

Name: .....

ID Number: .....

## COMP102: Test 1

26 July, 2006

### Instructions

- Time allowed: **45 minutes** .
- Answer **all** the questions.
- There are 45 marks in total.
- Write your answers in the boxes in this test paper and hand in all sheets.
- If you think some question is unclear, ask for clarification.
- There is some Java documentation at the end of the test paper.
- Model solutions for part of Assignment 2 are also included at the end of the test paper.
- This test will contribute 5% of your final grade, but only if it helps your grade.
- Non-electronic translation dictionaries and calculators without a full set of alphabet keys are permitted.

### Questions

### Marks

1. Basic Java

[13]

2. Defining a method

[10]

3. Using Scanner for input

[15]

4. Loops and Conditionals

[7]

TOTAL:

## Question 1. Basic Java

[13 marks]

(a) [8 marks] For each of the following nine terms, find a corresponding element of the program below, and draw a labelled circle around the element. The first one is done as an example.

1. Class name: | `Question1`
2. Method definition | `from public void doQn... to }`
3. Assignment statement | `a = 20.0; or b = n; or a = b; or b = (a + 15)/5;`
4. Method call | `System.out.println(...n); or System.out.printf(...b)`
5. Parameter declaration | `(int n)`
6. Variable declaration | `double a or double b`
7. Type | `int or double`
8. Expression | `20.0 or n or b or (a+15)/5 or "n is now "+ n or ...`
9. String | `"n is now " or "first is now %.2f second is now %.2f\n"`

```
public class Question1 {
    public void doQn(int n) {
        double a = 20.0;
        double b = n;
        a = b;
        b = (a + 15) / 5;
        System.out.println("n is now " + n);
        System.out.printf("first is now %.2f second is now %.2f\n", a, b);
    }
}
```

(b) [5 marks] Suppose the `doQn` method above is called with an argument of 10, (eg, you call the method using BlueJ and enter 10 in the dialog box asking for the value of `n`). What will it print out?

```
| n is now 10
| first is now 10.00 second is now 5.00
```

## Question 2. Defining a Method

[10 marks]

Complete the following `computeOrderCost` method so that it prints out the total cost of an order of some number of CD's. The method should have one parameter — an integer specifying the number of CD's in the order.

The CD's cost \$4.95 each. They are shipped in boxes that hold up to 10 CD's each. The shipping cost of each box is \$3.40.

The method should compute the number of boxes required, and the total cost of the order including both the cost of the CD's and the shipping cost. It should print out the result in a form such as:

```
Total cost of 16 CDs = $86.00
```

```
public void computeCost( int numItems){
    double costCD = numItems * 4.95;
    int numBoxes = ((numItems-1) / 10) + 1;
    double shipping = numBoxes * 3.40;
    System.out.printf("Total cost of %d items = $%.2f\n",
        numItems, (cost+shipping));
}
//OR

public void computeCost( int numItems){
    System.out.printf("Total cost of %d items = $%.2f\n",
        numItems, (numItems * 4.95 + (((numItems-1) / 10) + 1) * 3.40));
}
//OR ...
```

### Question 3. Using a Scanner

[15 marks]

(a) [6 marks] The following method will prompt the user for some values. What will the method print out if the user types the following line

```
3 6 2006 14 Wellington Jane
```

in response to the first prompt

```
public void doit(){
    Scanner scan = new Scanner(System.in);
    System.out.print("Enter values: ");
    int n = scan.nextInt();
    n = n + scan.nextInt();

    System.out.println("answer1 = " + n);

    String y = scan.next();
    int w = scan.nextInt();
    y = y + w;
    System.out.println("answer2 = " + y);

    String name = scan.next();
    String city = scan.next();
    System.out.println(name + " commutes to " + city);
}
```

```
Enter values: 3 6 2006 14 Wellington Jane
| answer1 = 9
| answer2 = 200614
| Wellington commutes to Jane
```

( )

(Question 3 continued on next page)

**(Question 3 continued)**

**(b)** [9 marks] Complete the following `printTag` method so that it asks the user to enter their name and then prints out a name tag like the one shown below. It should use a `Scanner` to read the name from the user.

If the user typed the name "Peter Smith", the nametag should look something like:

```
+-----+
| HELLO,   My name is   |
|                                     |
|      Peter Smith     |
|                                     |
+-----+
```

```
public void printTag(){
    Scanner scan = new Scanner(System.in);
    System.out.print("Enter name: ");
    String name = scan.nextLine(); // watch out for names with two tokens !

    System.out.println(" +-----+");
    System.out.println(" | HELLO, My name is |");
    System.out.println(" |                                     |");
    System.out.printf (" |   %15s   |\n", name);
    System.out.println(" |                                     |");
    System.out.println(" +-----+");
}
```

**Question 4. Loops and Conditionals (harder)**

[7 marks]

(a) [5 marks] What will the following doNums method print out if it is called with the arguments 23 and 7?

```
public void doNums(int n, int m){
    System.out.println("doNums : ");
    int x = n;
    int y = m;
    int z = 0;
    while (x > 0){
        if (x % 2 == 1){
            System.out.println(y);
            z = z + y;
            x = x - 1;
        }
        else if (x % 2 == 0) {
            x = x / 2;
            y = y + y;
        }
    }
    System.out.printf ("%d, %d => %d", n, m, z);
}
```

```
doNums :
7
14
28
112
23, 7 => 161
```

(b) [2 marks] Explain what the method computes and how.

The method computes the product of its two arguments. Effectively, it converts the first argument to a binary number and multiplies the second number by all the 1's in the first number as it goes. It is called the Russian Peasant method of multiplication. The advantage is that you can multiply any two numbers if know how to add, to double, and to halve – you don't need to know your times tables

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