MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS 2019/2020 ACADEMIC YEAR
SECOND YEAR FIRST SEMESTER

SCHOOL OF SCIENCE
BACHELOR OF COMMERCE

COURSE CODE: BCM 2103
COURSE TITLE: INTRODUCTION
TO PROGRAMMING

DATE: 11-12-19   **TIME: 0830-1030 HRS**

INSTRUCTIONS TO CANDIDATES

Answer Question **ONE** and any other TWO questions

**SECTION A** (30Marks): Answer **all** questions from this section

QUESTION 1

(a) Write a java program to display your name and admission number on a dialog box　　　　　　(3 Marks)

(b) What does the following code print?　　　　　　(4 Marks)

System.out.println("\n**\n***\n****\n*****");

(c) Programming errors are unavoidable, even for experienced programmers. Errors can be categorized into three types, list and explain them (6 Marks)

(d) Write a program that will output the following　　　　　(4 Marks)
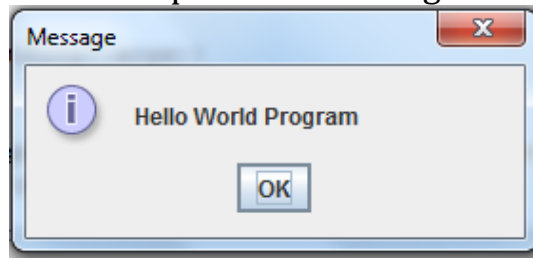
(e) Write the code for the calculate area button to display the area on jLabel3 using the variables indicated in the following figure　　　　(5 Marks)
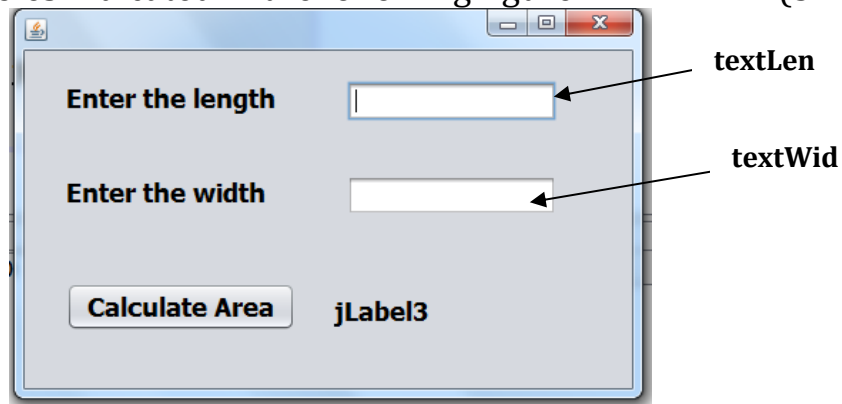
(f) Explain the importance of program documentation　　　　(3 Marks)

(g) What is the output of the following program　　　　(3 Marks)

```
public class Prg {
    public static void main(String args[]){
        System.out.print(20+ 1.34 + "A" + "B");
    }
}
```

(h) Explain garbage collection in the context of Java　　　　(2 Marks)

SECTION B (40Marks): Answer **TWO** questions from this section

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QUESTION 2

(a) Write the code for the calculate average button to display on jLabel4 the average grade of the subjects entered on the textbox with the variables indicated. (8 Marks)
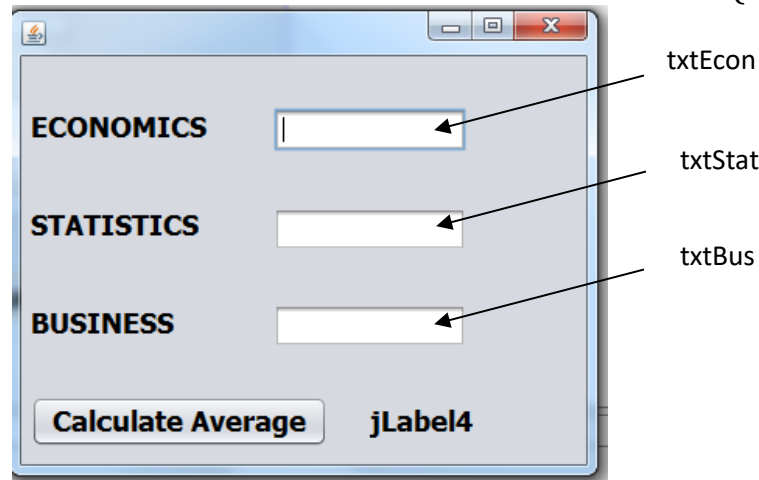
(b) Write a program that reads in investment amount, annual interest rate, and number of years, and displays the future investment value using the following formula: (12 Marks)

futureInvestmentValue=investmentAmount *
$(1+monthlyInterestRate)^{numberOfYears*12}$

For example, if you enter amount 1000, annual interest rate 3.25%, and number of years 1, the future investment value is 1032.98.

QUESTION 3

(a) Give two sources of runtime error (2 Marks)
(b) Write a program that displays the result of (5 Marks)

$$\frac{9.5 \times 4.5 - 2.5 \times 3}{45.5 - 3.5}.$$

(c) Identify three line numbers with errors and explain how to fix them in the following code: (3 Marks)

```
1 public class Test {
2 public void main(string[] args) {
3 int i;
4 int k = 100.0;
5 int j = i + 1;
```

```
6
7 System.out.println("j is " + j + " and
8 k is " + k);
9 }
10 }
```

(d) Translate the following algorithm into Java code: (5 Marks)
   Step 1: Declare a double variable named miles with initial value 100;
   Step 2: Declare a double constant named MILES_PER_KILOMETER with value 1.609;
   Step 3: Declare a double variable named kilometers, multiply miles and MILES_PER_KILOMETER, and assign the result to kilometers.
   Step 4: Display kilometers to the console.
   What is kilometers after Step 4?

(e) Write a java application that asks the user to enter two integers, obtains them from the user and prints their sum, product and difference (5 Marks)

QUESTION 4

(a) Write a pseudocode and a java program that computes loan monthly payments. The loan can be a car loan, a student loan, or a home mortgage loan. The program lets the user enter the interest rate, number of years, and loan amount, and displays the monthly and total payments. The formula to compute the monthly payment is as follows: (10 Marks)

$$monthlyPayment = \frac{loanAmount \times monthlyInterestRate}{1 - \dfrac{1}{(1 + monthlyInterestRate)^{numberOfYears \times 12}}}$$

(b) Suppose you save Kshs. 100 each month into a savings account with the annual interest rate 5%. So, the monthly interest rate is 0.05 / 12 = 0.00417. After the first month, the value in the account becomes
100 * (1 + 0.00417) = 100.417
After the second month, the value in the account becomes
(100 + 100.417) * (1 + 0.00417) = 201.252
After the third month, the value in the account becomes
(100 + 201.252) * (1 + 0.00417) = 302.507
and so on.
Write a program to display the account value after the sixth month. (10 Marks)

//END