### FINAL EXAMINATION
SECOND SEMESTER SESSION 2008/2009

**CODE / COURSE** : TIA1013 – BASIC PROGRAMMING

**DATE** : 23 APRIL 2009 (THURSDAY)

**TIME** : 8:30 A.M. – 11:00 A.M. (2 ½ HOUR)

**VENUE** : KYM, KIA, DP 4(1) FTM, DP 4(3) FTM

**INSTRUCTION** :

1. This book script contains ELEVEN (11) printed pages excluding the cover page.
2. Answer ALL the questions in the spaces provided.

<table>
<thead>
<tr>
<th>MATRIC NO. :</th>
<th>(in words)</th>
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<th>GROUP :</th>
<th>TABLE NO. :</th>
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PLEASE DO NOT OPEN THIS QUESTION BOOKLET UNTIL INSTRUCTION IS GIVEN.
SECTION A: MULTIPLE CHOICES QUESTIONS (10 MARKS)

Instruction: Circle the correct answer.

1. Below are examples of application softwares EXCEPT
   A. Windows Operating System
   B. Student Management System
   C. Hotel Reservation System
   D. Stock Management System

2. Which of these statements is NOT TRUE when processing a JAVA program?
   A. Editor is used to write Java code using Java syntax (source code)
   B. Compiler is used to compile the source code for correctness of syntax and translate into bytecode
   C. Loader is used to transfer the compiled code (bytecode) into main memory
   D. Interpreter is used to read and translate each bytecode instruction into assembly language

3. The diagram below is referring to a(n) ________________

   [Bus]

   A. object
   B. class
   C. method
   D. attribute

4. ________________ refers to situation where we hide the details of a class.

   A. Inheritance
   B. Polymorphism
   C. Encapsulation
   D. Abstraction

5. Which of the following precisely explains a Java “source code”?

   A. A result of a compiled java program and is saved in a “.class” file.
   B. Any java codes that can be executed by the Java Virtual Machine.
   C. A bytecode understood by the Java Virtual Machine.
   D. Codes written by a programmer which are saved in a “.java” file
6. Java is designed for use in embedded consumer electronic applications and intended to replace the ________________ language.
   A. C
   B. C++
   C. Java
   D. Cobol

7. Below are types of primitive data EXCEPT
   A. Numeric
   B. Character
   C. Boolean
   D. String

8. The format specifier %d is used to print out a(n) ________________ value.
   A. Integer
   B. Double
   C. Float
   D. Character

9. ________________ will produce a line separator.
   A. %ls
   B. %ln
   C. %l
   D. %n

10. Which of these requirements that need to be clarified first when using value-returning method?
   I) Name of the method
   II) Data type of the value computed (value returned) by the method (called the type of the method
   III) Number of parameters (if any)
   IV) Data type of each parameter
   A. I and II only
   B. I, II and III only
   C. II and III only
   D. I, II, III and IV
SECTION B: STRUCTURED QUESTIONS (60 MARKS)

1. Give THREE (3) level of programming languages: (3 marks)
   
   i) 

   ii) 

   iii) 

2. Give TWO (2) differences between Overriding and Overloading in Polymorphism concept. (4 marks)

<table>
<thead>
<tr>
<th>Overriding</th>
<th>Overloading</th>
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3. Give TWO (2) access modifiers that can encapsulate the attributes of a class. (2 marks)

4. State TWO (2) types of Java programs and explain each type. (4 marks)

5. After execution of the code fragment below, what is the value of variable a? (2 marks)

   ```java
   int a, x = 45, y = 7, z = 3;
   a = (--x + 5) / y % 3 - z;
   ```
   
i) 
   
ii) 

7. What is the output for the statement below?
   
   ```java
   System.out.print("//\\n//\\t\\");
   ```
   
   (2 marks)

8. State **ONE (1)** difference between `next()` and `nextLine()` methods in `Scanner` class. 
   
   (2 marks)

<table>
<thead>
<tr>
<th><code>next()</code></th>
<th><code>nextLine()</code></th>
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<tbody>
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9. What is an algorithm? State and explain **TWO (2)** ways that are commonly used to represent algorithm. 
   
   (4 marks)
10. Based on the following terms, sketch the correct notation used in an activity diagram.

<table>
<thead>
<tr>
<th>Term</th>
<th>Notation</th>
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<tbody>
<tr>
<td>start state</td>
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<tr>
<td>final state</td>
<td></td>
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<tr>
<td>decision point</td>
<td></td>
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<tr>
<td>activity</td>
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</tbody>
</table>

(2 marks)

11. Give **TWO (2)** categories of user-defined methods.

i) 

ii) 

(2 marks)

12. Give **THREE (3)** properties of a constructor.

i) 

ii) 

iii) 

(3 marks)
13. Write down the output of the program below.

```
public class Fruit
{
    public static void main (String args[])
    {
        Fruit myFruit = new Fruit("Papaya", 10);
    }

    Fruit (String name, int volume)
    {
        System.out.println("Fruit:" + name);
        System.out.println("Volume:" + volume);
    }
}
```

14. Rewrite the code segment below using a 'switch-case' statement.

```
if (grade == 'A')
    System.out.println("You got A.");
else if (grade == 'B')
    System.out.println("You got B.");
else if (grade == 'C')
    System.out.println("You got C.");
else
    System.out.println("You got F.");
```
15. What is the output of the following Java code?

```java
int x = 100;
int y = 200;
if (x > 100 && y < 200)
    System.out.println(x"+y"+(x+y));
else
    System.out.println(x"+y"+(2*x-y));
```

16. Consider the following segment of code:

```java
int value=1,i=0;
while (i<=3)
{
    if(i%2 !=0)
        value=value*i;
    i++;
}
System.out.println("The value is:"+value);
```

a. What is the output of the code? (2 marks)

b. Re-write the code using for statement. (2 marks)
c. Re-write the code using do-while statement. 

17. Write the correct value for each element inside the list array. 

```
int[] list = new int[5];
list[4] = 15;
list[0] = 39;
```

<table>
<thead>
<tr>
<th>Location</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>list[0]</td>
<td></td>
</tr>
<tr>
<td>list[1]</td>
<td></td>
</tr>
<tr>
<td>list[2]</td>
<td></td>
</tr>
<tr>
<td>list[3]</td>
<td></td>
</tr>
<tr>
<td>list[4]</td>
<td></td>
</tr>
</tbody>
</table>

18. State TWO (2) different array processing which use loops. 

i) 

ii)
19. Consider the following statements:

```java
String str = "Going to the amusement park";
char ch;
int len, position;

a. What value is stored in ch by the following statement?
   ch = str.charAt(10);

b. What value is stored in len by the following statement?
   len = str.length();

c. What value is stored in position by the following statement?
   position = str.indexOf('t');

d. What is the output of the following statement?
   i) System.out.println(str.substring(0,5));

   ii) System.out.println(str.substring(13,22));

   iii) System.out.println(str.replace('t', '*'));
```
SECTION C: CASE STUDY (30 MARKS)

Write a program that mimics a calculator. The program should take as input two integers and an arithmetic operation (+, -, *, or /) to be performed. The selection of operation MUST be done using switch-case. It should then output the numbers, the operator, and the result. (For division, if the denominator is zero, output an appropriate message.) Some example output as follow:

**Example Output 1:**
Enter the first integer: 2
Enter the second integer: 5
Enter operator: + (addition), - (subtraction), * (multiplication), / (division): +
2 + 5 = 7

**Example Output 2:**
Enter the first integer: 4
Enter the second integer: 0
Enter operator: + (addition), - (subtraction), * (multiplication), / (division): /
4 / 0 = ERROR
Cannot divide by zero

**Instruction:** Complete the following activity diagram and program.

i) **Activity Diagram**

(10 marks)
import java.util.*;

public class Calculator {
    static Scanner console = new Scanner(System.in);
    public static void main(String[] args) {
        int num1, num2;
        char opr;
        //prompt user and read num1 2½ marks

        // prompt user and read num2 2½ marks

        System.out.print("Enter operator: + (addition), -
(subtraction), "+ " * (multiplication), / (division): ");

        opr = console.next().charAt(0);
        System.out.print(num1 + " " + opr + " " + num2 + " = ");
        //switch case for operator
        switch (opr)
        {
        //case +  3 marks
        
        //case -  3 marks

        //case *  3 marks

        //case /  6 marks

        break;

        default: System.out.println("Illegal operation.");
        }
    }
}