L-Università ta' Malta

MATSEC
Examinations Board

# Examiners' Report

## Advanced Computing

## Special September Session 2020

TABLE OF CONTENTS

## A. STATISTICAL INFORMATION

The total number of candidates who registered to sit for Advanced Computing was 137, which is 41 candidates less than in 2019. This potentially corrects a spike in registrations observed in 2019, which we hypothesised was due to the fact that 2019 was the last year in which candidates were able to submit a project. In 2018, the number of candidates was 145.

Table 1 shows the distribution of grades for the Special September Session 2020 of the examination

| GRADE | A | B | C | D | E | F | ABS | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **NUMBER** | 12 | 27 | 30 | 22 | 21 | 22 | 3 | 137 |
| **% OF TOTAL** | 8.8 | 19.7 | 21.9 | 16.1 | 15.31 | 16.1 | 2.2 | 100 |

*Table 1: Distribution of grades for AM Computing, Special September Session 2020*

## B. GENERAL REMARKS

### General Remarks on the Written Examination

In general, candidates achieved on average 60% in most questions across Paper I and Paper II. In Paper II, candidates who attempted the question on assembly programming did very well (average of 75%). The most challenging topics in which candidates' performance was poor were interrupt service routines, databases, bitwise operations, and programming. The latter is a particular cause for concern.

Given the importance of programming and algorithmic thinking in this subject, it is worrying that (i) 22% of candidates failed the programming question in Paper I; (ii) the 64 candidates who selected the programming question in Paper II had an average mark of 9.9/20 with 23 (36%) of these candidates failing the question.

Since candidates are heavily exposed to programming over two years (including three assessed practical tasks included in the assessment), one would expect that candidates fare better in programming questions. Conversely, candidates fared very well in their practical tasks with an average mark of 23.8/30 (76%) and only 8 candidates getting a failing mark. Whilst this is inconsistent with performance in the written exam, it is probably due to (i) practical tasks being focused in terms of what is expeced for each task; (ii) familiar environments (school labs) in which the practical tasks are administered; and (iii) the use of integrated-development environments which reduce the amount of mistakes that candidates can make.

## C. COMMENTS ON PAPER I AND PAPER II

### Paper I

#### *Question 1*

Average Mark: 3.4 / 5

1a. Most candidates answered this question correctly.
1b. A majority of candidates did not answer this question correctly.
1c. Few candidates were able to answer this question correctly.

### *Question 2*

Average Mark: 3.8 / 5

2a. Few candidates were able to answer this question correctly.

2b. Most candidates answered this question correctly.

### *Question 3*

Average Mark: 2.7 / 5

3a. Most candidates were aware that this question was related to encryption, but could not distinguish between a public and private key.

3b. Several candidates thought that IPv6 can only support a rather small number of addresses, such as 128.

3c. Most candidates answered this question correctly.

### *Question 4*

Average Mark: 3.0 / 5

4a. Few candidates were aware of what multiplexing really means in telecommunications.

4b. Most candidates were able to accurately describe TDM and FDM.

### *Question 5*

Average Mark: 2.0 / 5

Several candidates left this question out or did not obtain any marks for their attempt. For the rest of the candidates:

5a. Most candidates were able to outline the purpose of an Interrupt Service Routine (to handle interrupts), but several candidates failed to mention that it consists of a block of software.

5b. A majority of candidates were able to answer this question correctly.

5c. Most candidates were able to answer this question correctly.

### *Question 6*

Average Mark: 3.4 / 5

6a. Most candidates were able to answer this question correctly.

6b. Most candidates were able to answer this question correctly, but several erroneously mentioned paging instead of defragmentation.

6c. Most candidates were able to answer this question correctly.

### *Question 7*

Average Mark: 3.8 / 5

7a. Several candidates confused "an application used to develop a database" with "applications of databases".

7b. Most candidates answered this question correctly.

### *Question 8*

Average Mark: 1.9 / 5

Several candidates left this question out or did not obtain any marks for their attempt. For the rest of the candidates:

8a. Most candidates could only recall two database models.

8b. The performance of several candidates to explain secondary key was poor.

### *Question 9*

Average Mark: 3.8 / 5

9a. A majority of candidates could not answer this question correctly.

9b. Most candidates answered this question correctly.

*Question 10*

Average Mark: 3.5 / 5

10a. The attempt of several candidates to explain the term pointer was poor. Most of those who answered this question referred to the pointer in relation to the stack pointer (rather than to the general sense of pointing to a location in memory).

10b. Most candidates answered this question correctly.

10c. Most candidates answered this question correctly although some confused searching with sorting.

*Question 11*

Average Mark: 4.2 / 5

Most candidates answered this question correctly.

*Question 12*

Average Mark: 4.6 / 5

Most candidates answered this question correctly.

*Question 13*

Average Mark: 2.9 / 5

While, in general, the candidates responded the question correctly, the performance of some candidates to differentiate between DRAM and SRAM was poor. There were some candidates who mixed DRAM and SRAM.

*Question 14*

Average Mark: 2.7 / 5

Most candidates did not answer this question correctly. The attempt to differentiate between RISC and CISC was inadequate.

*Question 15*

Average Mark: 2.4 / 5

Most of the candidates did not answer this question correctly, particularly part b where only a simple repeated division was required. Several candidates obtained no marks at all for this question.

*Question 16*

Average Mark: 3.6 / 5

While in part a, most candidates answered correctly, this was not the case for part b. There were a good number of candidates who flipped the answers for compiled and interpreted languages.

*Question 17*

Average Mark: 3.2 / 5

Most candidates answered parts a and c correctly but there were problems in part b. Most candidates were under the impression that a debugging tool finds bugs automatically.

*Question 18*

Average Mark: 3.8 / 5

Most candidates responded this question correctly. While only the names of the main stages of the Waterfall Life Cycle were required a good number of candidates gave a detailed definition of each stage.

*Question 19*

Average Mark: 3.5 / 5

Most candidates answered this question correctly.

*Question 20*

Average Mark: 3.5 / 5
Most candidates part a correctly but several candidates' performance in part b was inadequate.

## Paper II

*Question 1*

Average Mark: 14.0 / 20
Very few candidates chose this question but those who did generally answered correctly and were able to design the circuit correctly. Parts of the question were considered out of syllabus. In cases, where candidates tried this question special consideration was given.

*Question 2*

Average Mark: 15.0 / 20
Most candidates performed well in this question. The performance of some candidates with regards to pseudo-directive was poor. For part e, while a good number of candidates were able to identify the division operation, there were some candidates who simply translated the program into English.

*Question 3*

Average Mark: 12.3 / 20
Most candidates were able to describe the function of the different buses and the system clock. The performance of some candidates to correctly draw the block diagram of a generic processor was poor. Particularly, most candidates missed the sizing of the memory. In part e, the attempt of some candidates in describing was inadequate.

*Question 4*

Average Mark: 11.9 / 20
While several candidates did well in this question, some candidates' performance in the three stages of compilation was poor. Mostly everyone knew the differences between syntax and semantic errors. Questions c ii and d proved problematic for most candidates.

*Question 5*

Average Mark: 11.6 / 20
5a. Most candidates answered this question correctly.
5b. Several candidates confused an online OS with a network OS.
5c. Most candidates answered this question correctly.
5d. The majority of the candidates answered this question correctly.

*Question 6*

Average Mark: 11.7 / 20
6a. According to the candidates' responses, it was evident that several candidates did not understand the meaning of "communication mode" (i.e. simplex, half-duplex, full duplex).
6b. According to the candidates' responses, it was evident that most candidates did not understand the importance of analogue wave modulation, but were able to recall one analogue modulation technique.
6c. Most candidates answered this question correctly.
6d. Most candidates answered this question correctly.

### *Question 7*

Average Mark: 11.8 / 20

7a. Approximately half of the candidates managed to obtain the 3rd Normal Form.

7b. Most candidates answered this question correctly.

7c. Most candidates answered this question correctly.

### *Question 8*

Average Mark: 9.9 / 20

8a. A majority of candidates answered this question correctly, but a good number could not recognise the recursive programming paradigm.

8b. Most candidates answered this question correctly.

8c. Most candidates were not able to recall not even one characteristic of a good hashing function.

Chairperson
Examination Panel 2020