

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD  
UNIVERSITY OF MALTA, MSIDA  
MATRICULATION EXAMINATION  
INTERMEDIATE LEVEL  
SEPTEMBER 2013

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**SUBJECT:** COMPUTING  
**DATE:** 7th September 2013  
**TIME:** 4.00 p.m. to 7.00 p.m.

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### Directions to Candidates

- Answer **ALL** questions in Section A and **ONE** question from Section B.
  - Good **English** and orderly **presentation** are important.
  - All answers are to be written on the **booklet** provided.
  - The use of **flowchart templates** is permitted but **calculators** may **NOT** be used.
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### Section A

(Answer **ALL** questions in this section)

- A1 a. In the context of computer hardware, explain what a **bus** is. [1]  
 b. Name the **THREE buses** which form the system bus. [1]  
 c. Answer the following questions by naming **the appropriate bus(es)** that you listed in part 'b' above.  
 i. Which bus(es) allow/s information to flow in both directions?  
 ii. Which bus(es) allow/s information to flow in one direction only?  
 iii. Which bus determines the maximum possible memory capacity of the system?  
 iv. Which bus is a key factor in determining the overall system performance? [4]
- A2 a. According to **De Morgan's** law  $\overline{A.B.C}$  is equivalent to what? [2]  
 b. Use **truth tables** to justify your answer to part 'a' above. [4]
- A3 a. Mention **TWO advantages** of databases over traditional file systems. [2]  
 b. For each of the following statements concerning databases, give the appropriate **term/s**.  
 i. A programming language used to specify the arrangement of data items within a database.  
 ii. A language that allows the user to select records from a database.  
 iii. This holds the name, type, range of values, source and authorization for access for each data element in the organization's files and databases.  
 iv. A language that requests data from a DBMS. [4]

- A4 a. Why is the **main memory unit** (the RAM) such an important component within a computer system? [1]
- b. **RAM** can be **dynamic** or **static**.
- i. Differentiate between the two **types** of RAM.
  - ii. Which of the two types of memory is **faster**?
  - iii. What exactly is meant by a **'fast'** memory?
  - iv. Give ONE **example** of the use of dynamic RAM and ONE **example** of the use of static RAM in a computer system. [5]
- A5 a. Differentiate between a **primary** and a **secondary** key in a database. [2]
- b. What is an **attribute** in one table which is the primary key in another table, called? [1]
- c. What is the purpose of a **compound** key in a database? [2]
- d. What is a **record** referred to in databases? [1]
- A6 a. Briefly explain the role of a **router** in a network system. [2]
- b. Distinguish between a **hub** and a **router's** role in data transfer. [2]
- c. Suggest a data transmission **medium** for a LAN. [1]
- d. Name and briefly describe ONE method to overcome **transmission errors**. [1]
- A7 a. Differentiate between **circuit switching**, **message switching** and **packet switching**. [3]
- b. Give ONE reason why it is reasonable for the **Internet** to use packet-switching rather than circuit-switching. [1]
- c. Suggest TWO advantages of a **full-duplex** over a **half-duplex** connection. [2]
- A8 a. Why is **system software** necessary to a computer system? [1]
- b. Give TWO advantages of storing an operating system on a **solid-state disk** (such as a pen drive) rather than a **traditional hard disk**. [2]
- c. Mention suitable **application software** that could be used by the following:
- i. A company using mail-merging to produce monthly bills.
  - ii. A fashion magazine photo editor.
  - iii. A student researching a school project online. [3]
- A9 a. In the context of object oriented programming (OOP), what is **polymorphism**? [1]
- b. Explain how **encapsulation** can help a programmer implement security features in his/her application. [2]
- c. Explain how in OOP, **inheritance** can increase productivity. [2]
- d. Declare, in Java, class Square which **inherits** class Shape. [1]
- A10 a. Distinguish between the **bubble** sort and the **insertion** sort algorithms. [2]
- b. Give the **pseudocode** for a procedure that bubble sorts an array of ten numbers. [4]

**Section B**(Answer **ONE** question from this section)

- B1 *This question is about Operating Systems.*
- a.
    - i. What is an **interrupt handler**?
    - ii. What are the TWO possibilities that **initiate** the interrupt handler?
    - iii. Mention TWO situations where the **polling** method is appropriate and TWO situations where the **interrupt-based** method is appropriate. [8]
  - b. **File management** is one of the main functions of an operating system.
    - i. Name and describe TWO **file attributes**.
    - ii. What are **file access rights**?
    - iii. Name and describe the THREE main **access rights**. [6]
  - c. Another function of the operating system is **process control**.
    - i. What is **process control**?
    - ii. Name and describe ONE **example** of process control. [2]
  - d.
    - i. Describe TWO **scheduling** objectives.
    - ii. Briefly describe the **round robin** scheduling. [4]
- B2 *This question is about the System Lifecycle.*
- a. List and briefly explain the steps of the **waterfall** system lifecycle model. [7]
  - b. Distinguish between **black box** and **white box** testing. [2]
  - c. Distinguish between the **top-down** and **bottom-up** design approaches. [2]
  - d. List THREE things you expect to find in **program documentation**. [3]
  - e. Suggest ONE advantage and ONE disadvantage of a **parallel changeover**. [2]
  - f. Explain ONE situation where a **phased transition** would be advisable. [1]
  - g. List and briefly explain THREE categories of reasons why a system may require **maintenance**. [3]
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