THE UNIVERSITY OF AUCKLAND

FIRST SEMESTER, 2008
Campus: City

COMPUTER SCIENCE

TEST

Principles of Programming

(Time allowed: 75 MINUTES)

NOTE: Attempt **ALL** questions
Write your answers in the space provided
There is space at the back for answers that overflow the allotted space
No calculators are permitted

Surname:	
Forenames:	
Student ID number:	
Login name:	

SURNAME: ..... FORENAMES: .....

CompSci 101 Test Results

Question	Marks	Out of
Question 1		40
Question 2		9
Question 3		8
Question 4		8
Question 5		8
Question 6		10
Question 7		7
Question 8		10
TOTAL		**100**

SURNAME: ..... FORENAMES: .....

Question 1 (40 marks)

a) What is the output produced by the following code?

```
int a = 6 + 1 * 7 - 4 * 5 / 8 + 7 % 3 - 2;
System.out.println(a);
```

10

(2 marks)

b) What is the output produced by the following code?

```
String a = 6 + 1 + "OVER" + 1 + 1;
System.out.println(a);
```

7OVER11

(2 marks)

c) What is the output produced by the following code?

```
System.out.println("A\nB\\n\"n");
```

A
B\n"n

(2 marks)

CONTINUED

SURNAME: ..... FORENAMES: .....

d) Complete the following code so that the output when the code is executed is:

SAME

```
String a = new String("hello");

String b = a;

if (a == b) {
     System.out.println("SAME");
}
```

(2 marks)

e) Complete the following code so that the output when the code is executed is:

PER

```
String a = new String("SUPERMAN");

String b = a.substring(      2, 5                );

System.out.println(b);
```

(2 marks)

f) Write a Java statement which defines an `int` constant, `SURCHARGE`, which holds the value 10.

```
final int SURCHARGE = 10;
```

(2 marks)

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g) The following statement assigns a random number to the variable, `a`. What are ALL the possible values which can be assigned to the variable, `a`?

```
int a = (int) (Math.random() * 2) + 3;
```

3, 4

(2 marks)

h) What is the output produced by the following code?

```
int a = Math.min(Math.min(4, 5), Math.max(8, 12));
System.out.println(a);
```

4

(2 marks)

i) Complete the following code so that the output when the code is executed is:

UP

```
String a = new String("SUPERWOMAN");

char c1 = a.charAt(  1  );

char c2 = a.charAt(  2  );

String s = "" + c1 + c2;
System.out.println(s);
```

(2 marks)

SURNAME: ..... FORENAMES: .....

j) What is the output of the following code?

```
String a = "21";

System.out.println(5 + a);
System.out.println(3 + Integer.parseInt(a));
```

```
521
24
```

(2 marks)

k) What is the output of the following code?

```
double a = 21/10;
System.out.println(a);
```

```
2.0
```

(2 marks)

l) What is the output of the following code?

```
int a = 5;
int b = 6;
int c = b;

c = c + 3;
a = b;
b = b + 1;

System.out.println(a + ", " + b + ", " + c);
```

```
6, 7, 9
```

(2 marks)

CONTINUED

SURNAME: ..... FORENAMES: .....

m) The following code obtains an `int` value from the user, adds 5 to the value entered by the user and prints the result. Complete the code.

```
String input;
int num;

System.out.print("Enter number: ");

input = Keyboard.readInput();

num = Integer.parseInt(input);

num = num + 5;

System.out.println(num);
```

(2 marks)

n) What is the output of the following code?

```
int a = 6 % 8;
int b = 27 % 9;
int c = 24 % 5;

System.out.println(a + ", " + b + ", " + c);
```

```
6, 0, 4
```

(2 marks)

o) Write a boolean expression which tests if the `int` variable, `value`, contains a number which is odd.

```
value % 2 == 1
```

(2 marks)

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p) Write a boolean expression which tests if the `int` variable, `value`, contains a number which is between 4 and 50 inclusive.

```
value >= 4 && value <= 50
```

(2 marks)

q) What is the output of the following code?

```
String word = "AMAZING";
int pos1 = word.indexOf("A");
int pos2 = word.indexOf("Z");
int pos3 = word.indexOf("n");

System.out.println(pos1 + ", " + pos2 + ", " + pos3);
```

```
0, 3, -1
```

(2 marks)

r) What is the output of the following code?

```
String words = " ZIP IT UP   ";
words = words.trim();
int length = words.length();
System.out.println(length);
```

```
9
```

(2 marks)

SURNAME: ..... FORENAMES: .....

s) Complete the output of the following code.

```
String word1 = new String("HOP");
String word2 = new String("hop");
String word3 = word2.toUpperCase();
System.out.println("1. " + word1.equals(word2));
System.out.println("2. " + word1.equals(word3));
```

```
1. false

2. true
```

(2 marks)

t) What is the output when the following program is executed?

```
public class MyProgram {

     public void start() {
          int a = 4;
          methodOne(a);
          System.out.println("1: " + a);
     }

     private void methodOne(int a) {
          a = a + 2;
          System.out.println("2: " + a);
     }
}
```

```
2. 6
1. 4
```

(2 marks)

SURNAME: ..... FORENAMES: .....

Question 2 (9 marks):

Complete the method header for each of the following three methods (i.e. complete the first line of each method definition).

a) The `adjust()` method is *called* in the following way:

```
int num = adjust(15, 7, true);
```

```
private    int    adjust(  int num1, int num2,
                                    boolean toAdd   )  {
    if (toAdd == true) {
         return num1 + num2;
    }
    return num1 – num2;
}
```

(3 marks)

b) The `getInitials()` method is *called* in the following way:

```
String result = getInitials("Emilia", "Young");
```

```
private   String    getInitials( String name1,
                                    String name2   ) {
    String result = name1.charAt(0) + "."
                                + name2.charAt(0) + ".";
    return result;
}
```

(3 marks)

c) The `show()` method is *called* in the following way:

```
show("Magnificent", 3);
```

```
private    void    show( String word, int pos  ) {
    System.out.println(word.substring(0, pos));
}
```

(3 marks)

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Question 3 (8 marks):

Complete the `printDate()` method below which prints the date. The `printDate()` method is passed three parameters:

an `int`: the day of the month
a `String`: the name of the month
an `int`: the year

If you complete the method correctly, the output of the following method calls:

```
printDate(15, "May", 2008);
printDate(1, "January", 2005);
```

would be:

```
May 15, 2008
January 1, 2005
```

Complete the `printDate()` method in the space provided below:

```
private __void__ printDate( __int day, String month__

                          __int year__ ) {

    System.out.println(month + " " + day + ", " + year);

}
```

(8 marks)

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Question 4 (8 marks):

The `getIntPlus1()` method is passed one **String** parameter which contains only digits. The `getIntPlus1()` method should return an `int` made up of the `int` value in the String parameter plus one.

If you complete the method correctly, the output of the following method calls:

```
int n1 = getIntPlus1("345");
int n2 = getIntPlus1("84");
int n3 = getIntPlus1("0");
System.out.println(n1 + ", " + n2 + ", " + n3);
```

would be:

```
346, 85, 1
```

Complete the `getIntPlus1()` method in the space provided below:

```
private  int  getIntPlus1(  String digits  ) {



    int number = Integer.parseInt(digits);
    number++;
    return number;









}
```

(8 marks)

CONTINUED

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Question 5 (8 marks):

The `getRandomHoroscope()` method has an equal chance of returning one of the following three Strings:

```
"Amazing day ahead"
```
or
```
"Lie low"
```
or
```
"Lucky you"
```

If you complete the method correctly, the output of the following method calls:

```
String message = getRandomHoroscope();
System.out.println(message);
message = getRandomHoroscope();
System.out.println(message);
```

might be:

```
Lucky you
Lie low
```

Complete the `getRandomHoroscope()` method in the space provided below:

```
private  String  getRandomHoroscope() {




    int number = (int) (Math.random() * 3);

    if (number == 0 ) {
        return “Amazing day ahead”;
    }

    if (number == 1 ) {
        return “Lie low”;
    }

    return “Lucky you”;




}
```

(8 marks)

CONTINUED

SURNAME: ..... FORENAMES: .....

Question 6 (10 marks)

a) What is printed by the following?

```
public void start() {
     lotsOfIfs(16, 5);
}

private void lotsOfIfs(int value1, int value2) {

     System.out.print("A ");

     if (value1 < value2) {
          System.out.print("B ");
          value1 = 10;
     } else if (value2 < 10) {
          System.out.print("C ");
          if (value1 < 20) {
               System.out.print("D ");
          }
          value2 = value2 / 2;
     }
     if (value1 >= 6) {
          System.out.print("E ");
          value1 = 5;
     } else if (value2 >= 3) {
          System.out.print("F ");
          value2 = 5;
     } else {
          System.out.print("G ");
          value1 = value2;
     }

     System.out.println(value1 + " " + value2);
}
```

A C D E 5 2

(6 marks)

SURNAME: ..... FORENAMES: .....

b) Complete the output.

```
int value = 3;

boolean a = value >= 0 && value != 10;

boolean b = value <= 0 || value == 10;

boolean c = !(value < 0) && value >= 3;

boolean d = value != 3 || value <= 0 && value < 4;

System.out.println("1. " + a);
System.out.println("2. " + b);
System.out.println("3. " + c);
System.out.println("4. " + d);
```

```
1. true

2. false

3. true

4. false
```

(4 marks)

SURNAME: ..... FORENAMES: .....

Question 7 (7 marks)

What is the output of the following program?

```
public class MyProgram {

     public void start() {
          int a = 16;
          methodTwo(a);
          System.out.println("1: " + a);
     }

     private int methodOne(int x, int y) {
          y = y * 4;
          System.out.println("2: " + y);
          return x + y;
     }

     private void methodTwo(int a) {
          int x = a / 10;
          int y = a + 3;
          int z = methodOne(y, x);
          System.out.println("3: " + z);
     }
}
```

Show the output here:

```
2: 4
3: 23
1: 16
```

(7 marks)

SURNAME: ..... FORENAMES: .....

Working for Question 7:

Diagrams of the method calls are not required but partial credit may be given for working if the output is incorrect.

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Question 8 (10 marks)

a) Consider the following "while" loop:

```
int s = 0;

while (s < 10) {
     System.out.println(s);
     s++;
}
```

Rewrite this as a "for" loop. There are a number of ways of doing this. You will get maximal number of marks for using the facilities of the "for" loop to their fullest (i.e., by making the loop body as short as possible).

```
for (int s = 0; s < 10; s++)  {
     System.out.println(s);
}
```

(6 marks)

b) What is the output of the following code fragment?

```
System.out.println("start");

int a = 0;
while (a < 1) {
     System.out.println(a);
     a++;
}

System.out.println("finish");
```

```
start
0
finish
```

(2 marks)

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c) What is the output of the following code fragment?

```
System.out.println("start");

int a = 0;
while (a > 1) {
     System.out.println(a);
     a++;
}

System.out.println("finish");
```

```
start
finish
```

(2 marks)

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