.	Presents valid appraisal of findings in parts following a critical appraisal of information. Interprets a number of matters and ideas but with some descriptive passages evident which lack clear purpose. Demonstrates creativity and originality in places. Demonstrates a critical understanding of problem-solving approaches and applies sufficient problem-solving skills.	Provides some reflection and self-awareness in relation to the outcomes of own work and personal responsibility, as required by the assessment.	Some relevant reference sources selected and drawn upon.  Some weaknesses in referencing technique.	Writing style is occasionally not appropriate for the assessment. Grammar, spelling and punctuation are generally competent, but may pose minor difficulties for the reader. Some paragraphs may lack structure, and there is limited linking and signposting. Some appropriate vocabulary is used.	The presentational style and layout are largely correct for the type of assignment. Adequately structured. Inclusion of some figures, tables and images but not all clear, relevant and/or referred to.
Borderline Fail 35% - 39%	Work addresses some of the requirements of the brief. Irrelevant and superficial content.  <b>One or more learning outcomes have not been met.</b>	Demonstrates a lack of knowledge and understanding of theory and practice for this level. Demonstrates insufficient understanding of a range of areas in different contexts.	Presents a descriptive overview of findings following some analysis of information. Some passages lack clear purpose. Demonstrates scant creativity or originality. Demonstrates a lack of critical understanding of problem-solving approaches and insufficient problem-solving skills.	Provides limited reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.	Sources selected are limited and/or lack relevance.  Poor referencing technique employed.	Writing style is unclear and does not match the requirements of the assessment in question. Deficiencies in spelling, grammar and punctuation makes reading difficult and arguments unclear in places. Paragraphs are poorly structured.	For the type of assignment the presentational style, layout and/or structure are lacking. Inclusion of figures, tables and images but not clear, relevant and/or referred to.
Fail <34%	Work does not address the requirements of the brief. Irrelevant and superficial content.  <b>One or more learning outcomes have not been met.</b>	Demonstrates inadequate knowledge and understanding of theory and practice for this level.  Demonstrates insufficient understanding of relevant areas.	Presents a descriptive overview of findings with little consideration of the quality of information drawn upon. Demonstrates little or no creativity. Demonstrates a lack of understanding of problem-solving approaches and limited problem-solving skills.	Provides inadequate reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.	An absence of academic and relevant sources selected and drawn upon.  Poor referencing technique employed.	Writing style is unclear and does not match the requirements of the assessment in question. Deficiencies in spelling, grammar and punctuation makes reading difficult and arguments unclear. Unstructured paragraphs.	For the type of assignment the presentational style, layout and/or structure are lacking. Inclusion of figures, tables and images but not clear, relevant and/or referred to.