Title: e-Portfolio Submission – https://helenhelene.github.io/eportfolio/

Final Reflection

Introduction

Reflecting on my journey through the Object-Oriented Programming (OOP) module of my MSc in Computer Science, I feel both challenged and enriched. This module has deepened my technical skills and significantly impacted my professional and personal development.

Project Outcomes and Key Learnings

Throughout this module, I have learned a lot about the key features of OOP, such as abstraction, encapsulation, inheritance, and polymorphism. These concepts were difficult at first, but through continuous practice, they have become a part of my programming approach.

The assignments focused on designing and implementing software for a driverless car. This real-world application of OOP principles was both exciting and intimidating. For Assignment 1 (https://helenhelene.github.io/eportfolio/module/OOP_Assignment1.html), I researched driverless cars and their main features, prepared UML models, and designed a comprehensive software proposal. This process required extensive research, enhancing my skills in UML diagram preparation and system design.

Assignment 2 (https://helenhelene.github.io/eportfolio/module/OOP_Assignment2.html) was even more challenging, requiring the actual implementation of the driverless car system using Python. Despite being a beginner, I leveraged the research from Assignment 1 and the knowledge gained from Codio exercises and lab sessions to develop software supporting driverless cars. This hands-on experience was invaluable, reinforcing my learning and boosting my confidence in tackling complex programming tasks.

For the collaborative discussion, it was an interesting experience for me as I rarely discuss topics in a forum. We had to conduct research before making an initial post, review other posts and comments, and then make a summary post. This process not only accumulated knowledge on professional topics but also trained my reflection and critical thinking skills.

For the e-portfolio submission (Figure 1), I am unsure if it just needs to save all artifacts in a folder on GitHub or if it needs a website hosted by GitHub. However, I prefer to host it as a website for a better view. This would also allow me to record my entire MSc computer science journey and use it as a reference in the future. You may also find an About Me section (Figure 2) on the website hosted by GitHub. I separate each unit with individual learning outcomes and reflections (Figure 3). I also provide a quick access option for the list of artifacts (Figure 4), which collectively document the learning journey and practical application of concepts throughout the OOP module.

Figure 1: e-Portfolio Submission

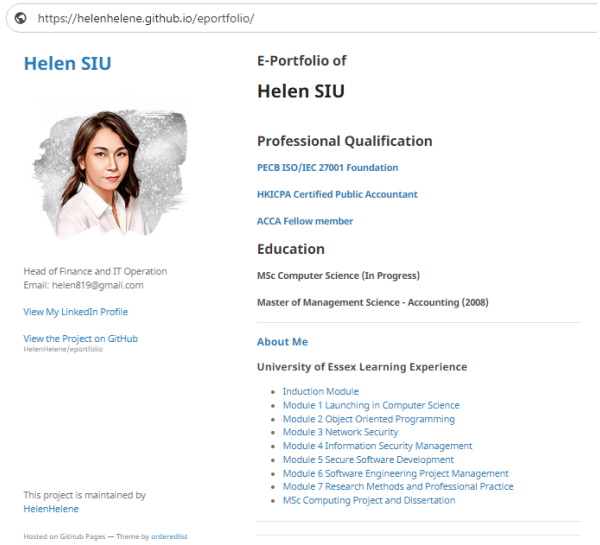


Figure 2: About Me

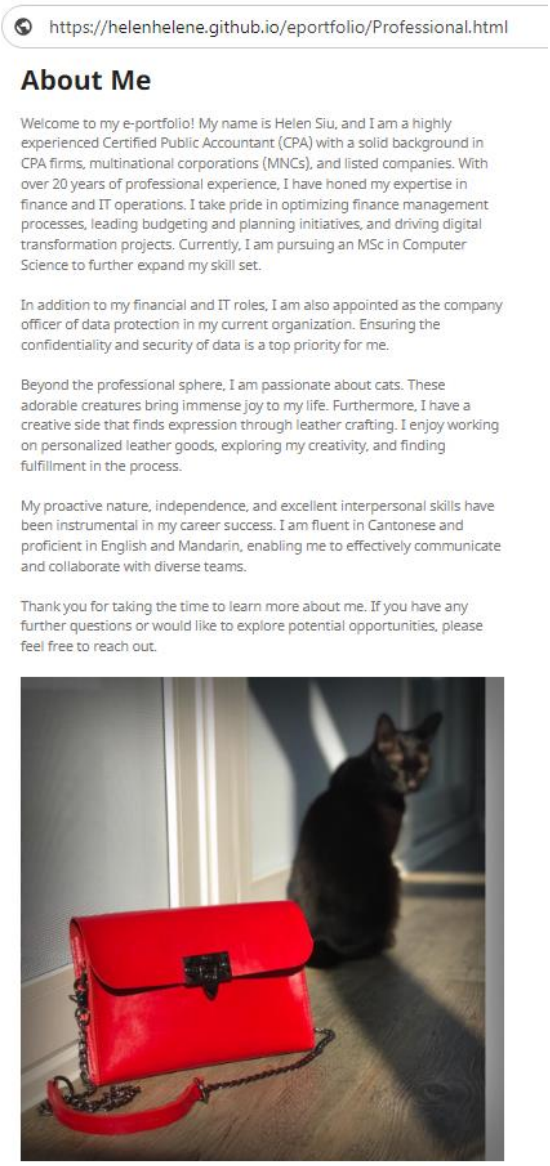


Figure 3: List of OOP Units

https://helenhelene.github.io/eportfolio/module/OOP.html

Module 2 Object Oriented Programming

This module focuses on utilizing the Python programming language for designing and developing object-oriented programs. It emphasizes the use of the Unified Modeling Language (UML) to support the object-oriented analysis and design process, with a particular focus on the four key features of Object-Oriented Programs (OOP): abstraction, encapsulation, inheritance, and polymorphism.

Two of the assignments in this module involves designing and implementing software to support the operation of a driverless car. The objectives of these assignments include preparing UML models for the object-oriented design process, applying data structures for efficient data storage, and implementing data search algorithms for optimal data processing.

Assignment 1: System Design ***(🎓Pass with Distinction)***

A Design Proposal of Software to Support Operation of a Driverless Car

Assignment 2: System Implementation ***(In Progress)***

Driverless Car System - README

Driverless Car System - Python Scripts

Furthermore, there are formative activities and e-portfolio tasks that require gathering all the evidence related to my work in this module, including an Individual Reflective Piece that reflects on my personal development throughout the module.

Assignment 3: e-Portfolio Submission ***(In Progress)***

Final Reflection

The units presented below serve as a compilation of evidence, showcasing the work accomplished in this module and documenting the learning journey.

Unit 1: An Introduction to Python Programming and the OO Programming Paradigm

Unit 2: Object Oriented Analysis - Initial Steps towards Programming in Python

Unit 3: UML

Unit 4: Applying a UML Model to a Program Implementation: UML in Practice

Unit 5: More on Classes

Unit 6: Abstract Methods and Interfaces

Unit 7: Debugging / Error Handling, Data Structures and Data Search

Unit 8: Data Structures and Data Search in Practice

Unit 9: Packaging and Testing

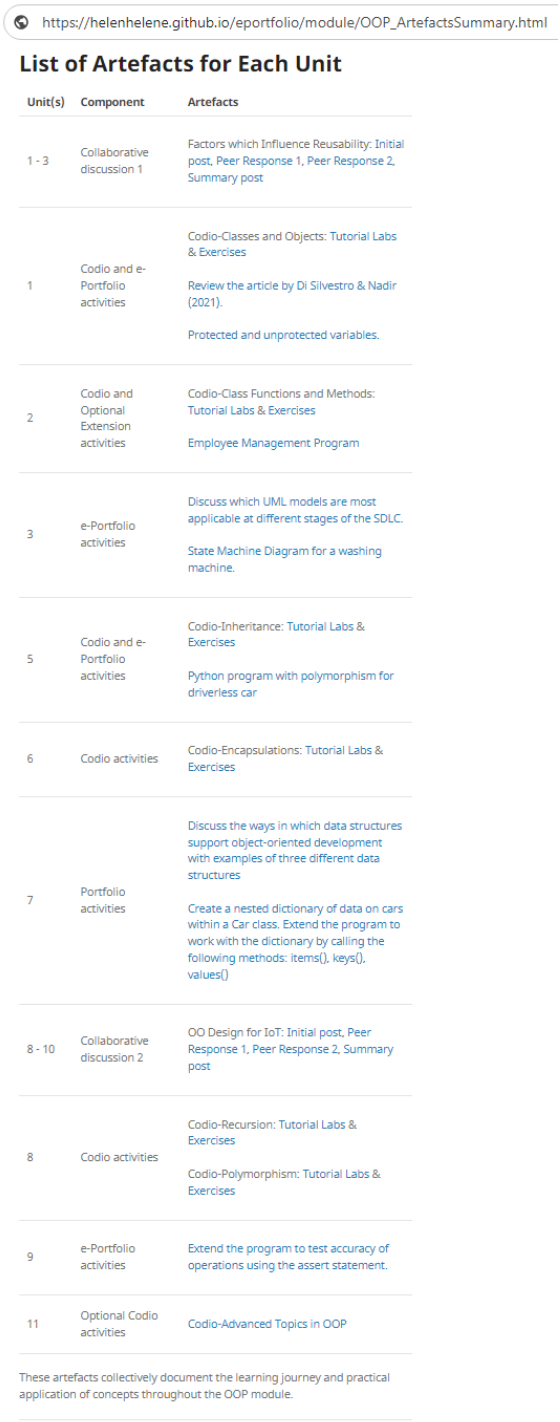
Unit 10: Testing Code in Practice

Unit 11: Pointers, References & Memory, and Design Patterns

Unit 12: Working with Design Patterns to Structure Code

You may also refer to the List of Artefacts for quick access to all artefacts.

Figure 4 : List of artifacts



https://helenhelene.github.io/eportfolio/module/OOP_ArtefactsSummary.html

List of Artefacts for Each Unit

Unit(s)	Component	Artefacts
1 - 3	Collaborative discussion 1	Factors which Influence Reusability: Initial post, Peer Response 1, Peer Response 2, Summary post
1	Codio and e-Portfolio activities	Codio-Classes and Objects: Tutorial Labs & Exercises Review the article by Di Silvestro & Nadir (2021). Protected and unprotected variables.
2	Codio and Optional Extension activities	Codio-Class Functions and Methods: Tutorial Labs & Exercises Employee Management Program
3	e-Portfolio activities	Discuss which UML models are most applicable at different stages of the SDLC. State Machine Diagram for a washing machine.
5	Codio and e-Portfolio activities	Codio-Inheritance: Tutorial Labs & Exercises Python program with polymorphism for driverless car
6	Codio activities	Codio-Encapsulations: Tutorial Labs & Exercises
7	Portfolio activities	Discuss the ways in which data structures support object-oriented development with examples of three different data structures Create a nested dictionary of data on cars within a Car class. Extend the program to work with the dictionary by calling the following methods: items(), keys(), values()
8 - 10	Collaborative discussion 2	OO Design for IoT: Initial post, Peer Response 1, Peer Response 2, Summary post
8	Codio activities	Codio-Recursion: Tutorial Labs & Exercises Codio-Polymorphism: Tutorial Labs & Exercises
9	e-Portfolio activities	Extend the program to test accuracy of operations using the assert statement.
11	Optional Codio activities	Codio-Advanced Topics in OOP

These artefacts collectively document the learning journey and practical application of concepts throughout the OOP module.

Return to Module 2

Analysis and Impact

The workload of this module was substantial, especially for a part-time student. The constant pressure and the need to master new and complex OOP concepts often felt overwhelming. However, this pressure also drove me to manage my time effectively and seek help when necessary. The successful completion of assignments, especially seeing a program run without bugs and publishing a real website on GitHub, was very satisfying and showed the tangible outcomes of my hard work.

Reflecting on my emotions, I realized that the initial stress gradually transformed into a deep sense of accomplishment as I progressed through the module. Engaging with peers and reviewing literature provided a broader perspective on my work and behavior, further enriching my learning experience. This module has significantly impacted my professional development, with the skills and knowledge gained being directly applicable to my career. Personally, the experience has taught me resilience and the importance of continuous learning. The high workload and challenging content have prepared me to handle similar pressures in future professional settings.

In Unit 1, we reviewed the article by Di Silvestro & Nadir (2021) on e-portfolios (https://helenhelene.github.io/eportfolio/module/OOP_Unit01_Discuss.html). Initially, I viewed the requirement to maintain an e-portfolio as an unnecessary task. However, I have come to appreciate its value in promoting reflective and deeper learning. This realization has changed my approach to the e-portfolio, seeing it as a tool for documenting and reflecting on my learning journey, which will be invaluable for my future career.

Professional Skills Matrix and Development Plan

The knowledge and skills developed during this module, such as creating UML diagrams, implementing OOP principles in Python, and using GitHub for version control and collaboration, are invaluable. Specifically, the UML practice is directly transferable to real-world projects in my current management role. The knowledge of UML I gained from this module makes it easier to communicate between top management and information technology teams, particularly in projects that require designing and implementing complex systems.

Please refer to the Professional Skills Matrix for the OOP Module below.

Skill	**Description**	**Level Before Module**	**Level After Module**	**Evidence**
Time Management	Managing time to meet deadlines and balance workload between current career and staggering modules.	Intermediate	Advanced	Completed assignments on time despite high workload.

Critical Thinking and Analysis	Evaluating information to make well-informed decisions and solve problems.	Intermediate	Advanced	Applied critical thinking in project evaluations and literature reviews.
Problem-Solving	Developing and implementing effective strategies to resolve issues.	Intermediate	Advanced	Implemented a driverless car system using OOP principles.
Communication and Literacy skills	Collaborative discussion and idea presentation.	Basic	Intermediate	Participated in discussions, created project proposals with UML diagram, and maintained an e-portfolio.
IT and Digital	OOP, Python Programming, UML diagram, and GitHub	Basic	Intermediate	Completed assignments, prepared detailed UML models, implemented driverless car

				software with OOP principles, and published a website on GitHub.
Critical Reflection	Reflecting on experiences to identify strengths, weaknesses, and areas for improvement.	Basic	Intermediate	Maintained an e-portfolio with reflections and learning outcomes for each unit.

The challenges faced in this module have shown me the importance of continuous learning and adaptation. I intend to keep building on the foundations laid during this course by engaging with advanced topics in OOP and exploring other programming languages. Additionally, I will continue to refine my skills in using development tools and platforms like Codio, Jupyter Notebook, and Draw.io. I also plan to explore advanced topics in Python, such as game development with Pygame (Pygame, 2024), to broaden my programming capabilities and apply them to more diverse projects.

Conclusion

In summary, the OOP module has been a transformative experience. It has equipped me with essential technical skills, fostered a deeper understanding of reflective practice, and

significantly impacted my professional and personal development. As I move forward, I am committed to applying the knowledge and skills gained to real-world projects, continuing my learning journey, and contributing to software development practices.

Reflecting on this journey has been enlightening, helping me to consolidate my learnings and prepare for future challenges. The experiences and insights gained will undoubtedly serve as a strong foundation for my ongoing growth and success in the field of computer science.

References

Di Silvestro, F. & Nadir, H. (2021) The Power of ePortfolio Development to Foster Reflective and Deeper Learning in an Online Graduate Adult Education Program. *Adult Learning* 32(4):154-164.

Pygame. (2024) Pygame Front Page. Available from: https://www.pygame.org/docs/ [Accessed 28 May 2024]

University of Essex Online. (2024) *University of Essex Online Writing Guide Series – A short guide to Reflective Writing.* Essex: University of Essex Online.