

THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2003
COMPUTER SCIENCE
Principles of Programming

TERMS TEST
(Time allowed: 60 MINUTES)

Surname:	
Forenames:	
Student ID number:	
Login name (UPI):	

INSTRUCTIONS:

- Attempt **ALL** questions - write your answers in the box provided
- Calculators are **NOT** permitted

LAB GROUP:

- Please circle the ONE lab group session below to which you belong
- When your test is marked, it will be handed back during the lab you specify below

Mon 9-11	Tue 9-11	Wed 9-11	Thu 9-11	Fri 9-11
Mon 11-1	Tue 11-1	Wed 11-1	Thu 11-1	Fri 11-1
Mon 1-3	Tue 1-3	Wed 1-3	Thu 1-3	Fri 1-3
Mon 3-5	Tue 3-5	Wed 3-5	Thu 3-5	
		Wed 5-7		

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RESULTS:**For examiner to complete (DO NOT FILL IN):**

Question	Mark
1	(/20)
2	(/10)
3	(/10)
4	(/15)

Question	Mark
5	(/10)
6	(/15)
7	(/10)
8	(/10)

TOTAL:

(/100)

CONTINUED

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Question 1 (20 marks)

- a) What is printed by the following?

```
System.out.println( 3 + 5.3 );
```

(1 mark)

- b) What is printed by the following?

```
System.out.println( 3 / 2 + 1.0 );
```

(1 mark)

- c) What is printed by the following?

```
System.out.println( 1.0 * 3 / 2 );
```

(1 mark)

- d) What is printed by the following?

```
int a = 9;  
double b = 1.5;  
b = a;  
System.out.println( b );
```

(1 mark)

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e) What is printed by the following?

```
int a = 3;  
int b = 2;  
a = b;  
b = a;  
System.out.println( a + b );
```

(1 mark)

f) What is printed by the following?

```
System.out.println( 3.5 + (int)3.5 );
```

(1 mark)

g) What is printed by the following?

```
System.out.println( (double)3 + 2/3 );
```

(1 mark)

h) What is printed by the following?

```
System.out.println( 20 % 2 );
```

(1 mark)

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i) What is printed by the following?

```
System.out.println( 20 % 3 );
```

(1 mark)

j) What is printed by the following?

```
System.out.println( 20 % 30 );
```

(1 mark)

k) What is printed by the following?

```
System.out.println("Sum = " + 3 + 3.5);
```

(2 marks)

l) What is printed by the following?

```
System.out.println("Sum = \" + 3 + 3.5");
```

(2 marks)

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m) What is printed by the following?

```
System.out.println("\\\\"+"+"\\");
```

(2 marks)

n) What is printed by the following?

```
System.out.println(Math.max(Math.min(1,4), Math.max(1,2)));
```

(2 marks)

o) What is printed by the following?

```
String x = "Hello";  
String y = "Joe";  
System.out.println(x.length() + y.length());
```

(2 marks)

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Question 2 (10 marks)

Using the values given for the variables below, evaluate the following boolean expressions:

```
boolean a = true;  
boolean b = false;  
boolean c = true;  
boolean d = false;  
int e = 3;  
int f = 5;
```

(a) `(a && b) || (a && c)`*(2 marks)***(b)** `(a || b) && (b || d)`*(2 marks)***(c)** `(a && !b) && !(a || d)`*(2 marks)***(d)** `(e >= f) || ((e+2) < f)`*(2 marks)***(e)** `(e < f) && (f != e)`*(2 marks)*

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Question 3 (10 marks)

What is the output when the following code is executed?

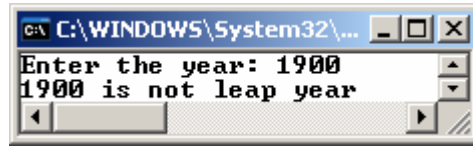
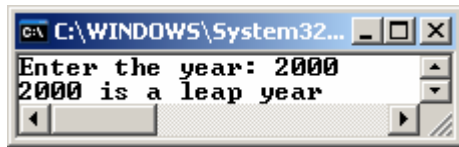
```
public class Q3{
public static void main(String[] args){
int num1 = 15;
int num2 = 34;
int num3;
if (num1>4 && num2<22){
num3 = num2-num1;
if (num3>30)
System.out.println("output 1");
else if (num3>20)
System.out.println("output 2");
else
System.out.println("output 3");
System.out.println("output 4");
}
else {
num3 = num2+num1;
if (num3<30)
System.out.println("output 5");
else if (num3<50 || num3%2==1)
System.out.println("output 6");
else
System.out.println("output 7");
System.out.println("output 8");
}
}
}
```

(10 marks)

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Question 4 (15 marks)

Complete the application below. Your application should ask the user to enter a year. Your application should then print out whether that year was a leap year or not. The following screenshots show two examples of this program:



Remember the rule for determining if a year is a leap year or not: Every year which is evenly divisible by 4 is a leap year, except that a year which is also divisible by 100 is not a leap year, unless it is divisible by 400, in which case it is a leap year after all.

You can assume that the `readInput()` method is provided.

```
import java.io.*;
public class LeapYear {
    public static void main(String[] args) {
        System.out.print("Enter the year: ");
        int year = Integer.parseInt( readInput() );

    }
    //readInput method is declared here
    private static String readInput() {
        ...
    }
}
```

*(15 marks)***CONTINUED**

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Question 5 (10 marks)

What is the output of the following program? You may find it useful to use the desk-checking technique covered in lectures. The space on the facing page can be used to show the diagram you used to desk-check the code (below).

```
public class Q5 {  
    public static void main(String[] args) {  
        int num = 3;  
        method1();  
        System.out.println("main() num: " + num);  
        System.out.println("main(): " + method2("Test", 1));  
    }  
  
    private static String method2(String letters, int i) {  
        int num = 2;  
        System.out.println("2. letters: " + letters);  
        return letters.substring(0,i);  
    }  
  
    private static void method1() {  
        int num = 5;  
        String word = "Happy, Happy, Joy, Joy";  
        word = method2(word, num+1);  
        System.out.println("1. num: " + num);  
    }  
}
```

Show the output here:

C: /> **java Q5**

(10 marks)

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Show your working here:

CONTINUED

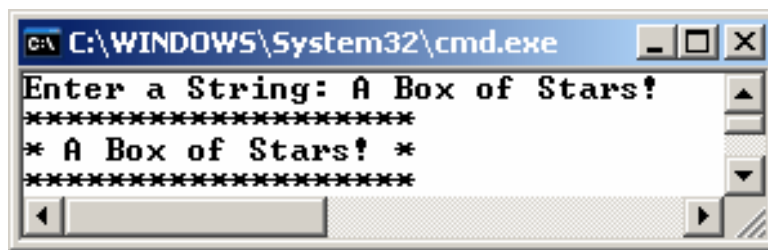
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Question 6 (15 marks)

Complete the application below which asks the user to enter a String, and then prints out the String surrounded by a box of stars (asterisks), as shown by the following screenshot.

Write a method called `printStars()` which will accept an integer number as a parameter. The method should print out a row of stars with the length of the row equal to the parameter.

The `main()` method of your application should use the `printStars()` method to print the top and bottom of the box.



```
import java.io.*;
public class Q6{

    public static void main(String[] args){
        System.out.print("Enter a String: ");
        String input = readInput();

        //COMPLETE THE MAIN METHOD HERE

    }

    //Assume the readInput method is declared here
    private static String readInput(){
        ...
    }
}
```

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//WRITE THE PRINTSTARS METHOD HERE

private static _____ printStars(_____){

} //End of the printStars method
} //End of the application

(15 marks)

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Question 7 (10 marks)

Examine the application below:

```
public class Q7 {  
    public static void main(String[] args) {  
        int[] values = new int[10];  
        for (int i = 0; i < values.length; i++) {  
            values[i] = i%3;  
        }  
        int count = 0;  
        for (int i = 0; i < values.length; i++) {  
            if (values[i] == 0)  
                count++;  
        }  
        System.out.println(count);  
    }  
}
```

What is the output of the above application?

C:\> java Q7

(10 marks)

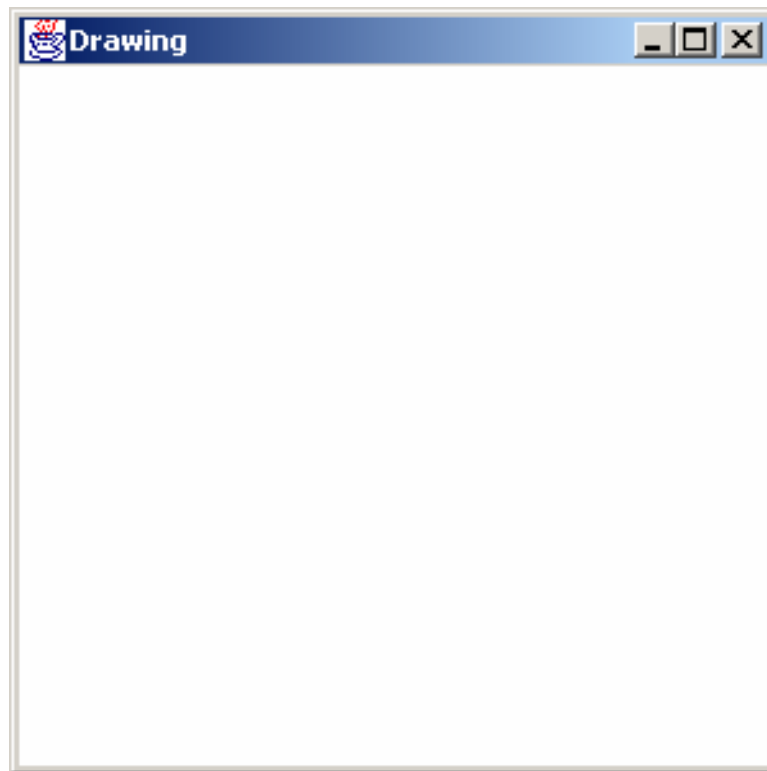
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Question 8 (10 marks)

Given the following `paint()` method:

```
public void paint(Graphics g) {  
    g.drawLine(50, 50, 50, 150);  
    g.drawLine(150, 50, 50, 100);  
}
```

Accurately draw what would appear in the Frame below for which the `paint()` method above is defined. The window below is 200 pixels wide and 200 pixels high.



(10 marks)

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OVERFLOW PAGE

(If you have used this page, please indicate clearly under the relevant question that you have overflowed to this page)