

**JUNIOR LYCEUM ANNUAL EXAMINATIONS 2008**  
DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION  
Educational Assessment Unit

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**FORM 4 (Option)**

**COMPUTER STUDIES**

**TIME: 1 hr 30 min**

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

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

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***Directions to Candidates:***

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

*Answer any **TWO** questions from **Section B** on separate foolscaps;*

*The use of flow chart template is permitted;*

*Calculators are **NOT** allowed;*

*Good English and orderly presentation are important.*

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*For office use only:*

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Paper<br>Total | Course<br>Work | Final<br>Mark |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----------------|----------------|---------------|
| Max      | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5  | 5  | 15 | 15 | 15 | 85%            | 15%            | 100%          |
| Mark     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |                |                |               |

## Section A - Answer all Questions

- 1 (a) Validation checks are used to detect errors during the entry of data. One type of validation check is **range check**.
- Briefly describe what range checking is.
  - Give an example of a range check to justify your description.

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

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

[2]

- (b) What is **data verification**?

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

[1]

- (c) **Check digits** are used to check whether a numeric code has been inputted correctly. Modulo-11 is a typical method of generating a check digit. The procedure to generate the check digit is the following:

- Each digit of the code is assigned a weight (see example below)
- Each digit is multiplied by the weight and the products added together
- The sum of products is divided by 11 and the remainder obtained
- The remainder is subtracted from 11 to give the check digit
- Exceptions: If the remainder is 0 the check digit is 0 and if the remainder is 1 the check digit is X

Example: To calculate the check digit for 3245

|                            |                         |   |    |    |
|----------------------------|-------------------------|---|----|----|
| Code:                      | 3                       | 2 | 4  | 6  |
| Weights:                   | 5                       | 4 | 3  | 2  |
| Multiply by weight         | 15                      | 8 | 12 | 12 |
| Add products               | $15 + 8 + 12 + 12 = 47$ |   |    |    |
| Divide by 11               | 4 remainder 3           |   |    |    |
| Subtract remainder from 11 | $11 - 3 = 8$            |   |    |    |
| Check digit = 8            | Complete code is 32468  |   |    |    |

Use the Modulo-11 system to generate the complete code for:

- 1587
- 2059

**Code for 1587:** \_\_\_\_\_

**Code for 2059:** \_\_\_\_\_

[2]

- 2 (a) Study the Pascal snippet below.

```
Program exam;  
Var  
  X, Y, Z : integer;  
Begin  
  Write(' Enter 2 numbers between 0 and 250 ');  
  Readln(Y,Z);  
  X := Y + Z;  
  ....
```

Provide **two** examples of **testing** that may be done on the two inputted numbers.

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

\_\_\_\_\_

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

\_\_\_\_\_

[2]

- (b) Name the **three** types of errors that are commonly done while programming.

**Names:** \_\_\_\_\_

[1]

- (c) **Dry Run** and **Trace Tables** are used to test the code of a program. Differentiate between the two.

**Dry Run:** \_\_\_\_\_

\_\_\_\_\_

**Trace Table:** \_\_\_\_\_

\_\_\_\_\_

[2]

- 3 (a) i. What is a **computer simulation**?  
ii. Give an example where a computer simulation may be used.

**Simulation:** \_\_\_\_\_

\_\_\_\_\_

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

[2]

- (b) i. What does the acronyms **CAD** and **CAM** stand for?  
ii. Briefly describe how CAD and CAM are related.

**CAD:** \_\_\_\_\_

**CAM:** \_\_\_\_\_

**Description:** \_\_\_\_\_

\_\_\_\_\_

[2]

- (c) **E-Government** provides services and information to the citizen via the Internet. Give an example of one **service** which is available in e-government.

**Service:** \_\_\_\_\_

\_\_\_\_\_

[1]

- 4 A computer system is made up of several items such as: **Control Unit, Arithmetic Logic Unit, RAM, ROM, Input devices, Output devices** and **Secondary store**. Using the terms in **bold**, draw a block diagram of a computer system showing clearly the **data flow**.  
*Space for block diagram:*

- (b) (i) What is the **word length** of a computer?  
(ii) Name the **bus** that is typically associated with the word length.

[3]

**Word length:** \_\_\_\_\_

\_\_\_\_\_

**Bus:** \_\_\_\_\_

[2]

- 5 (a) Various types of **documentation** are prepared when computerizing a system. Give **one** reason why documentation is important.

**Reason:** \_\_\_\_\_

\_\_\_\_\_

[1]

- (b) Differentiate between **User Documentation** and **Program Documentation**.

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

\_\_\_\_\_

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

\_\_\_\_\_

[2]

- (c) Name one section of the **user documentation** that may accompany a software package, and describe what it consists of.

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

**Description:** \_\_\_\_\_  
\_\_\_\_\_

[2]

- 6** (a) Show how -75 is stored in an 8 bit register using **2's Complement**.

*Space for working:*

**Answer:** \_\_\_\_\_

[1]

- (b) **Convert** the two decimal numbers 249 and 140 to binary, and then **add** the two binary numbers.

*Space for working:*

**249=** \_\_\_\_\_

**140=** \_\_\_\_\_

**Addition=** \_\_\_\_\_

[2]

- (c) What happens if the result of part (b) were to be stored in an 8 bit register?

**Answer:** \_\_\_\_\_


[1]

- (d) What is the minimum number of bits required to store a character set which consists of: the digits from 0 to 9, the capital and small letters of the English alphabet (26 characters each) and the four characters '+' (plus), '-' (minus), '\*' (asterix) and '/' (slash).

**Answer:** \_\_\_\_\_

[1]

- 7 The table below shows part of a database used by the school administration to store information about the school's staff. Two field names together with their data types and size/format have been prepared. Fill the missing cells in the table with **five** appropriate **field names** together with their **size/format** according to the given **data types**.

| Field Name  | Data Type  | Size/Format |
|---|------------|-------------|
| Name  | Text       | 20          |
| Surname   | Text       | 20          |
|  | Autonumber |             |
|   | Text       |             |
|   | Number     |             |
|   | Date/Time  |             |
|   | Yes/No     |             |

[5]

- 8 James (J), Sue (S) and Mike (M) are three shareholders in a company and they have 650, 300 and 300 shares respectively. Whenever a decision is to be made they take a vote by pressing a switch in front of them if they are in favour. The vote passes if:

- James alone is in favour
- Both Sue and Mike are in favour
- All three are in favour.

When the vote passes a bell rings.

- (a) Using **J**, **S** and **M** as inputs and **B** as output, design a **circuit** which makes the bell rings. Assume that logic 1 at an input implies a vote in favour and logic 1 at the output implies the bell rings.

*Space for Circuit.*

[2]

- (b) Draw the **truth table** for the circuit of part (a) above.

*Space for Truth Table.*

[2]

- (c) Using **J**, **S**, **M** and **B** write the **Boolean expression** for the circuit.

**B** = \_\_\_\_\_

[1]

- 9 (a) i. What is the **Internet**?  
ii. Give an **advantage** and a **disadvantage** when using the Internet for **educational** purposes.

**Internet:** \_\_\_\_\_

**Advantage:** \_\_\_\_\_

**Disadvantage:** \_\_\_\_\_

[3]

- (b) i. What is **e-commerce (e-business)**?  
ii. Give a **disadvantage** of e-commerce.

**E-Commerce:** \_\_\_\_\_

**Disadvantage:** \_\_\_\_\_

[2]

- 10 Draw a **flowchart** for the following task:  
- A user is asked to input **two** numbers **A** and **B**  
- The value of **A** divided by **B** is calculated, and stored in **C**  
- If zero (0) is inputted for **B** a message is shown informing the user that 'Division by 0 Not Allowed'  
- If **B** is not zero (0) the value of **C** correct to **2 decimal places** is output  
*Space for flowchart:*

- 11 Write a **Pascal program** for the task of question 10.  
*Space for program.*

[5]

[5]

## Section B – Answer any TWO Questions

- 12 (a) An important stage in **Systems Analysis** is gathering information on the present system. Apart from interviews, **name** and **describe two** other methods how information may be gathered. [4]
- (b) **Name** and **explain** an **advantage** and a **disadvantage** when performing an interview to gather information. [2]
- (c) Another stage in Systems Analysis is **Design**.  
i. Why is design important?  
ii. **Describe two** important features which need to be designed. [5]
- (d) i. **Name** and **describe** one **changeover** method.  
ii. For the mentioned changeover, provide an **advantage** and a **disadvantage**. [3]
- (e) What is **System Maintenance**? [1]
- 13 Write a Pascal program for the following task:  
Tom deposits €1500 in a bank which gives 6% interest per annum (yearly). At the end of each year the interest is added to the amount which becomes the new deposit for the following year. Tom wants to find the number of years needed for his initial deposit of €1500 to exceed €2000 and what the amount at the end of the year would be. The output should be displayed on a yearly basis and should look as follows:
- | Year | Deposit | Interest | Total   |
|------|---------|----------|---------|
| 1    | 1500.00 | 90.00    | 1590.00 |
| 2    | 1590.00 | 95.40    | 1685.40 |
| 3    | ...     |          |         |
- The total first exceeds 2000 euro at the end of year: ?  
The amount is: ? euro [15]
- 14 (a) Name **five** registers found in the **central processing unit** and **explain** their function. [5]
- (b) The sequence of operations involved in executing an instruction is known as the **Fetch-Execute Cycle**. Briefly explain the steps involved during the cycle. [5]
- (c) i. Define the terms: **instruction set**, **opcode** and **operand** as used in assembly language.  
ii. Give an example of an **arithmetic instruction** in assembly language that includes both the opcode and the operand. **Explain** what the instruction does. [5]