The fact that majority of students chose not to attend lectures was very evident in answers given in the examination.

Question 1

a) i) The question was looking for not only sources of information, but also why they would be useful. Many of the answers failed to describe why they would be useful.

   ii) The question was looking for how the sources of information identified in part i) would be applied to give an understanding of the system. Many answers just described alternative ways of code reading without any reference to the use of the sources identified in par i).

b) The question was looking for a broad view of what the representation listed show and then the uses in software evolution to which they can be put. Many answers attempted to describe in detail each of the representations listed and then failed to clearly indicate the use to which they could be put.

c) Generally the control flow graph produced for this part was well done. The major place where marks were lost was in not representing the for-loop as three nodes (initialise, condition and increment). Marks were also lost for not labelling the arcs exiting condition nodes with true and false labels, and including nodes where there was no statement (in particular for the closing brace of code blocks).

d) This part was looking for the identification of an idiom. Although there is a loop over a collection, it is not a process all items because a condition within the loop means that no operation is performed on all elements. It is also not a search, because no index or item matching a condition is returned. The presence of a condition around the main function code of the loop means that a filter is being applied. Given that the filtered element is copied to a matching element in another collection, could argue that it is a filtered copy. As part of this, the question required a language independent form and identification of the line of code that equated to each part of this form. A significant number of answers lost marks by not giving the language independent form or by not identifying the line numbers for each part.

Question 2

a) This part was looking for an indication that software that exists for a long time will be changed (why) and that these changes will increase the size of the code, which will make it harder to understand; this decreasing its quality. Answers frequently omitted to say that code would be changed, that code would get larger and thus harder to understand. Often stated that got more complicated without why.

b) This question was looking for business reasons why refactoring not done; i.e. it costs to do and adds no immediate benefit to bottom line. Many answers described what refactoring is (not required) or failed to mention that has a cost to perform.

c) This part was looking for why current development practices have lead to an increase in refactoring. Many answers just described current development practices (not specific enough). Also failed to mention that existence of regression tests mitigates many of the risks of refactoring.

d) There was two problems with this part; the first was that the required code occurred before not after the question text. The second was that there were some case typos in the code. An allowance was made for all students who had used the wrong code example. The typos were also given an allowance; however, the question specifically asked about code smells which do not include syntax errors. Several answers identified coding convention or style issues, again these are not code smells.

e) This part was asking to identify language and domain facts or questions from the code example. While many of the answers managed to identify relevant points, the question also sked for justification of the points given, a significant number of the answers failed to address this part of the question.
Question 3
a) This question was asking for evaluation of options from the consultant’s report and a recommendation to the board. A significant number of answers were generic and did not take into account the circumstances described in the scenario given. Some answers also lost marks by not giving a recommendation to the board.

b) Part was for an indication of the complete process via which the revised system would come into existence. It was not restricted to migrating to a new architecture; that is covered in part d). Thus, answers needed to cover the analysis required to identify the needs of the revised system and the development of enhanced schemas and other system elements. Many of the answers restricted themselves to architecture migrating.

c) This part was looking for an indication of a new architecture that would meet future needs. It also asked for justification of the proposed architecture. Answers tended to only give a revised architecture and no justification of it.

d) This part was looking for details of the forward migration process that would you use. In particular, the order in which elements would be migrated and the business reasons for this order. Many answers just described forward migration and made no attempt to define the order in which elements would be migrated.

Question 4
a) This part was looking an evaluation of the two options and a recommendation. All answers had some evaluation, however, the depth of this evaluation varied significantly. Elements that were often missed included the long term licensing costs of the existing offering and the danger of basing of your business on a product that might cease to exist. Also missed were the short-term costs and quality issues of developing a bespoke solution.

b) This part was looking for an in-depth discussion of the options available. Again, the problem was the lack of depth to discussions. Suggesting that you immediately make the core of your business dependent on a product without proven quality is not sensible.

c) This part was specifically asking for the advantages that DI and AOP could bring to software development. Some answers just attempted to describe what these are without answering the question.