

UNIVERSITY OF MALTA

**THE MATRICULATION EXAMINATION
ADVANCED LEVEL**

**COMPUTING
May 2015**

EXAMINERS' REPORT

**MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD**

**Computing
Advanced Level
May 2015**

Part 1: Statistical Information

The distribution of grades awarded in the May 2015 session are given in the table below:

GRADE	A	B	C	D	E	F	Abs	Total
Number	13	34	40	33	18	13	8	159
% of Total	8.18	21.38	25.16	20.75	11.32	8.18	5.03	100

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

a) Most people got this question wrong which was surprising (the contents of an object can be modified when the object is passed to a method as a parameter). This is fundamental knowledge of OO. There is a clear disconnect with the students' knowledge with respect to what happens to an object when it is passed as a parameter and methods on the object are then called.

b) This question caused some confusion. Not many people got it right but given the lack of understanding shown in (A) this would seem to be consistent. The point of the question was to have the student realising that only a field in the object has changed rather than the whole object thus the object needs to be replaced for it to be truly "new".

Question 2

Many students had issues with this question. The difference between an object oriented language and an imperative one was not clear.

Section B**Question 3**

Most students got this question right, some failed to see how a right shift translates to a multiplication, even though parts (a)-(c) showed a clear example.

Question 4

The answers here varied. Some students struggle with Boolean algebra. One missed opportunity was that the question asked the students to show that the complex expression can be simplified to a given simple expression, and there should have been more students who used the knowledge of the final simplified expression to their advantage.

Question 5

Few students got this question right, but many seemed to struggle with the implications of data bus size and address bus size on memory capacity, that is, that: (memory capacity in bits) = $2^{(\text{address bus size in bits})}$ times (data bus size in bits).

Question 6

Many students did not know how the stack and stack pointer are used in assembly function calls. There were also some students who talked about the stack data structure in high-level languages and libraries like Java, which was off topic for this question.

Question 7

There were no major issues in this question. One common error is that some students do not count the JNZ instruction when the jump condition was false and thus no jump was performed.

Question 8

Many students were not clear about the different outputs from various types of translators although many knew the generalities of what each type of translator does, quite a number of others confused the real meaning behind each type of translator. Many have the notion that translators, compilers and interpreters are only used in Java. While this might be the case as Java is seen as both compiled and interpreted, compilers produce an executable file, interpreters do not and translators are used to translate from a language to another, e.g. translating Java code to C#. It was also noted that many have the idea that a compiler is used for error checking and quick debugging and for small programs whilst an interpreter also used for debugging. In fact interpreters are mainly used for interpreted languages (html, Python, Java) whilst compilers are used in languages such as C and all its derivatives amongst others.

Question 9

Most students did reasonably well on this question. There were issues around confusion when building a tree from the insertion items with a fair number of them.

Question 10

A good number of students somehow confuse the terminal and non-terminal symbols of formal languages with end of statements (";") and language reserved words.

Question 11

Generally most responded in a satisfactory manner although a good number confused parts of the proper stages and identified them as stages themselves.

Question 12

A substantial number of students did not have a clear idea of what constitutes "system software" and that this may be divided into two distinct categories namely system utilities and operating system. Some identified system software as software which is used to build other software (probably referring to IDE's). In replying to part b) of this question, many produced the wrong replies simply because they misunderstood the question.

Question 13

In general this question was rightfully answered although some confused JSP with ER diagrams or possibly thought that both are the same or can be used for the same tasks. Others seemed to have an idea that flowcharts are used for "programs" and while this is true, flowcharts are also used extensively to model parts of a program.

Question 14

A wide variety of answers were given for this question. Overall however students did fine in this question.

Question 15

As is the case historically with database questions such as this, the vast majority of students were able to interpret an SQL statement and correctly produce the output. Many part marks loss were due to carelessness with the fields selected (and, thus, their output).

Question 16

Majority of the students correctly gave four types of Operating Systems and successfully managed to describe the function of one of them. It is clear that students are being well prepared in the subject of different operating systems and the different functionality of each.

Question 17

Around 75% of the students were able to describe why an operating system manages processes with the other 25% who either did not understand the question or did not know the answer. Similarly, close to half the students could list the three states of a process with the other half failing to give a correct answer.

Question 18

A mixture of replies were given to explain what Contiguous Memory partitioning is used for. Some students actually explained what contiguous memory is but failed to specify that its function is to manage memory. Very few candidates, around 25%, managed to name 3 other memory management techniques.

Question 19

This practical question about the use of IP was successfully replied by nearly all the students who appreciate the issue of unique addressing. This topic seems to be very natural for the candidates as it touched daily applications they make use of, and so it was no surprise that the majority named three Internet applications.

Question 20

Transmission error occurs when data is corrupted during transmission over a network, and few students, around 30%, managed to give a correct answer; which subsequently led to the second part, which even fewer candidates got correct. The rest either failed to give an answer at all or misunderstood the question.

Part 3: Comments regarding Paper II

Question 1

In general students did well in this question. In part (c), some students just wrote their answer without showing any working, which means that if their instruction count is off slightly, there is no working to prove that their mistake was only a minor one. A good number of students deduced the arithmetic operation performed by the function correctly.

Question 2

Although not really an issue, in part (b), some students did not follow the very common convention that, for the two-bit example, A1 would be the most significant bit and A0 would be the least significant. For part (c), a common error is for students to try to optimize the expression obtained from the Karnaugh map using Boolean algebra. For part (d), going from a Karnaugh map expression to a diagram using NAND gates should be trivial, but some students drew complex logic circuits using various logic gates, and then they just converted the gates to equivalent NAND-based circuits, ending up with complex diagrams that give rise to useless errors.

Question 3

Less than half the candidates chose this question, and less than half of them gave the correct answer, namely, use of registers and memory-mapped I/O. Very few students, around 10% of the total papers gave a correct sequence of how polling works during device handshaking. This clearly shows a gap in the candidates' knowledge of how I/O operations occur maybe because they are not so visual, practical and straightforward.

Question 4

Slightly less than half the students chose this question and the majority of them gave a correct reply to what Media Access Methods are used for together with the details related to CSMA/CD. The sequence of how it works is a practical one and easily understood by students, which explains why correct answers were predominantly given.

Question 5

Many did not know what the Integrated Development Environment is or what it stands for. Many students did not have an idea that it is a suite of software applications. (b) The large majority responded correctly this part of the question although a recurring small mistake is that in the lexical analysis stage, lexemes and tokens are the same when in fact the text in the code is first divided into lexemes which are then grouped into tokens. (c) Many responded in a satisfactory manner to this part.

Question 6

In general most replies were coherent and did not show a lot of deviation although some offered answers, which clearly confused certain aspects such as the top-down or bottom-up advantages and disadvantages.

Question 7

Surprisingly, many students seemed to struggle with the concept of bubble sort and counting compares/swaps. The second list they were to analyse was the worst-case scenario for Bubble Sort, which students did not seem to understand (or they did not really understand the complexity of bubble sort as the max swaps/compares will be the same as this was a frequent error). The last part of this question (d) was a complexity question and few students got it correct (the ones that did tended to do very well in the rest of the question).

Question 8

No real concerns jumped out with this question. Most students who attempted it got a mark of 60% or higher on it. Some confusion around having a type table was shown on those not doing well in the question in addition to not identifying PK/FK correctly.

**Chairperson
2015 Examination Panel**