JUNIOR LYCEUM ANNUAL EXAMINATIONS 2011

Directorate for Quality and Standards in Education
Educational Assessment Unit

FORM 5 **COMPUTER STUDIES** **TIME: 1h 45min**

Name: _____ **Class:** _____

***Directions to Candidates**:*

*Answer **ALL** questions in **Section A** and **Section B** on this paper;*
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) A computer stores integers in **two's complement** form in **8 bits**. Write down in binary the two's complement representation of the following values:

i. 75

ii. -80

75 = _____

-80 = _____

Working Space

[2]

(b) What is the **largest positive** decimal number that can be held in 8 bits, using two's complement?

Answer: _____

[1]

(c) If 76 is the decimal ASCII code for **L**, what is the binary ASCII code for **Q**?

Answer: _____

Working Space

[2]

2 (a) Modern technology has made computers more accessible to people with special needs. **Name** and briefly **describe** an **input** device which is helpful for persons with special need.

Input device: _____

Description: _____

_____

[2]

(b) A secondary storage medium can be one of **three** different types. **Name** the three types of media and for each type give an **example** of a device/medium.

1st Type: _____

Example: _____

2nd Type: _____

Example: _____

3rd Type: _____

Example: _____

[3]

3 The Systems Analysis exercise is commonly carried out in 7 different stages. The first stage and last stage are: 'Project selection and feasibility study' and 'System maintenance'. List the remaining **5 stages** in their correct **order**.

Stage 1: *Project selection and feasibility study.*

Stage 2: _____

Stage 3: _____

Stage 4: _____

Stage 5: _____

Stage 6: _____

Stage 7: *System maintenance.*

[5]

4 For each of the following I.T. related personnel, mention **one main duty**:

Data Entry Clerk: _____

I.T. Trainer: _____

Programmer: _____

Web Master: _____

Computer Technician: _____

[5]

5 (a) What do the acronyms **LAN** and **WAN** stand for?

LAN: _____

WAN: _____

[1]

(b) Provide **two advantages** of having a LAN system in the school's administration offices rather than standalone computers.

1st Advantage: _____

2nd Advantage: _____

_____

[2]

(c) Besides browsing for information, mention **two** other **services** that a student can use over a WAN system.

1st Service: _____

2nd Service: _____

[2]

6 (a) What is **software piracy**?

Software piracy: _____

_____

[1]

(b) i. What is software **registration**?
ii. Mention one **advantage** of registering newly bought software.
iii. **Name** and **explain** one other **software** measure (excluding registration) and one **hardware** measure which are used by software publishers to deter piracy.

Software registration: _____

_____

Advantage: _____

_____

Software: _____

_____

Hardware: _____

_____

[4]

7 A room has two windows and one door and a security alarm system is wired to them. The alarm sounds (Logic 1) if any one window (or both windows) are open (Logic 1) or the door is open (Logic 1).
Using only **two** logic gates and the letters **W1** (window 1), **W2** (window 2), **D** (door) for the inputs and **A** (alarm) for the output:

i. Draw the **circuit** for this alarm system.
ii. Draw the **truth table** for this system.
iii. Derive the **Boolean expression** for this alarm system.

Circuit:

Truth table:

Boolean expression: _____

[5]

8 (a) What is **process control** and give an **example** where process control is used.

Process control: _____

_____

Example: _____

[3]

(b) Differentiate between **general-purpose** and **dedicated** computer systems.

General-purpose: _____

_____

Dedicated: _____

_____

[2]

9 **Real-time processing**, **Batch processing** and **Time-sharing** each require a different operating system.

i. Write down the **type of operating system** from those given above, that is normally associated with the each of the following applications:

Application	Type of operating system
ATM bank transaction system	_____
Electricity billing system	_____
Auto pilot system in airplanes	_____
Payroll system	_____

ii. Mention three major **characteristics** of a real-time system.

1st Characteristic: _____

_____

2nd Characteristic: _____

_____

3rd Characteristic: _____

_____

[5]

10 The Pascal snippet below is intended to read a **mark** between 0 and 100 (both marks being valid marks), and output **Distinction**, **Merit** or **Fail** according to the inputted mark. However it has **two errors**. Study the snippet and then answer the questions below. *(Line numbers are included to facilitate your references).*

```
Line 1:   Writeln(`Enter a mark between 0 and 100: `);
Line 2:   Readln(Mark);
Line 3:   If (Mark >= 0) AND (Mark >= 100) Then
Line 4:   Begin
Line 5:       Case  Of
Line 6:           75..100     : Writeln(`Distinction`);
Line 7:           50..74      : Writeln(`Merit`);
Line 8:           0..49       : Writeln(`Fail`);
Line 9:       End; {of Case}
Line 10:  End {of If}
Line 11:  Else
Line 12:  Begin
Line 13:      Writeln(`You entered a wrong mark`);
Line 14:  End;  {of Else}
```

i. Write the **line numbers** where the two errors are.
ii. What **type of programming error** has been made in each case?
iii. Re-write the instructions **without the errors**.

1st Error: _____ **2nd Error:** _____

1st Error type: _____

2nd Error type: _____

1st Instruction: _____

2nd Instruction: _____

[5]

11 Consider the following section of **assembly language** program. *A semicolon indicates a comment.*

```
LDA   #2     ; load number 2 into the accumulator
STA   X      ; store the contents of the accumulator in location X
LDA   #8     ; load number 8 into the accumulator
STA   Y      ; store the contents of the accumulator in location Y
```

(a) From the program above **identify** a **mnemonic** and an **operand**.

Mnemonic: _____

Operand: _____

[2]

(b) To run an assembly language program one needs an **assembler**.
i. What **language level** is assembly language?
ii. What is the **function** of an assembler?

Language Level: _____

Function: _____

_____

[3]

Section B – Answer BOTH Questions

12 For each of the statements below write **one or more** instructions in Pascal.

(a) Ask the user to input two integers ***A*** and ***B***; then output the **integer part** when B is divided by A. *(Example - 9 divided by 4 will output 2)*

[2]

(b) Store the **result** of the **expression** on the right in variable ***X***. *(Use the built-in mathematical functions where necessary.)* $\sqrt{b^2 - 4ac}$

[3]

(c) Write a **conditional** instruction for Question (b) above, which displays the word 'Real' when ***X*** is greater or equal to zero (0), otherwise displays 'Not real'.

[3]

(d) Declare a **2-dimensional integer** array named **Matrix** with a size of **10** rows by **20** columns.

[2]

(e) Use a loop to ask the user to enter **ten numbers** and then the program outputs the **smallest number** entered.

[5]

13 (a) i. What is the **Fetch-execute cycle**?

ii. Write down the six typical **steps** involved during one fetch-execute cycle.

Fetch-execute cycle: _____

_____

_____

Steps: 1. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

[8]

(b) Define the terms: **word length**, **instruction set** and **control bus**.

Word-length: _____

_____

Instruction set: _____

_____

Control bus: _____

_____

[3]

(c) **Name** and briefly explain the **function** of any two **registers** found in the CPU.

1st Register: _____

Function: _____

_____

2nd Register: _____

Function: _____

_____

[4]