COMP 102: Test 2

2017, September 25

Instructions

- Time allowed: **50 minutes**
- Attempt **all** the questions. There are 50 marks in total.
- Write your answers 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 increased to your exam mark if that is higher.)
- You may use dictionaries.
- You may write notes and working on this paper, but make sure your answers are clear.

Questions	Marks	
1. Understanding while	[6]	
2. Writing with while	[8]	
3. Defining Classes	[10]	
4. Files	[12]	
5. Event Driven Input	[14]	
	TOTAL:	

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 1. Understanding while [6 marks]

Consider the following printOut method that takes x as a parameter.

```
public void printOut( int x) {
    int y = 26;
    while (x < y) {
        UI. println (x);
        x = x * 2;
        y = y - 2;
    }
    UI. println ("y:  " + y);
    UI. println ("Done");
}
```

(a) **[4 marks]** What will be printed if printOut(2) is called?

Hint: Show your working using the boxes for x and y.

Your answer:

x: [ ]   y: [ ]

(b) **[2 marks]** What will be printed if printOut(12) is called?

Hint: Show your working using the boxes for x and y.
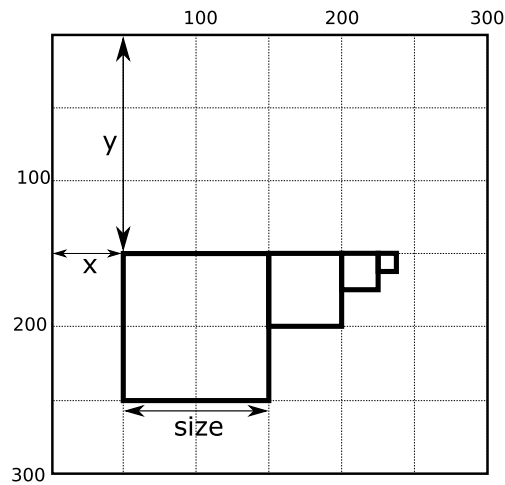
Your answer:

x: [ ]   y: [ ]

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Question 2. Writing with while   **[8 marks]**

Complete the following drawSquares method so that it uses a loop to draw a series of squares, as shown below.

- The parameters specify the location of the top left corner (double x, double y) and the size (double size) of the biggest square.
- The size of each square is half the size of the previous square, and each subsequent square is drawn to the right of the previous one.
- The smallest square must have a size of at least 10.

For example, the pattern above was generated by calling drawSquares(50, 150, 100).

```
public void drawSquares( double x,  double y,  double size ) {




}
```

Student ID: ....

Question 3. Defining Classes [10 marks]

For this question, you are to complete part of a program for a product managing system. The program uses Product objects to store information about the product. A Product contains information including

- a description of the product,

- a quantity, indicating how many units there are of the product in stock,

- and a reference number.

The program can buy more product, which increases the product's quantity. The program can also sell product, which decreases the product's quantity. If the program tries to sell more product than the quantity, then it does not sell any product at all.

For this question, you are to complete the Product class on the facing page.

Define:

- Fields to store the relevant information about a Product. A Product should know its description, quantity, and a reference number.

- The constructor: initialises the product with a description, quantity, and reference number.

- The getCode, sell, and buy methods, as specified in their comments.

The getCode method requires you to concatenate the first 3 characters of the product description and combine it with the reference number. For example, a product with the description "chocolate" and a reference number 1034 will return "cho1034".

Hint: Check the String class methods in the documentation (page 3) to help with the getCode method.

```
public class Product{
    // Fields



    /** Creates a new Product object with the specified description, quantity,
        and reference number. */
    public Product (String desc, int quantity, int refNumber){




    }
    /** Returns the product code. The product code is the first 3 characters of the
        product description concatenated with the reference number.
        You can assume that the product description contains at least 3 characters. */
    public String getCode () {




    }
    /** Sells q amounts of the product.
        If there is less quantity than the amount q,
        it does not sell any and returns false.
        Otherwise, it will reduce the quantity amount by q, and return true. */
    public boolean sell (int q) {














    }


    /** Increases the quantity amount by q */
    public void buy (int q) {




    }
}
```

Question 4. Files   **[12 marks]**

Suppose a file contains information about a shopping list. First, a category is indicated (e.g Meat, Fruit and Staple), which is then followed by items within that category. Each item line has the amount of the item, the item name, and the date indicating when the item was added to the shopping list. For example:
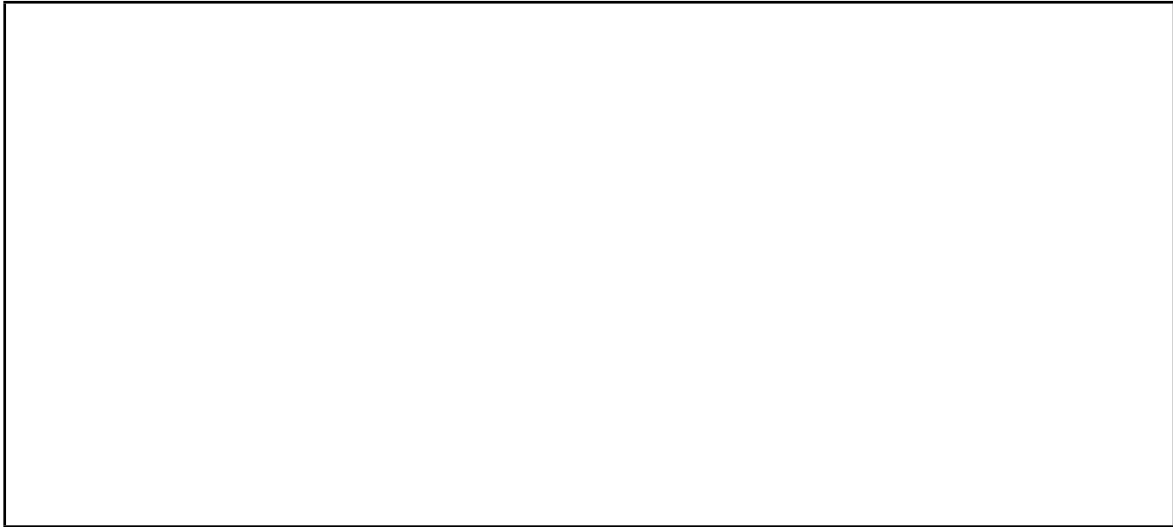
```
Meat:
1 chicken 05-03-2017
6 steak 02-03-2017
5 lamb 24-03-2017
Fruit:
2 banana 13-03-2017
10 apple 04-03-2017
8 orange 07-03-2017
Staple:
7 rice 19-03-2017
11 pasta 23-03-2017
```

Consider the following printData method.

```java
public void printData(){
    try{
        Scanner scan = new Scanner (new File("ShoppingList.txt"));
        String line = scan.nextLine();
        String token = scan.next();
        UI. println (scan.next ());
        UI. println (scan.next ());
        while(scan.hasNextInt()){
            UI. println (scan. nextInt ());
            if (scan.hasNextInt()){
                UI. println (scan. nextInt ());
            }else{
                scan. nextLine ();
            }
        }
        UI. println (scan. nextLine ());
    } catch(IOException e){UI. println ("Fail: " + e);}
}
```

(a) **[5 marks]** What will be printed if printData is called, assuming "ShoppingList.txt" is the example file shown above?
Hint: Keep track of where the Scanner is up to.

(b) **[7 marks]** Complete the following countNumItemsInCategory method which is passed the name of a shopping list file. The countNumItemsInCategory method should read through the file and count the total number of items there are for each category.

For example, using the example file above, countNumItemsInCategory("ShoppingList.txt") should print:

```
Meat: 12
Fruit: 20
Staples: 18
```

```
public void countNumItemsInCategory(String fileName){
    try{




















    } catch(IOException e){UI. println ("Fail: " + e);}
}
```

SPARE PAGE FOR EXTRA ANSWERS

Cross out rough working that you do not want marked.
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Question 5. Event Driven Input   **[14 marks]**

Complete the LineCircleDrawer program on the facing page so that it allows the user to draw circles with lines between the centre of each subsequent circle on the graphics pane. When the program begins, the starting radius value is 8.0.

The program should have one button and a slider:

- "Radius" slider (range 1 to 15), which should set the radius of the circles.
- "Quit" button, which should quit the program.

For example, the diagram shows what the program might draw if the user carried out the actions below. The circled numbers indicate where the user clicked.

- clicked the mouse at positions ① to ④, then
- moved the slider to 15, ⑤ then
- clicked the mouse at positions ⑥ to ⑧
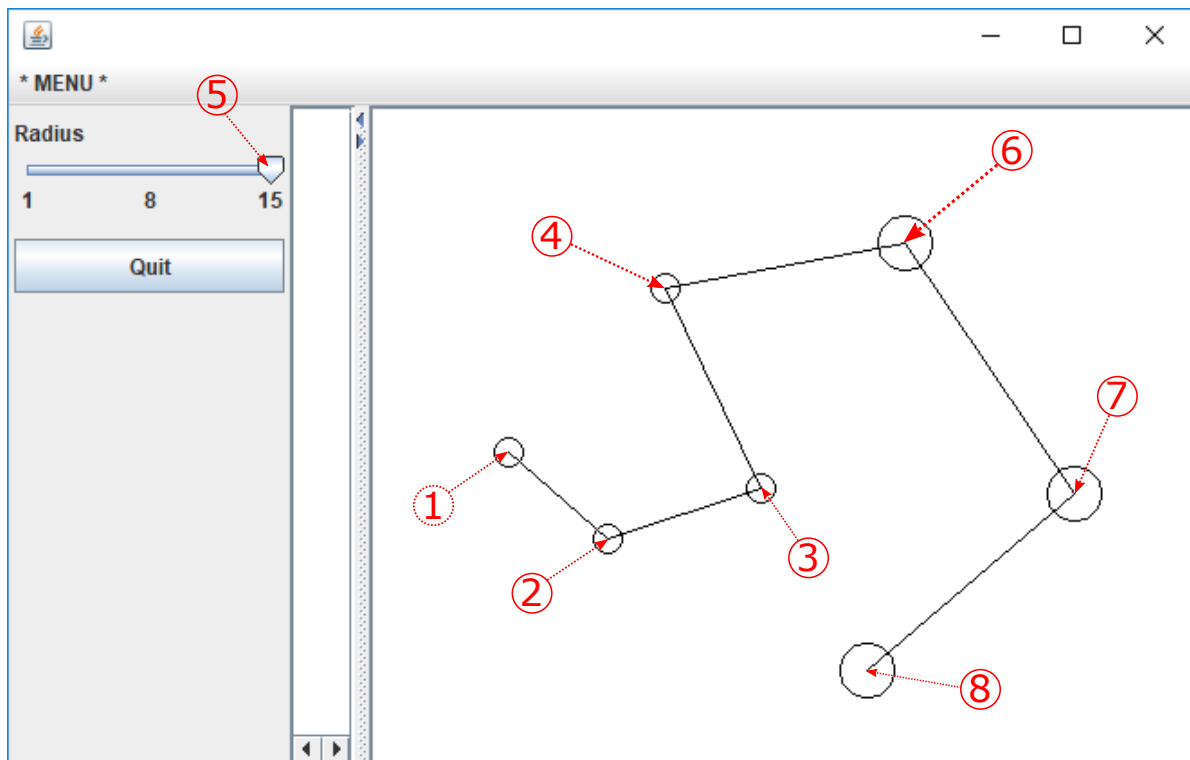
Hints:

- When the user clicks in the graphics pane for the first time, the program should draw a circle but no line.
- Every subsequent click after the first one should draw a circle and a line between the centre of the last circle to the centre of the current circle.
- Check the documentation (page 2) for the event based methods.

(Question 5 continued)

```java
public class LineCircleDrawer   {
    // Fields




    // Constructor
    public LineCircleDrawer(){






    }

    // Methods to respond to buttons and mouse
    public void doRadius(double r){


    }

    public void doMouse(String action,  double x,  double y){

















    }
}
```

* * * * * * * * * * * * * *