CONFIDENTIAL TIA1023

UNIVERSITI UTARA MALAYSIA

FINAL EXAMINATION
SECOND SEMESTER 2008/2009 SESSION

CODE/COURSE : TIA1023 ADVANCED PROGRAMMING
DATE : 28 APRIL 2009
TIME : 12:30PM – 3:00PM (2 ½ HOURS)
VENUE : DMS, KYM

INSTRUCTIONS:
1. This exam paper contains THREE (3) sections in FIFTEEN (15) printed pages, excluding the cover page.
2. Section A contains TWENTY (20) multiple choices questions. Section B contains THIRTEEN (13) structured questions. Section C contains ONE (1) long question.
3. You are required to answer ALL of the questions on the exam paper.

MATRIC NO.: (in words) (in figures)
IDENTITY CARD NO.: (in figures)
LECTURER: 
GROUP: TABLE NO.: 

DO NOT OPEN THE PAGE UNTIL YOU ARE TOLD TO DO SO

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SECTION A: MULTIPLE CHOICES QUESTION (20 MARKS)

**Instruction:** Circle the correct answer.

1. Which of below choices is NOT the characteristic of OOP?
   A. Polymorphism
   B. Aggression
   C. Abstraction
   D. Encapsulation

2. Instance method is ______________________.
   A. a method defined for an object
   B. a method defined for a class
   C. an attribute defined for an object
   D. an attribute defined for a class

3. Based on the following array definition,
   ```java
   int[] list1 = {(1,3),(3),(1, 2, 3),(3,2)};
   ```
   what is the value of list1[2].length?
   
   A. 1
   B. 2
   C. 3
   D. Will cause syntax error

4. Based on the following codes, which object reference inside Student array is deleted?
   ```java
   int delArr = 3 - 1;
   Student[delArr] = null;
   ```

   ![Diagram of Student array with references to A, B, C, and D]
5. Which of the following statements is TRUE?
A. Inheritance implies a HAS-A relationship.
B. Polymorphic behaviour can be demonstrated without the use of polymorphic reference.
C. It is necessary for a child of an abstract parent to override all abstract methods in its parent unless the child is also abstract.
D. protected accessibility is more restricted than default accessibility.

6. What is the output of the following code?

```java
class A {
    public void a() {
        System.out.print("AAA");
    }
}

public class B extends A {
    public void b() {
        System.out.print("BBB");
    }

    public static void main(String[] args) {
        A aRef = new B();
        aRef.b();
    }
}
```

A. AAA
B. BBB
C. AAABBB
D. Compilation fails.
7. Which of the following statement is FALSE about Java exception?
   
   A. In some cases, the order in which catch blocks are listed is not important in a try-catch block.
   B. The finally block can be guaranteed to execute in all situations.
   C. If there are more than one catch blocks, only one can be executed when an exception is thrown from the try block.
   D. The last catch block may or may not be followed by a finally block.

8. What happens in a method if an exception is thrown in a try block and there is NO MATCHING catch block?
   
   A. This is not legal, so the program will not compile.
   B. The method throws the exception to its caller.
   C. The program stops immediately.
   D. The program ignores the exception.

9. Which of the following is FALSE about Graphical User Interface (GUI) in Java?
   
   A. Java GUI classes are provided in either AWT or Swing package.
   B. JPanel is an example of container class.
   C. You can always set a specific type of Layout Manager to a component.
   D. A JTextField can be used both for input and for output.

10. What is the one component that nearly all Java GUI applications will have?
    
    A. Frame
    B. Button
    C. List
    D. Monitor

11. How does FlowLayout() put components into the content frame?
    
    A. By rows starting at the top, then left to right in each row.
    B. Starts at the bottom, then right to left in each row.
    C. Positions at the center, north, south, east or west of the frame.
    D. Divides frame into equal size cells and puts the components in the cells.
12. How does a listener register with a JButton object?

A. By calling the \texttt{addActionListener()} method of the listener interface object.
B. By calling the \texttt{addActionListener()} method of the JButton object.
C. By calling the \texttt{addMouseListener()} method of the ActionEvent object.
D. By calling the \texttt{addMouseListener()} method of the JFrame object.

13. Will the following code compile correctly?

\begin{verbatim}
File file = new File("temp.txt");
\end{verbatim}

A. No—the constructor for File is used incorrectly.
B. No—the constructor for File must have a full path name.
C. Yes—the syntax is correct.
D. Yes—on the condition that file "temp.txt" already exists.

14. Which of below choices are Data-Level Streams for Binary File?

I. DataInputStream
II. FileInputStream
III. DataOutputStream
IV. FileOutputStream

A. I & II
B. II & IV
C. I & III
D. All of the above

15. A node is ____________________________.

A. an object that is linked together to form a data structure.
B. a record that is linked together to form a data structure.
C. a file that is linked together to form a data structure.
D. a data that is linked together to form a data structure.
16. Which of the following is **FALSE** about list?
   
   A. All Java list classes are grouped in the `java.util` package.
   B. All elements in a list are always indexed.
   C. You can traverse a list in both direction by using the `ListIterator` interface.
   D. The `Vector` class is the same as `LinkedList` class but differs only in the synchronization part.

17. Which of the basic operation in stack below is **NOT VALID**?
   
   A. Determine the stack is full or empty
   B. Create empty stack
   C. Determine the size of stack
   D. Access item/object at the bottom of stack

18. Which class below is the parent for the Java Stack class?
   
   A. List class
   B. Vector class
   C. LinkedList class
   D. ArrayList class

19. Which of the following is **TRUE** about queue?
   
   A. Elements in a queue need to be indexed.
   B. An element is removed from a queue by either the `poll()` or `remove()` operation.
   C. In a priority queue, the element with the highest priority is added first.
   D. In the queue ADT, the enqueue operation removes an element from the front part of the queue.

20. Which of the following class implements the Java Queue interface?
   
   A. List class
   B. Vector class
   C. LinkedList class
   D. ArrayList class
SECTION B: STRUCTURED QUESTION (65 MARKS)

Instruction: Answer all questions in the space provided.

1. Based on the following Unified Modeling Language (UML) class diagram, write the complete class definition. (You don’t have to define the body of any method)

```
<table>
<thead>
<tr>
<th>Clidder</th>
</tr>
</thead>
<tbody>
<tr>
<td>- clidlet : String</td>
</tr>
<tr>
<td>- graplet : int</td>
</tr>
</tbody>
</table>

+ juicer(newGrap : int) : String
```

(6 marks)
2. Based on the given codes, fill in the right locations inside BillPay array with the correct values.

```java
double[][] BillPay;
BillPay = new double[4][4];
BillPay[2][1] = 20.10;
BillPay[1][3] = 19.10;
BillPay[3][2] = 21.10;
BillPay[1][2] = 22.10;
```

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(4 marks)

3. Based on the following Java codes, what is the output of running the class Z?

```java
class X {
    public X() { System.out.println("Inside X "); }
}
class Y extends X {
    public Y() { System.out.println("Inside Y "); }
}
class Z {
    public static void main(String[] args) {
        System.out.println("Inside Z ");
        Y y = new Y();
    }
}
```

(3 marks)
4. The following codes contain compilation error. Briefly explain the error.

```java
class Circle {
    double radius;
    public Circle(int rad) {
        radius = rad;
    }
}

public class Ring extends Circle {
    String owner;
    public Ring() { owner = "Frodo"; }

    public static void main(String[] args) {
        Ring oneRing = new Ring();
    }
}
```

(3 marks)

5. Give TWO (2) situations in which you would use the reserved word `super`.

(2 marks)
6. Rewrite the following method so that it becomes an abstract method.

```java
protected String change(int[] arr) {
    return " " + a[a.length-1];
}
```

(3 marks)

7. Consider the following Java code:

```java
int lowerLimit, divisor, result = 0;
try {
    System.out.println("Entering try block");
    result = lowerLimit / divisor;
    if (lowerLimit < 100)
        throw new Exception("Lower limit error");
    System.out.println("Exiting try block");
} catch (ArithmeticException ex) {
    result = 110;
} catch (Exception ex) {
    System.out.println("Exception: "+ ex.getMessage());
} System.out.println("After the catch block");
System.out.println("Result = "+ result);
```

What is the output of this code if:

a) the value of lowerLimit is 50 and the value of divisor is 10?

b) the value of lowerLimit is 50 and the value of divisor is 0?

(8 marks)
c) the value of lowerLimit is 150 and the value of divisor is 10?

d) the value of lowerLimit is 150 and the value of divisor is 0?

8. The following code is a simple GUI program. This program does not utilize inheritance.

```java
import javax.swing.*;
public class Greeting
{
    public static void main(String[] args)
    {
        JFrame frame = new JFrame("Welcome");
        JLabel msg = new JLabel("Hello, World!");
        frame.add(msg);
        frame.setSize(200, 100);
        frame.setVisible(true);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }
}
```

Rewrite another version of this program which makes use of inheritance.

(6 marks)
9. State the **TWO (2)** types of file and give **ONE (1)** example for each type.  
   *(4 marks)*

10. Name **SIX (6)** operations that can be performed on a list.  
    *(6 marks)*

11. List can be implemented using array or linked list. Give **TWO (2)** differences between each approach.  
    *(4 marks)*
12. Write Java statement(s) for each of the followings regarding stack:
   
a) Create a Stack object named `nameStack`. (2 marks)

b) Given the following array:

   ```java
   String[] names = {"Ali", "Gwen", "Siti", "John"};
   ```

   Using a for loop, push all of the elements in `names` array (starting with the first element) onto `nameStack`. (4 marks)

c) Remove a name from the stack `nameStack` and print it to the screen. (2 marks)

d) Get (but do not remove) a name from the stack `nameStack` and print it to the screen. (2 marks)

e) Print the current size of the stack `nameStack`. (2 marks)
13. Below are **FOUR (4)** operations in Queue *Abstract Data Types* (ADT). Give the description for each operation.

   *(4 marks)*

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>enqueue()</td>
<td></td>
</tr>
<tr>
<td>dequeue()</td>
<td></td>
</tr>
<tr>
<td>getFront()</td>
<td></td>
</tr>
<tr>
<td>clear()</td>
<td></td>
</tr>
</tbody>
</table>
SECTION C: LONG QUESTION (15 MARKS)

Instruction: Answer all questions in the space provided.

Write a program (by completing the codes below) that can read the data from a text file called myData.txt which stored N random integer numbers (where N is an integer value). Each number in the file occupies one line (one line contains only one number). After the data are read, your program will calculate and display to the screen the average of all the numbers in the file.

```
import java.io.*;
class ReadCalcAverage {
   public static void main( String[] args ) {
      //declare and instantiate the File object here

      String line;
      double sum = 0.0, average = 0.0;
      int numCount = 0;  //to count the number of integer in file
      try {
         // instantiate the text streams here

         //read every number and total it to variable sum here
      }
   }
}
```
//calculate the average and display it here

//close the stream here

} catch ( IOException iox ) {
    System.out.println("Problem reading file");
}
}