COMP 102: Term Test

15 September, 2009

Instructions

- Time allowed: **45 minutes**
- There are 45 marks in total.
- Answer **all** the questions.
- Write your answers in the boxes in this test paper and hand in all sheets. You may ask for additional paper if you need it.
- If you think some question is unclear, ask for clarification.
- Brief Java documentation will be supplied with the test.
- This test will contribute 15% of your final grade, 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	[19]	
2. Define a method	[9]	
3. Two class programs	[8]	
4. Debugging: Files	[9]	
	TOTAL:	

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

Question 1. Basic Java [19 marks]

(a) [5 marks] Consider the method definition below.

```
public void farenToCent(int faren){
        int cent = (faren − 32) ∗ 5 / 9;
        System.out.println(faren + "F -> " + cent + "C");
}
```

(i) [1 mark] What is the name of the method being defined?

(ii) [1 mark] What is the type of the parameter?

(iii) [1 mark] What is the name of the variable of type *int*?

(iv) [1 mark] How many assignment statements are in the method?

(v) [1 mark] Does this method return any value?

(b) [4 marks] Consider the following printLabels 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.

```java
public void printLabels(){
    Scanner scan = new Scanner(System.in);
    System.out.println("Enter ID number and name: ");
    int code = scan.nextInt();
    String name = scan.nextLine();

    System.out.println("Enter address: ");
    String st = scan.nextLine();

    System.out.println("Courier:");
    System.out.println(name);
    System.out.println(st + " NZ");

    System.out.println("Attn:");
    System.out.println("Name:" + code);
    System.out.println("City: " + st);
}
```

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

```
Enter ID number and name:   300012345 Allan
Enter address:   23 Homewood Road
```

(c) [4 marks] Consider the following printChoice method

```java
public void printChoice(int x){
    if (x < 10) {
        x = x * 5;
        System.out.println("Choice 1: " + x);
    }
    if (x < 15) {
        x = x + 1;
        System.out.println("Choice 2: " + x);
    }
    else if (x >= 15){
        x = 25;
        System.out.println("Choice 3: " + x);

    }
    System.out.println("x is updated: " + x);
}
```

(i) [1 mark] What will be printed if printChoice(20) is called?

(ii) [1 mark] What will be printed if printChoice(2) is called?

(iii) [2 marks] What will be printed if printChoice(6) is called?

(Question 1 continued)

(d) [2 marks] What will the following fragment of Java print?

```
int i = 2;
while ( i < 50) {
  i = i * 2;
  System.out.print(i + ",  ");
}
System.out.println( "done ");
```

(e) [4 marks] Write a fragment of Java that will print out all the even numbers from 10 to 1000 (inclusive), like the following:

```
10
12
14
16
  :
```

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Question 2. Define a method [9 marks]

Complete the following findMax method to return the maximum number from a sequence of integers. This method should prompt the user to enter a number and then read the number in using a Scanner. It should keep doing this until the user enters "quit" (or angthing that is not a number). It should then return the largest of all the numbers that were entered.

```java
public int findMax(){



    }
```

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Question 3. Two Class programs [8 marks]

Consider the MyBalloon class on the facing page that represents a balloon (circle) on the screen that can expand and move.

Complete the following playBalloonGame method so that it uses the MyBalloon class to put two balloons on the screen at positions (100,100) and (300,100) respectively. It should then repeatedly make the first balloon expand by 1 and the second balloon move 2 steps to the right. Each balloon should be expanded/moved and shown 50 times.

```java
public void playBalloonGame (){
    JFrame frame = new JFrame("Balloon Game");
    DrawingCanvas canvas = new DrawingCanvas();
    frame.setSize(600, 400);
    frame.getContentPane().add(canvas, BorderLayout.CENTER);
    frame.setVisible(true);



}
```

(Question 3 continued)

```java
import comp100.*;

public class MyBalloon{
  // Fields
  private DrawingCanvas canvas;
  private int radius = 5;
  private int centerX, centerY;
  private Color color = new Color((float)Math.random(),(float)Math.random(),(float)Math.random());


  // Constructors
  public MyBalloon(DrawingCanvas c, int x, int y){
    this.centerX = x;
    this.centerY = y;
    this.canvas = c;
    this.draw();
  }

  public void draw(){
    this.canvas.setColor(color);
    this.canvas.fillOval (this.centerX−this.radius, this.centerY−this.radius,
                          this.radius*2, this.radius*2);
  }

  public void expand(int step){
    this.radius = this.radius + step;
    this.draw();
  }

  public void move(int stepX, int stepY){
    this.canvas.clearRect(this.centerX−this.radius, this.centerY−radius,
                          this.radius*2+1, this.radius*2+1, false);
    this.centerX = this.centerX + stepX;
    this.centerY = this.centerY + stepY;
    this.draw();
  }
}
```

Question 4. Debugging: Files [9 marks]

Suppose the file called data.txt contains the text:

```
4 equals 2 plus 2
3 frogs have 12 legs
8 children laughed
```

(a) [6 marks] What will the following fragment of Java print?

```java
try{
    Scanner sc = new Scanner(new File("data.txt"));
    int num=0;
    while (sc.hasNext()){
        if (sc.hasNextInt()){
            num = sc.nextInt() + num;
        }
        String token = sc.next();
        System.out.print(token+" ");
    }
    System.out.println ();
    System.out.println("num = " + num);
    sc.close ();
} catch(IOException e){System.out.println("Error while scanning"+e);}
```

(b) [3 marks] Give an example of a file which would cause the above java fragment to crash.

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