National College of Ireland

Higher Diploma in Science in Computing - Year 1
(HDWD_SEPB , HDCSDEV_INT, HDSDEV_JAN22O_Y1,
HDAIML_SEPBL, HDBC_SEPBL, HDSDEV_SEPL)

Object Oriented Software Engineering

Project
100%

Semester 1, 2022/23

Introduction

This project is designed to evaluate all the learning outcomes of the Object Oriented Software Engineering module as outlined below:

1. Demonstrate the conceptual, practical and technical skills of planning and monitoring a project plan using an appropriate CASE tool
2. Describe in detail the theory, concepts and methods pertaining to Software Engineering such as Agile and UML.
3. Create requirements using use case modelling concepts.
4. Demonstrate conceptual and technical skills in the analysis, design, implementation and test of a software development solution individually or as part of a team.
5. Employ tools and techniques for Software Engineering.

Objectives

In teams of 2 or 3, your task is to design an application to address the requirements of a specific business domain. You should select the business domain from the table below based on the last digit of the student number of the member of the team that has the first letter of their surname nearest to the start of the alphabet.

Last digit of student number	**Problem domain**
0 or 5	A health food store
1 or 6	A veterinary practice
2 or 7	A credit union
3 or 8	A solictor's office
4 or 9	A creche

Alternatively, you may choose a business domain familiar to one or more members of your team, provided that you discuss this with your lecturer and obtain their prior approval before starting work on the project.

The project is divided into two parts:

- Part A is worth 42.5% of the total mark and focusses on the analysis and design of the system.
- Part B is worth 57.5% of the total mark and concentrates on the strategy to be used for implementing the system.

Part A 42.5 marks

In this first part of the assessment you are expected to project plan a project and apply UML diagrams to the resolution of the problem area identified above.

You should produce a report detailing your design. The report should fulfil the following requirements:

1. Identify and describe the actors and construct a use case model. (7.5 marks)
2. Each team member should select one distinct use case from the use case model and describe it in detail. The use case must contain an alternate flow or exceptional flow.. (5 marks)
3. Create a glossary in which all project-related terminology that requires clarification is both listed and fully defined. (2.5 marks)
4. Create a conceptual class diagram modelling the architecture of the proposed system. The conceptual class diagram should demonstrate the use of **three or more** of the following: attributes, relationships, navigability, association, multiplicity and composition. (7.5 marks)
5. Draw a system sequence diagram from the conceptual class diagram. (7.5 marks)

6. Each team member should select one of the system operations and should develop a contract for it. (7.5 marks)
7. Using appropriate design patterns, each team member should create a communication diagram based on the contract developed in task 6. (5 marks)

Part B 57.5 marks

In this part of the assessment you are expected to apply agile methods such as TDD and SCRUM to the resolution of the selected problem domain.

1. Discuss how risk, quality and communication will be managed in your project. Provide justifications for your choices. (5 marks)
2. Describe and justify the development methodology you will follow. (2.5 marks)
3. Using an appropriate object oriented language (e.g. Java), fully develop the classes required to implement one of the use cases described in part 1 of the assessment. (15 marks)
4. Fully test the classes developed above, naming and justifying the test methodology followed. Describe the tests carried out, detailing how they will ensure that the classes are free from errors and detail the results of the tests. (17.5 marks)
5. Provide detailed artefacts of the agile methodology followed, such as user stories, backlogs and burndown charts (17.5 marks)

Academic Integrity

Your submission must be entirely your own work. Any written work created by others must be **properly cited** and should be **paraphrased** or **summarised** where possible, otherwise it should be included in quotes. Figures not created by you should include an acknowledgement detailing the name(s) of the creator(s). Code found on the internet should not be claimed as your own, but instead a comment should be included in the source code indicating where you obtained it.

Students are strongly advised to familiarise themselves with the Guide to Academic Integrity produced by the NCI Library [1].

Note: All submissions will be electronically screened for evidence of academic misconduct, e.g. plagiarism, collusion and misrepresentation. Any submission showing evidence of such misconduct will be referred to the college's academic misconduct committee for disciplinary action.

[1] https://libguides.ncirl.ie/academicintegrity

Software Tools

Visual Paradigm is recommended for the production of UML diagrams and Agile artefacts. NCI has a license for the professional version of Visual Paradigm. Ask your lecturer for details.

For the development and testing of classes, NetBeans is the recommended tool.

Submission

Note: Each part has tasks that are either carried out as a team or as individual members of the team. Answers for Individual tasks should all be included in the same report, with the team member who wrote the answer clearly identified.

For example, for task 6 in Part A, you should have a section as follows:

> **System Contracts**
> **Team Member A**
> Answer from team member A...
>
> **Team Member B**
> Answer from team member B...

Part A of the report should be uploaded as a **single PDF document** to the TurnItIn link on Moodle by 23:59 on **Friday November 11th, 2022** at the very latest. There will also be a link for submitting supporting files, such as those created in Visual Paradigm. Submission of these files is optional but recommended.

Part B of the report should be uploaded as a **single PDF document** to the TurnItIn link on Moodle by 23:59 on **Friday December 16th, 2022**. You will also be **required** to upload your code artefact. This should be a zip file containing the classes developed and the suite of tests carried out. As before, there will also be a link for uploading supporting files, such as the Agile artefacts produced in Visual Paradigm.

Late submissions will **not be accepted** unless an extension has been officially approved.