Comments Please see the attached report.

Examination Performance Feedback to COMP62542, AY 2015 – 2016 (LZ)

Answer ALL of section A and ALL of section B.
Section A: Marks out of 20 (total 20)
Section B: Marks out of 20 (total 20)

Section A
Answer All Questions

a) What is a software design pattern? Name *three types of design pattern* and briefly explain the purpose of each type.

The answers to the first part of the question were good overall, but the answers to the second part of the question were not so good, with more than half of the answers were wrong. The correct answer should be: Creational patterns, structural patterns and behaviour patterns.

b) What are domain objects? Briefly explain *any three types of things* that you have learned from this course that can be candidates for domain objects, illustrating each type with an example.

The answers were good overall.

c) If you encounter two domain objects "**Cashier**" and "**Basket**" in your software analysis, what will make you decide if you *should* or *should not* include these objects in your design?

The answers were more varied, with some of them clearly misunderstanding the question. The correct answer should involve an analysis of the type of software to be developed. Basket should be included in the design if the software is an online store; it should not be included if the software is used in store, e.g., at the checkout point. Cashier should be included in the design if its data need to be kept in the software; otherwise it should not be included.

d) State two different situations in which *design patterns can serve as a tool for communication*. Use an example to illustrate each situation and name the actors involved in the communication.

The answers were varied. Two different situations should communication between experienced developers and communication between experienced developers and inexperienced ones. The answers to the first situation were good overall.

Section B
Answer ALL Questions

You are developing a Computer Assisted Design (CAD) system for Steelworks Ltd, a civil engineering company, which specialises in large steel-framed buildings. The CAD system is for the management of the products made by the company. The main products are frames, which are

constructed from steel bars by using a combination of nuts and bolts and welding. Larger frames are constructed from smaller frames and so on to complete the framework for a building. The company also makes other large structures (e.g. air conditioners, lifts), which are likewise constructed from smaller ones. Answer the following questions:

a) Draw a UML class diagram which shows how the **Composite** design pattern could be applied to model structures as described above. The diagram should indicate how the weight of a structure would be calculated.

Most answers were wrong. Common mistakes are: 1) wrong Composite design pattern structure, 2) missing atomic structure, 3) missing classes, and 4) wrong UML notation.

b) The company has a large numbers of small items, such as bolts. Briefly explain what a **factory** is and describe two advantages of using one in this situation.

The answers were good overall, but some answers failed to state that the factory is a Pure Fabrication whole sole responsibility is to create objects.

c) Your system should be able to keep track of every single bolt it possesses. A bolt can be in a number of states, e.g. in storage (at some place), used or damaged. You should design your system in a way that minimises the amount of storage required to represent bolts. Answer the following questions:

i) You could use the **State** pattern to represent the states of bolts, but briefly explain why this may not be necessary, and what you could do instead without using a pattern.

The answers were good overall.

ii) Or you could use the **Flyweight** pattern. Explain how Flyweight could be applied to this particular situation, in a way that minimises the amount of storage required to represent bolts.

The answers were good overall.

iii) Briefly explain the principle behind the **Flyweight** pattern.

The answers were good overall.

d) The company regularly orders shipments of structures from suppliers, where a shipment may involve several different container loads. A shipment can be in several different states, e.g. ordered, partially delivered (some containers have arrived but not others). Explain how the **Observer** pattern can be used to help in the tracking of shipments.

The answers were good overall.