

# St Edward's College Malta

Mid-Year Examinations February 2020



**Year 10**

**Computing**

**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 in the spaces provided.
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	Total
Obtained												
Allotted	6	9	5	15	10	6	6	15	11	9	8	100

1. Work out the following data representation exercises.

a. Express  $1100101_2$  both in **hexadecimal** and **decimal** representations.

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[2]

b. Express  $2B_{16}$  in **binary** representation.

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[1]

c. Express  $33.5_{10}$  in **binary** and **hexadecimal** representations.

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[3]

2. This question is about number representation.

a. A binary number X consists of 4 bits. Give the **minimum** and **maximum** values that can be expressed if:

i. The representation is **unsigned**.

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[3]

ii. The representation is in **two's complement**.

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[3]

- b. Show how the computer works out  $85 - 37$ . Assume that numbers are represented in one **byte**.

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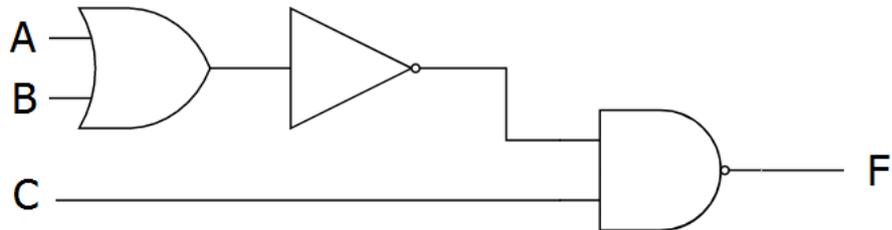
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[3]

3. Look at the following logic circuit and answer the questions below.



- a. Express **F** in terms of **A**, **B** and **C**.

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[2]

- b. Draw the **truth table** of F.

[3]

4. This question is about the CPU.

a. Explain briefly what is the **fetch-decode-execute cycle**.

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[2]

b. Explain the role of the **control unit** and the **arithmetic and logic unit**.

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[4]

c. A particular desktop has a 2.8 **GHz** processor. What does 2.8 GHz mean?

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[1]

d. What is the role of the following **registers**?

i. PC

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[2]

ii. IR

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[2]

iii. MDR

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[2]

iv. MAR

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[2]

5. Consider the following program:

```
public class Supermarket
{
    public static void main (String[] args)
    {
        double bill;
        char card;

        System.out.print ("Please enter amount to pay: ");
        bill = Keyboard.readDouble();
        System.out.print ("Do you have a loyalty card? ");
        card = Keyboard.readChar();
        if (bill >= 50) bill = bill*0.95;
        if (card == 'y') bill = bill*0.97;
        System.out.println ("Amount to pay is: " + bill);
    }
}
```

a. Write down the variables used in the program together with their respective types.

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[2]

- b. Write down one **declaration** found in the program [1]  
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- c. Write down one **assignment statement** found in the program [1]  
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- d. Write down one **condition** found in the program. [1]  
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- e. Draw a **flowchart** of the program. [5]

6. This is a question on databases.

a. What do we mean by a **relational database**?

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[2]

b. A relational database consists of the following two tables:

FOOTBALLERS (IdNumber, Name, DOB, Nationality, IdClub)

CLUBS (IdClub, Name, Country)

i. Write down the **primary field** of each table.

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[2]

ii. Write down the **foreign field**.

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[1]

iii. What is the **relationship** between the two tables (one-to-one, one-to-many, or many-to-many)?

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[1]

7. This question is about RAM.

a. What is the role of **RAM** inside the computer system?

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[2]

b. A RAM receives this data from the CPU:

From the **data bus** it receives  $88_{10}$

From the **address bus** it receives  $546621_{10}$

From the **control bus** it receives Write

What does it do?

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[2]

c. How does **cache** help in making the computer more efficient?

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[2]

8. Answer the following questions on secondary storage and ROM.

a. How many bytes are indicated by the following terms: **kilobyte**, **megabyte**, **gigabyte** and **terabyte**.

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[2]

b. Name **three** different kinds of **secondary storage** and discuss their capacities.

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[6]

c. Explain the role of the **device driver**.

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[2]

d. Give one example of how a **buffer** can be used.

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[1]

e. Explain what **ROM** is and give two examples of what it contains.

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[4]

9. This question is about programming.

a. Study the program below and then answer the questions.

```
public class Sequence
{
    public static void main (String[] args)
    {
        for (int i=7; i<=19; i=i+3)
        {
            System.out.print (i + "*");
        }
    }
}
```

i. What is the **output** of this program?

\_\_\_\_\_ [2]

ii. What **changes** are required in the program so that the output is the following?

```
*
4
*
9
*
14
*
19
*
24
*
```

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\_\_\_\_\_  
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- b. Describe these terms using an example for each: **syntax error**, **logical error** and **run-time error**.

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[6]

10. The following questions are related to programming.

- a. Give a description of the following translators: **compiler**, **interpreter** and **assembler**.

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[3]

- b. Explain how Java is **translated** from a high-level language to machine code.

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[2]

- c. What is an **IDE**?

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[2]

- d. What is an **API**?

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[2]

11. This is a question on operating systems.

a. Give a description of the following operating systems:

i. **Real-time** operating system:

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[2]

ii. **Multi-tasking** operating system:

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[2]

b. Name and describe **two scheduling policies**.

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[4]