

**UNIVERSITY OF MALTA**

**THE MATRICULATION CERTIFICATE EXAMINATION  
ADVANCED LEVEL**

**COMPUTING  
May 2012**

**EXAMINERS' REPORT**

**MATRICULATION AND SECONDARY EDUCATION  
CERTIFICATE EXAMINATIONS BOARD**

**Computing  
Advanced Level  
May 2012**

**Part 1: Statistical Information**

The distributions of grades awarded in the May 2012 session are given in the table below.

GRADE	A	B	C	D	E	F	Abs	Total
Number	13	38	62	31	26	18	6	194
% of Total	6.70	19.59	31.96	15.98	13.40	9.28	3.09	100

**Part 2: Comments regarding Paper 1**

**Section A**

**Question 1**

- a) A good part of the answers given failed to clearly differentiate between the access modifiers, default and protected. The idea of packages seems to be unclear.
- b) The majority of the students correctly answered this question. However a more complete answer was being expected, whereby reference to accessor and mutator (get and set) methods is made.

**Question 2**

The majority of the students were not capable of providing an analysis of such algorithms based on their complexity. Some students explained how these algorithms worked rather than explaining the relation between implementation and complexity.

**Question 3**

- a) Very few students mentioned the importance of “late binding” with regards to polymorphism. A number of students explained method overriding and the importance of inheritance, but not how the java virtual machine used late binding to “choose” the appropriate method during runtime. Some students confused method overriding with method overloading, highlighting it as part of the polymorphic process.
- b) With regards to the design advantage when using polymorphism the majority of the students mentioned reusability, but failed to elaborate. Only few students referred to the use of abstract classes and interfaces as a way to better design the code and to make it extendible.

**Section B**

**Question 4**

Most students knew how to answer this question even though there were some of them who mixed up the terms.

**Question 5**

This question was answered well by most students. However when it came to providing real examples, not all students were capable of providing them.

***Question 6***

Most students knew what is an interrupt handler and why it is used. However, a lot of them got mixed up in the process. Many did not mention how an interrupt is detected and what action is taken immediately after. Issues such as polling, etc were barely discussed.

***Question 7***

Most students knew what was meant by Simplex, Half Duplex and Full Duplex however failed to describe Analogue and Serial correctly. This was quite surprising considering the last two terms are more popular in computer literature.

***Question 8***

Most students knew how to describe the term cyber crime however they fell short when giving examples. Maybe more awareness should be emphasized on different sorts of cyber crimes.

***Question 9***

Most of the candidates understood the Waterfall Life Cycle model, however they failed to correctly explain the Rapid Application Development approach. Most candidates seem to be under the impression that RAD is a 'quick and dirty' approach to software development which leads to lower-quality software.

***Question 10***

Most candidates were confident with the differences between a compiler and interpreter as well as the definition of a debugging tool. Several candidates incorrectly answered b(ii), stating that a debugger is used 'after development to find bugs'.

***Question 11***

Candidates answered this question correctly, but several failed to define the contents of a symbol table.

***Question 12***

Although several candidates answered correctly, many had no idea what a strongly typed language was and gave a myriad of incorrect answers.

***Question 13***

The majority of candidates answered this question correctly.

***Question 14***

Mostly correct. Some did not convert to 8-bit and did the HEX conversion wrongly

***Question 15***

Mostly correct. The usual some that do not distinguish between  $A \cdot B$  and  $AB$ . A few were not able to handle the individual functions to build up the final answer.

***Question 16***

- (a) The majority, who knew what they were doing, answered correctly. A minority did not have a clue.
- (b) Many answered 16 instead of 8

**Question 17**

- (a) One of the questions that gave students problems, due to wrong handling of HEX and the lack of intuition to see that they were the complement of each other (not the two's complement).
- (b) Again those who knew what they were doing did it correctly. Some had no idea of the distinction between the address and its contents.

**Question 18**

I cannot really say much. Unfortunately, students could easily try to guess a pattern without really knowing the answer. So with hindsight, the question did not necessarily achieve the aim of checking understanding of static and dynamic RAM. Using the answers obtained, (v) was the most erroneous one.

**Question 19**

- a) The majority of the students failed to correctly answer this question. The expected answers should have included descriptions of e.g. serial or indexed file organizational schemes.
- b) An example was expected here, and a number of students failed to provide such an example.

**Question 20**

- a) The majority of the students correctly distinguished between a database and a database management system, however some answers were not considered as sufficiently detailed.
- b) The majority of the students correctly answered this question.

**Part 3: Comments regarding Paper 2**

**Question 1**

- (a) The truth table was in general answered correctly. There were a few answers which showed that the students did not understand that logic '1' is true and logic '0' is false and built up two tables.
- (b) A very few were not able to design the Karnaugh map properly. Of those who designed it properly, many did not fully minimise it and lost marks because of wrong grouping.
- (c) Most students wrote down the minimised functions properly. Again a few did not know how to do this properly.

**Question 2**

- (a) Again most answers had a good idea mentioning the two most important issues – 'extra instructions for isolated I/O' and 'common addresses' for MM I/O. A few did not really know what computer memory is.
- (b) There was a mix up between register indirect and indirect addressing. Many students gave a register indirect as their answer – hence only one access to memory after instruction fetch, instead of two.
  - ii) This was a simple exercise in logical thinking. Most students got the answer right and related it to the fact that the ALU operates on two parameters at a time. This seems to have given some trouble – from students who gave polling as their answer to others who talked about operating system memory issues or disk access.

**Question 3**

Most students correctly explained the term program module, and gave a correct account of both the advantages of modularization and the bottom-up testing approach. In (d), several candidates failed to mention integration testing.

**Question 4**

Several candidates found difficulty answering questions related to EBNF. Indeed, a few candidates even remarked on paper that they were told the topic was not in the syllabus, which is not the case. Most candidates answered (e) correctly.

**Question 5**

This question was related to the Internet and the various protocols used to send information. It seems that a lot of students are not familiar with these protocols and they do not understand how the web works. This is a pity considering that the internet is becoming so important in our daily lives. More effort should be done to teach these elements and help students understand how the web works. It also transpires that a lot of students are exposed to the OSI model which is good but their exposure is rather superficial.

**Question 6**

A substantial number of students chose this question. However it is very clear that they are not really understanding how the web works. A good definition for Web 2.0 and HyperMedia was surprisingly very rare. Social Networking was obviously well known considering their experience with Facebook which was mentioned in most questions. Netiquette was well defined in most cases. I must also observe that when compared to last year, students were more informed about the Web however more should be done.

**Question 7**

This question was about High Level Language Programming

- a.
  - i) The majority of the students had a clear idea of the concept of information hiding and how important access modifiers are and how they are used.
  - ii) Though the majority of the students had an idea of what inheritance was, using keywords such as superclass and subclass, parent and child. Some however failed to explain this using a suitable example or by highlighting the use of “extends” in java. Furthermore, when it came to using UML class diagrams, many students confused the direction of the arrows that connect a subclass with its superclass.
- b. The majority of the students knew that a Constructor was a method, however many failed to link this to the “new” operator when creating new instances.  
When asked about a default constructor, the majority of the students failed to answer this correctly and referred to such a constructor as a method **declared** without any parameters.  
A number of students explained what method chaining (or overloading) was, and applied this to Constructors. However they failed to mention how constructors can be effectively linked using *this()* and *super()* and how these are used.
- c. A number of students failed to clearly understand this question and explained what variables and methods are, rather than explaining the difference between instance and class variables and instance and class methods. Some made this distinction but failed to highlight the use of the **static** keyword for class variables and methods.

- d. The majority of the students did not answer this question correctly. This possibly indicates a lack of understanding in how the inheritance mechanism actually works.

***Question 8***

This question was about Databases

- a. The majority of the students gave a satisfactory explanation of what a relational database was. Some answers, were however very superficial.
- b.
  - i.) The majority of students correctly explained that it was possible for more than one publisher to publish a version of the same book, given the structure of the database.
  - ii.) Again, the majority of the students provided ample explanations as to why a new table needs to be created to handle multiple websites, elaborating on the primary and foreign keys that need to be defined. However some students incorrectly answered that a possible solution would be to add a new field for the second website.
  - iii.) The majority of the students correctly explained why attempting to include such a record would fail.
  - iv.) The majority of the students correctly explained the purpose of the query however some students failed to provide a table with the result of such a query.

**Chairperson  
Board of Examiners  
July 2012**