

St Edward's College Malta

Mid-Year Examinations February 2020



Year 13

**Computing SL
Paper 1**

Time: 2 hours

**Name and
Surname**

Instructions to Students:

1. Do not open this examination paper until instructed to do so.
2. Write your name and surname on this page.
3. Read all instructions and questions carefully.
4. Answer ALL questions.
5. Diagrams must be drawn in pencil.
6. Leave the last 10 minutes for revision of paper.

For teacher's use only

Mr E. Attard Cassar

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Obtained															
Allotted	2	2	3	3	2	4	4	3	2	10	10	10	10	5	70

Section A

1. Explain why **cache memory** can speed up the processing within a computer. [2]
2. Identify any **two** of the layers of the OSI model. [2]
3. Outline the main steps involved in a **selection sort**. [3]
4. Construct the **truth table** for the following expression: $A \text{ xor } (B \text{ or } C)$ [3]
5. Describe a **disadvantage** of the use of virtual memory. [2]
6.
 - a. Express the decimal number 189 as **hexadecimal**. You must show your working. [2]
 - b. Convert -87 to an 8-bit **two's complement** representation. [2]
7. Outline one advantage and one disadvantage to protest groups of communicating by **social networks**. [4]
8. Explain the importance of the **memory management** function of an operating system. [3]
9. Describe one advantage of **prototyping** during the systems development life cycle. [2]

Section B

10. Consider the following method.

```
public static boolean whatPropertyIsIt(String s)
{
    int i = 0;
    int j = s.length() - 1;
    while (i < j)
    {
        if (s.charAt(i) != s.charAt(j))
        {
            return false;
        }
        i = i + 1;
        j = j - 1;
    }
    return true;
}
```

Note that **s.charAt(i)** is the character in the *i*th position of String *s*.

For example, where *s* is the string "abcde", *s.charAt(2)* is the character 'c'.

- a. By copying and completing the following table, **trace** the method for the call **whatPropertyIsIt("xyzdyx")**. [4]

i	j	i<j	s.charAt(i) != s.charAt(j)	return value
0	5	true	false	

- b. Identify the **purpose** of this program. [1]
- c. Identify the **termination conditions** for the loop. [2]
- d. Explain the effect of changing the condition in the while loop to $i \leq j$. [3]

11. A **LAN** in a health centre allows two receptionists and four doctors to share three PCs and a printer which are connected to a server. The LAN has a **star** topology, and uses cables.

- a.
- i. Define the term **server**. [1]
 - ii. Define the term **client**. [1]
- b. Outline the role of a **hub** in a star topology. [2]

The doctors can access only the medical records of the patients; the receptionists cannot access the medical records of the patients and deal only with registering new patients and booking appointments.

- c.
- i. Describe how the **access** of the doctors and the receptionists can be **restricted** to the appropriate parts of the file system. [2]
It is proposed to allow patients **partial** access to the health centre's system over the internet.
 - ii. Explain the **type** and **level** of access that should be granted to the patients and how this would be achieved. [4]

12. A company stores the details of all of its employees in a **sequential master file**. Every month the **payroll** program is run during which the master file is updated by a transaction file.

- a. With reference to the payroll program, explain the **relationship** between the master file and the transaction file. [4]
- b. Identify the characteristics of the above system that would allow **batch processing** to take place. [2]
- c. Outline
 - i. how a **deliberate** error could enter the system [2]
 - ii. how the company could try to **prevent** this type of error. [2]

13. Many modern devices use microprocessors.

- a. Define the term **microprocessor**. [2]
- b. Identify a **device**, other than a computer, that uses a microprocessor. [1]
- c. For this device, describe
 - i. the function of its microprocessor. [2]
 - ii. its inputs. [1]
 - iii. its outputs. [1]
- d. Describe **two** different types of memory that might be found within the microprocessor from part (b). [3]

14. A program accesses a **text file** on disk. To edit the text the user of the program enters data using a keyboard. The program then amends the text which was read from the file, writes the updated file back to disk and produces a printed report of all amendments made to the text file.

- a. Construct a **systems flowchart** representing this process. [4]

The data on disk can be lost due to various errors.

- b. State one example of how data can be lost due to **human error**. [1]