L-Università ta' Malta

MATSEC
Examinations Board

Examiners' Report
AM Computing

First Session 2025

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A. STATISTICAL INFORMATION

The total number of candidates who registered to sit for Advanced Computing was **151**, which is **5** candidates more than in 2025.

Table 1 shows the distribution of grades for the Main 2025 session of the examination

GRADE	A	B	C	D	E	F	ABS	TOTAL
NUMBER	12	31	33	17	30	26	2	151
% OF TOTAL	7.9	20.5	21.9	11.3	19.9	17.2	1.3	100

Table 1: Distribution of grades for AM Computing 2025 Main Session

B. GENERAL REMARKS

Coursework

When compared to the previous year, the number of candidates registered increased from 146 in 2024 to 151 in 2025. The overall failure rate rose slightly, with 24 candidates failing the subject compared to 19 last year (15.9% in 2025 vs 13% in 2024). The proportion of candidates achieving Grades A, B, or C declined from 53.5% to 49.7%, driven primarily by decreases in Grade A (down to 7.9% from 9.6%, 12 candidates vs 14) and Grade C (down to 21.2% from 29.5%, 32 candidates vs 43), although Grade B saw a notable increase from 14.4% to 20.5% (31 candidates vs 21). Candidates obtaining Grades D or E rose from 30.1% to 33.2%, with Grade D decreasing significantly (down to 11.3% from 17.1%, 17 candidates vs 25) and Grade E increasing sharply (up to 21.9% from 13%, 33 candidates vs 19). Attendance improved, with only 2 candidates absent compared to 5 last year (1.3% vs 3.4%). Overall, the data indicates a shift away from mid-range grades, with more candidates achieving either higher intermediate results (B) or lower passing grades (E), alongside a modest increase in outright failures.

While the performance distribution shows a reasonable spread across grades, the results indicate that candidates continue to face challenges with applied and scenario-based tasks, particularly where database design, programming, or systems concepts had to be explained beyond definitions. The strong results in binary arithmetic (Paper II), Boolean logic, and fundamental networking questions demonstrate that candidates have a solid grasp of core principles. However, when these principles were embedded in longer problem-solving or design-based contexts, many candidates struggled to organise their answers and apply their knowledge flexibly. This contrast suggests that while rote knowledge is fairly secure, greater emphasis in teaching and practice should be placed on structured problem-solving, analysis, and design thinking.

C. GENERAL COMMENTS ON INDIVIDUAL QUESTIONS

Paper I

Question 1

Average Mark: 2.0 / 5

Overall, candidates performed well on this question and understood 2's complement and Boolean logic. Most were able to complete the truth table correctly and use a Karnaugh map. A few responses included errors when simplifying.

Question 2

Average Mark: 2.2 / 5

Responses indicate that candidates found this question harder. Some were able to simplify the Boolean expression correctly in part (a), and those candidates usually drew the correct logic circuit in part (b) as well. However, responses indicate that many candidates performed poorly in the simplification of steps, which made it harder for them to draw the right circuit.

Question 3

Average Mark: 4.8 / 5

Candidates performed very well in this question. Most were able to follow the loop and understand how the values in the registers changed each time. Many candidates worked through each step and correctly found the final value of BX. This means most candidates understood how loops and register changes work in Assembly.

Question 4

Average Mark: 3.9 / 5

Most candidates performed fairly well on this question. Many were able to follow the shift operations and find the correct binary value in part (a). Responses indicate that some candidates were unsure about how logical shifts work, especially when bits are moved and zeros are added. A few responses included minor mistakes in part (c), but overall, most understood the main idea of shifting bits.

Question 5

Average Mark: 4.2 / 5

Candidates performed well in this question and showed a good understanding of basic networking concepts. Most could clearly explain what a router does and gave correct examples of network topologies. Many also explained the purpose of DNS correctly. A few candidates gave general answers for the security threat, but most were able to name a valid threat and suggest a good solution.

Question 6

Average Mark: 2.2 / 5

Average Mark: 2.2 / 5

Responses indicate that candidates found this question more challenging. While some could define what a protocol is, fewer were able to clearly explain why protocols are important for communication between networks. Many candidates' attempt to match the correct functions to the right OSI layers was poor, especially when it came to error detection and reliable transmission.

Question 7

Average Mark: 4.3 / 5

Candidates performed very well in this question. Most were able to name and describe common requirements gathering methods, such as interviews and questionnaires. They also gave good answers for the advantages and disadvantages of each method. Additionally, many candidates showed a clear understanding of how a Data Flow Diagram is used in system analysis.

Question 8

Average Mark: 2.6 / 5

Responses indicate that candidates found this question quite challenging. While some could describe the top-down and bottom-up approaches, the attempt to explain the differences was poor. Fewer candidates were able to thoroughly justify which design approach would be the most suitable for the hospital system and explain their reasoning.

Question 9

Average Mark: 2.7 / 5

Many candidates performed poorly in this question. While some were able to identify the relevant tables and separate the data into products, customers, and orders, many had difficulty organising the information correctly. Few candidates assigned primary and foreign keys properly to link the tables.

Question 10

Average Mark: 2.5 / 5

Responses indicate that many candidates found it difficult to accurately draw the relationships using Crow's Foot notation and explain the cardinality between entities. Additionally, several candidates had difficulty describing how normalisation, particularly up to Third Normal Form, reduces duplicate data.

Question 11

Average Mark: 3.4 / 5

In general, candidates answered part (a) correctly. However, some candidates incorrectly stated that the CIR stores data rather than instructions. Others confused the role of the CIR with the MAR. Parts (b) and (c) were generally completed correctly by most candidates, showing a good understanding of the Arithmetic Logic Unit and Control Unit.

Question 12

Average Mark: 2.8 / 5

Some candidates confused the term EPROM with EEPROM, incorrectly describing electrical erasure instead of the ultraviolet light method used for EPROM. A number of candidates provided correct real-world applications for PROM and EPROM, while others' attempt to give appropriate or relevant examples was inadequate.

Question 13

Average Mark: 2.2 / 5

Most candidates correctly defined Contiguous, Linked, and Indexed file allocation methods. However, many did not represent the chosen method diagrammatically in a correct or complete manner. Diagrams often lacked key elements such as block pointers, correct sequencing, or alignment with the described method.

Question 14

Average Mark: 1.9 / 5

Some candidates had partially correct transitions, but not all were accurate. In part (b), many showed uncertainty about the term Suspend. Some confused it with Wait, while others incorrectly interpreted Suspend as equivalent to Terminated. A number of candidates drew a Memory–CPU–I/O diagram instead of the process execution state diagram.

Question 15

Average Mark: 3.4 / 5

Most candidates were able to correctly differentiate between natural and formal languages and provided appropriate examples. In part (c), candidates generally explained the concepts of syntax and semantics well. However, many omitted the discussion of why these elements are important in programming, limiting the depth of their answers.

Question 16

Average Mark: 3.5 / 5

Some responses mixed up the three main language translators, often omitting the proper names or providing unclear details. Part (b) was generally answered correctly, showing a good grasp of the core concepts. Partial answers indicated incomplete understanding of the roles and reasons for using these translators, especially around when and why each is employed in the programming process.

Question 17

Average Mark: 1.1 / 5

Some candidates drew bottom-up parse trees instead of the required top-down approach. Most candidates could describe what a bottom-up parse tree is, but the majority's attempt to explain how the bottom-up parsing process works was inadequate.

Question 18

Average Mark: 2.9 / 5

Most candidates correctly differentiated between static and dynamic implementations. However, the attempt to provide appropriate advantages and disadvantages for each was poor. Several candidates performed poorly in the programming task when asked to provide an example implementation of a queue.

Question 19

Average Mark: 1.4 / 5

In general, candidates performed adequately in explaining what a hash table is and how collisions can occur. Most candidates performed poorly in part (c). Many responses simply listed the values in order without applying hashing functions or considering collisions. Some candidates disregarded the question about collision resolution methods, while others demonstrated an understanding of how to handle collisions effectively.

Question 20

Average Mark: 1.7 / 5

Most candidates performed well, correctly defining the queue data structure and explaining its behaviour. Candidates' attempt to write appropriate pseudo-code algorithms for queue creation was adequate.

Paper II

Question 1

Average Mark: 17.2 / 20

This question was attempted by 149 candidates.

Candidates performed very well in this question overall. Most were able to convert binary and hexadecimal values correctly and carry out binary addition with proper attention to overflow. Many candidates understood the advantages of using hexadecimal for error codes. The majority successfully drew the truth tables and wrote the Boolean expressions needed for the lighting and alarm systems. Some attempts in simplifying the Boolean expression and drawing the correct logic circuit were inadequate. However, overall, responses indicate adequate skills in applying binary arithmetic, logic, and hexadecimal concepts.

Question 2

Average Mark: 13.0 / 20

This question was attempted by 119 candidates.

Many candidates correctly defined opcode and operand and identified mnemonics from the code fragment. Most demonstrated a good understanding of the role of the AX register. However, few candidates were able to clearly explain the significance and usage of the BX and DX registers in the program. Some candidates performed poorly in the different addressing modes, particularly in distinguishing between immediate and indirect addressing, and in explaining how data is accessed and manipulated in each instruction. Additionally, the concepts related to the assembly process, along with the different types of assemblers, proved challenging for several candidates, with only a small number providing thorough and complete responses.

Question 3

Average Mark: 14.4 / 20

This question was attempted by 106 candidates.

Candidates performed generally well in this question, showing a good understanding of communication types, modulation techniques, and error detection methods. Most attempts to define simplex and full-duplex communication and to provide relevant examples within the university network context were adequate. Many candidates explained modulation clearly and compared amplitude and frequency modulation with reasonable accuracy. Responses indicate that the concepts of electromagnetic interference and error detection methods like parity checks and checksums were well understood. However, some candidates performed poorly in identifying which error detection method is better for multiple errors. Candidates were mostly able to explain the roles of SMTP and IMAP in email systems, although the advantages of IMAP over POP3 were not always clearly stated. The differences between HTTP and HTTPS and the importance of HTTPS for security were generally well explained.

Question 4

Average Mark: 12.5 / 20

This question was attempted by 116 candidates.

Many candidates performed adequately in basic SQL and answered the first query correctly. However, responses indicate that the second query involving AVG and the HAVING clause was challenging for many candidates. While most were able to spot issues with the way the data was stored, fewer could clearly explain or apply the steps to convert the table into third normal form. The roles of a database administrator and the three schema levels were mostly identified, but some responses lacked detail. Candidates gave brief explanations of database security, and only a few discussed specific measures like access control or encryption.

Question 5

Average Mark: 7.9 / 20

This question was attempted by 17 candidates.

This question focused on Random Access Memory (RAM), including its various types, the memory address map, and address decoders. Most candidates did not manage to complete this question. When asked to provide a diagram of RAM, most candidates incorrectly included RAM as a labelled component rather than illustrating its internal structure or relevant concepts. Answers were often presented in tables or as disjointed points, with little to no explanation or justification provided.

Question 6

Average Mark: 10.5 / 20

This question was attempted by 63 candidates.

This question covered topics related to Memory-Mapped I/O vs Isolated I/O, data transfer methods, interrupts, and polling. Most candidates were able to clearly distinguish between Memory-Mapped I/O and Isolated I/O. However, responses indicate that some candidates struggled to provide relevant real-world applications for each. While many responses demonstrated an understanding of handshaking, difficulties were noted when asked to provide examples of reliable communication methods. Responses indicate that candidates generally understood both interrupts and polling concepts and could identify scenarios where each is applicable. However, some were confused when comparing their response times. The role of the interrupt handler and the stack was unclear to most candidates. Most candidates successfully identified and explained interrupt priorities and the function of the Interrupt Mask Register (IMR).

Question 7

Average Mark: 9.6 / 20

This question was attempted by 79 candidates.

This question focused on compilers, language translators, interpreters, and virtual machines (VMs). Responses indicate that many candidates were unsure about the role and function of a lexer. There was frequent confusion between compilers and interpreters, with some candidates using the terms interchangeably. Virtual Machines were often misunderstood; several candidates referred only to the Java Virtual Machine (JVM), while others were unsure of what a VM actually is or its purpose.

Question 8

Average Mark: 10.1 / 20

This question focused on Java programming, covering topics such as data structures, loops, file input/output operations, and different types of files. Some candidates confused the use of arrays with Array Lists, applying one when the question required the other. Explanations comparing text files and object files were often inaccurate or incomplete. Most candidates did not attempt or complete Question 8(f).

D. CONCLUDING COMMENTS

Overall, the 2025 session shows a continuation of the pattern observed in recent years: candidates perform confidently on direct, knowledge-based questions but experience significant difficulty when required to synthesise knowledge across topics or to solve less structured, real-world style problems. The weaker performance on programming, database design, and system implementation questions highlights the need for more active practice in applying concepts rather than relying on standardised, rehearsed approaches.

Chairperson
Examination Panel 2025