FINAL EXAM
SECOND SEMESTER SESSION 2012/2013

COURSE CODE / NAME : STIA1013 / BASIC PROGRAMMING
DATE : 13 JUNE 2012
TIME : 9.00 A.M. – 11.30 A.M. (2 ½ HOURS)
VENUE : DSB K. TM

INSTRUCTION :

1. This booklet contains THREE (3) sections which are SECTION A (10 questions), SECTION B (13 questions) and SECTION C (2 questions) in SEVENTEEN (17) printed pages excluding the cover page.
2. Answer sheet for Section A is provided on page 4.
3. Answer the questions for Section B and Section C in the space provided.

MATRIC NO : [space] (with word) [space] (with number)
IDENTIFICATION CARD NO. :
LECTURER :
GROUP : [space] TABLE NO. :

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STIA 1013 Basic Programming

SECTION A : MULTIPLE CHOICE QUESTIONS (10 MARKS)
Instruction : Answer ALL the questions. The answer sheet is provided on page 4.

1. ___________ translates Java source code into machine code.
   A. Interpreter  
   B. Assembler  
   C. Compiler  
   D. Linker

2. In a console window, what is the name of the command used to run a Java program?
   A. javadoc  
   B. javac  
   C. java  
   D. run

3. Which of the following is NOT a keyword or reserved word?
   A. int  
   B. public  
   C. stuff  
   D. class

4. What is the output for the following code fragment, if the input is “WELCOME TO JAVA PROGRAMMING”?

   ```java
   Scanner scan = new Scanner(System.in);
   String message1 = scan.next();
   String message2 = scan.next();

   System.out.println(message1 + " " + message2);
   ```

   A. WELCOME  
   B. WELCOME TO  
   C. WELCOME TO JAVA  
   D. WELCOME TO JAVA PROGRAMMING
5. A (n) ____________ is a step-by-step sequence of instructions that describes how the data are to be processed to produce the desired outputs.

A. algorithm
B. method
C. gantt chart
D. class

6. What is the output for the following code?

```java
public class caseCode
{
    public static void main(String args[])
    {
        int code = 1;
        switch (code)
        {
            case 1: System.out.print("Hello");
            case 3: System.out.print("Good-Bye");
                break;
            default: System.out.print("See u again");
                break;
        }
    }
}
```

A. Hello
B. Good-Bye
C. See u again
D. HelloGood-Bye

7. Based on the code below, identify the correct output.

```java
public class Animal
{
    public static void main (String [] args)
    {
        int kitty;
        Animal cat=new Animal();
        kitty = cat.total (4);
        System.out.println("After sound method:" +kitty);
    }
    public int total (int a)
    {
        System.out.println("In sound method:" + a);
        return ++a;
    }
}
```
A. In sound method : 4
   After sound method : 6
B. In sound method : 4
   After sound method : 5
C. In sound method : 4
   After sound method : 4
D. In sound method : 5
   After sound method : 5

8. Which looping process checks the test condition at the end of the loop?
   A. for
   B. while
   C. do-while
   D. None of the above statements is true.

9. The following statement is used to create a (n) ________________.

   ```java
   double[ ] temperature = new double [7];
   ```
   A. method
   B. class
   C. array
   D. object

10. Consider the following code fragment:
    ```java
        String river = new String("Sg. Badak");
        System.out.println(river.length());
    ```
    What is printed?
    A. 8
    B. 9
    C. Sg. Badak
    D. river
ANSWER SHEET FOR SECTION A.

Please circle the correct answer.

1. A B C D
2. A B C D
3. A B C D
4. A B C D
5. A B C D
6. A B C D
7. A B C D
8. A B C D
9. A B C D
10. A B C D
SECTION B: STRUCTURED QUESTIONS (60 MARKS)
Instruction: Answer ALL the questions in the space provided.

1. Answer the following questions based on the figure below:

```
Public class Total {
    public static void Main(String[] args) {
        System.out.println("Hello World");
        System.out.println(1/2);
    }
}
```

a) Where is the program stored when it is not currently running? (1 mark)

b) Identify and make a correction from the syntax error as given above. (2 marks)

c) From 1(b), execute the source code after the correction has been done. What is the output? (1 mark)
2. a) What is Java library? (2 marks)

b) Name TWO (2) operating systems that Java class uses to execute/run. (1 mark)

3. Based on the picture below, answer the following questions.

a) List TWO (2) suitable attributes. (2 marks)

b) List TWO (2) suitable behaviors (methods). (2 marks)

4. If $u = 2$, $v = 3$, $w = 5$, $x = 7$, and $y = 11$, what is the value of each of the following expressions? Assume all variables are type of int.

a) $u + v * w + x$ (1 mark)
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b) \( u + y \% v * w + x \)  

(2 marks)

c) \( u++ / v + u++ * w \)  

(2 marks)

5. Answer the questions based on the following code.

```java
import java.util.Scanner;

public class Calculate {
    public static void main(String[] args) {
        double number1, number2;
        double result;

        System.out.print("Enter a first number : ");
        number1 = \_\_\_\_\_\_\_\_\_;

        System.out.print("Enter a second number : ");
        number2 = \_\_\_\_\_\_\_\_\_;

        result = number1/number2;
        System.out.println();
        System.out.printf("%.2f divide by %.2f is %.3f", number1, number2, result);
    }
}
```

a) Write a code to declare a scanner object in line 7.  

(2 marks)
b) Write a code for line 13 and 16.

(1 mark)

c) What is the output of the program if the input values are 10 and 3?

(2 marks)

6. Complete the following flow chart for computing the balance in your savings account. Every month, the interest is calculated and the monthly interest rate is the yearly percentage rate which is 5%, divided by 12. Then, the interest is added to the account's balance at the beginning of each month. You can make one transaction, either deposit or withdraw, and provide the amount. If you are making a deposit, the amount will be added to the account's balance. Otherwise, subtract the amount from the balance. Then, display the current balance.

(5 Marks)
Consider a class Time that represents a time of day. It has attributes for the hour and minute. The hour value ranges from 0 to 23, where the range 0 to 11 represents a time before noon. The minute value ranges from 0 to 59. Use a default constructor that initializes the time to 0 hour and 0 minute. Create a private method isValid(hour, minute) that returns true if the given hour and minute values are in the appropriate range. Write a method setTime(hour, minute) that sets the time if the given values are valid.

Based on the description above, complete the following fragment code by filling in the blanks with the correct answer.

```
import java.util.Scanner;

public class Time {
    private int theHour;
    private int theMinute;

    public Time() {
    }

    public Time(int hour, int minute) {
        setTime(hour, minute);
    }

    private boolean isValid(int hour, int minute) {
        return (hour>=0&&hour<=23)&&(minute>=0&&minute<=59);
    }

    public void setTime(int hour, int minute) {
        if (isValid(hour, minute)) {
            theHour = hour;
            theMinute = minute;
        }
    }
}
```
8. Write an if statement based on the following scenario.

a) If the pressure is greater than minimum and less than maximum, then display “Pressure is OK”, otherwise display “Pressure is out of range”.

(3 marks)

b) If salary greater than expenses or saving greater than expenses, then display “Solvent”, otherwise display “Bankrupt”.

(3 marks)

9. a) What's wrong with the following loop that is intended to compute the sum of the integers 1 through 100?

```java
for (int i = 1; i <= 100; i++) {
    int sum = 0;
    sum = sum + i;
}
System.out.println(sum);
```

(3 marks)

b) Write a while statement to print the odd numbers from 99 down to 1.

(4 marks)
10. Given the following declaration.
   
   ```java
   int[] a = new int[100];
   ```
   
a) What is the last index of `a`? (1 mark)

b) What is the value of `a.length`? (1 mark)

11. Answer the question based on the following code.

   ```java
   public class anArrayTest {
      public static void main(String[] args) {
         int[] anArray = new int[10];
         for (int i = 0; i <= anArray.length - 1; i++)
            anArray[i] = 2 * i;
      }
   }
   ```

a) Write a code to display all the elements in the array using `for` statement. (3 marks)

b) What is the value stored in the following array.
   
i) `anArray[1]` (3 marks)

ii) `anArray[5]`

iii) `anArray[9]`
12. Assume k1, k2 and k3 are String variables initialized to "Proton", "Telekom", and "Petronas" respectively.

```java
k1=k2.toLowerCase();
k2=k1.replace('e','u');
k3=k3.concat(k2);
int n = k3.indexOf('u',0);
```

What are the results of k1, k2, k3 and n after executing each statement?

(4 marks)

13. What output is produced by the following code fragment?

```java
String s1 = "Foundations";
String s2;
System.out.println(s1.charAt(1));
s2=s1.substring(0,5);
System.out.println(s2);
System.out.println(s1.length());
System.out.println(s2.length());
```
SECTION C: CASE STUDY QUESTIONS (30 MARKS)
Instruction: Answer all questions in the space provided.

1. Your local government wants you to write a program to compute the property tax on home and commercial properties. First, the program should ask the user for the type of property (1 for Home, 2 for Commercial). If the property is a home, the program should ask for the residence type (1 for Primary, 2 for NonPrimary). If the property is a commercial, the program should ask if the property contains a building or land only (1 for Building, 2 for Land Only). Then the program should prompt the user for the assessed value of the property. Finally the program will display the amount of property tax to be paid. The tax is calculated according to the following table:

<table>
<thead>
<tr>
<th>Property</th>
<th>Property Tax Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Home</td>
<td>3.2% of Assessed Value</td>
</tr>
<tr>
<td>Non Primary Home</td>
<td>4.1% of Assessed Value</td>
</tr>
<tr>
<td>Commercial with Building</td>
<td>6.2% of Assessed Value</td>
</tr>
<tr>
<td>Commercial with Land Only</td>
<td>5.3% of Assessed Value</td>
</tr>
</tbody>
</table>

Two samples of the program running are as follows:
Running No 1:

```
Enter property type: 1. Home  2. Commercial
1
Enter Residence type: 1. Primary  2. NonPrimary
2
Enter assessed value of property: 100000
The amount of tax you have to pay is = RM4100.00
```

Running No 2:

```
Enter property type: 1. Home  2. Commercial
2
Enter Commercial type: 1. With Building  2. Land Only
1
Enter assessed value of property: 1000000
The amount of tax you have to pay is = RM62000.00
```

Note: The underlined values must be entered by the user.
You are given **TWO (2)** incomplete classes:

i) `PropertyTaxProgram` - the class representing the program.
ii) `PropertyTax` - the class definition for `PropertyTax` object to be used in `PropertyTaxProgram`.

Complete the following classes based on the given information. (12 marks)

```java
import java.util.Scanner;

public class PropertyTaxProgram {
    public static void main(String[] args) {
        int type, residenceType, commercialType;
        double value, taxPay;

        Scanner ____ = new Scanner(System.in);

        PropertyTax ____ = ____________________;
        System.out.println("Enter property type: 1. Home 2. Commercial");
        type = read.nextInt();

        if (______) {
            System.out.println("Enter Residence type: 1. Primary 2. NonPrimary");
            residenceType = read.nextInt();
            System.out.println("Enter assessed value of property: ");
            value = read.nextDouble();

            taxPay = tax.___________(______________, __________);
        } else {
            System.out.println("Enter Commercial type: 1. With Building 2. Land Only");
            commercialType = read.nextInt();
            System.out.println("Enter assessed value of property: ");
            value = read.nextDouble();

            taxPay = tax.___________(______________, __________);
        }
        System.out.printf("The amount of tax you have to pay is = RM%.2f\n", _______);
    }
}
```
public class PropertyTax {
    double taxAmount;

    public double calculateHomeTax(int type, double value) {
        if (___________) {
            taxAmount = value * ______;
        } else {
            taxAmount = value * ______;
        }
        return __________;
    }

    public double calculateCommercialTax(int type, double value) {
        if (________) {
            taxAmount = value * ______;
        } else {
            taxAmount = value * ______;
        }
        return __________;
    }
}
2. You are asked to write a program that can read SIX (6) integers. The program then can display the biggest integer and the average value of the six integers. To do this, your program named NumberMunch will use an object from a class named ArrayCrunch. ArrayCrunch has all the methods that can be used to do the required tasks of reading the six integers and finding the biggest integer and the average. A sample output of this program is given below:

```
Enter integer 1: 5
Enter integer 2: 1
Enter integer 3: 10
Enter integer 4: 9
Enter integer 5: 6
Enter integer 6: 5
The biggest number is 10
The calculated average = 6.0
```

The complete NumberMunch program is given below:

```java
public class NumberMunch {

    public static void main(String[] args) {
        ArrayCrunch t = new ArrayCrunch();
        t.read();
        System.out.println("The biggest number is "+ t.findBiggest());
        System.out.println("The calculated average = " + t.average());
    }
}
```

Your task is to complete the ArrayCrunch class below by completing the two methods:

a) `findBiggest()` method
b) `average()` method

(10 marks)
public class ArrayCrunch {
    int[] nosArray = new int[6];

    void read() {
        Scanner scan = new Scanner(System.in);
        for (int i = 0; i < nosArray.length; i++) {
            System.out.print("Enter integer "+(i+1)+":");
            nosArray[i] = scan.nextInt();
        }
    }

    int findBiggest() {

    }

    double average() {

    }
}