DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2012

| **FORM 3 (Option)** | **COMPUTING** | **TIME: 1h 30min** |

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

1. This question is about Computer Systems.

   a. Answer with **True** or **False.**

		True/False	[3]
i.	Keyboard, mouse, hard disk and RAM are all examples of hardware.		
ii.	Computers deal with information and not with data.		
iii.	**All** computers, including computerized devices like automatic washing machines etc., have a processor.		

   b. In which of the following type/s of jobs would you expect **computers to be better** [2] **suited** than humans? (Tick as appropriate.)
   The first one has been done for you.

	Statement	Answer
i.	Jobs requiring complex calculations	√
ii.	Jobs requiring creativity	
iii.	High precision repetitive jobs	

2. Most modern operating systems use a **GUI** (Graphics User Interface).

   a. What is a graphics interface? [1]

   _____

   b. Give **ONE** reason to show why non-computer experts prefer a graphics interface. [1]

   _____

   c. Modern Operating Systems allow us to organise files and folders in a **tree structure.** [1] Suggest **ONE** reason why users may prefer to use a tree structure of folders for their documents.

   _____

   d. How does the **clipboard** facility help users share data between different applications? [2]

   _____

   _____

3. **Wordprocessors**, **Spreadsheets** and **Graphics Package** are application software.

   a. Which of the above application software is **most suitable** for the following jobs? [3]

      i.   Keeping a family budget.

      ii. Writing personalized letters to everyone on a mailing list. _____

      iii. Producing a picture for a poster to advertise a school activity. _____

b. Mention a **feature** in a modern word processor to help the user:

i. Improve the presentation of his work [1]

_____

ii. In language skills [1]

_____

4. An antivirus helps us clear our system of viruses and is an example of utility software.

a. What is **utility software**? [1]

_____

b. Give **TWO characteristics** of a virus: [2]
i.

_____
ii.

_____

c. Mention **ONE other type of utility software,** besides an antivirus, and briefly describe its use. [2]

Utility Software

_____

Use

_____

_____

5.

a. What specialized **input device** would the following people use for the mentioned tasks? [2]

	Person	Task	Device
i.	Cashier at Supermarket	Obtaining item price for bill production	
ii.	Designer	Sketching a new logo	

b. Insurance companies often use OCR for the input of the clients' details on forms.

i. What does OCR stand for? [1]

_____

ii. Suggest **ONE** advantage of using OCR rather than manually inputting data. [1]

_____

iii. Suggest **ONE** possible shortcoming (fault) of OCR. [1]

_____

6. Printers often have a buffer area.

    a. Would you expect a buffer area to be **volatile** or **non-volatile** memory? [1]

    b. Why is buffering important when input and output devices are in use? [2]

    c. Suggest **TWO ways** in which inkjet printers and laser printers are different. [2]

	Inkjet Printers	Laser Printers
i.		
ii.		

7. This question is about accessing data from a storage device.
    a. Magnetic Tape allows **serial access** only.

        i. What is serial access? [2]

        ii. Suggest **ONE** application where serial access is suitable. [1]

        iii. Explain why serial access would not be suitable for use in a book lending library's computer system. [1]

    b. A solid state hard disk is different from a traditional magnetic hard disk because it is electronic and has **no moving parts**. In fact it works similar to a pen drive rather than to a traditional hard disk. [1]

        Suggest **ONE** reason why some laptops today have their operating system installed on a solid state hard disk (even if the application software and user data is then stored on a traditional hard disk).
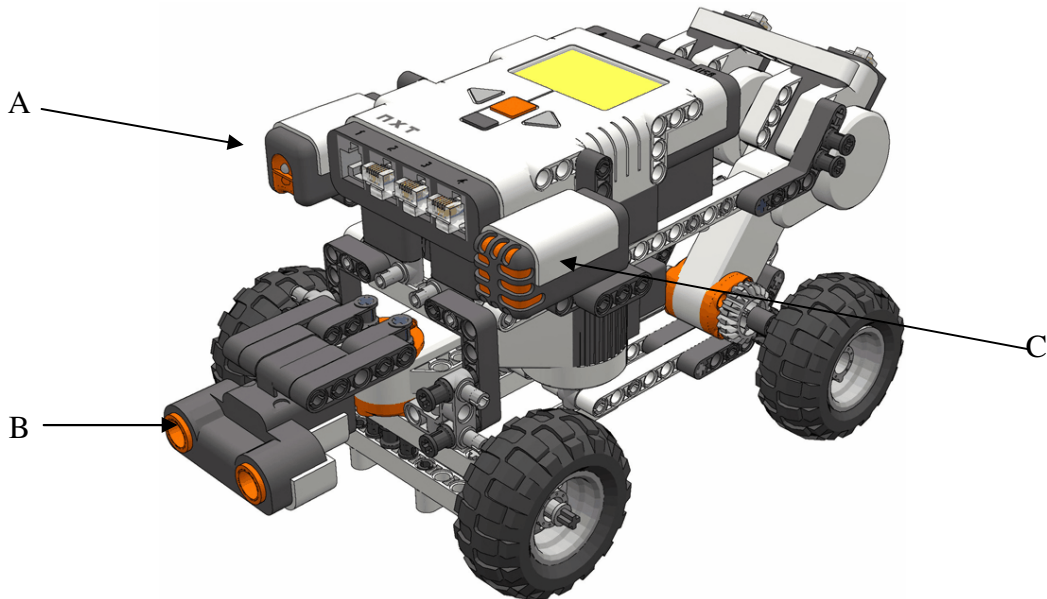
8. This question is about Internet use. [5]
    Fill in the blanks with a suitable word or phrase.

    a. A _____ is an application software we use to find and display web pages.

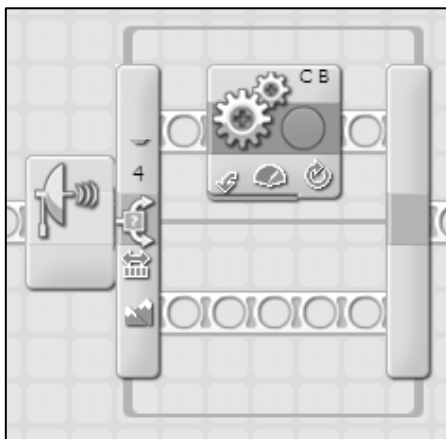   b. When one wants to use the World Wide Web to look up information on a particular subject one uses a _____.

c.   If one finds a webpage that s/he needs to access often, one should add it to her/his _____.

d.   One normally needs to enter her/his username and password before one can _____to her/his web-based e-mail account.

e.   Some text on a website can be clicked on to take you to another page; this type of text is called _____.

9.   The diagram shows a simple NXT robotic device.

A

B

C

a.   Which of the **sensors** A, B, C would you use to: [3]

    i.   Allow the device to realize when it's approaching a wall

    ii.   Make the device start moving only when someone claps

    iii. Differentiate between a white wall and a black wall

b.   Explain the **function** of the NXT instructions shown below: [2]
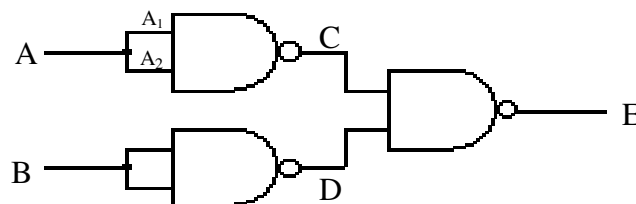
10. This question is about character sets.

    a. ASCII is a **7 bit** character set. Therefore how many characters can it represent? [1]

    _____

    b. What does the acronym ASCII stand for? [1]

    _____

    c. In ASCII the letter 'a' is represented by the binary pattern 1000001. What is the [2] **decimal equivalent** of this binary pattern?

    _____

    _____

    d. Suggest **ONE reason** why Unicode is prefered to ASCII. [1]

    _____

11. NAND gates are gates which give the opposite (inverse) output of an AND gate. This means that a NAND gate gives 0 only when both inputs are 1, else it outputs 1.

    a. Give the **truth table** of a NAND gate. [1]

Input A	Input B	Output
0	0	
0	1	
1	0	
1	1	

    b. The following logic circuit involves a series of NAND gates connected such that [4] collectively they function as a single OR gate.
    Prove that the circuit in fact functions as an OR gate.
    Hint: Complete the truth table below to help you.
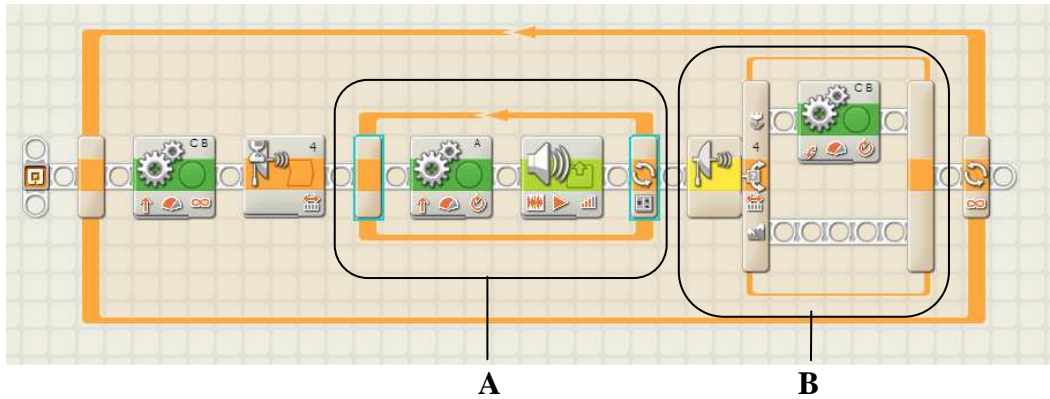   Note: When A is 0 A_1 and A_2 are also 0 etc.

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

    Proof

    _____

Section B

12. Programs like the one shown below can be created to make robotic devices perform specific tasks.

A   B

a. A **sequence** is one of the basic algorithm constructs and involves a number of instructions that will be executed in succession.

i. List and briefly explain the other two algorithm constructs. [4]

Construct	Explanation

ii. Look again at the picture above and identify the two constructs labelled A and B. [2]

A _____

B _____

b. Look carefully at the properties of the move block shown below and then answer the questions that follow by placing the numbers 'i' to 'iv' in the correct boxes. [3]
The first one has been done for you.

i. Mark (**i**) the section responsible for making the robotic car **move forward**.

ii. Mark (**ii**) the section responsible for the **speed** with which the robotic car moves.

iii. Mark (**iii**) the section responsible for determining **which motors** are being controlled by this move block.

iv. Mark (**iv**) the section responsible for how much the motor turns.

c. Flowcharts are used to design solutions to problems.

    i. What is a **flowchart**? [1]

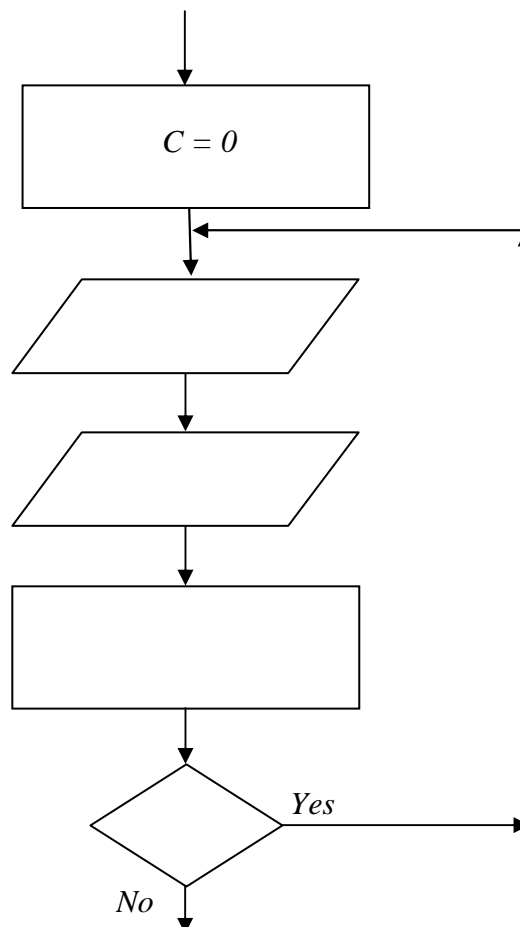   ii. **Underline** the correct terms: [2]

In a flowchart

- A move block is represented by (a process, an output, a decision) symbol.

- A sound block is represented by (a process, an output, a decision) symbol.

    iii. The following pictures show part of a looping block. The image on the right shows the properties of the block. [3]

The incomplete flowchart below represents the looping block above. Complete the flowchart.

13. A new computerised system is going to be developed for **a school library**.

    a. The System will involve 3 main **files**:

Student File	Including the fields: StudentID, Name, Surname, Date of birth, Class, Address, Telephone number

Book File	Including the fields: BookID, Name, Author, Year of publication, Shelf mark, Available

Loans File	

    i. Identify the field you would use as **keyfield** in the Student File and justify your answer. **[2]**
       Field: _____

       Reason: _____

       _____

    ii. Suggest a suitable **data type** for the fields in Book File. **[2]**

        (Some have been done for you)

Field	Data Type
BookID	
Name	Text
Author	
Year of publication	
Shelf mark	Text
Available	

    b. The new system will be a **relational database.**

    i. What is a **relational database**? **[1]**

       _____

       _____

    ii. Suggest **ONE advantage** of a relational database when compared to a system of separate files. **[1]**

       _____

c. At the end of every month the librarian needs to run a query for students who have overdue books that should have been returned that month and were not. The system needs to issue these students a fine.

i. What is a **query**?   [1]

_____

ii. Suggest a suitable **record structure** for the Loans File.   [4]

Field	Type

iii. Use the following information to draw **a flowchart** for the part of the database [4]
      program that will **calculate** and **output** the fine or overdue books.
      - The student will be charged 10c for every day since the due date.
      - Assume that the due date is stored in a variable called dateIn and that the last day of the month is stored in a variable called lastDay.