

# Junior Lyceum Annual Examinations 2003

Educational Assessment Unit – Education Division  
Malta

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**Form 4 (option)**

**Computer Studies**

**Time 1hr 30min**

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Name .....

Class.....

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### *Directions to Candidates:*

*Answer ALL questions in Section A on this paper,  
Answer any TWO questions from Section B on separate foolscaps,  
The use of flow chart template is permitted,  
Calculators are NOT allowed,  
Good English and orderly presentation are important*

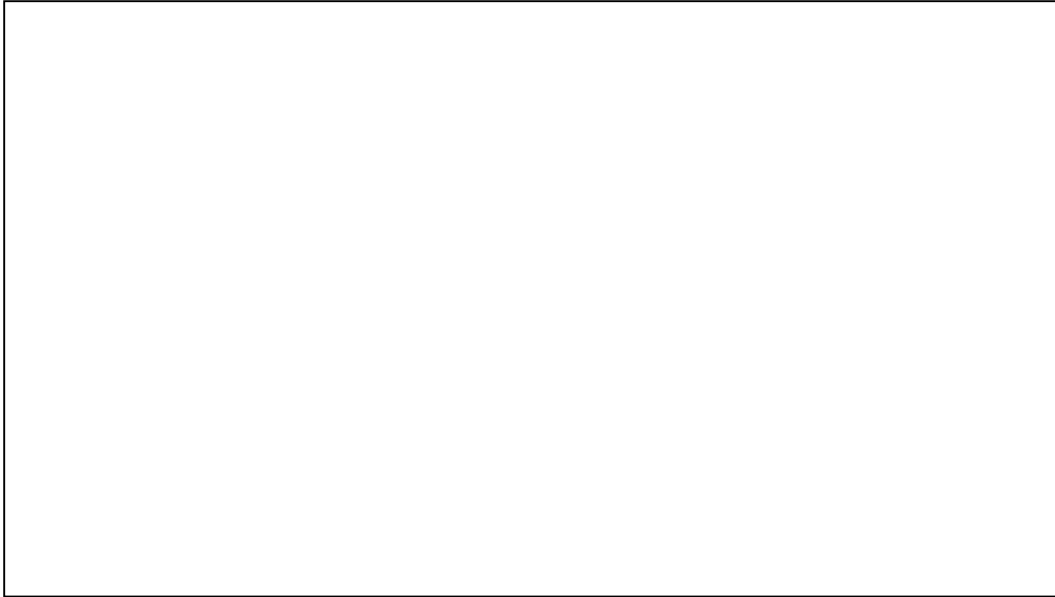
*For office use only:*

Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Paper Total	Course Work	Final Mark
Max	5	5	5	5	5	5	5	5	5	5	5	15	15	15	15	85%	15%	100%
Mark																		

**Section A - Answer all Questions**

- 1 Draw and label a block diagram of CPU and Main memory, showing clearly the following items:

ALU, Accumulator, Control unit, Program counter, Memory Data register, Memory Address register, Data bus, Address bus and control bus



[5]

- 2 For each of the following situations name and describe an computer software application that makes the job easier:

a) Helping students to learn better: \_\_\_\_\_

b) Weather forecasting \_\_\_\_\_

c) Designing a house plan \_\_\_\_\_

d) Managing Stocks in a large warehouse \_\_\_\_\_

e) Handling financial transactions in an organisation \_\_\_\_\_

[1 mark each]

- 3 Fill in the following conversion table:

Decimal	Binary	Hexadecimal
255		
	1100110	
		AB

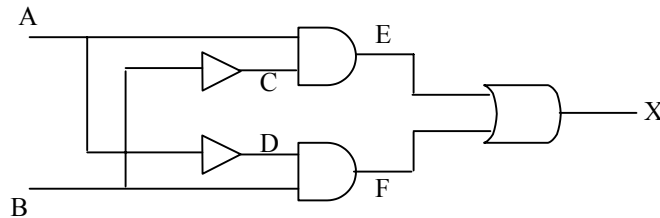
[5]

- 4 When designing a database each field in a record has to be named and defined. Fill in the following table, which describes a patient's record in a hospital. Identify which field should be the key field.

Key	Field name	Data type	Field size

[5]

- 5 a) Given the logic circuit fill in the table below:



A	B	C	D	E	F	X
0	0					
0	1					
1	0					
1	1					

[3]

- b) Write the Boolean expression that represents the above logic circuit.

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

- 6 What do you understand by the following terms:

Data capture form: \_\_\_\_\_ [1]

Data validation : \_\_\_\_\_ [2]

Data verification \_\_\_\_\_ [2]

7 a) What do you understand by the term ASCII Code :

\_\_\_\_\_ [1]

b) Why is it important to use a standard code when data is transferred from one computer to another? \_\_\_\_\_

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

c) How many bits are required to send all the following characters in binary code.  
( a,b,c,d,.....to .....x,y,z, A,B,C,D,...to.....X,Y,Z, 0,1,2,3,4,5,6,7,8,9, = , + , - , / , \* , ? , > , < )

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

8 a) Explain the following terms

The instruction set \_\_\_\_\_

\_\_\_\_\_ [1]

Opcodes and operands \_\_\_\_\_

\_\_\_\_\_ [1]

b) Describe briefly the sequence of steps carried out during the fetch-execute cycle. In your answer refer to the Program counter, main memory and instruction register..\_\_\_\_\_

\_\_\_\_\_ [3]

9 When developing a project or new software the process passes through a number of steps. All this process is known as the Project Life Cycle. List all the steps in this process.

\_\_\_\_\_ [5]

1 a) Write in Pascal language a code snippet which implements a conditional  
0 statement that prints A if  $A > B$  and prints B if  $B > A$

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[2]

b) Name and draw flow diagrams for the three main loop constructs used in programming

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[3]

1 Explain what you understand by the following types of documentation.

1 a) Technical Manual \_\_\_\_\_

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[2]

b) Program documentation \_\_\_\_\_

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[2]

c) Describe two main features you find in a user manual

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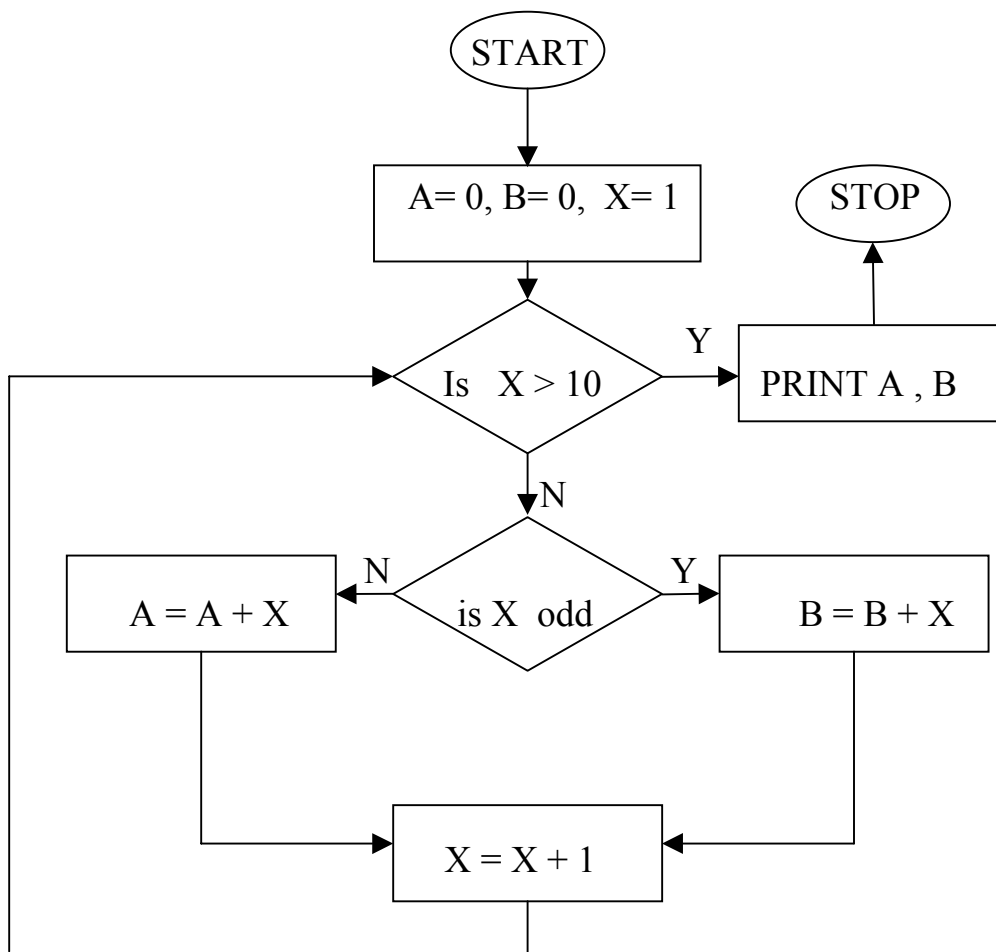
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[1]

12



- a) What is the initial value of the variables A , B, and X [1]
- b) How many times will the program flow through the conditional statement “ IS X > 10” before it prints A and B [2]
- c) What is the process A = A + X doing? [2]
- d) Copy and fill in the following table that represents part of a dry run of the above flow chart the first two step has been done for you as an example:

Step number	X	A	B	X > 10	is X odd	A=A + X	B=B + X	X= X + 1
1	1	0	0	no	yes	no action	1	2
2	2	0	1	no	no	2	no action	3
3								
4								
5								
6								

[4]

- e) After filling the table describe the whole process represented by the flow diagram. In your description state clearly the result obtained before the algorithm stops [5]

- 13 Write a program in Pascal language that allows user to enter a student's name and mark obtained in a Maths examination. The program should prompt user to enter name and mark, check that mark is in the range  $0 \leq \text{mark} \leq 100$  otherwise asks for the mark again. The program outputs the student's name and grade. Grades are awarded according to the following grade boundaries.

80 < mark <= 100 grade A  
60 < mark <= 80 grade B  
40 < mark <= 60 grade C  
mark <= 40 failed

Make the program as user friendly as possible and include some inline comments to help program understanding

[15]

- 14 The librarian in your school decides to computerise the book lending system of the school library. You have been asked to help him design a Database system. It is suggested that the Database has three main files:

a student record file  
a book record file  
a lending transaction file

- a) Choose two from the above list and for each, design a record structure that includes the field name, data type, field size and description. [4]  
b) In the three files identify the key field/s. Explain how these key fields are related? [3]  
c) What is a query? Describe a query to identify students who prefer detective stories. [2]  
d) Describe the process that helps the librarian to send for students with overdue books. [3]  
e) At the end of the year the librarian has to present a report about the library to the head of school, Identify and describe briefly three items you expect to find in this report. [3]