University of Wollongong

SCSSE
School of Computer Science and Software Engineering

Family Name	.....
First Name	.....
Student Number	.....
Table Number	.....

CSCI213

Java Programming and Object Oriented Design

This paper is for students studying at:

[×] Wollongong	[ ] Batemans Bay	[ ] Bega	[ ] Loftus
[ ] Moss Vale	[ ] Shoalhaven	[ ] Sydney	[ ] Distance

SPRING SESSION 2008 EXAMINATION

Time Allowed: 3 hours 15 minutes.

This examination has two parts:
A) Multiple choice (20 questions, 20 marks total),
B) Java Programming questions (questions 2, 3, and 4, 30 marks total).

DIRECTIONS TO CANDIDATES

1. Please attempt all questions. Please write all answers neatly.
2. The examination paper is printed on both sides.
3. This paper is worth 50% of the total marks for the subject.
4. Use answer booklet for the part B of the exam.

EXAMINATION MATERIALS/AIDS ALLOWED

Nil

USEFUL INFORMATION

Nil

THIS EXAMINATION PAPER MUST NOT BE REMOVED FROM THE EXAMINATION ROOM

Part A – Multiple Choice — Total 20 marks

Answer Part A questions 1 to 20 on a Computer Marking Sheet by selecting the most correct answer. Each question is of equal value and worth 1 mark.

1. Which of the following statements is **not correct**?
   JDBC driver manager

   A. keeps track of available drivers.
   B. handles establishment of connection between a database and the appropriate driver.
   C. connects database system.
   D. deals with login time limits, printing of log and tracing messages.

2. Which of the following statements is **not correct**?

   A. Java script is an event handling system.
   B. Java script runs via interpreter.
   C. Java script is costly and slow at run time.
   D. Java script is a "typeless" language.

3. Java program language

   A. is not an OO language.
   B. can provide access to pointer.
   C. has no #defines, macros.
   D. has free functions to release unused memory.

4. What would the following Java program output be?

```
class relation {
    public static void main(String[] args) {
            double x = 0.5;
            if(0.0 <= x <= 1.0)
                    System.out.println("x's value is between 0.0 and 1.0");
            else
                    System.out.println("Out of range");
    }
}
```

   A. Compilation error.
   B. x's value is between 0.0 and 1.0.
   C. Out of range.
   D. x=0.5

5. Functions in Java program

   A. must be declared as global functions.
   B. must be static functions of a class.
   C. must be declared as member functions of a class.
   D. must be declared as final functions.

6. What would the following Java program output be?

```
import java.util.*;

class Objass {
        public static void main(String[] args) {
                Vector<String> data1 = new Vector<String>();
                Vector<String> data2 = new Vector<String>();

                data1.add("ABCDEFG");
                data2.add("XYZ");
                data2 = data1;

                System.out.println(data2.elementAt(0));
        }
}
```

A. Compilation error
B. Exception error
C. XYZ
D. ABCDEFG

7. What would the following Java program output be?

```
String tmp = new String("ABC, DEF; HIJ, KLM;  NOP, QRS, ");
String[] words = tmp.split(";");
for(int i=words.length-1; i>=0; i--)
        System.out.print("["+words[i]+"]");
```

A. [ABC, DEF; HIJ, KLM; NOP, QRS,]
B. [NOP, QRS,][HIJ, KLM][ABC, DEF]
C. [ABC][DEF][HIJ][KLM][NOP][QRS]
D. [ABC, DEF][HIJ, KLM][NOP, QRS,]

8. Use "this" in Java program

A. to store the local integer's value.
B. to define a variable of "this" type.
C. to reference the constructor of a class.
D. to reference the current object for which a method is being executed.

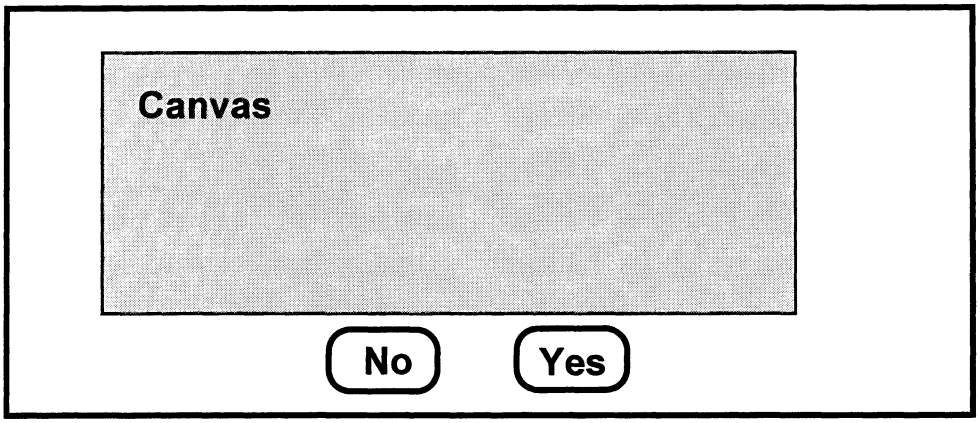
9. An "abstract class" in Java program

A. declares some methods – leaving definition to subclasses.
B. only declares methods – leaving definitions to subclasses.
C. only defines data members – leaving methods declarations and definitions to subclasses.
D. only defines some methods – leaving data members defined to subclasses.

10. To define a constant value PI and set its value to 3.14, in a Java program, which of the following statements is correct?

A. const PI = 3.14;
B. const double PI = 3.14;
C. final static double PI = 3.14;
D. static double PI = 3.14;

11. Which layout should be chosen in the graphic user interface design as follows?



A. BorderLayout
B. FlowLayout
C. GridLayout
D. CardLayout

12. To draw graphics, different platforms do share

A. similar coordinate models.
B. similar range of functions.
C. similar (r, g, b) colour space.
D. all of above.

13. "WindowEvents" will be generated by

A. Frame
B. Button
C. Menu item
D. CheckBox

14. Which of the following statements is correct?

A. A Java applet can be run by "java" command.
B. A Java applet can always access local files.
C. A Java applet cannot be embedded in a web page.
D. A Java applet can open network connection only to site from where applet was itself loaded.

15. Comparing threads and processes in a time share system, which of the following statements is correct?

A. Processes are faster than threads.
B. Processes cost OS resources less than threads.
C. Processes need more OS resources.
D. Communications among threads are must harder than that among processes.

16. When we implement Runable interface, we must define the method

A. thread()
B. actionPerformed()
C. run()
D. None of above

17. Is the following code correct?

```
abstract class Print {
        abstract void show();
}

class Display extends Print {
         public Display() {
         }

        public static void main(String[] args) {
                System.out.println("Hello");
        }
}
```

A. Correct
B. Incorrect, Method show() in the class Print should be defined
C. Incorrect, Method Display() should has a return type, such as void
D. Incorrect, Method show() should be override in the class Display

18. The use of protected keyword to a member in a class will restrict its visibility as follows:

A. Visible only in the class and its sub-classes in the same package
B. Visible only inside the same package
C. Visible in all classes in the same package and sub-classes in other packages
D. Visible only in the class where it is declared

19. Which of the following statements is correct?

A. A class in Java can extend one or more classes
B. A class in Java can extend one class and implement one or more interfaces
C. A class in Java can extend one interface and implement one or two classes
D. A class in Java can extend one class and implement one interface

20. Which of the following methods are used to implement thread intercommunication?

A. suspend() and resume()
B. sleep() and wake()
C. join() and sync()
D. wait() and notify()

Part B – Java programming questions — Total 30 marks

Students are to answer **all** questions. Write your answer in the examination booklet. Clearly mark the number of the question attempted.

Question 2: Short answers — (10 marks total)

2.1. Explain how to use **Iterator** to visit collection classes. Illustrate your answer using simple java program code.

(2 marks)

2.2. How are "layout managers" used with Containers? Describe the arrangement of components produced for two commonly employed layout managers.

(2 marks)

2.3. Explain the Event Listener mechanisms used in Java to handle user interaction. Illustrate your answer with details of the events handled by your solution to the assignment 4 given in this subject.

(2 marks)

2.4. Explain why **synchronised** methods are needed in a class like Vector.

(1 mark)

2.5. Explain how a function defined in a concrete class can invoke the operation of the corresponding function in its base class. Illustrate your answer using simple Java program codes.

(2 marks)

2.6. Explain the role of `interface` class.

(1 mark)

Question 3: Java programming **(10 marks)**

3.1. Study the Java code given below:

```
int     a=8;
a = a >>> 2;
System.out.println(a);
```

What will the output be?

(2 marks)

3.2. Identify two errors in the following Java program code and suggest corrections for each error.

```
class 2DBox {
        int     width;
        int     height;

        public 2DBox() { }

        public int area() { return width*height; }
}

public class Boxes {
        public static void main(String[] args) {
                2DBox b = new 2DBox();
                b.width = 10;
                b.height = 20;
                System.out.println(b.area());
        }
}
```

(2 marks)

3.3. Write simple Java program code to illustrate how to connect to a Database system. Which Java object should be defined if the following SQL statement needs to be executed?

select name, dob, address from Employee where e# = ?

The question mark above should be replaced by a real value input from the keyboard at running time.

(3 marks)

3.4. When a Java class needs to handle events of a mouse movement, which class should be implemented?

(1 mark)

3.5 Define an interface as follows:

```
interface Shape {

        public int area();

        public int length();
}
```

Write a Java program code to define concrete classes Rectangular and Circle that inherited from class Shape. You must define necessary data and method members in the concrete classes. The formulas to calculate area and length of a rectangular are:

*the area = width*height*

*the length = 2 * (width+ height).*

The formulas to calculate area and length of a circle are:

the area $= \pi * radius^2$

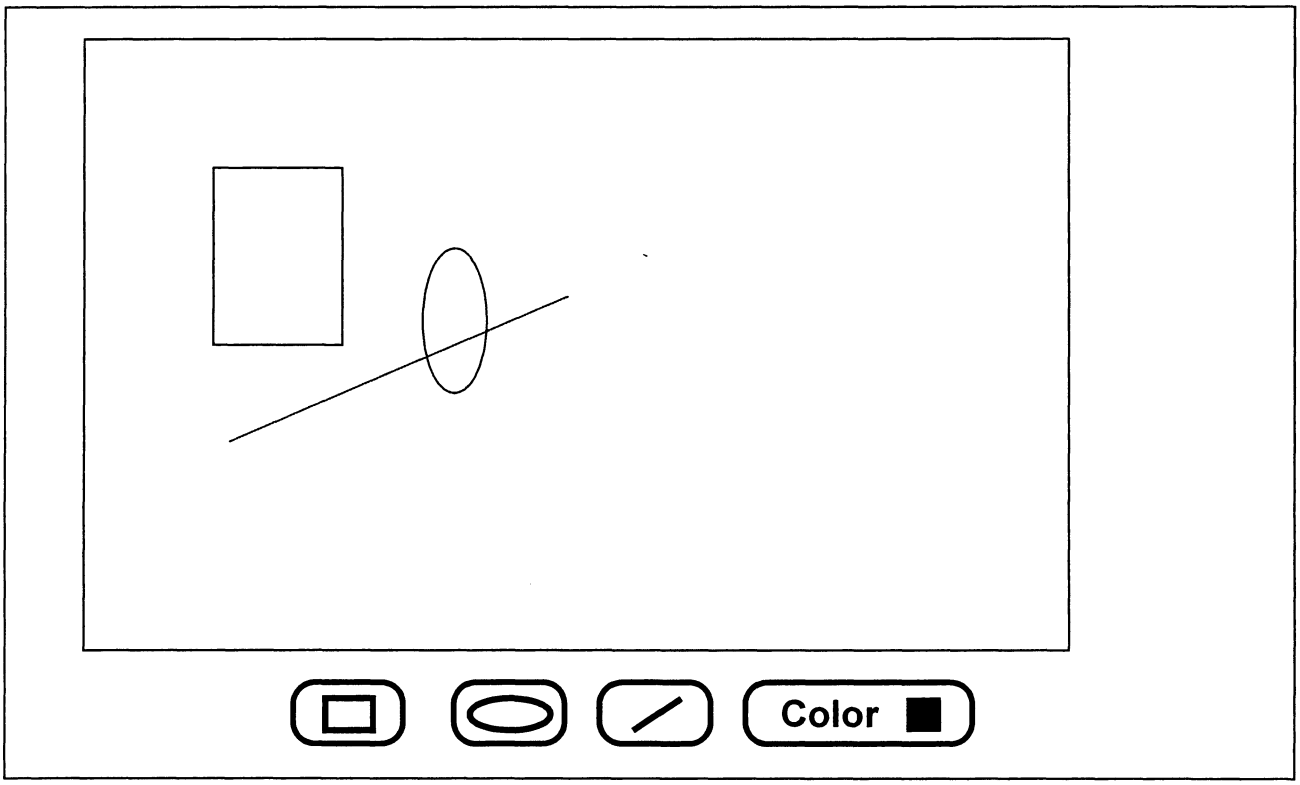
the length $= 2 * \pi * radius,$

where π is constant and its value is 3.14.

(2 marks)

Question 4: Java programming implementation **(10 marks)**

4. 1 Look at the following GUI created by a Java applet.



4.1.1 Explain how such an interface can be constructed using javax.swing or java.awt classes for "frames", "layout-managers", "buttons", and other classes. (Identify the classes and their responsibilities, and provide a sketch of the code that builds such a graphical interface.)

(3 marks)

4.1.2 Explain how the program would monitor the action button? How would it draw a shape (rectangular, oval or a line)? How would it arrange for the chosen colour to be displayed?

(2 marks)

4.2 The code below is not complete. The completed code should perform the following tasks:
Add two buttons "OK" and "Cancel" at the bottom of the frame. When the button "OK" has been clicked, the message "Hello there" should be displayed on the console.

Fill in missing statements to complete the code.

```
import java.awt.*;
import java.awt.event.*;

public class ButtonTest {
        ButtonHandler bh=null;

   public ButtonTest() {
        f.setLayout(new BorderLayout());
        f.addWindowListener(new java.awt.event.WindowAdapter() {
                public void windowClosing(WindowEvent winEvt) {
                // Perhaps ask user if they want to save any unsaved files first.
                System.exit(0);
                }
                });

        Panel p = new Panel();

        Button b;
        b = new Button("OK");

        b= new Button("Cancel");

        f.add(p, "South");

        f.setSize(400,400);
   }

   public static void main(String[] args) {
        ButtonTest bt = new ButtonTest();
   }
}

class ButtonHandler implements ActionListener {
        public void actionPerformed(ActionEvent evt) {
                if(s.equals("OK"))
                        System.out.println("Hello there");
        }
}
```

(5 marks)

End of Examination