

Family Name: .....

Other Names: .....

ID Number: .....

## COMP102: Test 1

6 August, 2010

### 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.
- This test will contribute 15% of your final grade  
(But we will use your exam mark if it is higher.)
- You may use paper translation dictionaries, and calculators without a full set of alphabet keys.

#### Questions

#### Marks

|  |        |                      |
|--|--------|----------------------|
| 1. Basic Java                                | [8]    | <input type="text"/> |
| 2. Understanding variables                   | [6]    | <input type="text"/> |
| 3. Understanding Scanner and System.out      | [5]    | <input type="text"/> |
| 4. Programming with input and output         | [10]   | <input type="text"/> |
| 5. Graphical output, Methods calling methods | [16]   | <input type="text"/> |
|  | TOTAL: | <input type="text"/> |

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

## Question 1. Basic Java

[8 marks]

Consider the class below.

```
1 public class Question1 {
2
3     public void convertMphToMps(){
4         String input = JOptionPane.showInputDialog("Enter a number");
5         double num = Double.parseDouble(input);
6         this.mphToMps(num);
7     }
8
9     public void mphToMps(double mph){
10        double mps = (mph * 0.44704 );
11        System.out.println(mph + "mph =" + mps + "m/s");
12    }
13
14 }
```

(Question 1 continued on next page)

(Question 1 continued)

ANSWERS

The following questions refer to the code on the facing page. Your answers to the first four questions should be a line number or a list of line numbers.

(a) [1 mark] Which line or lines contain the definition of the `convertMphToMps` method?

3-7

(b) [1 mark] Which line or lines contain the header of the `mphToMps` method?

9

(c) [1 mark] Which line or lines contain an assignment statement?

4,5,10

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

6

(e) [1 mark] What is the type of the variable `num`?

double

(f) [1 mark] What is the type and the name of the parameter in the `mphToMps` method?

double mph

(g) [2 marks] What will be printed out if the user entered "100.0" in the `JOptionPane` window when the `convertMphToMps` method is tested?

100.0 mph = 44.704 m/s

## ANSWERS

### Question 2. Understanding variables

[6 marks]

Suppose the following `printStuffOut` method is called with two arguments of 5, 10, (eg, you call the method using BlueJ and enter 5, 10 in the dialog box asking for the value of `x`, `y`). What will it print out?

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

```
public void printStuffOut( int x, int y){
    System.out.println("printStuffOut (" + x + ", " + y + ") :");

    x = x + 1;
    y = y + x + 10;
    int z = x + y;
    System.out.println("all: " + x + " " + y + " " + z);

    y = x;
    x = Math.max(x,z);
    System.out.println("1st: " + x);
    System.out.println("2nd: " + y);
    System.out.println("3rd: " + z);
}
```

```
printStuffOut (5, 10) :
all: 6 26 32
1st: 32
2nd: 6
3rd: 32
```

## ANSWERS

## Question 3. Understanding Scanner and System.out

[5 marks]

Consider the following printPayment method which will prompt the user for some values and print something out.

Hint: draw boxes for each variable and keep track of the value put in it.

```
public void printPayment(){
    Scanner scan = new Scanner(System.in);
    System.out.print("Enter name and phone number: ");
    String s1 = scan.next();
    String s2 = scan.nextLine();

    System.out.println("line1: " + s1);
    System.out.println("line2: " + s2);

    System.out.print("Enter hours worked and hourly rate: ");

    int c = scan.nextInt();
    double d = scan.nextDouble();
    String s3 = scan.nextLine();

    System.out.println("line3: " + s1 + c);
    System.out.println("line4: " + s1 + (c*d));
    System.out.println("line5: " + d + s3);
}
```

What will the method print out if the user typed the following answers to the two prompts:

```
Enter name and phone number: Peter 476 3778
| line1: Peter
| line2: 476 3778
Enter hours worked and hourly rate: 8 20.0 pay day: 12/09/10
| line3: Peter8
| line4: Peter160.0
| line5: 20.0 pay day: 12/09/10
```

**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.

**ANSWERS****Question 4. Programming with input and output**

[10 marks]

Complete the following `assignmentSummary` method to print out the average marks of the first two assignments of a student. The method should first ask the user to enter the name of the student, then ask for the marks for assignment 1 and assignment 2. It should then compute the average marks and print out a summary like the one shown below.

It should use either `JOptionPane` or `Scanner` to read the name and the marks from the user and use `System.out` to print the summary.

For example, if the user typed `Peter Smith` for the name, and `70.5` for `assignment1` and `80` for `assignment 2`, the output should look something like:

```
To: Peter Smith
assignment 1: 70.5
assignment 2: 80.0
average: 75.25
```

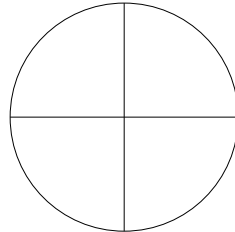
```
public void assignmentSummary(){
    Scanner scan = new Scanner(System.in);
    System.out.print("Enter a name: ");
    String name = scan.nextLine();
    System.out.println("Enter two marks: ");
    double m1 = scan.nextDouble();
    double m2 = scan.nextDouble();
    System.out.println("To: " + name);
    System.out.println("Assignment 1: " + m1);
    System.out.println("Assignment 2: " + m2);
    System.out.println("average: " + (m1+m2)/2 );
}
```

## ANSWERS

### Question 5. Graphical output and methods calling methods

[16 marks]

The ball below consists of a circle and two lines through the center of the circle, one horizontal and one vertical.



(a) [8 marks] Complete the `drawBall` method below so that it draws the above ball on a `DrawingCanvas`. The method has four parameters: the coordinates (`left`, `top`) for where the ball should be placed, the diameter of the circle and the `DrawingCanvas` to draw on.

You will need to use the `drawOval` and `drawLine` methods, described in the java documentation.

```
public void drawBall(int left , int top, int diameter, DrawingCanvas canvas){
```

```
    canvas.drawOval(left, top, diameter, diameter);
```

```
    canvas.drawLine(left+diameter/2, top, left +diameter/2, top+diameter);
```

```
    canvas.drawLine(left, top+diameter/2, left +diameter, top+diameter/2);
```

```
}
```



(b) [8 marks] Complete the following `drawFigure` method, so it first calls the `drawBall` method defined in (a) to draw a ball at (100, 200) with a diameter of 50, then it asks the user for a new location and a new diameter, and calls the `drawBall` method again to draw a second ball at the given position with the given diameter.

Note that you can still do this question even if you haven't done (a). You may just assume there is a `drawBall` method available.

```
public void drawFigure(){
    JFrame frame = new JFrame("Draw a figure");
    DrawingCanvas canvas = new DrawingCanvas();
    frame.setSize(600, 400);
    frame.getContentPane().add(canvas, BorderLayout.CENTER);
    frame.setVisible(true);

    this.drawBall(100,200,50,canvas);

    Scanner scan = new Scanner(System.in);
    System.out.println("Enter the position and the diameter");
    int x = scan.nextInt();
    int y = scan.nextInt();
    int d = scan.nextInt();
    this.drawBall(x, y, d, canvas);

}
```

**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.

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