

# JUNIOR LYCEUM ANNUAL EXAMINATIONS 2010

Directorate for Quality and Standards in Education  
Educational Assessment Unit

FORM 4

COMPUTER STUDIES

TIME: 1h 30min

Name: \_\_\_\_\_

Class: \_\_\_\_\_

## Directions to Candidates:

Answer **ALL** questions in **Section A** on this paper;  
Answer **BOTH** questions in **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:

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

## Section A - Answer all Questions

- 1 (a) What is data **verification**?

**Verification:** \_\_\_\_\_

\_\_\_\_\_

[2]

- (b) **Check digits** and **range checks** are two types of validation checks.

- What is **check digit**?
- What is a **range check**?
- Give a practical **example** where range checking can be suitable.

**Check digit:** \_\_\_\_\_

\_\_\_\_\_

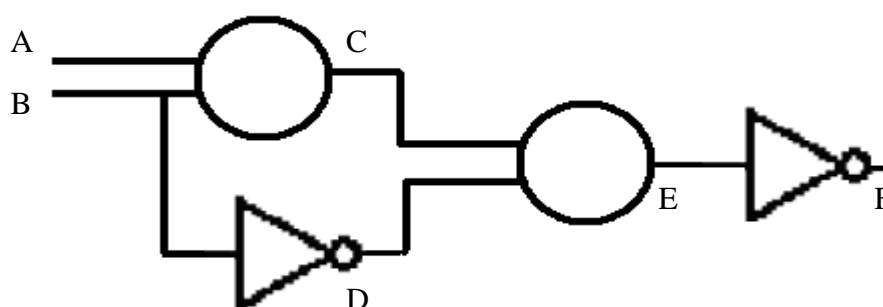
**Range check:** \_\_\_\_\_

\_\_\_\_\_

**Example:** \_\_\_\_\_

[3]

- 2 Below are a logic circuit and its truth table. Two gates in the logic circuit are represented by circles.



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

- (a) Study the circuit and truth table. Then write the **name of the gate** in each circle.

[2]

- (b) Write down the **Boolean expression** which represents the circuit above.

**Expression:**  $F =$  \_\_\_\_\_

[2]

- (c) Refer again to the truth table above. If logic 0 is represented by **false** and logic 1 by **true**, **complete** the following statement for the output of the circuit:

Output F is **true** only if input A is \_\_\_\_\_

[1]

- 3 (a) Using **twos complementation** represent the following two decimal numbers in **8 bits**:

- i. 45  
ii. -73

**45:** \_\_\_\_\_

**-73:** \_\_\_\_\_

Working space:

- (b) The following two 8-bit binary numbers, **1011 0011** and **0110 0000**, are added together. [2]
- i. What is the name of the **error** if the result of addition is stored in an 8-bit register?
- ii. What other type of **arithmetic operation** (subtraction, division or multiplication) on the same two numbers would also result in the same type of error?

**Error:** \_\_\_\_\_

**Arithmetic operation:** \_\_\_\_\_

- (c) What is the minimum **number of bits** required to store a character set made up of the English alphabet (26 letters) both in capital and in small letters? [2]

**Number of bits:** \_\_\_\_\_

- 4 (a) Application packages may be **off-the-shelf**, **customisable** or **tailor-made**. Give one **advantage** of each type of package when compared to the others. [1]

**Off-the-shelf:** \_\_\_\_\_

\_\_\_\_\_

**Customisable:** \_\_\_\_\_

\_\_\_\_\_

**Tailor-made:** \_\_\_\_\_

\_\_\_\_\_

- (b) Why do programmers prefer a **4GL** (4<sup>th</sup> Generation Language) when developing certain applications? [3]

**4GL:** \_\_\_\_\_

\_\_\_\_\_

- (c) What is **software licensing**?

**Software licensing:** \_\_\_\_\_

\_\_\_\_\_

- 5 (a) Distinguish between: **user**, **technical** and **program documentation**.

**User:** \_\_\_\_\_

\_\_\_\_\_

**Technical:** \_\_\_\_\_

\_\_\_\_\_

**Program:** \_\_\_\_\_

\_\_\_\_\_

- (b) Give **two items** of information one can find in the program documentation. [3]

**1<sup>st</sup> item:** \_\_\_\_\_

**2<sup>nd</sup> item:** \_\_\_\_\_

\_\_\_\_\_

- 6 (a) **Syntax** and **logical** errors are two types of programming errors. [2]

i. Distinguish between the two types of errors.

ii. For each type of error give an example.

**Syntax:** \_\_\_\_\_

\_\_\_\_\_

**Example:** \_\_\_\_\_

**Logical:** \_\_\_\_\_

\_\_\_\_\_

**Example:** \_\_\_\_\_

\_\_\_\_\_

- (b) What is meant by **dry running** a programming? [4]

**Dry run:** \_\_\_\_\_

\_\_\_\_\_

- 7 The **central processing unit** is made up of two subunits; the **arithmetic logic unit** (ALU) and another subunit. [1]

i. What is the other **subunit** called?

ii. Briefly explain the **function** of both subunits.

iii. Name **one** register found in each unit.

**Name of subunit:** \_\_\_\_\_

**Function of ALU:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Function of subunit:** \_\_\_\_\_

**Register in ALU:** \_\_\_\_\_

**Register in subunit:** \_\_\_\_\_

[5]

- 8 (a) **POS** and **CAL** are acronyms used for two computer applications. What does each acronym stand for?

**POS:** \_\_\_\_\_

**CAL:** \_\_\_\_\_

[2]

- (b) The left column of the table below shows three **areas of computer applications**. From the following list, write down the most suitable **example** for each area.

**CAD-CAM    Stock control    Weather forecasting**

Area of computer application	Example
Scientific	
Industry	
Commercial data processing	

[3]

- 9 (a) Programming languages may be divided into **generations**. This is the order in which they were developed. First we had the 1<sup>st</sup> generation of languages (1GL), then came the 2<sup>nd</sup> generation (2GL), the 3<sup>rd</sup> generation (3GL), and so on. Highlight one main **difference** between these three generations.

**1GL:** \_\_\_\_\_

**2GL:** \_\_\_\_\_

**3GL:** \_\_\_\_\_

[3]

- (b) What is meant by the **fetch execute cycle**?

**Fetch Execute Cycle:** \_\_\_\_\_

\_\_\_\_\_

[2]

- 10 (a) Write one statement in **Pascal** to store in variable **Y**, the **remainder** of variable **E** divided by variable **F**.

\_\_\_\_\_

[1]

(b) Write a program in **Pascal** to input, find and display the **sum** of five integer numbers using a **loop**. Each time one number is inputted during runtime, the sum that instant in time has to be displayed.

[4]

- i. What is the difference between **WWW** and the **Internet**?
- ii. Mention two **risks** a person may encounter when using the Internet.
- iii. What is **e-government**?

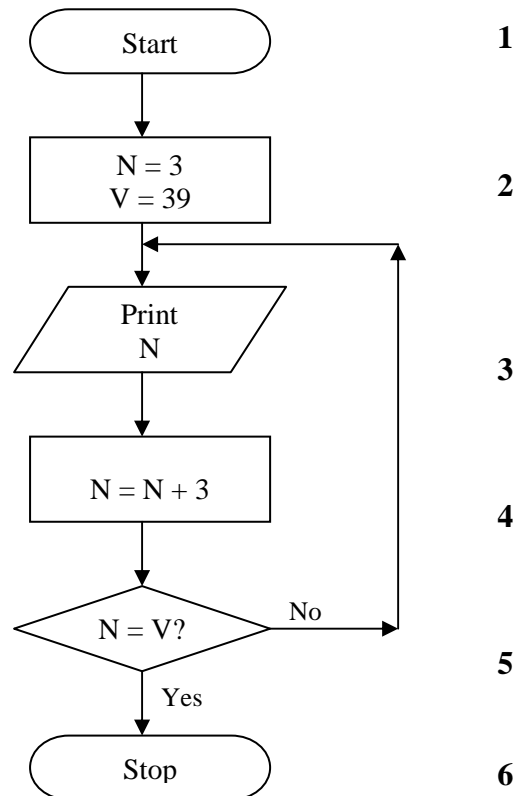
[5]

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## Section B – Answer BOTH Questions

12

The following **flowchart** shows an algorithm, part of which loops a number of times. The steps of the flowchart have been numbered for ease of referencing.



- (a) Study the flowchart and then answer the following questions.
- What is the process of **step 2** called? [1]
  - How many **times** steps 3, 4 and 5 are repeated? [2]
  - What is the value of *N* after the third repetition of the loop? [2]
  - Explain briefly what the **algorithm** does. (*No marks are awarded for explaining each flowchart symbol.*) [2]
  - Write a **program** in Pascal for the above flowchart. [6]
- (b) To run a Pascal program on a computer, it needs to be **converted** into machine code. What **terms** are used for the (i) Pascal program and (ii) machine code version of the program? [2]
- 13 (a) i. Mention two **reasons** to show the importance of conducting the **systems analysis** exercise within an organisation. [3]
- ii. Why is systems analysis, at times referred to as **systems life-cycle**? [3]
- (b) Feasibility study is carried out at an early stage during systems analysis.
- Describe one **benefit** for this. [4]
  - Name and briefly describe one **cost** that would be considered. [4]
- (c) Name two different **methods** that the systems analyst may use when investigating the present system. For each method give a **reason** to show why the analyst may decide on one method and not the other. [4]
- (d) **Straight changeover** and **staggered (phased) changeover** are two methods that may be employed to change from the old system to the new system.
- Differentiate** between both changeovers. [4]
  - For each changeover explain when it may be **beneficial**. [4]

