Faculty of Science, Engineering and Technology

Object Oriented Programming

Topic 6: Elements of Good Design

Resources

The following resources can help you with this topic:

- Case Study Requirements Document
- Case Study Implementation Plan

Topic Tasks

Before starting to work on the tasks, first read through this entire document to get a sense of the direction in which you are heading. Complete the following tasks and submit your work to the Canvas before the deadline.

Supplementary Exercise - Case Study: Iterations 1 and 2

Distinction Task 1 - Custom Program Proposal and UML Class Diagram

After you have **discussed** your work with your tutor and **corrected any issues**, it will be signed off as complete.

Supplementary Exercise - Case Study: Iterations 1 and 2

Over the remainder of the semester you will implement a larger object oriented program that demonstrates the elements of good object oriented designed and uses of all of the concepts covered so far. This will help you to develop a deeper understanding, and create additional pieces of work to communicate this understanding.

1.Read the Case Study Requirements document. It outlines what you need to create.

> **Note**: As with any requirements document, you **should** have questions. It is important to understand what the user wants you to create before you start to design and implement a program — it is easy to build the wrong program.

2. Review the stages in the **Case Study Implementation Plan** document.

> **Note**: This is a **design** document, things may be missing or not fully thought through. You are likely to have questions or encounter issues. Discuss the issues with the tutor.

3. For this week aim to complete Iteration 1 and Iteration 2.

> **Note**: At this point there will not be a "program" as such, just a set of unit tests that help demonstrate that your solution is moving toward completion.

Once your tests are working correctly create your own cover page for this piece, you will add to this over the next few weeks. Remember to relate what you are doing to the unit's learning outcomes.

Distinction Task 1 - Custom Program UML Class Diagram

You have now completed tasks that demonstrate the four main principles of object oriented programming, and you are ready to work toward demonstrating these in your own program. If you are aiming for a Distinction or higher grade you should start working on this program now. Aim to create something of around the complexity of the Battleships program. Specifically it should:

1. Demonstrate sound use of the principles of object oriented programming - encapsulation, abstraction, inheritance, and polymorphism
2. Demonstrate the different forms of collaboration between classes
3. Demonstrate the use of collection classes
4. Demonstrate appropriate use of coding conventions (case, indentation, etc.)
5. Include extensive and thoughtful internal documentation

Here are some steps to get you started:

1. Think about what you want the program to do; write a paragraph or two that describes it to others. Drawing a picture of what you want it to look like is also a great idea.
2. Think about the roles and responsibilities of the objects required for your model.

> **Tip**: Focus on the program model (the cake) and don't start working on the icing (e.g. detailed layout of the graphical user interface, game sprite designs, or a comprehensive variety of program features). Start with a small program with a sound design that demonstrates the four principles before writing code.

3. Draw some high-level UML class diagrams by hand - don't worry about every last attribute or method - then scan or take a picture and send to your tutor for feedback. Don't fiddle with the software for UML class diagrams until you are fairly clear about your design. The whole diagram need not fit on one page; e.g. you might have different class diagrams to describe different levels in the inheritance hierarchy.
4. Submit early! The design need not be perfect before you send it to your tutor.

Distinction Task 1 - Assessment Criteria

Include the following in your submission:

- Cover sheet with high-level description of your Distinction project (a couple of paragraphs).
- High-level UML class diagram of the relationships between objects (a single image).