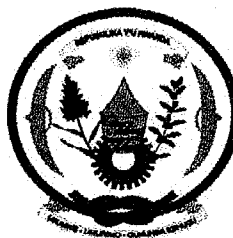


Computer Science

016

19 Nov.2012 8.30 am – 11.30 am

REPUBLIC OF RWANDA



RWANDA EDUCATION BOARD (REB)

ADAVANCED LEVEL NATIONAL EXAMINATIONS 2012

SUBJECT: COMPUTER SCIENCE

COMBINATIONS : MATHS-COMPUTER SCIENCE-ECONOMICS: MCE

MATHS-PHYSICS-COMPUTER SCIENCE: MPC

DURATION : 3 HOURS

INSTRUCTIONS :

This paper consists of **three** sections: **A, B** and **C**.

Section A: Attempt **all** questions.

(55 marks)

Section B: Attempt **three** questions.

(30 marks)

Section C: Attempt **any one** question.

(15 marks)

SECTION A: Attempt all questions (55 marks)

1. What is a computer program? (3 marks)
2. What is computer programming? (3 marks)
3. a. Explain the term *stored procedure*. (3 marks)
b. Briefly explain the advantages of using stored procedures. (6 marks)
4. What will be the output of the following code? (5 marks)

```
#include<stdio.h>
#define max 10+2
int main()
{
    int i;
    i=max*max;
    printf("%d",i);
    return 0;
}
```

5. In the table bellow give and explain with examples the 6 Arithmetic Operators of Visual Basic? (12 marks)

Each Operator 1 mark, Meaning in words 0.5 marks,

Example (Arithmetic expression) 0.5 mark.

Operator	Meaning in words	Example (Arithmetic expression)

6. a) What is Visual Basic? (2 marks)
b) How is VB program made up? (3 marks)
7. What are the responsibilities of a DBA (Database Administrator)? (4 marks)
8. Why does a DBMS interleave the actions of different transactions instead of executing transactions one after the other? (4 marks)
9. Explain the following terms briefly: (10 marks)

a) attribute,	b) entity,	c) relationship,
d) relationship set,	e) one-to-many relationship,	f) many-to-many relationship,
g) participation constraint,		h) weak entity set,
i) aggregation,		k) role indicator.

SECTION B: Attempt any three questions from this section (30 marks)

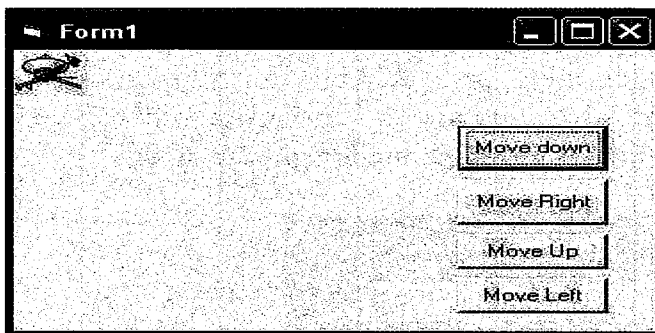
10. GCD of two numbers is a largest positive numbers which can divide both numbers without any remainder. For example GCD of two numbers 4 and 8 is 2 since 2 is the largest positive number which can divided 4 as well as 8 without a remainder. Write a c program for finding gcd (greatest common divisor) of two given numbers. (10 marks)

11. Answer the questions below concerning the following fragment of code in C++.

```
int n;
{
    cout << "Enter an integer: ";
    cin >> n;
    if (n < 10)
    {
        cout << "less than 10" << endl;
    }
    else if (n > 9)
        cout << "greater than 9" << endl;
    else
        cout << "not interesting" << endl;
}
```

- What will be the output of the fragment above if the user enters the integer value 0? **(2.5 marks)**
- What will be the output of the fragment above if the user enters the integer value 15? **(2.5 marks)**
- What will be the output of the fragment above if the user enters the integer value 7? **(2.5 marks)**
- What values for n will cause the output of the fragment above to be "not interesting"? **(2.5 marks)**

12. Below is a program that can move an object up, down, left, and right every time you click on a relevant command button. The code is such that `Image1.Top = Image1.Top + 100` which makes the distance increase or decrease every time a user clicks on the command button. For example, if the initial position of image1 is 1000 twip from the top, after one click, the distance from the top will be 1100, and the next distance will be 1200 and so on. Write the program for all the four buttons that allows you to move the image in four directions by clicking any of the four buttons. **(10 marks)**



13. Explain how the following steps are performed in JDBC:

- Connect to a data source. **(4 marks)**
- Start, commit, and abort transactions. **(4 marks)**
- Call a stored procedure. **(2 marks)**

14. Consider the following relations:

Student (*snum*: integer, *sname*: string, *major*: string, *level*: string, *age*: integer)

Class (*name*: string, *meets at*: string, *room*: string, *fid*: integer)

Enrolled (*snum*: integer, *cname*: string)

Faculty (*fid*: integer, *fname*: string, *deptid*: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Write the following queries in SQL. No duplicates should be printed in any of the answers.

- a) Find the names of all Juniors (level = JR) who are enrolled in a class taught by 1Teacher. **(4 marks)**
- b) Find the age of the oldest student who is either a History major or enrolled in a course taught by one Teacher. **(6 marks)**

SECTION C : Attempt any of one question from this section (15 marks)

15. Write a c program for ATM transaction while currencies are 1000,500 and 100. **(15 marks)**
16. An airplane has a registration number, type and location (City Airport base of the airplane). Each airplane type is described by its name (Boeing 747, Airbus A340 ...), its weight, its capacity and range. A company technician has a name, number (matriculate), address (city of residence), phone number, salary and is an expert on one or several types of airplane during a given period (beginning date and end date). A driver is described by the same attributes as a technician. In addition it must pass an annual medical examination. Each plane must also pass a number of testing work. Each test has a number that identifies a name and a minimum value (a threshold to be reached). We want to keep the date and status of each test. Each flight is commanded by a single pilot on one plane A flight departure city (Departure_City) and city of arrival (Arrival_City), time of departure (Departure-hour) and time of arrival (arrival_hour). Make a conceptual data model (entities relationship and associations model). Do not forget the cardinalities and underline the keys. **(15 marks)**
17. Knowing that the formula to compute the volume of a cylinder is $v = \pi \cdot (r^2) \cdot h$ where $v =$ volume; $\pi = 22/7$; $r =$ radius and $h =$ height. Write a required code to make a program that calculates the volume of a cylinder using the VB interface as designed bellow: **(15 marks)**

When you run the program, you should be able to see the interface as shown in. If you enter a value each in the radius box and the height box, then click OK; the value of the Volume will be displayed in the volume box.

NB: Using the function Str\$. The declaration step is not required.