

**UNIVERSITY OF MALTA**

**THE MATRICULATION EXAMINATION  
ADVANCED LEVEL**

**COMPUTING  
May 2014**

**EXAMINERS' REPORT**

**MATRICULATION AND SECONDARY EDUCATION  
CERTIFICATE EXAMINATIONS BOARD**

**Computing  
Advanced Level  
May 2014**

**Part 1: Statistical Information**

The distribution of grades awarded in the May 2014 session are given in the table below:

GRADE	A	B	C	D	E	F	Abs	Total
Number	11	29	51	41	20	24	4	180
% of Total	6.11	16.11	28.33	22.78	11.11	13.33	2.22	100

**Part 2: Comments regarding Paper I****Section A****Question 1**

A surprising number of people did poorly on this question. There seemed to be confusion with regards to how parameters by value are treated.

**Question 2**

The majority of the candidates did well in this question. There was however a small amount of confusion around the issues of polymorphism and sub typing (this is where most marks were lost).

**Section B****Question 3**

A good number of candidates got this right, although some of them used a lot more steps than necessary. Some candidates got half way through, while others had no idea how to do this. It seems that not many took time enough to think so that they can simplify the expression, and instead they just tried to apply as many identities as they could remember without getting any closer to the simplified answer.

**Question 4**

For part a, many candidates had a wrong preconception that ASCII (not extended ASCII) is an 8-bit code, so even if the question stated clearly that the ASCII set contains 128 characters, they said that 8 bits were required to represent ASCII instead of 7, some even stated that  $\log_2 128 = 8$ . Very few got part b wrong. For part c, there were a lot of silly mistakes in counting.

**Question 5**

While the question was about the difference in two methods of data transfer, many candidates just recited definitions of DMA and interrupts, without relating what they wrote to data transfer at all.

**Question 6**

The question was about the assembly process. Many candidates confused assembly with Java compilation, and just recited definitions of linkers as related to Java, not to assembly, so that they could not really answer the question. Many candidates had no idea about cross assemblers, while some others had a clear idea and illustrated their answers with suitable examples.

**Question 7**

Some candidates had no idea how to interpret the assembly code given. Many got the main parts right, but there were errors, the most common being: counting the loop 6 times instead of 7; not counting the jump instruction which is executed; counting the pseudo-directive which, as the comment clearly states, is a directive and not an executable instruction.

**Question 8**

Most people answered this question at a very basic level. Additional details like the size of hash table should be odd (preferably prime), ordinal values from keys, usage of modulus operator and various ways of dealing with collisions were not brought up as much as one would have anticipated.

**Question 9**

Many candidates hit on a few points from the definition of a data dictionary. However it was as if many candidates were just listing database facts hoping to score hits on the question.

**Question 10**

The majority of candidates did well on this question.

**Question 11**

Majority of the candidates gave a valid answer to what determines the choice of an OS but a significant number (30%) still had no idea why different OS are used. Only around 10% could not identify different types of OS as most probably they are easy to remember and frequently mentioned.

**Question 12**

Protection of files is also a popular topic with extensive applications and so close to 80% got a correct answer together with different facilities employed against file access. This reflects a popular topic that in reality candidates have first-hand experience in protecting their information as well as security issues online.

**Question 13**

A mixture of replies were given to why interrupt handling is employed. A bit more than half the candidates gave a correct reply, while the rest gave a partial answer or an incorrect one. When it came to other functions of an OS more candidates, around three quarters, gave correct answers.

**Question 14**

This question about error checking and recovery was set to ensure that candidates are aware that transmission over a network is not as simple as it seems. Only a third of the candidates gave a correct answer together with 3 error detection methodologies. The rest gave partial or wrong answers.

**Question 15**

The way this question was set was not meant to be a trick question but simply to reverse the way candidates prepare for their exam. Instead of asking what is switching, the question gave the answer and asked what is the methodology for communicating over a digital network. Few candidates (around 25%) gave a correct answer and managed to identify 3 different types of switching.

**Question 16**

Candidates often confused the right description of a syntax diagram and where it this important diagram is used. A number of replies included or were presented as some form of pseudo-code. There seems to be a wrong perception between what constitutes the syntax of a high level language like Java and the syntax for a context-free grammar. Many presented wrong notation for BNF with the railroad diagram not correctly presented or presented using the wrong type of symbols used. Quite a good number of candidates cannot distinguish between the main usage of BNF and Syntax diagrams and their use to depict a context-free grammar in **two distinct ways**. (36% of candidates obtained less than 3 marks while over 42% obtained zero or did not attempt this question).

**Question 17**

This question also posed some problems for a number of candidates in that they seem to understand that a Parse tree is only used for arithmetic statement evaluation, when this is clearly not the case. A small number even associated BNF with database notation such as 1NF or 2NF. Candidates need to be aware that syntax diagrams are used so that humans

could understand high-level languages, which are not understandable by humans at all. Overall, BNF should be thoroughly emphasised and candidates need to be able to use the proper symbols and terminologies used in this notation technique. A few candidates associated the BNF with a low level language while the Syntax diagram was associated with a high level language. Candidates had a clearer idea how to write BNF but then failed to mention that BNF has a LHS which is made up of terminal and non-terminal symbols. (35% obtained less than 3 marks while only 12% obtained a zero or did not attempt this question).

**Question 18**

The majority of candidates seem well versed in mapping out a tree to its notation although the few who did not reply correctly or obtained few marks made use of an ambiguous method to map out the tree which resulted in partially wrong or wrong replies. (Only 9% obtained less than 3 while only 6% did not reply or obtained zero marks).

**Question 19**

There were quite a few inconsistencies when determining the stages required of the SDLC, which led to more inconsistencies in explaining the stages in the second part of the question. Many frequently refer to Systems Analysis to be associated with database design when this is definitely not the case. The approach taken by the majority of candidates seems to indicate that systems analysis or the SDLC is **only** associated with systems that use some form of database such as libraries, DVD rental stores (this approach is totally irrelevant in the modern days of online viewing). It must also be pointed out that many readily-made and relatively cheap application software exist, which make writing such software in a HLL devoid of a GUI totally irrelevant). (23% obtained less than 3 marks while only 2% did not reply or obtained zero marks).

**Question 20**

In replying to this question candidates showed various levels of inconsistencies regarding the Requirements stages of both the Waterfall and RAD development models. Again, it must be stressed that candidates are exposed to the correct terminologies and structures of such models, which form the basis of other models. Knowing how a model works becomes more relevant in later stages of education. (20% obtained less than 3 while 10% obtained zero marks).

**Part 3: Comments regarding Paper II**

**Question 1**

Most candidates did well in this question. Very few got the truth table completely wrong, but there were some careless mistakes. There were some issues with Karnaugh map optimization, and many candidates drew unnecessary rectangles or used many small rectangles that could have been replaced by larger ones. Some then attempted to simplify their unnecessarily complex expressions using Boolean algebra, which led to further mistakes. Then, for part e, most of those who got the first parts right had no issues, while others could not answer correctly. Answers to part f were mostly good.

**Question 2**

Many candidates got part a wrong and got very strange answers, which should have been a clue that they got something wrong. For part b, many candidates just distinguished between the contents of the registers, without mentioning the bus connections and data flow directions. Some had very little idea and only said that the MAR contains the address and the MDR contains the data, which is really just repeating the question. Answers to part c and part d were generally good. For part e, there were many good answers, but some candidates confused the different addressing modes completely.

**Question 3**

Majority of the candidates who selected this question were able to identify real-time OS situations with critical-mission and life-threatening scenarios being the most popular. Others gave scenarios that in reality need no real-time processing at all. Around half the candidates then proceeded to justify the cost of such systems to ensure the reliability is high.

**Question 4**

Slightly less than half the candidates who chose this question gave a correct reply to what Modulation is while others got lost explaining Modem issues and incorrect answers. The simple fact that what was being asked is to check if candidates knew that the process of varying one or more properties of the periodic waveform is called Modulation was creating problems. Only a third of those candidates managed to identify the 4 different modulation techniques, namely, Amplitude, frequency, phase, and pulse-coded.

**Question 5**

In describing these important parts of the Compilation process, candidates generally responded in a satisfactory manner whilst when tackling the Linking part of the question many missed the fact that not all objects that a program uses are included in the final executable and thus parts of the "software" belong to the operating system itself and will be borrowed by the application whilst running. Another important aspect of the Linker was also missed or forgotten by many; the fact that the linker's work is to relocate parts of an executable or its objects into memory, translating pointers etc. is a **fundamental** part of the linking process. (Question attempted by 32% of the candidates with 11% obtaining less than 10 marks and a little more than 1% obtained no marks).

**Question 6**

Again we see that there was a consistency in the wrong use of the DFD basic rules and their omission or non-application – DFD's use simple symbols, a total of four, to create model complex data flowing throughout an organisation or throughout a software application. Quite a good number of wrong uses of the DFD symbols included un-named flows (arrows without names), bi-directional flows (double-ended arrows), data stores in level 0 diagram, the usage of the same symbols to describe entities and processes (these are supposed to be rectangles or rectangles for entities and circles/ovals or squares with rounded corners for processes). It was also noted that many candidates used UML symbols in drawing DFD's. Candidates need to be more aware of the inherent differences between each modelling technique and where this is used. (Question attempted by 39% of the candidates with 20% obtaining less than 10 marks and 4% who obtained no marks).

**Question 7**

Problem points on this question were on part (b) regarding the use of **super()** and **this()** not being allowed in the constructor. Very few candidates knew this to be the case. The descriptions of the try/catch/finally block generally did not include facts that one could have multiple catch blocks in the structure and few candidates used the finally component or explained it.

**Question 8**

This was a very popular question. Most people did reasonably well on this one (but the ones who did poorly tended to do very poorly). Transforming the table into a normalised form when taking into account new requirements was generally the point those candidates struggled with.

**Chairperson  
2014 Examination Panel**