B23 - C++ Programming Methods

Sample Exam Paper

[Note that as B23 is a new course there are no past exam papers. This sample aims to give an idea of what to expect.]

Answer Three Questions

1. You have been asked to design a GUI based application for managing email. It should support normal email usage (reading, sending, etc.) and allow messages to be organised into named folders.

a) Using a design patterns, describe how email messages and folders will be stored and accessed.

[15 marks]

b) Show how the GUI is integrated into the application. What patterns are used?

[10 marks]

c) How does the use of design patterns affect the design process?

[8 marks]

[Total 33 marks]

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2. Using the Envelope/Letter idiom, consider the design of a C++ class to represent a collection of items.

a) What are the properties of the Envelope/Letter idiom and when should it be used in preference to other implementation approaches?

[10 marks]

b) Outline the implementation of a class Collection, using the Envelope/Letter idiom, taking care that copying and assignment are properly addressed. Include the class definition and outline implementation of key member functions. Also define two letter classes using different storage mechanisms, to be used with the Envelope class.

[23 marks]

[Total 33 marks]

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3. a) What is a robust program? Describe the set of issues that should be addressed when designing such programs.

[15 marks]

b) How does good design interact with the ideas of habitability and piecemeal growth? Should the design process be controlled or allowed to vary unpredictably?

[18 marks]

[Total 33 marks]

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4. a) What are the main categories and sub-categories of classes in the STL library?

[10 marks]

b) What are the design decisions that allow STL components to be combined in different ways? How do they relate to abstraction and encapsulation?

[13 marks]

c) Why does STL not use inheritance for most of its key features?

[10 marks]

[Total 33 marks]

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5. Design a framework of abstract classes for creating WWW based applications. The framework should provide a GUI interface, support communication protocols and offer useful components for application construction (e.g., dialog boxes, editing windows, etc.).
Using the framework it should be possible to generate applications by subclassing abstract classes to provide concrete behaviour.
Clearly show where design patterns are used and what they contribute to the design.

[33 marks]

END OF PAPER