

UNIVERSITY OF BOLTON
BSc COMPUTING / BEng Software Engineering
COURSEWORK SUBMISSION FORM

Student/Centre to complete:

SURNAME/FAMILY NAME: FORENAMES:

BOLTON STUDENT ID: EMAIL:

DATE OF SUBMISSION:

MODULE NO./TITLE: SWE4201 Introduction to Software Development.....

TUTOR'S NAME:....Abdul Razak.....

COURSEWORK TITLE: The Friston College

Please state if this is your FIRST submission OR REFERRED/DEFERRED submission
 OR a REPEAT submission?

Declaration

I hereby declare that this work is my own work. I understand that if I am suspected of plagiarism or another form of cheating, my work be referred to Academic Registrar and/or the Board of Examiners, which may result in me being expelled from the programme. I understand once I submit this work, it will automatically belong to the University of Bolton.

Academic staff to complete:

Feedback:

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Date Issued: 20 March 2023

Hand-In Date: **12 May 2023 @ 4 pm**

Other Relevant Date e.g., Demonstration: **on or before week commencing 8 May 2023 and week commencing 15 May 2023 during the practical sessions.**

Received: On Time ☐ Late ☐ (within 5 days of published deadline date)

Mark awarded: % Do not apply mark penalty unless the work was submitted late.

Assessors Name: A. Razak

Signature:

Date:

Degree Conversions A: 70-100% B: 60-69% C: 50-59% D: 40-49% F: 0-39%

HND Conversions Pass: 40-49% Merit: 50-66% Distinction: 67-100%

Late submission:

For late submission, see Assessment Regulations for Undergraduate Programmes:

<https://www.bolton.ac.uk/assets/Assessment-Regulations-for-Undergraduate-Programmes-2022-23-V8.pdf>

	Creative Technologies
Course / Programme:	BEng (Hons) Software Engineering and BSc (Hons) Computing
Module name and code:	Introduction to software development SWE4201
Tutor:	Abdul Razak
Assignment number:	Assignment 1
Assignment title:	The Friston College
Weighting	60%of overall module grade
Issue date:	20 March 2023
Submission deadline:	12 May 2023 @ 4 pm
Demonstration:	on or before week commencing 8 May 2023 and week commencing 15 May 202 during the practical sessions.

Learning outcomes:

1. Develop algorithms to solve given problems
2. Construct logically and syntactically correct programs using appropriate programming constructs.
3. Demonstrate systematic testing of programmed solutions to identify and correct syntax, semantic and logical errors.
4. Present effective use of modelling standards to represent system structure, behaviour and interaction.

Grading

A percentage mark will be provided as feedback. Grading is as follows:

A:	70 – 100%
B:	60 – 69%
C:	50 – 59%
D:	40 – 49%

Marks below 40% will be classed as fail.

Assignment

Scenario - The Friston College

The village of Friston has had its own community college for 30 years, but it is now under threat of closure due to spending cuts. The only hope is to improve the college's efficiency, and to do this they have asked you to create a computer program to keep track of its students and courses.

Task 1 of 3 - Object Oriented Design Theory (10 marks)

After reviewing the college's business processes, you have suggested using the Object-Oriented paradigm as the basis of your programmed solution.

In no more than 1000 words, summarise the basic principles of object-oriented program design including a discussion of class hierarchies, inheritance, and programming to interfaces.

The General Assessment Guidelines for Written Assessments Level HE4 are shown on final page. Correct use of secondary research including in-text citation using the Harvard Referencing techniques and a Reference list is expected. Your written work will be checked using Turnitin for originality.

Task 2 of 3 - Develop a programmed solution for the college (80 marks)

Using your knowledge of object orientation, you have identified several entities that need to be modelled by your software, they are:

Student

The college keeps basic information about each student these include their first name, last name and phone number, also each student is given a unique identity number (this is a positive integer).

Courses

The college gives each course a unique identity number (this is a positive integer) which is used to identify the course. The college also records the course title and the course enrolment fee.

Enrolment

An enrolment is a student signing up to study on a particular course. Students can enrol on several courses, so if a student enrolls onto 3 courses, then this is considered to be three enrolments. The college records the student ID number, the course ID number and the date of enrolment.

College

This entity provides all the functionality required to maintain collections of students, courses and enrolments. The expected functionality is shown on page 5.

Some guidelines to creating the software

Step 1

You are obviously going to need some classes to model the student and the course, so you should create these first. For each class:

- identify and define the fields required, these can be found in the scenario.
- create accessor and mutator methods for each field.
- create a parameter constructor to simplify the creation of students and courses objects.
- create a method that prints the objects details on one line, this will be useful when you want to print a list of students or courses.
- Use the Violet UML editor software provided to create a class diagram which accurately describes the implementation.

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Step 2

Once you have created these classes you can then create the college class which will be used to maintain collections of students and courses.

- Define two fields of type ArrayList, one for the students and one for the courses.
- create a constructor that will create the ArrayLists.
- create methods to implement the functionalities listed in page 5 – each user requirement would be a separate method in this class.

Step 3

The final part is implementing the enrolment functionality. Here I suggest you create an enrolment class that has at least two attributes which hold student ID and course ID (or student and course object references). To implement the final part using dates I recommend that you investigate the Java library class `GregorianCalendar`.

Referencing

If you have used a piece of code that you have not written or used ideas from online forums, please ensure that you properly cite the reference from where you obtained the code. This will prevent you being accused of plagiarism. Also, please remember that we will be assessing your ability to develop and write the programme.

What you are required to do

There are four parts of this task that must be attempted.

- 1) Program implementation
 - a) You must create a program that provides some, or all of the functionality specified in the ***College system user requirements*** provided on page 5. The maximum mark available depends on how much of the functionality you can successfully produce.
- 2) Class diagram
 - a) Use the Violet UML editor software provided to create class diagram which accurately describes the implementation.
- 3) Javadoc documentation
 - a) Use the documentation tool in Eclipse to produce a set of web pages that accurately describes the program implementation.
- 4) Testing
 - a) create an additional class or classes for the purpose of testing the college functionality.
 - b) this class(es) will automatically create college, student and course objects.
 - c) this class will have methods that can be executed to test aspects of the implementation e.g., adding a student, removing a course etc.
 - d) Javadoc documentation will be provided for the class(es)

Marking

The mark awarded will be based on the level of functionality provided **and** the quality of the program and its documentation. For instance, a submission of poor quality may get a lower mark than a program with less functionality but is of higher quality.

College system user requirements (functionality / methods)

User Requirements Set A	Max mark
<ul style="list-style-type: none">1. Student records:<ul style="list-style-type: none">a. add a new studentb. for a given student ID number print the student's detailsc. print a list all students2. Course Records<ul style="list-style-type: none">a. add a new courseb. for a given course ID number print the course detailsc. print a list of all courses	39%
User Requirements Set B	
<ul style="list-style-type: none">3. Student records:<ul style="list-style-type: none">a. return a student object with a particular student ID numberb. search for and print all students where their surname contains a particular search stringc. remove a student with a particular student ID number4. Course Records<ul style="list-style-type: none">a. return a course object with a particular course ID numberb. search for and print all courses whose title contains a particular search stringc. remove a course with a particular course ID number	49%
User Requirements Set C	
<ul style="list-style-type: none">5. Enrolment records (For this set there is no need to store the date of enrolment)<ul style="list-style-type: none">a. add an enrolment for given student and course ID numbersb. remove an enrolment for given student and course ID numbersc. print a list all enrolments giving student and course details	59%
User Requirements Set D	
<ul style="list-style-type: none">6. Enrolment records (For this you will need to work with dates)<ul style="list-style-type: none">a. print a list of enrolments (giving student and course details) made between two given dates.	89%

Task 3 of 3 (10 marks)

In no more than 500 words, discuss the challenges relating to applying software development techniques in a business context.

The General Assessment Guidelines for Written Assessments Level HE4 are shown on final page. Correct use of secondary research including in-text citation using the Harvard Referencing techniques and a Reference list is expected. Your written work will be checked using Turnitin for originality

Assignment submission

Your assignment must be submitted (Moodle upload of Report) and program file (Eclipse project) by the date shown on the front page of this assignment brief.

Your submission must include:

Submission parts	Check
A short report, which include: <ul style="list-style-type: none">a) This assignment brief (in its entirety), signed by you and dated on the front page. Also, you must identify the functionality you have implemented on the feedback sheet.b) A summary of the principles of object-oriented program design employed in doing this assignmentc) A discussion of the challenges of implementing software engineering solution in a business context.d) Your UML class diagram for the college system.e) If you have implemented any additional functionality; provide an explanation of the extra features.	
Your completed Eclipse project including the javadoc documentation.	

Demonstration

- You need to demonstrate your program and explain how it works during the practical sessions on the dates shown on page 1 of this assignment brief.
- No demonstration means **zero** mark.

Referencing

All written work should be referenced using the standard University of Bolton referencing style– see:

<https://www.bolton.ac.uk/leaponline/My-Academic-Development/My-Writing-Techniques/Referencing/Level-2/Harvard-Referencing.aspx>

Minimum Secondary Research Source Requirements:

Level HE4 - It is expected that the Reference List will contain between **five and ten sources**. As a **MINIMUM** the Reference List should include **one refereed academic journal** and **three academic books**

Assignment 1 – Marking Scheme and Student Feedback

Student ID number & Name	
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FUNCTIONALITY PROVIDED					Max Mark
User Requirements Set A	1	a	b	c	39%
	2	a	b	c	
User Requirements Set B	3	a	b	c	49%
	4	a	b	c	
User Requirements Set C	5	a	b	c	59%
User Requirements Set D	6	a			89%

Circle the letters showing what functionality you have implemented.

PROGRAMMING CODE	BS	WA	A	G
Appropriate user defined classes provided				
Classes have appropriate fields				
Classes have appropriate constructors				
Classes have appropriate accessor & mutator methods				
Classes have other methods as required				
Java naming convention used for classes, fields and methods				
Java naming convention used for parameters and variables				
Use of descriptive variable names				
Appropriate validation and error messages				
Overall structure and logic of code				
Overall quality of code				

JAVADOC DOCUMENTATION	BS	WA	A	G
All classes documented				
All public fields and methods documented				
All parameters and return values documented				
Documentation clearly states the purpose of the class/method				
Documentation clearly explains how to use the methods				

CLASS DIAGRAM	BS	WA	A	G
All classes included				
All public fields and methods included				
All private fields and methods included				
Correct relationships between classes				

BS – Below acceptable standard : WA – Weak but acceptable : A – Acceptable : G – Good

Specific Assessment Criteria:

(Please note that the General Assessment Guidelines – level HE4 will also apply – see below).

First class (70-100%):

- Students will provide an excellent summary of the basic principles of object-oriented programming paradigm including, but not limited to, a discussion of class hierarchies, inheritance, and programming to an interface.
- User requirements Set A, B, C and D will be implemented to an excellent standard.
- Additional classes will be created for testing all the functionalities of the application.
- Excellent documentation of the application using javadocs to produce a set of web pages that accurately describes the program implementation.

Second class (50-69%):

- Students will provide a comprehensive summary of the basic principles of object-oriented programming paradigm including a discussion of class hierarchies, inheritance and programming to an interface.
- User requirements Set A, B, C and part of set D will be implemented to a very good standard.
- Additional classes will be created for testing all the functionalities of the application.
- Comprehensive documentation of the application using javadocs to produce a set of web pages that accurately describes the program implementation.

Third class (40-49%):

- Students will provide a satisfactory summary of the basic principles of object-oriented programming paradigm including a discussion of class hierarchies, inheritance and programming to an interface.
- User requirements Set A, B, and part of C will be implemented to a good standard.
- Additional classes will be created for testing the functionalities of the application.
- Satisfactory documentation of the application using javadocs to produce a set of web pages that accurately describes the program implementation.

Fail (39% and below)

Students who do not meet the requirements of a third-class grade will not successfully complete the assessment activity.

GENERAL ASSESSMENT GUIDELINES – LEVEL HE4

	Relevance Learning outcomes must be met for an overall pass	Knowledge and Understanding	Analysis, Creativity and Problem-Solving	Self-awareness and Reflection	Research/ Referencing	Written English	Presentation and Structure
Class I (Exceptional Quality) 85% - 100%	Work is directly relevant and expertly addresses the requirements of the brief. Learning outcomes are met.	Demonstrates breadth of knowledge and understanding of theory and practice beyond the threshold expectation for the level. Demonstrates excellent understanding of key concepts in different contexts.	Presents an excellent and cohesive appraisal of findings through the critical analysis of information. Draws clear, justified and thoughtful conclusions. Demonstrates creative flair, originality and initiative. Demonstrates a critical understanding of problem-solving approaches and applies strong problem-solving skills.	Provides insightful reflection and 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, there is effective placement of, and reference to, figures, tables and images.
Class I (Excellent Quality) 70% - 84%	Work is relevant and comprehensively addresses the requirements of the brief. Learning outcomes are met.	Demonstrates an excellent breadth of knowledge and understanding of theory and practice for this level. Demonstrates in-depth understanding of key concepts.	Presents an excellent and cohesive discussion of findings through the interpretation and evaluation of information sources. Draws clear, justified and thoughtful conclusions. Demonstrates clearly creativity and initiative. Applies excellent problem-solving skills.	Provides excellent reflection and self-awareness in relation to the outcomes of own work and personal responsibility.	A 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 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, there is effective placement of and reference to, figures, tables and images.
Class II/i (Very Good Quality) 60% - 69%	Work is relevant and addresses most of the requirements of the brief well. Learning outcomes are met.	Demonstrates a thorough breadth of knowledge and understanding of theory and practice for this level. Demonstrates very good understanding of key concepts.	Presents a perceptive and cohesive discussion of findings through the interpretation and evaluation of information sources. Draws clear and justified conclusions. Demonstrates creativity and initiative. Applies strong problem-solving skills.	Provides justified 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 in the 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, there is effective placement of figures, tables and images.
	Relevance Learning outcomes must be met for an overall pass	Knowledge and Understanding	Analysis, Creativity and Problem-Solving	Self-awareness and Reflection	Research/ Referencing	Written English	Presentation and Structure

Class II/ii (Good Quality) 50% - 59%	Work addresses key requirements of the brief. Some irrelevant content. Learning outcomes are met.	Demonstrates a sound breadth of knowledge and understanding of theory and practice for this level. Demonstrates sound understanding of key concepts.	Presents a logical discussion of findings through the interpretation and evaluation of information sources. Draws clear and justified conclusions. Demonstrates some creativity and initiative. Applies sound 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. Some sources accurately cited in 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 largely correct for the type of assignment. Logically structured in the most part. Where relevant, effective placement of some figures, tables and images.
Class III (Satisfactory Quality) 40% - 49%	Work addresses the requirements of the brief, although superficially in places. Some irrelevant content. Learning outcomes are met.	Demonstrates a sufficient breadth of knowledge and understanding of theory and practice for this level. Demonstrates a sufficient understanding of key concepts.	Presents a valid discussion of findings through the interpretation and evaluation of information sources. Draws justified conclusions. Demonstrates creativity and initiative in places. 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 always relevant and/or clear.
Borderline Fail 35% - 39%	Work addresses only some of the requirements of the brief. Irrelevant and superficial content. One or more learning outcomes have not been met.	Demonstrates limited knowledge and understanding of theory and practice for this level. Demonstrates a lack of understanding of key concepts.	Presents a limited discussion of findings through the interpretation of information sources. Draws some irrelevant conclusions. Creativity and initiative are lacking. Problem-solving skills are lacking.	Provides limited reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.	Sources selected are limited and 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. Figures, tables and images included when required but these lack clarity and relevance.
Fail <34%	Work does not address the requirements of the brief. Irrelevant and superficial content. One or more learning outcomes have not been met.	Demonstrates inadequate knowledge and understanding of theory and practice for this level. Demonstrates insufficient understanding of key concepts.	Presents a limited discussion of findings with little consideration of the quality of information drawn upon. Draws irrelevant conclusions. Creativity, initiative and problem-solving skills are absent.	Provides inadequate reflection and self-awareness in relation to the outcomes of own work and personal responsibility, when required.	There is an absence of relevant sources. 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. Figures, tables and images are absent when required or lack relevance/clarity.

