

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

Track 2

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 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. **Identify** the types of software in the table below by using the terms in the following box. [5]
(The first one has been done for you)

e-mailing software, off-the-shelf software, system software, CAD software, tailor-made software, image editing software

	Question	Answer
a.	A generic term for mass-produced application software that can be readily bought.	<i>Off-the-Shelf software</i>
b.	A generic term for software that is made to suit a firm's particular needs.	
c.	Software that allows us to send and receive short messages using a computer network.	
d.	A type of software used by architects, engineers etc to design their prototypes.	
e.	A type of software that a publishing company may use to edit and enhance photos.	
f.	Software responsible for managing the computer's resources.	

2. Use the following computer applications to name the tasks listed in the table below. [5]
(The first one has been done for you)

Simulation, CAD-CAM, medical diagnosis, e-government, CAL, robotics

	Question	Answer
a.	The use of computers and educational software in education.	<i>CAL</i>
b.	The use of computers to design and make cars.	
c.	The use of web-based services to download forms required by government agencies.	
d.	The use of computer software and hardware rather than real planes to train pilots.	
e.	The use of monitoring machines in hospitals to diagnose back problems.	
f.	The use of computer-controlled machines in a factory that can perform high-precision jobs.	

3. Convert:

(Show your working clearly in the space provided)

- a. 45 to 8-bit **unsigned binary**.

[2]

Space for working

Answer _____

- b. Add the following two 8 bit binary registers: 10010011 + 10001110

[2]

Space for working

Answer _____

- c. If the above is carried out in an 8 bit system, what kind of error will your answer in (b) generate? [1]

4. This question is about the range of numbers that can be represented in an 8-bit register.

- a. What is the **smallest unsigned binary number** that can be represented in an 8-bit register? [2]

- b. Give the **decimal equivalent of the largest unsigned binary number** that can be represented in an 8-bit register. [2]

- c. Hence what is the **range** (in decimal) of unsigned numbers that can be represented in an 8 bit register? [1]

5. This question is about commercial applications of computers.

a. Answer the following with a **True** or **False**. [3]

	Answer
i. e-POS makes producing bills faster	
ii. e-POS is online shopping	
iii. e-POS often slows down bill production	

b. What does **EFT** stand for? [1]

c. Suggest one possible **problem** associated with EFT. [1]

6. A school has specially-designed software to help in the administration. Ann, Mark and Joseph use and manage this software in the school.

- Ann is going to update the existing software.
- Joseph is the school technician who will advise the head of school about new hardware the school is investing in.
- Mark is the school assistant head responsible for entry of data into the system to produce time tables etc.

a. Underline the name of the person who may want to use the following [3]
documentations.

- i. Program Documentation: (Ann, Joseph, Mark)
- ii. Technical Documentation: (Ann, Joseph, Mark)
- iii. User Documentation: (Ann, Joseph, Mark)

b. Mention two things you expect to find in the user documentation: [2]

- i. _____
- ii. _____

7. The CPU is at the heart of any computer system.

a. Three **CPU characteristics** that determine CPU performance are described below. [2]
Name these characteristics.
(The first one has been done for you)

Description	Number of bits the CPU can handle at a time
Characteristic 1	Wordlength

Description	Very fast volatile memory that holds recently accessed data
Characteristic 2	
Description	The number of CPU cycles per second
Characteristic 3	

b. The ALU is part of the CPU.

i. What does **ALU** stand for?

[1]

ii. What is the **role** of the ALU?

[2]

8. Software is tested before being distributed.

a. One very common type of programming error is a Syntax error.

[4]

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

		True/ False	
i.	A program that has a syntax error will run but give the wrong result.		[1]
ii.	A program that has a syntax error will not run.		[1]
iii.	A program that has a syntax error will crash while the program is running.		[1]
iv.	Forgetting a semicolon (;) at the end of a line of code generates a syntax error.		[1]

b. **Name** the type of error that occurs when a programmer uses the wrong formula for a calculation (e.g. using the formula for area when trying to find the volume).

[1]

9. A database is a structured collection of related data.

[1]

a. Suggest **one advantage** of computerizing a manual database system.

b. Suggest four important fields in the **record structure** for a students' file in a school database. Give the data type for each field.

[2]

Field name	Field Type

- c. Which of the above fields would you establish as the **keyfield**? Why?

Field:

Reason:

10. Database files (tables) can be linked.

- a. Suggest **two advantages** of linking files in databases: [2]

i.

ii.

- b. A DVD shop has a database system that includes the following three files (tables):

DVD File	(includes DVD details like: DVD Id, DVD name, star actor etc)
Client File	(includes Client detail like: Client Id, name, address etc)
Lending File	(includes Lending Id, DVD Id, Client Id, Date Rented, Returned)

- i. Suggest **one** other field for DVD file. [1]

- ii. The above three files would be linked. **Tick** the correct statements below. [2]
(The first one has been done for you)

- The field 'DVD id' would be used to link the Lending file to the DVD file.	√
- The field 'name' in the client file could be used to link the Client File to the Lending file.	
- The field 'Client ID' would be used to link the Client File to the Lending File.	

11. The following is a simple Java class that uses lejos instructions to control a robotic car.

```
import lejos.nxt.*;
```

```
public class roboticCar {
```

```
    public static void main (String args [])
```

```
        Motor.B.regulateSpeed(true);
```

```
        Motor.C.regulateSpeed(true);
```

```
        Motor.B.setSpeed(300);
```

```
        Motor.C.setSpeed(300);
```

```
        Motor.B.forward();
```

```
        Motor.C.forward();
```

```
        Timer.Sleep (50);
```

```
        LCD.drawString("Ready", 0, 0);
```

```
        Timer.Sleep (50);
```

```
    }
```

```
}
```

- a. Use the above class to give an example of the following:
- i. The name of this class _____ [1]
 - ii. A method that is called to determine the car's speed _____ [1]
 - iii. The third party class in which the sleep method is _____ [1]
 - iv. A Java keyword _____ [1]
- b. How would you change the above code such that your robotic car moves forward **twice as fast**? (Correctly rewrite the line/s you would change) [1]
-

Section B – Answer ALL Questions

12. Below is a simple INCOMPLETE Java class that deals with the marks of a student group.

```
public class GroupMarks{
    public void enterMarks(){
        System.out.println ("ENTER MARKS");
    }

    public void viewStatistics(){
        System.out.println ("VIEW STATISTICS");
    }

    public void quitApp(){
        System.out.println ("QUITTING");
    }

    public void mainMenu(){
        int choice;

        System.out.println ("MENU");
        System.out.println ("1. Enter Marks");
        System.out.println ("2. View Statistics");
        System.out.println ("3. Quit");

        choice = Keyboard.readInt();

        switch (choice){
            case 1: {
                enterMarks();
            }
            case 2: {viewStatistics();
            }
            case 3: {quitApp();
            }
        }
    }
}
```

- a. The above switch has a small problem because when option 1 is chosen, option 2 and 3 are also executed, and when option 2 is chosen option 3 is executed as well.

Fill in the dotted lines below to fix this problem.

```
switch (choice){
    case 1: {
        enterMarks();
        .....;
    }

    case 2: { viewStatistics();
        .....;
    }

    case 3: { quitApp();
    }
}
```

- b. The user may enter invalid menu options like '5' or '7'. [2]

Write down the line you would include **before** closing the switch block in order for the words 'Invalid choice' to be displayed if any number besides 1, 2 and 3 are entered by the user.

- c. The marks will be read into an array called markList. This array will be one of the properties of the class GroupMarks.

- i. Complete the code to show how you would **declare** and **assign** the array markList assuming: [2]

- marks can be whole numbers only
- the maximum number of students in a group is 25

_____ [] markList = new _____ [_____];

- ii. In the method enterMarks() the students' marks will be read into the array markList using a for loop.

Complete the code for this **loop** to enter marks into markList.

- assume any class necessary for data input is already imported
- assume that if an object of this class is needed it is called Input

```
for (int i=_____;i_____;i_____) {
    System.out.println ("Enter mark: `");
    markList[___] = _____;
}
```

[5]

- d. **Complete** the code such that the Menu is repeatedly displayed until the user selects 3 to exit.

```
public void mainMenu(){
    int choice;

    .....

    System.out.println ("MENU");
    System.out.println ("1. Enter Marks");
    System.out.println ("2. View Statistics");
    System.out.println ("3. Quit");
    choice = (Input.nextInt());
    switch (choice){
        case 1: {
            enterMarks();

        }
        case 2: {
            viewStatistics();
        }

        case 3: {quitApp();
        }

    }

    .....;
}
```

- e. The class below is another class in the same application.

```
public class MarksApp{
    public static void main (String args[]){
        GroupMarks group1 = _____ GroupMarks();
        group1.mainMenu();
    }
}
```

- i. **Complete** the following line so that it creates an object called group1 which is an instance of GroupMarks

GroupMarks group1 = GroupMarks();

[1]

- ii. Explain the **function** of the following line:

group1.mainMenu();

[1]

- iii. This application has many methods. From which method does execution start?

[1]

13. The system lifecycle is the steps involved in the development of a new computerized system.

- a. Number the following steps of the system lifecycle so that they are in order. [6]
(The first step has been labeled for you)

Step	Action
	Present system study and analysis
	Control and Review
	Programming, Testing and Documentation
	Design of new computerised system
1	Problem definition and Feasibility study
	System maintenance
	Implementation and changeover methods

b. Answer the following:

- i. Suggest **a method** that the person/s in charge of the System Analysis uses to collect the necessary information. [1]

Method

- ii. Mention **two reasons** why system maintenance may be required. [2]

Reason 1

Reason 2

c. Two types of **changeover methods** are: [2]

- Direct Changeover
- Parallel Changeover

Fill in the table with the changeover method that is best suited.

	Situation	Changeover Method
i.	A small school library needs a changeover method that will not slow down book lending and so will not involve entering data twice: in the old and new system.	
ii.	A banks system that deals with important transactions and needs a changeover method that reduces the risk of loss of data.	

- d. Fill in the blanks of the paragraph below with the following words:

Reasonable, bugs, unreasonable, plan

Developed programs need to be very well tested for _____ before they can be distributed. The testing procedure follows a rigorous _____ that is drawn up by systems analysts. The program is tested with _____ data – where acceptable data is input into the system to make sure it gives the correct results – and it is also tested with _____ data – which means that nonsense or unacceptable data is entered to make sure that the system gives an error statement without crashing.

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