DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2013

Tra___

FORM 4 (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 a 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. Fill in the blanks with one of the following:
   The first one has been done to help you.

	GHz, bus, logic gate, instruction set, control unit, byte	
a.	The part of the CPU that manages CPU components.	*Control Unit*
b.	A small device that carries out a logical operation on its input/s to produce a logic output.	
c.	A group of 8 bits.	
d.	A unit of measurement for processor speed.	
e.	Physical connections that transfer data between the different parts inside a computer.	
f.	The complete set of instructions that a processor can deal with.	

2. Fill in the blanks with: [5]

GPS receiver, satellites, navigation, location, time.

   GPS makes use of _____ orbiting the Earth. It is a system that gives

   us information about our _____ and the _____.

   Many modern cars have a _____ that can help the user in

   _____. This is very useful, especially when we are in a foreign country.

3. Computers may be used in **CAD**, **CAM**, **CAL** and **simulations**.
   a. Fill in with one of the above applications: [3]

i.	The use of videoconferencing in a school's *eTwinning* project.	
ii.	The use of computer software to design the setup of a room.	
iii.	The use of robot devices in car manufacture.	

   b. Flight simulators are used to train pilots.

   i. What is the **advantage** of using computerised simulation rather than real planes in the training of pilots? [1]

   _____

   ii. Give a **disadvantage** of simulation-training. [1]

   _____

4. A computer system has different types of software.

a. Indicate whether the following are **System Software** or **Application Software**.
   The first one has been done to help you.

i.	Antivirus software	*System Software*
ii.	Web Browser	
iii.	Operating System	
iv.	Wordprocessor	

b. Give **two** differences between Tailor-Made and Off-The-Shelf packages. [2]

	Tailor-Made Packages	**Off-the-Shelf Packages**
i.		
ii.		

5. Documentation and Testing are important steps in the **System Lifecycle**.

a. Name **two** things one finds in a User Manual. [2]

   i.

   ii.

b. Mention **two** things one finds in the Program Documentation. [2]

   i.

   ii.

c. Underline the correct answer: [1]

   > Program documentation is used by the (*end-user, programming team*).

6. The System Lifecycle has a number of steps.

a. What is the **first** step of the System Lifecycle? [1]

b. Which of the following are **True** or **False**? [4]

i.	Errors during a parallel changeover are less likely to result in loss of data.	
ii.	A direct changeover involves more data redundancy.	
iii.	The feasibility study is done *after* the program is written and tested.	
iv.	System flowcharts need to be made *before* programming starts.	

7. a. Which gates do the following symbols represent?

i.		Gate: _____
ii.		Gate: _____

Look at the logic circuit below:
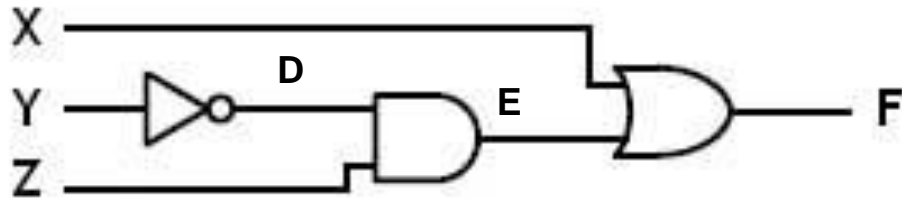
b. Complete the **truth table** for the above logic circuit.   [3]

X	Y	Z	D	E	F
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

8. **ASCII** is a 7-bit character encoding scheme. It can represent 128 (2^7) different characters.

a. How many **different characters** can an **8-bit** character encoding scheme represent?   [1]

_____

b. Extended ASCII is an 8-bit code. Mention **one advantage** of extended ASCII over   [1]
ASCII.

_____

c. Besides a letter, a 7-bit binary pattern can also represent a number.   [3]

i. What is the **decimal equivalent** of the **largest unsigned number** that can be
represented by a 7-bit pattern?

_____

ii.   What is the **decimal equivalent** of the **smallest unsigned number** tha
represented by a 7-bit pattern?

_____

iii. What is the **range of unsigned decimal numbers** that can be represented by a
7-bit pattern?

_____

9.   Computers store and process binary numbers.

a. | **Convert** the number 53 to 8-bit **binary**. | [1] |
Working

Answer: _____

b. | **Convert** the number 24 to 8-bit **binary**. | [1] |
Working

Answer: _____

c. | **Add** 24 and 53 in binary. | [2] |
Working

Answer: _____

d.   Where, inside the computer, is binary addition carried out?   [1]

_____

10. 'If' structures allow us to implement decisions in Java programs.

a.   **Complete** this code so that it outputs 'pass' if the variable *mark* is 50 or over.   [2]

if (_____){

   System.out.println (_____);

}

b.   Underline the Java **decision structure** from the below: [1]

| Comment, Switch, do…while |

c. Decisions are one of the three constructs (building blocks) of algorithms. M[...] [...]
two other algorithm constructs, besides decisions.

Construct 1	
Construct 2	

11. Which of the programming errors below are probably involved when: [5]

Logic error, syntax error, runtime error

a.	A program does not run.	
b.	Values entered by the user cause the program to crash.	
c.	The programmer has used the wrong formula in a calculation.	
d.	A program runs but gives the wrong results.	
e.	The programmer misspells a keyword.	

Section B – Answer all Questions

12. A school management system is being developed using Java.

a. The application has a class called 'Student' that has the following **properties**:

name, surname, group, totalMark

(* *totalMark* is a whole number out of a total of 1000)

i Answer **True** or **False**. [2]

Students will be entered into the system as objects of class Student.	
A Java class can only have one method.	

ii. Show how the following properties should be declared: [2]
The first one has been done to help you.

group	*String group;*
name	
totalMark	

b. Class Student will include a method called *enterStudent* that allows the user to [ ]
student details.

Fill in the blanks to complete the method enterStudent shown below:

Hint: Use the comments in the code to help you.
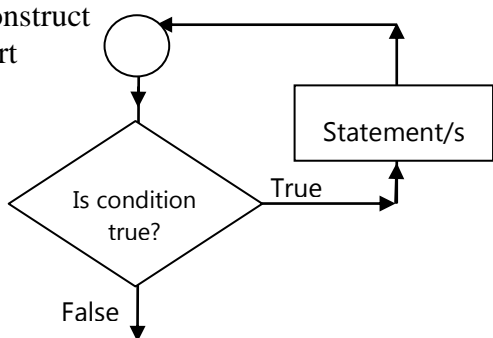
```
public void _____{
        System.out.print ("Enter name: ");
        this.name = (Keyboard.readString());
        System.out.print ("Enter surname: ");
        this.surname = (Keyboard.readString());
        System.out.print ("Enter group: ");
        this.group = (Keyboard.readString());
        int mark;

        _____{ // starts a loop to read 10 marks
          System.out.print ("Enter mark: ");
          mark = _____; //reads mark from the keyboard

          _____
          // the line above adds the mark entered to totalExamMark of the
              current object
        }
}
```

c. Java allows other looping constructs besides the one you mentioned in 'b'. Fill in   [5]
the blanks with one of the looping constructs below:

> *'while loop', 'do/while loop', 'for loop'*

i.	An unconditional looping construct.	
ii.	A conditional loop that may loop many times, once or not at all.	
iii.	A conditional loop that will execute loop contents at least once.	
iv.	A looping construct most useful when it is known beforehand how many times the program will loop.	
v.	Which looping construct does this flowchart represent?	

13. The CPU is found at the heart of a computer system.

a. What do the following stand for?

i.	CPU	
ii.	ALU	

b. **Fill in** with the words below. [5]

Wordlength, address space, system clock, data bus, address bus

i.	The number of bits the CPU can send, receive or process at a go.	
ii.	Carries data between the CPU and main memory.	
iii.	The number of memory locations a CPU can directly access.	
iv.	Its width determines the address space.	
v.	An electronic timer that partly determines CPU speed.	

c. The CPU has a number of registers.

i. What is a **CPU register**? [1]

ii. Explain the **function** of the following special purpose registers: [3]

Accumulator	
Program Counter	
Instruction Register	

d. Answer **True** or **False**. [4]

i.	CPU registers are volatile.	
ii.	Once an instruction is fetched from Main Memory it is stored in the ALU.	
iii.	A fetch instruction can only start at a signal from the System Clock.	
iv.	Cache memory is very fast volatile memory, so having more cache memory can improve performance.	