UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2011/2012

COURSE NAME	:	OBJECT ORIENTED PROGRAMMING
COURSE CODE	:	BEC 20702
PROGRAMME	:	BEC
EXAMINATION DATE	:	JUNE 2012
DURATION	:	2 1/2 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS IN **PART A** AND **TWO (2)** QUESTIONS IN **PART B.**

THIS PAPER CONSISTS OF **SIX** (6) PAGES

PART A: ANSWER ALL QUESTIONS (60 MARKS)

Q1 **(a)** String messages are constructed using the following instructions :

String message1 = "BEC 20702 OOP";
String message2 = "COURSE";

    (i) Draw a memory diagram to represent the indices and characters that have been stored for message1.

                    (5 marks)

    (ii) Using the same memory diagram illustrate in Q1(a-(i)), select the specific element for message1.charAt(2), message1.charAt(5) and message1.charAt(3-2) (Indicate the element using arrows).

                    (3 marks)

(b) Using string declaration in Q1(a), write java statements for the following cases :

    (i) Retrieve the length of message1 and display the value to the screen.

                    (2 marks)

    (ii) Concatenate message1 and message2 to become a value of string message3.

                    (3 marks)

(c) Predict the output produce by the following code snippet :

```
String s1 = "Learn OOP";
String s2 = s1.substring(0,6) + "HTML";
String s3 = s1 + " and " + "U" + s2.charAt(8) + s2.charAt(9);
System.out.println(s2);
System.out.println(s3);
```

                    (4 marks)

(d) Modify the specific line from the following code to convert variable x to string and display the string value to the screen.

```
Line 1    class trytest {
Line 2        public static void main(String args[]) {
Line 3        double x = 4.4;
Line 4        System.out.println("4.4" + 3);
Line 5        } }
```

The expected output is shown as follows:

                    (3 marks)

Q2 Base on the following case:

> Faculty is a subclass of UTHM, Department is a subclass of
> Faculty and Lecturer and Lab are subclass of Department.

(a) State the general concept of object oriented analysis that can be applied for above case and then draw UML class diagram to analyze the concept.

(7 marks)

(b) Consider UTHM as the super class and can be publicly accessed by other classes, prepare a code frame to relates all the sub classes with the super class without any data member and methods to show the hierarchy of the classes.

(11 marks)

(c) Then, declare one example object that can be instantiated for class Lecturer.

(2 marks)

Q3 (a) List two from three groups to classify the GUI classes and then give one example for each group.

(4 marks)

(b) Consider this following Java GUI Program :

```
Line 1    import javax.swing.*;
Line 2    public class FramewithComponent {
Line 3        public static void main(String args[]) {
Line 4        JFrame frame1 = new JFrame("Welcome to Final Exam");
Line 5        JButton btnOK = new JButton("CLICK TO CONTINUE");
Line 6        frame1.add(btnOK);
Line 7        frame1.setSize(300,100);
Line 8        frame1.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
Line 9        frame1.setLocationRelativeTo(null);
Line 10       frame1.setVisible(true);
Line 11    } }
```

(i) Modify three(3) statements in above program to change the caption of The button to "NEXT", set the frame size to 200 width and 150 height, and to disable the visibility of the frame.

(6 marks)

(ii) Sketch the GUI interface produce by above program and relates each GUI objects instantiate from above program by labeling the objects on the produced interface.

(4 marks)

(c) Illustrate a table to stores information a Course offered by FKEE. The table has two tuples and three (3) attributes; courseCode, CourseName and numofCredit.

(6 marks)

PART B: 40 MARKS
Instruction: Answer TWO questions only.

Q4 Answer question (a) to (c) using the following memory representation diagram of array nums.

Subscript	0	1	2	3	4	5	6
Value	6	3	4	5	2	7	3

(a) Prepare 2 java statements to declare above array nums.

(5 marks)

(b) The following *while* statement is the code frame to insert value of nums through keyboard :

```
Line 1   int y =0;
Line 2   System.out.println("Insert 7 numbers :");
Line 3   while (y <nums.length) {
Line 4       nums[y] = MyInput.readInt();
Line 5       y++; }
```

(i) Describe the purpose of statement in Line 3.

(2 marks)

(ii) Assume that the *while* statement above is changes to *do-while* statement. Differentiate the general execution process of these two statements.

(5 marks)

(c) Write a method named displayEvens which displays the number of even integers found in its array parameter. The output should display three (3) numbers since 6, 4, and 2 are even. Use the following method header to begin your method definition :

```
public static void displayEvens(int[] nums) { }
```

(5 marks)

(d) Illustrate your tracing technique to find the return value return by the recursive method below. Assume that n receive 3 from the caller method.

```
static int xRecursive ( int n) {
  if (n == 1)
    return 1;
  else
    return 3 * xRecursive(n-1);
}
```

(3 marks)

Q5 (a) Briefly describe the uses of UML Diagrams in OOAD.

(2 marks)

(b) Given the following problem statement:

In UTHM Student Representative Council e-voting system, voters can see a list of candidates and select one to vote for. The electoral registrar will also want to print a summary of the total votes for each candidate, and list out the voters who have voted, and those who haven't. In case of a dispute, the system should also list a complete record of who voted for whom, but only a judge can view this record. A judge also can print the vote summary.

(i) Analyze the problem statement below by illustrating a Use Case diagram.

(8 marks)

(ii) The following class declarations is prepared for e-voting system

```
class voters {
        int numVote, numUnVote, totalVote, age;
        String name, id, faculty;
        voters ( ) {
            faculty = "FKEE";
        }
        voters (String fac) {
            faculty = fac;
        }
        double findTotalVote ( ) {
            return numVote,numUnVote;
        }
}
```

Prepare a simple code to instantiate the V1 from FKEE as an object for voters and get the V1's name and id from the user input.

(5 marks)

(iii) Modify the instantiation instruction for V1 in question b(ii) which you can invoke the second constructor in class voters. Assume that the faculty name is FKMP. Then display the data of V1's name, id and faculty to the screen.

(5 marks)

Q6 (a) Using the following table :

Table Q6 : Status of Webpage User

Age	Status
Less than 18	Young
18 to 55	Adult
>55	Senior citizen

(i) Apply suitable java control statement for above situation in determining and displaying the suitable status of the user of a webpage.

(5 marks)

(ii) Organize a class diagram for above webpage user in **Table Q6** which can inherits three more type of users; admin, members and non-members and they can freely view this webpage but in order to use certain applications only admin and members are allowed to do so by log in to the system. (Ignore the operation for all classes).

(8 marks)

(b) Study the following class definition :

```
class Circuit {
    public int numR,arrangement;
    public double resistor,Rt, voltage, curr;
    Circuit() {
        Rt = 0;
        numR= 0;}

    double calculateI (double r, double v) {
        return v/r;  }

    void printCurrent () {
        JOptionPane.showMessageDialog(null, "Current = " + currr + "A");
    }
}
```

(i) Construct a simple GUI input Dialog using JOptionPane to get the voltage value from the user and automatically convert the string input to double value.

(5 marks)

(ii) Briefly explain the benefit of using constructor in class definition.

(2 marks)