Southern College
Kolej Selatan
南方学院

Final Examination
Semester 3 / Year 2007

COURSE : SOFTWARE DEVELOPMENT
COURSE CODE : PROG1103
TIME : 2 1/2 HOURS
DEPARTMENT : COMPUTER SCIENCE
CLASS : IT07-A + CS07-A + CS07-B
LECTURER : SO YONG QUAY

Student’s ID:
Batch No:

Notes to candidates:
1) The question paper consists of 6 pages and 18 questions.
2) Answer all Questions.
3) Return the question paper with your answer booklet and disk.
SOFTWARE DEVELOPMENT

Section I: Multiple Choices Questions

(2% each)

1. ________ describes the state of an object.
   a. attributes
   b. methods
   c. constructors
   d. no of the above

2. An attribute that is shared by all objects of the class is coded using ________.
   a. an instance variable
   b. a static variable
   c. an instance method
   d. a static method

3. If a class named Student has no constructors defined explicitly, the following constructor is implicitly provided.
   a. public Student()
   b. protected Student()
   c. private Student()
   d. Student()

4. What would be the result of attempting to compile and run the following code?
   
   public class Test {
       static int x;

       public static void main(String[] args){
           System.out.println("Value is " + x);
       }
   }

   a. The output "Value is 0" is printed.
   b. An "illegal array declaration syntax" compiler error occurs.
   c. A "possible reference before assignment" compiler error occurs.
   d. A runtime error occurs, because x is not initialized.
5. Analyze the following code:

```java
public class Test {
    private int t;

    public static void main(String[] args) {
        Test test = new Test();
        System.out.println(test.t);
    }
}
```

a. The variable t is not initialized and therefore causes errors.
b. The variable t is private and therefore cannot be accessed in the main method.
c. Since t is an instance variable, it cannot appear in the static main method.
d. The program compiles and runs fine.

6. Suppose s is a string with the value "java". What will be assigned to x if you execute the following code?

```java
char x = s.charAt(4);
```

a. 'a'
b. 'v'
c. Nothing will be assigned to x, because the execution causes the runtime error StringIndexOutOfBoundsException.
d. None of the above.

7. What is the printout for the following code?

```java
class Test {
    public static void main(String[] args) {
        int[] x = new int[3];
        System.out.println("x[0] is "+x[0]);
    }
}
```

a. The program has a syntax error because the size of the array wasn't specified when declaring the array.
b. The program has a runtime error because the array elements are not initialized.
c. The program runs fine and displays x[0] is 0.
d. None of the above.
8. How can you get the word "abc" in the main method from the following call?

   java Test "+" 3 "abc" 2

   a. args[0]
   b. args[1]
   c. args[2]
   d. args[3]

9. When you implement a method that is defined in a superclass, you __________ the original method.

   a. overload
   b. override
   c. copy
   d. call

10. What modifier should you use on a variable so that it can only be referenced inside its defining class?

    a. public
    b. private
    c. protected
    d. Use the default modifier.

Section II: Questions: (2% each)

11. Show the output of the following program:

    public class FE200703_11{
        public static void main(String[] args) {
            String S = "Southern";
            StringBuffer buffer = new StringBuffer(S);
            change(S, buffer);

            System.out.println(S);
            System.out.println(buffer);
        }
    }
private static void change(String S, StringBuffer buffer){
    S = S + "and East";
    buffer.append(" and East");
}
}

12. What is the printout of the following code?

    public class FE200703_12 {
        public static void main(String[] args) {
            try {
                int value = 30;
                if (value < 40)
                    throw new Exception("Value is too small");
            } catch (Exception ex) {
                System.out.println(ex.getMessage());
            }
            System.out.println("Continue after the catch block");
        }
    }

What would be the printout if the line

        int value = 30;

is changed to

        int value = 50;
13. What is displayed when the following program is run?

```java
public class FE200703_13 {
    public static void main(String[] args) {
        try {
            int[] list = new int[10];
            System.out.println("list[10] is "+ list[10]);
        } catch (ArithmeticException ex) {
            System.out.println("ArithmeticException");
        } catch (RuntimeException ex) {
            System.out.println("RuntimeException");
        } catch (Exception ex) {
            System.out.println("Exception");
        }
    }
}
```

14. What is the constructor?

15. Explain overloading.
Section III: Complete the following program

16. Design a class named Time. The class contains: 
   (25%)
   • Data fields hour, minute, and second that represents a time.
   • A no-arg constructor that, creates a Time object for the current time. (the data fields values will represent the current time)
   • A constructor that construct a Time object with a specified elapse time since the middle night, January 1, 1970 in milliseconds. (The data fields value will represent this time)
   • Three get methods for the data fields hour, minute, and second, respectively.

Write a test program that creates two Time objects (using new Time() and new Time(555550000) ) and display their hour, minute, and second.

17. Write a program that prompts the user to enter two strings, and check whether the first string is a substring of the second string. 
   (20%)

18. Write a program that calculates the future value on an investment at a given interest rate for a specified number of years. The formula for the calculation is as follows: 
   (25%)
   \[ \text{futureValue} = \text{investmentAmount} \times (1 + \text{monthlyInterestRate})^{\text{years} \times 12} \]

Use text fields for interest rate, investment amount, and years. Display the future amount in a text field when the user clicks t Calculate button, as shown in following figure.