

Family Name:

Other Names:

ID Number:

Signature

COMP102: Test 1

4 August, 2011

Model Solutions

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.
- Brief Java documentation is provided with the test
- This test contributes 15% of your final grade
(But your mark will be boosted up to your exam mark if that is higher.)
- You may use paper translation dictionaries, and calculators without a full set of alphabet keys.
- You may write notes and working on this paper, but make sure your answers are clear.

Questions

Marks

1. Components of Java Programs

[10]

2. Understanding variables

[6]

3. Defining a Method

[10]

4. Calling methods

[9]

5. Using Objects

[10]

TOTAL:

Please answer the following question. (Your answer will not affect your mark in any way.)

How much programming had you done before starting the course?

Little or none

Some (used variables, if's, and loops)

Lots (eg, used arrays, defined methods/functions with parameters, used libraries)

ANSWERS

Question 1. Components of Java Programs

[10 marks]

The questions refer to the code below.

```
1 import comp102.*;
2 public class Question1 {
3     public void printQuote(){
4         int n = UI.askInt("Number of items:");
5         double price = UI.askDouble("Price: ");
6         double cost = this.computeCost(n, price);
7         UI.println ("The cost is: " + cost);
8     }
9
10    public double computeCost(int x, double y){
11        double t = (x * y) * 1.15;
12        return t;
13    }
```

(a) [1 mark] Which line or lines contain an assignment statement? (list the line numbers.)

4, 5, 6, 11

(b) [1 mark] Which line or lines contain a literal String value?

4, 5, 7

(c) [1 mark] What type of value is returned by the computeCost method?

double

(d) [1 mark] Which line or lines contain a method call?

4, 5, 6, 7

(e) [1 mark] How many arguments does the ComputerCost method require?

2

(f) [1 mark] List the operators used in the program.

`+, *`

(g) [1 mark] Which line or lines declare and compute the value that is returned by the `computeCost` method?

`11`

(h) [1 mark] List the variables used in the program.

`n, price, cost, t`

(i) [1 mark] List the parameters used in the program.

`x, y`

(j) [1 mark] Which line or lines contain a statement that calls the second method?

`6`

ANSWERS

Question 2. Understanding programs with variables

[6 marks]

What will the following testVariables method print out?

Hint: draw a box for each variable and keep track of the value that is put into it.

```
public void testVariables(){
    int a = 4;
    int b = 2 + a;
    Ul.println ("a is: " + a);
    Ul.println ("b is: " + b);

    a = a - 5;
    b = a * 2;
    b = b - 1;

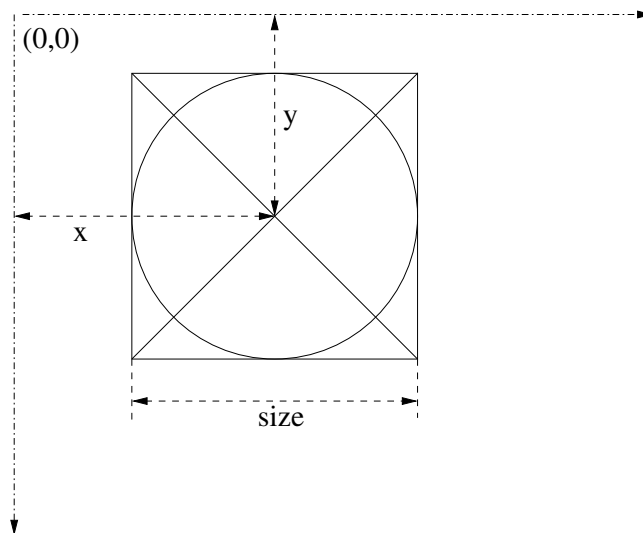
    Ul.println ("a is now: " + a);
    Ul.println ("b is now: " + b);

    Ul.printf ("was %d, now %d done\n", a+b, a);
}
```

```
a is: 4
b is: 6
a is now: -1
b is now: -3
was -4, now -1, done
```

Question 3. Defining a Method

[10 marks]



The figure above shows a "no machine washing" label, containing a square, a circle and two lines. Write a method to draw this label on an UI window. The method should

- ask the user for the size of the label
- ask the user for the x coordinate of the center
- ask the user for the y coordinate of the center
- draw the label

```
public void drawLabel(){
    int size = UI.askInt("Size:");
    int x = UI.askInt("Center X position:");
    int y = UI.askInt("Center Y position:");
    int top = y - size/2;
    int bottom = y + size/2;
    int left = x - size/2;
    int right = x +size/2;
    UI.drawRect(left, top, size, size);
    UI.drawOval(left, top, size, size);
    UI.drawLine(left, top, right, bottom);
    UI.drawLine(left, bottom, right, top);
}
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

Question 4. Calling methods

[9 marks]

What will the following printPay method print out? Note that printPay calls printOneDay which is also defined below.

```
public void printPay(){
    double x = 15.0;
    double y = 30.0;
    double t = this.printOneDay("Monday", 2, x);
    t = t + this.printOneDay("Thursday", 1, x + 2 );
    t = t + this.printOneDay("Saturday", 4, y );
    Ul.println (t);
}

public double printOneDay(String d, int h, double x){
    Ul.println ("-----");
    Ul.println (d+ ": " + h + " hours, " + "$" + x + "/h");
    return h * x;
}
```

```
-----
Monday:  2 hours, $15.0/h
-----
Thursday:  1 hours, $17.0/h
-----
Saturday:  4 hours, $30.0/h
167.0
```

Question 5. Using objects

[10 marks]

Suppose the Ball class has one constructor and two methods:

Constructor:

```
public Ball(int x, int y, int size)
// constructs a Ball object
// draw the ball as a circle
// the three arguments specify the position (center at (x,y)) and the diameter
// of the circle
```

Methods:

```
public void drop(int d)
// the ball drops d steps to a new position
// erase the old circle and draw a new circle using the new y position ,  $y = y + d$ 
public void roll (int d)
// the ball moves to the right d steps
// erase the old circle , draw a new circle with the new x position ,  $x = x + d$ 
```

(Question 5 continued on next page)

(Question 5 continued)

(a) [6 marks] Complete the following `playBall` method in the `playGame` class. Your method should

- create the first `Ball` object at position (100, 200) with a diameter of 50.
- drop the first ball by 150 steps
- create the second `Ball` object at a new position (any position you like, e.g. 200, 150) with a diameter of 30
- roll the second ball by 100 steps
- roll the first ball by 20 steps
- drop the second ball 200 steps

```
public class PlayGame {  
  
    public void playBall() {  
  
        Ball b1 =  
            new Ball(100, 200,50);  
        b1.drop(150);  
        Ball b2 = new Ball(30, 100, 30);  
        b2.roll (100);  
        b1.roll (20);  
        b2.drop(200);  
  
    }  
}
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.

(Question 5 continued on next page)

(Question 5 continued)

(b) [4 marks] Extend your program by defining new method/methods to allow a ball to bounce around on the screen. You may define your own bounce action and make your own assumptions if necessary. Add comments to briefly describe what your method does.

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
Specify the question number for work that you do want marked.
